

IMPACT OF FOREIGN DIRECT INVESTMENT AND TRADE ON
ECONOMIC GROWTH: EVIDENCE FROM DEVELOPING AND
TRANSITION COUNTRIES

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Abstract:

The impact of foreign direct investment (FDI) and trade on economic growth has been a widely debated topic in development economic and research. The present study tries to access the impact of FDI and trade on economic growth with the help of 29 countries data over the period 1996-2010. Theoretical and empirical review has been used to get idea of past study on the topic. The impact of FDI and trade on economic growth has been examined previously, keeping assumptions that FDI and trade bring technological change, which drive economic growth. In addition most of the past researches on the topic are based on proxies instead of actual data on FDI and trade. This study uses the actual data of FDI and trade, and incorporates indigenous R&D in the growth equation.

Using fixed effect, random effect and generalized least square approaches examine the effect of foreign direct investment and trade on economic growth. Our analysis suggests that there is significant positive effect of FDI on economic growth in developing and transition economies. In addition, domestic investment and expenditure on research and development appears to be an important determinant of growth. However, impact of trade on economic growth seems to have positive but not robust. Among other findings tax, government consumption, inflation and political instability plays a significant role in the growth process.

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Declaration

'No portion of the work referred to in the declaration has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning'.

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CHAPTER ONE

1. INTRODUCTION

1.1 Introduction:

Foreign direct investment (FDI) and trade are regarded as an important stimulus for economic growth in developing and transition countries (OECD, 2008). FDI is an important channel of technology transfer from developed countries; it encourages domestic investment; and also facilitates improvement in human resources and other components of the economy in the host country (Brozenstien *et al.*, 1995, Balasubramanyam *et al.*, 1996, Atiken and Harison, 1999). At the same time, international trade is also known as the instrument of economic growth (Frankel and Romer, 1999). In addition, trade facilitates more efficient production of goods and services by shifting production to countries that have comparative advantage (Makki and Somwaru, 2004).

The importance of FDI and trade can be seen in the context of new growth theory where FDI and technological progresses were incorporated together in 1980(Hsio and Hsio, 2000). Since then both FDI and trade have been considered to have permanent effect on the growth of the host country through technology transfer and spillovers (ibid).

Then question rises, how will the technology transfer and spillovers process be executed in the host country? Empirical experiences showed that in an open economy, technology and knowledge may be transferred through FDI and trade, and thus these two growth determinant variables play central role in the economic development especially in the developing countries (Frankel and Romer, 1999; Grossman and Helpman 1997). Furthermore, trade provides an opportunity to exploit the comparative advantage with trading partner countries, which increases competition that ultimately lead to greater efficiency (Francois *et al.*, 1997). Besides increased trade volume, it also increases the size

of market; in which larger market provides an economic of scale. These increased efficiency gains can turn into dynamic gains by increasing growth as well as FDI and domestic investment. In many cases FDI and trade actually act as a catalyst for these dynamic benefits to materialize (Jaumatte, 2004).

In addition, Solow-type standard neoclassical growth model also suggests that FDI increases the capital stock and thus growth in the host economy by financial capital formation (Berms,1970). In other words, FDI related technological spillovers, offset the effect of diminishing returns to capital and keep economy on long term-term growth path. Moreover, endogenous growth model implies that FDI can promote long-run growth by augmenting the existing stock of training and skill acquisition on one hand, and also introducing the alternative management practices and organizational arrangement on the other hand (Mello, 1997).

Therefore, it can say that both theories and the practices suggested that FDI play very decisive role in the economic growth of developing and transition economies. In addition, empirical evidences showed that increasing returns to scale and larger market size provides more opportunity to invest than smaller market for foreign investors as well as domestic investors (Zarotiadis *et al.*, 2004).

Theoretical model showed that the economies that experience increasing scale to returns attract growing inflows of vertical FDI, thereby boosting its international trade (Aizenman and Noy, 2005, Frank *et al.*, 2006). Furthermore, increasing FDI and productivity employ greater number of skilled labor in the developing and transition economies. The greater volume of trade that comes with the enhanced vertical FDI increases the demand for skilled workers, which in turn increases the returns to human capital in the developing countries (Bhagwati and Srinivasan, 2002). Besides delivering better wages, trade can also improve overall working conditions. For instance, it measures the injuries on job; child labor or effects on female labor; and can also improve working condition through its positive impact on per capita income (OECD, 2012).

On the other hand, larger inflows of FDI leads to higher volume of international trade as well as benefits such as: increased rate of productivity or higher output growth; which in turn increases per capita income. Moreover, Kohpaiboon (2003) stated that the gains of FDI is not only its emphasis on export promotion (EP) regime than an import substitution (IS); but it also provides a theoretical support; since the FDI has a reinforcing effect on GDP through exports. Due to this reinforcing effect of FDI, the economic growth policy priority of developing and transition countries becomes open to the economy; for inward FDI under the export promotion regime; whereby interactions between all these variables will induce economic growth.

Another critical relationship between FDI, trade and growth is demand- supply gap. As most developing countries experience a shortage of capital, this is reflected in their respective saving-investment and imports-exports gaps; which suggest that developing countries have insufficient saving and foreign exchange to finance their investment needs (Majeed and Ahmad, 2005, Amaro and Miles, 2006). To bridge this gap, they need an inflow of foreign capital, which can only be met by either increasing the FDI inflows or increase in trade particularly exports.

In addition, two ways relationship can be seen between FDI and trade in the context that trade (imports) tends to stimulate vertical FDI by facilitating the re-export processed goods; and also other horizontal FDI by expanding the market size; which would lead to an improved business climate; and expectation of better long term economic growth (Jaumotte, 2004).

So, it can say that FDI is an important vehicle for resources mobilization and technological progress. In the absent of the mentioned two variables, opportunities for growth in the developing nations would almost be impossible. Trade can be a powerful engine for growth (OECD-2012); at the same time, trade is common sources of economic growth; because the impact of trade on growth is not limited to export only. The increase in trade to GDP ratio is also a source of growth (Brucker and Leaderman 2012). However, growth impact of imports is

more limited than exports, as the increase of exports to GDP ratio becomes positive for all income group (OECD, 2012).

Moreover, trade plays an important role in technology transfer through the process of collaboration and imitation (David and Papell, 1996). It also raises marginal productivity of private capital via transfer of advanced technology and managerial knowledge, thereby inducing high rate of private investment and capital accumulation that lead to economic growth. Furthermore, "Doing Business Reports of the World Bank (2004) showed that access to credit is a major constrain as reported by entrepreneurs in many developing countries. Because directed credit would be insufficient for the sectors that are not regarded as a priority sector; in that case, FDI and trade play a supportive role.

The researchers have discussed the various reinforcing effects of FDI and trade on growth in developing and transition economies; and past studies revealed that the FDI and trade have positive impact on economic growth. But Rodrik (1992) asked a rhetorical question, that if the positive links between FDI, trade and growth are so obvious, "why does it take so long for countries of the world to embrace trade and FDI?"

The answer to this question lies in many other factors that control the results of spillovers effect of FDI and trade including: quality of human resources, technological gap between countries, level of infrastructure and institutions, political setup of the country, trade and macroeconomic policy. All these factors play important roles in determining the spillovers effect of FDI and trade on growth.

The spillovers effect of these two growth-determining variables is limited by the other variables. The determinant factors of FDI and trade spillovers that have been analyzed in details, is the absorptive capacity of domestic firms; together with influence of technological gap between foreign and domestic firms (Cerso and Fontoura, 2007).

Openness is another important determinant of spillovers effect of FDI and trade. Singh and Jun (1995) research showed that export orientation is very important

in spillover effect of FDI and trade. Furthermore, political setup of the host country influences the volume and effect of FDI and trade; if a country is politically stable, the inflows and volume of FDI and trade will be high respectively. Consequently, economic activities would run smoothly.

On the contrary, if there is political instability, that would create a lot of economic and social problems, which hampers the smooth functioning of the economy. At the same time, empirical findings showed that democratic form of government is more conducive for investment and trade, against the autocratic or dictatorship form of government (Ozler *et al.*, 1992). At the time, Sachneider and Fery (1985) studies have shown that political instability significantly affects volume and gains from FDI and trade. In addition, institutional quality is also likely to affect the prospective benefits from FDI and trade; particularly for developing and transition economies.

Therefore in the opinion of the researcher, good governance is usually associated with higher economic growth; and in the absence of proper institutions setup, cost of production would likely to go up; because corruption tends to add investment cost, which reduces profits as well as obstruct the steady functioning of the growth process. This fully agrees with the statement of Sachneider and Fery (1985). It shows that although, FDI and trade play an important role in economic growth of developing and transition economies in both directly and indirectly; but the intensity of the impact would depend on other supporting economic and non-economic components and country specific conditions (Bengoa and Robles, 2002).

1.2 Aim and Objectives

The primary aim of the research is to investigate through theories and literature review in one part; and econometric model analysis in the other part; the influence of FDI and trade on the economic growth of the developing and transition countries.

This aim will be addressed through the following objectives:

- i) To investigate the relationship of the FDI and the economic growth of developing and transition countries.
- ii) To analyze and evaluate the effect of trade on the economic growth of developing and transition countries
- iii) To assess and evaluate through an econometric model the effect of FDI and trade on the economic growth of developing and transition countries

1.3 Structure of Study

The structure of study is outlined as below:

Chapter one- gives the general introduction and overview of the study of the FDI and Trade; the aim and objectives; the scope and the research structure.

Chapter two: provides theoretical and empirical assessment on the FDI with the help of existing studies.

Chapter three: presents theoretical and empirical assessment on the trade

Chapter four: defines the research methodology used for the econometric model and the strategy in order to achieve the set aim and objectives of the dissertation.

Chapter five: address the aim, objective, conclusion, limitation of the study followed by some policy recommendations.

CHAPTER TWO.

2. Investigating the Relationship of the FDI and the Economic Growth of Developing and Transition Countries.

2.1 Introduction.

This chapter will discuss the definition of FDI, its trend; and the relationship of FDI with economic growth in the host countries. This will be achieved through literature reviews of the relevant peer reviewed journals. In addition, it will also provide theoretical and empirical evidence on the significance of FDI inflows on economic growth of the recipient countries followed by its impacts on trade, and relationship between economic growth and trade.

2.2 Definitions of FDI

FDI is the investment by the multinational corporations, which manage and conduct their production activities in more than one country. It is very different from those of foreign portfolio capital inflows such as bond and stock market investment that are pure financial investments seeking capital gains (Fransis, 2010).

According to OECD benchmark definition of foreign direct investment (OECD, 2004), FDI reflects the objective of establishing a lasting interest by a resident enterprise in one economy by a direct investor or having an enterprise or direct investment enterprise; that is resident in an economy other than that of direct investors.

The definition further argued that the direct or indirect ownership of 10 per cent or more of the voting power of an enterprise resident in one economy by an investor resident in other economy is called FDI inflows. So, it is the investment that enables an enterprise to get control over production, distribution and business related activities of firm in a foreign country. Furthermore, FDI is made

to get direct control over production process and other business related activities keeping in the mind of long-term gains for investors and sustainable economic growth for host country. However, other kinds of investment such as portfolio and investment in bond are driven by speculative consideration based on interest rate differentials and exchange rate expectation; not on long-term consideration; and its movement is often the result of moral hazard such as explicit exchange rate guarantee (Hausman and Arias, 2000). So the main difference between FDI inflows and other kinds of foreign investment are their involvement in management, production activities and the intention to get control of the enterprises.

2.3 Trend of FDI

Multinational Corporations (MNCs) are considered as major sources of FDI flows because of their significant contribution in the movement of international capital flows. The main objective of the MNCs is to maximize the profit by reducing the cost by using advance technology and skills. At the same time, in order to acquire their objectives, MNCs tend to move towards the regions, which are likely to bring higher returns on their investment. The possibility of higher returns on their investment is the reason that explains the concentration of FDI in one region against other regions.

Furthermore, MNCs undertake major parts of world's private research and development (R&D) as well as produce and control most of the world's advance technology (Blomstrom and Kokko, 1996). Although, most of the MNCs are based in the industrialized countries; unlike MNCs investment, production, and employment are more widely spread across industrialized and developing economies (ibid).

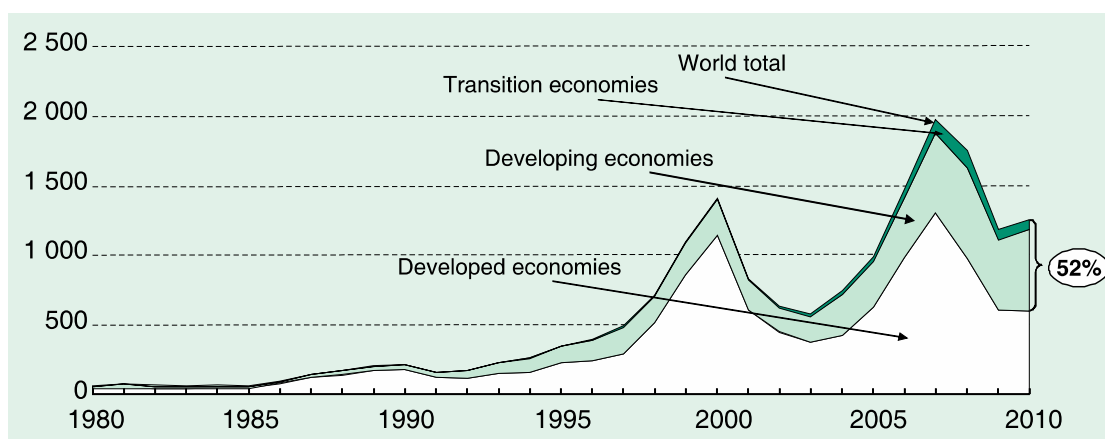
Most of the FDI comes from developed economies but reverse flows (developing to developed countries) also has increased during the last decade (UNCTAD, 2011). Global FDI inflows in 2010 reached an estimated \$1,244 billion, a small increase from 2009's level of 1,185 billion (UNCTAD, 2011). However, there was an even pattern between regions and also between sub-regions. FDI inflows to

developed and transitional economies diminished in 2010 (UNCTAD, 2012). In contrast, FDI inflows to developing economies recovered strongly and together with transition economies for the first time surpassed the 50 percent mark of the global FDI flows (UNCTAD, 2011).

2.3.1. FDI inflow, global and by group of economies, 1980-2010 (Billions of dollars).

Below mentioned graph depicts the trends of FDI from 1980 to 2010.

Figure 1



(Source: UNCTAD, 2011)

According to World Bank (2011) flows to developing countries are still below of their peak levels of 2007, although they rebounded strongly by 67 per cent in 2010. The report further stated that in the first half of 2011, the global economy continued to recover from recession, financial and credit market condition improved, profit increased and MNCs resumed their investment plan.

Although, the pace of such investment is expected to moderate in 2012; but the East Asian and the pacific region continue to receive the bulk of FDI flows in developing countries. For instance, China absorbed closed to half of all FDI flows into developing world in 2010. China accounted for \$ 185 billion (37 per cent) of all flows into developing economies. Latin American and Caribbean were

responsible for another quarter of total FDI flows. But in the least developing region, FDI flows fell by 7 per cent in 2010; and by another 16 per cent in 2011.

In the same vein, FDI inflows to developed countries contracted moderately in 2010, falling by less than 1 per cent to \$ 602 billion. Europe stood out as the sub region where FDI inflows fell most sharply due to uncertainties about the worsening sovereign debt crisis. In addition, declining FDI flows were also registered in Japan. However, FDI flows to the United States surged by almost 50 per cent due to the significant recovery in the reinvested earning of foreign affiliates. But FDI flows were still at about 75 per cent of their peak levels of 2008 (UNCTAD, 2011).

2.4 The Review of FDI Theories

Theory and assumption are the foundation base on which implementation of any economic policy depends. The research will adopt two important theories of FDI: The Neo Classical theory and the dependency theory for the purpose of the dissertation:

2.4.1 Neo Classical Theory of FDI

Neo classical theory states that the FDI has a positive effect on the economic growth and overall well-being of the host economy (Prasad *et al.*, 2007). This is because inflows of capital increase the quantity and quality of capital formations in the host economy. Therefore, inward flow of capital increases the saving of the host country, which is necessary for economic growth. At the same time, profit generated by FDI also contributes to corporate tax revenues in the host country (Loungani and Razini, 2001). The principal assumption of the neo classical theory of FDI is that, growth is driven by technological change; that arises from intentional investment decisions made by profit-maximizing agents (Romer, 1990). Solow (1956) model with technological change also stated that technological change provides the incentive for continued capital accumulation; and the capital accumulation and technological change account for much of the increase in the output. At the same time, it is well known fact that one of the

foremost positive effects of the FDI is that it brings new advance technology along with capital (Prasad *et al.*, 2007, Yoo and Wei, 2006).

2.4.2 Dependency Theory of FDI

Dependency theory developed in the late 1950 under the guidance of the Director of the United Nations Economic Commission for Latin America, Raúl Prebisch. These studies were triggered by the fact that economic growth in advanced-industrialized country did not necessarily lead to growth in the poorer countries (Ferrara, 1996).

Again, according to neo classical theory of foreign direct investment, FDI and foreign capital are beneficial for the host country. Contrary to that, this theory argues that FDI has adverse effects on the host economies particularly in the developing world (Prakash and Potoski, 2006).

The theory was based on the assumption that MNCs transfer management practices and technologies to their host countries subsidiaries; that are inferior to what they employ in their mother countries. Indeed, the theory suggested that economic activities in the richer countries often lead to serious economic problem in the poorer countries. In addition, theory argues that developed countries grow on the cost of developing countries and their investment is harmful for the long-term economic growth of the poor developing countries.

Furthermore, by investing in the developing and transition countries, developed countries capture their natural resources and bring all the benefits to their home countries, leaving host countries in the situation of continuing poverty. Therefore, it is arguable that the developing and transition economies must not depend on the FDI and foreign capital flow to develop them, instead there is a need to develop independently.

Throughout 1970's to 1980's economists predominately supported the dependency theory of FDI and its on developing countries, arguing that developing economies suffer negative consequences of FDI as a result of

profit repatriation, declining reinvestment and lack of spinoff (Cutter, 2006). Although, dependency theory retained the support of some, recent challenges suggest that FDI has the potential to positively affect developing and transition economies, shedding new light on the potential for FDI and MNCs a catalyst for economic growth and development in developing and transition economies (Adam, 2009).

2.5 Supporting Empirical Studies

There are large numbers of literature on the impact of FDI on economic growth in the host economies. But there is also great deal of controversy among all these literature; as some of the empirical findings showed positive relationship between FDI and economic growth; while other showed negative relationship between FDI and growth. In other words, there is absence of definite direction, be it positive or negative. Some studies find that FDI enhances the economic growth and claims that there is positive relationship between the two: Through transfer of technology and capital formation while other have rejected the former findings, and find no evidence in support of direct and positive relationship between FDI and growth.

Brozenstien *et al.*(1995) empirically tested the effect of FDI on growth with the help of unrelated regression technique in 69 industrial and developing countries over the period 1979-1989. Their results suggested that FDI was an important vehicle for transfer of technology and contributing relatively more to growth than domestic investment. However, higher production of FDI held only when the host countries had a minimum threshold stock of human capital. In addition, FDI had the effect of increasing total investment in the economy more than one for one. In other words, one per cent increases FDI cause for one per cent increase in growth rate. This suggested predominance of complementary effects with domestic firms.

Balasubramanyam *et al.*(1996) empirically examined role, which foreign direct investment (FDI) played in the growth process in the context of developing countries by using cross section data relating to sample of 46 developing countries. Their results indicated that impact of FDI on growth was strong and positive for those countries that pursued an outward oriented trade policy. However, the countries that adopted inward oriented trade policy effect were insignificant.

Atiken and Harrison (1999) using WLS approach and utilizing panel data of Venezuela plants for the period 1976-1989, empirically investigated the impact of FDI on plant productivity. They identified two effects of FDI on domestic enterprises. First, was increase in foreign equity participation were correlated with increase in productivity plants that consisted less than 50 employees. That suggested that plants benefitted from the productive advantage of foreign owners. Second, was that the increase in FDI negatively affected the production of wholly domestically own firms in the same industry.

Agosin and Mayer (2000) examined the impact of FDI on growth in terms of crowding out with the help of panel data for the period 1970- 1996, and two sub periods 1976-85, and 1985-96. They used their model for three developing regions (Africa, Asia and Latin America). Their results indicated that in Asia as well as Africa, there had been strong crowding in of domestic investment by FDI. In contrast, there had been strong crowding out in Latin America. The study concluded that an effect of FDI on domestic investment was by no means always favorable and that simplistic policy towards FDI was unlikely to be optimal.

Kinoshita (2000) using firm level panel data of Czech Republic analyzed impact of FDI on firm's productivity for the period 1995-98. The finding showed that, the learning effect of R&D was far more important than the innovative effect in explaining the productivity growth of a firm; and that there was no evidence of technological spillovers to local firms from having a foreign joint venture. In addition, positive spillovers for FDI were found in electrical, machinery and radio & TV sector, which were also active investor in innovative R &D.

Li and Liu (2005) investigated whether FDI affects economic growth. Based on panel data for 84 countries over the period 1970-99 and using both single and simultaneous technique to test the relationship; the findings showed a significant endogenous relationship between FDI and economic growth from mid 1980 onwards. But the FDI does not directly promote growth by itself; but rather does it indirectly through its interaction terms. The interaction of FDI with human capital exerted strong positive effect on economic growth in developing countries, while that of technology gap had a significant negative effect.

Bengoa and Robles (2002) explored the interplay between economic growth, FDI and economic freedom using panel data analysis for a sample of 18 Latin American countries for 1970- 1999. The results suggested that FDI was positively correlated with economic growth in host countries. However, host countries required adequate human capital and economic stability to benefits from FDI.

Nath (2005) using fixed effect panel data approach examined impact of FDI on growth in 13 transitional economies of central and Eastern Europe for the period 1989 to 2003. The analysis suggested that, in trade-growth equations, FDI did not seem to have any significant effect on growth. However, when estimated the growth equation without trade, finding revealed that FDI had highly significant effect on growth. This suggested a co-linearity relationship between trade and growth.

Hsiao and Hsiao (2006) using time series and panel data from 1986 to 2004 examined the Ganger causality between GDP, FDI and export among China, Korea, Taiwan, Hong Kong, Singapore, Malaysia, Philippines and Thailand. In other words, eight rapidly developing East and South East Asian economies. Their findings have shown that each country had different casual relationship; but did not yield any significant general rule. When constructed panel data set for three variables, for eight countries and used the fixed effect and random

effect approaches to estimate the equation. Their results revealed that FDI had unidirectional effect on GDP.

Johnson (2006) performed both cross section and panel data analysis on a dataset covering 90 countries during the period 1980 to 2002. The empirical results indicated that FDI enhanced economic growth but not in-developed countries.

Yoo and Wei (2006) examined the effect of FDI on growth the in context of newly industrialized economies (China); using panel of 29 provinces and municipalities for the period 1979-2003 by utilizing GMM approach. Their findings implied that the rate of technological progress, with the effect from FDI was about 3 percent per annum. With the effect of FDI, total rate of technological progress was 3.5 - 4.3 percent. This suggested that up to 30 per cent of technological progress in China had been due to the effect of FDI.

Rubio *et al.* (2007) empirically investigated the impact of FDI on growth in the Spain case by using the data of 17 Spanish regions over the period 1987-2000 and WLS approach. Their results supported the outstanding role-played by FDI as a vehicle of technology transfer and its relationship with productivity growth. In addition, the results indicated that FDI was particularly associated with human capital and its skills. Furthermore, it also revealed that FDI was influencing GDP per employee through its impact on human capital accumulation.

Herzerd *et al.* (2007) re-examined the FDI led growth hypothesis for 28 developing countries using co-integration techniques on a country by country basis. Their results indicated that in the vast majority of countries, there exist neither a long term nor short-term effect of FDI on growth. Indeed, there was no single country where positive unidirectional long -term effect from FDI to GDP was found. Furthermore, the results indicated that there was no association between growth impact of FDI and the level of per capita income; the level of

education and degree of openness and level of financial market development in the developing countries.

Beugelsdijk *et al.* (2007) investigated the empirical impact of FDI on host country economic growth by distinguishing between impact of horizontal FDI and vertical FDI. Using a new database, the study estimated the growth effect of vertical and horizontal United States MNEs activity into 44 host countries over the period 1983-2003; with the use of GMM approach and FDI figure as benchmark. After controlling endogeneity and absorptive capacity effects, they found that horizontal and vertical FDI had positive and significant effect on growth in developed countries. In addition, the results indicated a superior growth effect of horizontal FDI over vertical FDI. However, findings showed no significant effects on the horizontal or vertical FDI of developing countries.

Chakaraborty and Nunnenkamp (2008) empirically assessed the growth implication of FDI in India. By using industry specific FDI and output data, and applying Granger causality test within panel co-integration framework for the period 1987- 2000. Results indicated that the growth effect of FDI varied widely across sector. Furthermore, results had shown that FDI and output were mutually reinforcing in the manufacturing sector; but further casual relationship was absent in the primary sector. Interestingly, findings also showed only transitory effects of FDI on the output in the service sector. However, FDI in the service sector appeared to have promoted growth in the manufacturing sector through cross section spillovers.

Saini *et al.* (2010) investigated the systematic link between FDI and economic growth in panel of 85 countries for the period 1980-2004. Their empirical results based on GMM approach revealed that FDI by itself had no direct positive effect on output growth. However, the effect of FDI was contingent on the level of economic freedom in the host countries. That suggested, countries, which promoted greater freedom of economic activities gained significantly from the presence of multinational corporations (MNCs).

Norris *et al.* (2010) using GMM approach investigated the relationship between FDI and growth. The panel consisted of data from 1974- 2004 for 104 middle and low-income countries. Their findings had shown that FDI was significantly and positively associated with growth in non-fuel exporting low-income countries. The point estimates indicated that one percent point increase in the ratio of FDI to GDP was associated with a 0.5- 0.7 percentage increase in growth over a five-year period. In addition, the beneficial impact of FDI on growth was positive; but significant for 1974-1993 time period for only middle-income countries. However, the positive and significant effect of FDI on growth in all developing countries had strengthened in the period 1989- 2008.

2.5 Summary

The purpose of this chapter was to analyze the relationship, effect of FDI and its trends on economic growth. Different models and theories of FDI have been discussed; and one out of two theories highlighted the positive impact of FDI on economic growth. While other theory does not accept that FDI has positive impact on economic growth. At the same time, the theories also ignored the practical difficulties that come in the way of positive spillovers effects of FDI; such as poor human resources, infrastructure and international treaty such as Trade related Intellectual Property Rights (TRIPS). Consequently, due to effect of poor human resources and other factors, impact of FDI would likely to relatively small (Mello-1996). Furthermore, TRIPs provision hindered the free flow of technology from developed to developing and transition economies. None of the recent empirical finding gives importance to this aspect of FDI.

Further, finding revealed the concentration of FDI in some specific regions, especially, South East Asia and developed countries. Also in some cases, FDI flows to developing and transition economies have declined in recent years. Although, the empirical studies concluded with positive impact of FDI on economic growth in the developing nations, however, they are conditional gains. In other words, they depend on some other economic and social factors. In short,

the impact of FDI on economic growth is positive but the intensity of its positive effects depends on some other economic and social factor of host countries.

CHAPTER THREE.

3. Analyzing and Evaluating the Effect of trade on the Economic Growth of Developing and Transition countries

3.1 Introduction.

The previous chapter discussed the impacts of foreign direct investment on growth. This chapter deals with international trade and its impact on economic growth in order to address the primary aim of the research of investigating the influence of FDI and trade on the economic growth of the developing and transition countries. It will explore the relationship between growths and trade in the developing and transition countries. And finally will discuss the various theories and empirical evidences supporting on relationship between trade and the economic growth especially in developing and transition countries.

3.2 Overview.

Trade can be a powerful engine of growth, poverty reduction and development (OECD, 2011). A vast empirical literature shows that trade expansion does lead to higher economic growth. This finding justifies using trade as tool for development. However, the same literature shows that there is no guarantee. In some cases developing country experience with trade is disappointing because trade did not deliver the expected economic growth and poverty reduction (Hallaert, 2010).

Trade or openness in trade is now regarded as economically favorable, in the sense that it increases per capita income but at the same time anti-globalization critics have suggested that it is socially harmful on several aspects such as question of poverty and unequal distribution of income among different sectors. The critics of trade claim that trade accentuates not diminish poverty in both rich and poor countries (Bhagwati and Srinivasan, 2002).

The most of the empirical findings show that trade has positive effect on both the level and the growth rate of country's national income. The positive effects of trade on growth are based on three assumptions. First, trade openness increases the scale of production and therefore scope of learning-by-doing externalities. Second, trade induces knowledge spillover from advance to less advance countries and sectors. So, knowledge tends to flow from richer to poorer countries. And third, international trade tends to enhance product market competition by allowing foreign producers to compete with domestic producers, which in turn, enhance domestic productivity in two ways, (a) it compels the most inefficient firms out of domestic market and (b) it also forces domestic firms to innovate in order to escape competition with their new foreign counterparts (Peter and Hwoit, 2009). Therefore, as per proponents of free trade, all there assumptions lead to economic growth. However, exact interaction between trade and growth depends on nature of trade that countries engaged in and the geographical size of countries (Frankel and Romer, 1999)

The experience shows that endogenous growth across the world plays an important role in growth. But at the same time, international trade creates sufficient interactions to ensure a common long-run growth for all countries (Aderson and Babula, 2008). Furthermore, international trade like technical spillovers creates a powerful force limiting the extent of cross-country divergence (Acemoglue, 2009). That is to say, international trade acts as a powerful force keeping countries together on growth path that leads to same growth rate in the long run and stable world income distribution. In addition, international trade enables each input producer to access a larger market, and this makes inventing new technology more profitable. This greater profitability translates into higher rate of innovation and more rapid growth (Lopez, 2005).

The other positive effect of trade on economic growth is, its impacts on wage and poverty alleviation (OECD, 2011). Much recent work, based on variety of different models has explored the effects of trade on growth, and found that the real wage of skilled workers has increased relatively to that of unskilled workers in developing countries. But, at the same time there has been steep increased at

the wage of unskilled labor in the developing countries (Bhagwati and Srinivasan, 2002). In addition, trade is beneficial for poverty reduction in developing and transition countries (Banini and Thugge, 2001, Aeadely and Anker, 2006). Empirical findings show that inflation is a serious problem for developing and transition countries that mostly hurt to the poor of those countries. The main cause of inflation is mismatch in demand and supply of goods and services. So, at the time of steep inflation, trade facilitates to maintain the macroeconomic stability by facilitating imports of essential goods (Dexter, *et al.*, 2002). At the same time, export led growth facilitates to earn precious foreign currency, which may be utilize for payments of imports. Therefore, trade indirectly assists the poor. Furthermore, trade also plays an important role in terms of availability of scare resources. If a country has ample manpower and technology but does not possess raw material for end product, in that case via trade raw material can be imported (WTO, 2010)

Trade helps to stimulate innovation directly, which in turn contributes to economic growth in several ways. Such as increase in competition; and hence the incentive, and some cases means to innovate (Posher, 1961). Stronger competition has been shown to have particular powerful effects on productivity in countries far away from the technological frontier (OECD, 2012). In addition, trade involves FDI or the movements of skilled work force. It promotes the transfer of technology and expertise and thereby promoting innovation. For example, development of Kenyan cut flower industry benefitted greatly from technology embodied in FDI from Holland (*ibid*). Besides, trade provides an opportunity to firms to exploit economies of scale (Helpman, 1980). Because, trade enlarge the market size, which facilitates to MNC in recover R&D investments overlarge market size. In addition, trade raises the rate of return on domestic investment and therefore increases the saving rate (Frankel and Romer, 1999)

The pertinent question in today's climate of weak economic recovery, high unemployment and gloomy situation of public finance is what can government do to boost growth and employment? One answer lies in the keeping global

market open; which is increase in the volume of trade. Because, openness has historically gone hand in hand with better economic performance in both developed and developing countries (OECD, 2012). Every country in the world is trying their best to enhance their trade volume so that they can succeed in creating new opportunity for workers and firms. Because, this will help them to lift millions out of poverty. The impact of trade on growth can be seen in the context of tour of United States president to India in November 2010. The main purpose of Mr. Obama tour was to mobilize business order for American companies so that American economy could be brought out from recession and proper employment rate can be achieved (David, 2010). In addition, findings from the OECD-led International Collaboration Initiative on Trade and Employment (ICITE) highlights how different aspects of trade including its novel facets such as global services outsourcing and production off shoring, play a pivotal role in boosting growth and creating high value pay jobs (OECD,2011). The report further states that besides delivering better wages, trade can also improve over all working conditions. Whether the measure is injuries on the job, child labor, trade tends to improve working condition through its positive impact on per capita income. In addition, general consumers also benefited from trade. Because, trade provides them broad range of choice as well as trade helps to lower the prices. At the same time, companies can benefit because trade diversifies risks and channel resources, where returns are highest.

Apart from the social benefits attached to trade, it also brings some economic and social problems such as job loss, negative effects on environment and unequal distribution of income (Lonzen *et al.*, 2012). But the solution to these problems does not lie in minimizing the volume of trade. These problems can be tackle by proper policy formulation (UNCTAD, 2011). In addition, positive effects of trade depends on the quality of infrastructure and human capital, absorbing capacity of country, tax structure, quality of law implementing agency, proper implementation of property rights, monetary and fiscal policy and many other economic and social conditions (Warner and Kreinin, 1983). So, if a country holds all these qualities or ready to implement reforms in all these areas, then she could have the gains from trade.

3.3 International Trade Theories

This section provides selected theoretical concepts of international trade. Theoretical perspective on this issue can come from classical trade theory, neo classical trade theory and recent trade theory (Meir, 1998). A number of theoretical model have been developed to analyze the importance of trade in promoting economic growth. Some of these focus on static gains including the gains derived from comparative advantage consideration. Others consider knowledge spillovers and changes in growth dynamics of productivity and investment associated with international trade (Grossman and Helpman, 1991, Kose *et al.*, 2005).

The advent of international trade theory can be traced to the time of mercantilism; and its evolutionary process is still ongoing. In the later part of 20 century the trade theories have been revitalized by the emergence of new generation growth models based on role of economies of scale, human capital accumulation and endogenous technical progress, which have brought new elements into the analysis of the way in which trade and other policies affect long run economic growth (Edward, 1991).

All theories may be categorized under two sub-headings, namely:

- Classical theories of trade
- and Neo classical theories of trade.

Each group consists number of trade theories, which is beyond the reach of this dissertation; and hence one of the limitations of the dissertation. However, discussions on the theories will be either on the more applicable ones to the purpose of the dissertation or the ones that contribute to the further evolution in the development of trade theory.

3.3.1 Comparative Advantage Model (Ricardo Model):

The theory of comparative costs advantage was first introduced by David Ricardo in 1816 (Ruffin, 2002). Theory explains how it can be beneficial for two parties (country, regions) to trade; if one country has lower relative cost of producing some good. According to this theory it is opportunity cost production that matters and, not absolute cost. Because, it is opportunity that measures how much production of one good is reduced to produce one unit of another good; hence comparative advantage is a concept that revolves around free trade theory.

The comparative cost theory concludes that the countries can specialize in producing certain product in which they have comparative advantage of producing at low cost. This simply means that all the countries can have goods at low prices (Maneschi, 1992). In addition, theory further indicates that the countries, which have the advantage of raw materials, human resources and climate condition in producing particular good, can produce the product at low cost and high quality (Golub and Hsieh, 2000). The theory further states that a country should specialize in the producing and exporting the goods in which it hold comparative or relative advantage to other countries; and should as well import those goods in which it has comparative disadvantage.

The major problem with this theory is that, it is based on the several assumptions that limit its application in the real world (Prasche, 1996). In addition, some of the assumptions of the theory such as full-employment, current account are based on price adjustments between countries; and therefore wide spread distribution of benefits of trade could not hold. If these assumptions are violated, it means that free trade may cause rising unemployment, slower growth and increasing inequality. Such negative consequences of free trade are more severe than any gains from comparative advantage (Baiman-2010).

3.3.2 Heckscher-Ohlin Theory

This theory introduced by the two Swedish economists, namely, Eli Heckscher and Bertil Ohlin in early 1900s. The theory is named after both economists. According to this theory, countries should produce and export good that are abundant for them and import goods, which are in short supply for them. This theory differs from absolute advantage theory and comparative advantage theory. Because, the theory stresses on production of specific good; contrary to preceding theories which states that a country should specialize in the production and export by using the resources that are abundantly available for them (Jones, 1957). Because abundantly available resources are cheap and provide edge over other countries in terms of cost of production (Balassa, 1963). This theory is preferred to Ricardo theory by many economists, due to its simplified assumptions(Deardorff, 1982)

The empirical testing of the Heckscher Ohlin hypothesis was done by Leontief (1953), and gave an inconclusive result as it recommended that the assumptions of the theory require modifications. At the same time, it explains only a minor position of world trade (Jomo and Arnim, 2008). But, Fisher and Marshall (2011) rejected the generalization of Leontief's idea, as their study showed that there was a clear link between goods prices and factor returns. The study further emphasized that the theory forms the foundations of trade theory and part of development economics. Furthermore, theory is fundamentally a description of trade in factor services not in good themselves (Leamer, 1995).

3.3.3 New Trade Theory

The new trade theory, developed by researcher including Krugman (1979), Helpman(1981) and Lancaster(1980) in the late 1970s and 1980s was motivated by the failure of more traditional theories to explain some of the most significant facts about post world war trade data(Borgoeing, 1999]. Latter on, in 1991 Krugman incorporated increasing returns together with capital and labor migration and transport costs into one model. Since then it has become a workhouse of economic geography and international (Alex, 2008).

Theory identifies imperfect competition, economies of scale, product differentiation and process and product innovations as the main determinants of trade. In addition, on the basis of these theories, intra-industry trade and specification in differentiated product can be explained (Barkum, 2002). Besides it also succeeded in explaining intra-industry exchange between economies with similar endowment. Furthermore, theory emphasizes increasing returns to scale especially in manufacturing industries (Jomo and Arnim, 2008).

Under previous trade theories it was necessary that a country should hold comparative or absolute advantage in terms of resources. But, according to this theory international trade still possible in absence of any kind of comparative or absolute advantage. At the same time theory is based on more realistic approach of imperfect market condition. In contrast to previous theories, which are based on perfect competition. Moreover, the new trade theory has made a fundamental contribution in providing a tractable framework for analyzing the large volume of intra-industry trade (Dreadorff, 1984).

But new theory is criticized on the ground that it is unable to explain how oligopolist behave and compete. In addition, it also ignores the excess profits that oligopolies alleged to earn and the partial equilibrium nature of the analysis (Adam, 1994). Moreover, the limitations of new trade theory are particularly acute for developing and transitions countries, given their small economic size, the nature of their trade, and the enhanced possibilities for the capture of the trade policy by special interest group (ibid).

3.4 Empirical Studies

Theoretically, it has long been argued in the literature that trade stimulates long-term growth and that it can do so through multiplies channels. International trade allows countries to specialize in areas where they possess comparative advantage, expand potential markets and allow firms to exploit economies of scale; which enables the diffusion of technological innovation and frontier managerial practices (Calderon and Poggio, 2010, Frankel and Romer, 1999).

However, empirical findings are not as smooth as theories depict about the positive impacts of trade on economic growth. The earlier works found evidence in support of growth enhancing effects of trade. But, recent empirical findings

are contrary to the old empirical works. The number of people living below \$2 per day has risen by almost 50 per cent, since 1980. And this precisely the period that has most heavily liberalized (WTO, 2000)

Frankel and Romer (1999) using 63 countries bilateral trade data and IV methodology investigated the impact of international trade on standards of living. The investigation suggests that the impact of trade on growth is substantial. In a typical specification, the result suggests that increasing the ratio of trade to GDP by one percentage point raised income per person by one-half and two per cent. However, the studies showed that trade raises income by spurring the accumulation of physical and human capital, and by increasing output for given level of capital. Furthermore, the study concluded that the overall significant of trade on growth is a function of other variables such as geographical location and size of the country, population and the trade promoting policy.

Ferrarini (2010) investigated the impact of international trade on economic growth and standards of living, with special focus on developing Asia. The study used both OLS and IV methodologies; and both results provided evidence of a strong positive relationship between international trade and income; that was highly significant. The study gravity-instrumented IV regression did not only confirmed the sign and statistical significance of the trade-income relationship; but also showed that the relationship between international trade and growth is much stronger; about fourfold- compared to the OLS regression. In this case, IV point estimation for the trade elasticity of income was about 1.4 per cent. In other words, 1 per cent increases in the trade share on average raises a country's income per person by 1.4 per cent.

Colderon and Poggio (2010) using panel data set of 136 countries over 1960-2010 and generalized method of moments (GMM), investigated on whether the impacts of trade on economic growth is effective or not? The study analysis found that trade promoted growth; and that the result was robust to the specification and technique used. However, the growth benefits of trade are

conditional on the level of progress in structural areas such as education, innovation, infrastructure, institution, the regulatory framework, financial development and international financial integration. The study further, explained that lack of progress in these areas could restrict the potential benefits of trade.

Wacziarg (2001) investigated the link between trade and economic growth using data from a panel of 57 countries from 1970-89. The study findings suggest that trade have a strong positive impact on economic growth. In addition, trade accelerated accumulation of physical capital accounted for more than half of this effect and enhanced technological transmission accounted for 20 per cent of the impact of trade on growth.

Brucker and Leaderman (2012) estimated the effect of international trade on growth with panel data in Sub-Sahara Africa. Employing instrument variables technique that corrects endogeneity bias. The study suggests that within country variations trade causes economic growth, 1 percent point increase in the ratio of trade over gross domestic product was associated with a short-run increase with the growth of approximately 0.5 percent per year; the long run effect was larger reaching about 0.8 percent after 10 years. The results were robust after country and time fixed affects as well as political institution.

Similarly, Greenway *et al.* (2001) using dynamic panel of 73 countries and three different indications analyzed the impact of trade on growth. The study found that trade did not appear to impact growth with lag. The evidence pointed to a "J" type response and finding was robust to changes in specification, sample size and data period.

Das and Paul (2010) selected 12 emerging economies based on the average growth rate for the last two decades in Asia over 1970 to 2009 period, to investigate the impact of trade on economic growth. The study used GMM technique to overcome the shortcoming of the erogeneity as found in the

previous studies. The study investigation showed that trade has positive and significant effect on growth.

The International Study Group on Exports and Productivity (2007) using 14 countries comparable micro level data for the period 1995-2005, investigated the relationship between trade and productivity on the basis identically specified empirical models. The results showed that exporters were more productive than non-exporters, when observed and unobserved heterogeneity were controlled. And these exporters productivity tended to increase with the share of exports in the total sales. In addition, findings have shown that there was strong evidence in favor of self-selection of more productive firms into exports market. But, at the same time, there was no evidence that favors the learning by exporting hypothesis.

Khan and Qayyum (2007) empirically investigated the impact of trade on growth in Pakistan using annual observations over the period 1961-2005. The analysis was based on bound testing approach advanced by Pearson. The study empirical findings suggested that trade plays an important role in enhancing economic growth in Pakistan in long run. However, in short run impact of trade on growth was significantly low.

Doumal and Dauphine (2010) using the GMM estimator on a panel data set including Brazilian states for 1989-2002, investigated the impact of trade on economic growth. The study results indicated that trade benefits more; for example in Brazil states with the high level of per capita, the theory would tend to increase regional inequalities. Besides, the study found that trade has advantages in more states with good level of human capital as well as industrialized states rather than the states whose main activity was agriculture. The study finally concluded that international trade seemed to provide additional advantages to already well-developed Brazilian states while prime motive behind trade promotion and liberalization was to achieve territorial balance.

3.5 Summary

The primary objective of this chapter was to analyze and evaluate the effect of trade on economic growth on the basis of theoretical and empirical ground. The study found that most of theories and empirical studies support and have positive relationship with trade and economic growth; but evidence of contradiction was also found in the underlying assumptions and distribution of gains from trade. At the same time, one of the theories revealed the importance to absolute advantages and perfect competition; while other emphasis was on comparative advantage and perfect competition. Empirical findings showed that trade have positive impact on economic growth. However, it also contributes to unequal distribution of income that creates some other economic and social problems. But, this problem could be solved with proper state intervention.

CHAPTER FOUR

4. ECONOMETRIC ANALYSIS

4.1 Introduction

This chapter presents the econometric analysis model in order to quantitatively address the primary objective of the research of assessing and evaluating through an econometric model the effect of FDI and trade on the economic development growth of developing and transition countries. It also includes the hypothesis to be tested, data, variables and methodology adopted for the data analysis; and concludes with the discussion on regression analysis.

4.2 Hypothesis

The main objective of the study is to examine the impact of foreign direct investment and trade on economic growth in case of selected developing and transition economies. The study analyzes the assumption that FDI and trade stimulate economic growth. In other words, investigation will be done on the following hypotheses.

- First, is there evidence of positive association between FDI and economic growth in developing countries?
- Second, under the same econometric model, is there any evidence that trade is positively related to GDP per capita growth in developing countries?

4.3 Data and Variables

The econometric analysis study is based on a quantitative research strategy, with data collection samples from 29 developing and transition countries across the globe for the period of 1996 to 2010; as available through secondary data collection sources of World Development Indicators 2011(World Bank, 2012); and the World Governance Indicator (2012) respectively.

A list of countries along with definition and sources of all the elements (variables) are mentioned in the Appendix 1 and 2. The Net FDI inflows, reported in the WDI measures the net inflows of investment to acquire lasting management interest (10 per cent or more of voting rights) in a company operating in an economy other than native investors (OECD,2004).

While the gross FDI is the sum of the absolute value of inflows and outflows accounted (WDI, 2012). But for the purpose of the research the net FDI inflows, which is a share of GDP to the economy will be used as a measure of FDI.

4.4 The Model

The econometric model is derived from function in which level of country productivity depends on FDI, trade, domestic investment and human capital. The model is based on endogenous growth theory. The investigation adopted the model of Balasubramanyam *et al.* (1995), Borensztein *et al.* (1996) and Makki and Somwaru (2004); where FDI and trade contributes to economic growth directly through new technologies. Other input such as improved managerial skills and best business practices, could indirectly improving human capital. To access empirically the effects of FDI and trade on economic growth, the investigation specify the following basic formulation:

$$LGDPPC_{it} = \beta_0 + \beta_1 LFDI_{it} + \beta_2 LTrade_{it} + \beta_3 LInvestment_{it} + \beta_4 LGC_{it} + \beta_5 LRDexp_{it} + \beta_6 Tax_{it} + \beta_7 Linflation_{it} + \beta_8 LPstability_{it} + \eta + \varepsilon_{it}$$

Where,

LGDPPC= the logarithm of Gross Domestic Product per capita growth

LFDI = the logarithm of net FDI inflows ratio

LTrade= the logarithm of Trade percentage of GDP

LGC= the logarithm of government consumption in percentage of GDP,

LInvestment = the logarithm of gross capital formation in percentage of GDP

LRDexp= the logarithm of research and development expenditure in percentage of GDP

LInflation= the logarithm of inflation

LTax= the logarithm of tax on income, profits and capital gains in the host country expressed as percentage of revenue

LPstability= the logarithm of political stability -2.5 weak to 2.5 strong

β_0 = intercept

η = Is the unobserved country specific effect

ϵ = is an error term that is normally and identically distributed for each period t .

The variables FDI, trade, investment, government consumption and expenditure on R&D are measured as ratio of GDP. The model expands the work of Borensztein(1995), which came in early 1990s; when FDI and trade grew rapidly in developing countries. Most of the past empirical studies have indicated that FDI, trade, and domestic investment have positive impacts on economic growth in developing and transitional economies. The investigation expects the coefficient of these variables (FDI, trade and domestic investment) to be positive, and at the same time, also expects that expenditure on R&D would contribute to the growth.

The inflation rate is a key indicator of fiscal and monetary policies of a country. A lower inflation should mean a better climate for investment, trade and therefore economic growth (Froot and Stein, 1991, Makki and Somwaru, 2004). The investigation included expenditure on indigenous R&D, because indigenous technological progress results from the profit maximizing investments by far sighted entrepreneurs who have roles in growth (Grossman and Helpman, 1990, Romer, 1990).

In addition, the investigation incorporated political stability indicators because; it is an important non-economic determinant of FDI inflows, trade volume and smooth functioning of production process in the host country (Schneider and Fery, 1985). Finally, government consumption and tax on income, profits and capital gains are proxies for institutions and infrastructure in the host countries. The objective is to quantify FDI and trade on economic growth, while a focusing on developing and transition economies.

The investigation is a bit different from previous studies on two accounts:

- First, most of the previous researchers have used proxies such as openness or globalization, but this research is based on actual FDI – GDP ratio and trade –GDP ratio.
- Second, indigenous development of technology has been completely ignored by the previous research. Most of the researchers have given importance to technology development that comes with FDI or trade; the investigations have tried to give importance to indigenous R&D so that access to its role in economic development could be quantified.

4.5 MODEL ESTIMATION:

The model is estimating a balanced model, representing 29 developing and transitions countries from the period 1996 to 2010. The next action is to perform pair wise correlation test, descriptive statistics and then will follow by the regression using three different models, namely:

- Fixed Effects model (FE),
- Random Effects model (RE),
- and Generalized Least Square Model(GLS)

The fixed effects model facilitates in omit variables effects that are in different countries; while being constant over the period.

The random effects model is used when there are no significant variations between countries; but have significant temporal effects.

And finally xtglsl fits panel- data linear model by using feasible generalized least squares. This method allows estimations in the presence of AR (1) auto correlation and heteroskedasticity across panel.

Table1, section 4.5.1, revealed the performance of pair wise correlation test in order to enhance the analysis of the combined effects and dimension of the independent variables.

4.5.1 Pair wise Correlation:

Table 1 – Interrelationship between variables

	LGDPPC	LFDI	LInv.	LTrade	LGC	LInflat	LTax	LRD
LGDPPC	1.0000							
LFDI	0.2215	1.0000						
LInv.	0.2597	0.3483	1.0000					
LTrade	0.1190	0.2349	0.2046	1.000				
LGC	-0.0147	0.0619	0.0907	0.2931	1.0000			
LInflat	-0.0133	-0.0802	-0.1207	-0.0001	-0.0542	1.0000		
LTax	-0.1359	-0.0185	0.1555	-0.1085	-0.3548	-0.1748	1.0000	
LRD	0.1077	0.0195	0.2180	0.0337	0.5808	-0.0095	-0.1042	1.00
LEstab.	0.1563	0.2290	0.1189	0.1275	0.0760	-0.0400	-0.0214	0.04

The pair wise correlation results are in line with expected outcome. There is evidence of positive relationship between FDI and per capita GDP growth. In other words, if FDI increases, then the effect is seen, as it contributes to the per capita GDP growth. Investment (domestic) has positive relationship with per capita GDP growth and FDI. Trade also has positive relationship with per capita GDP growth, FDI, and investment. But government consumption (GC) has negative relationship with per capita GDP growth, FDI, investment, and trade. It means that when government consumption increases, it will negatively affect per capita GDP growth, foreign direct investment, domestic investment, and trade.

Government consumption and inflation have negative relationship with per capita GDP growth, FDI, trade, Investment.

As earlier stated, two variables government consumption and tax have negative relationship with per capita GDP growth, FDI, trade, but positive relationship with investment. It seems that tax contributes to investment; meaning that when tax ratio to GDP goes up, investment in the economy also goes up.

Expenditure on R&D (LRDex) has positive correlation with per capita GDP growth, FDI, investment, trade, and government consumption. But, negative correlation with inflation and tax.

Political stability (P-stability) has positive correlation with per capita GDP growth, FDI, investment, trade, government consumption and expenditure on R&D, but negative correlation with Inflation and Tax, which indicate that when political stability improves, inflation and tax ratio go down. Therefore, the pwcorr results are as per the expectation, which show that FDI, trade, investment, expenditure on R&D and political stability have positive correlation with per capita GDP growth; while inflation, tax and government consumption have negative correlation with per capita GDP growth.

4.5.2 Descriptive Statics of Variables

Table 2, section 4.5.2, presents descriptive statistics for all variables being used in the analysis.

This table provides the summery of mean, median, minimum and maximum and standard deviation of variables presented in logarithm form. It can be seen from the table that all variable are in reasonable degree of stability, except inflation and political stability where standard deviation exceeds.

This was bound to happen because the set of countries used for the analysis, consist of developing as well as transition economies.

Empirical studies show that transition economies are more prone to high inflation and political instability.

Table 2 - Descriptive Statistics of the Variables

Variables	Obs	Mean	Std. Dev.	Min.	Max
LGDP	371	1.5748	.73854	-2.1693	3.4974
LFDI	423	1.1234	.99528	-3.4984	3.8099
LInvestment	435	3.1714	.29317	2.20190	4.0602
LTrade	435	4.3555	.54853	2.70356	5.3954
LGC	435	2.6659	.33057	1.73875	3.3807
LInflation	417	1.8503	1.0703	-2.2283	6.9644
LTax	412	2.7948	.68287	.318563	4.1635
LRDex	393	-.8429	.82929	-3.0456	.68077
LPstability	369	2.9721	1.5943	-6.2045	4.5609

Sources: Various databases given in appendix

4.5.3 Fixed Effect Model

The study use fixed effect (FE) model in the case of variables differ between countries but are constant overtime, a fixed effect regression allows us to rein in omitted variables that vary between countries but are uniform over periods. The study has also performed heteroskedasticity (xttest3) and xtserial (Wooldridge test) tests to check the heteroskedasticity and autocorrelation of individual model. The table that follows indicates the result of fixed effect model.

Table 3 - Interrelationship between per capita GDP Growth and FDI and Trade: Fixed Effect Estimation

	Mode.2.1	Model2.2	Model2.3	Model2.4	Model2.5	Model 2.6	Model 2.7	Model 2.8
LFDI	.14464 (.048)***	.11102 (.048)**	.06162 (.051)	.00910 (.0527)	.00445 (.0519)	.01263 (.044)	-.02268 (.049)	-.01278 (.050)
LTrade		.67727 (.213)***	.64933 (.211)***	.57348 (.219)***	.43941 (.220)**	.06561 (.207)***	.69232 (.215)***	.75278 (.224)***
LInvestment			.50016 (.186)***	.52464 (.191)***	.60406 (.190)***	.63512 (.177)***	.68492 (.180)***	.729352 (.182)***
LRDExp				.12336 (.127)	.15272 (.126)	.04673 (.118)	.09643 (.136)	.0984033 (.136)
LGC					-.74448 (.237)***	-.54299 (.216)**	-.70915 (.226)***	-.81371 (.233)***
LTax						.03157 (.117)	.10158 (.125)	.07468 (.122)
LInflation							-.43627 (.039)	-.06014 (.042)
LPolitical Stability								-.00868 (.0314)
R ² - within	0.0262	0.0548	0.0749	0.0703	0.1002	0.1254	0.1477	0.1790
R ² between	0.1407	0.0556	0.0905	0.1063	0.0783	0.0614	0.0307	0.0399

F-static	8.96	9.63	8.94	5.59	6.57	6.88	6.83	6.95
Prob>f	0.0030	0.0001	0.0000	0.0002	0.0000	0.0000	0.0000	0.0000
Heteroskedasticity (chi2)	2301.72	19381.58	13411.89	7057.47	5056.03	4299.84	1814.18	1487.01
Prob>chi2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Wooldridge Test	13.685	13.071	13.660	25.289	16.469	23.200	21.137	21.504
Prob>F	0.0009	0.0012	0.0009	0.0000	0.0004	0.0000	0.0001	0.0001

Standard errors are in parentheses.

***= Significant at 1 % level, **= Significant at 5% level, *= Significant at 10 % level.

4.5.3.1 Model

First the study regressed per capita GDP growth on FDI and find that its impact is positive and significant at 1 per cent level. However, there is evidence of heteroskedasticity and serial correlation in our results.

4.5.3.2 Model

When the study include another new variable (trade) in the equation and regressed dependent variable on FDI and trade then the results show that impact of FDI is still positive and significant, but at the level of 5 percent. Earlier, it was significant at 1 per cent. At the same time, its coefficient went down. In addition, impact of trade on per capita GDP growth is also positive and significant at 1 per cent level. Furthermore, there was an enhancement in the value of F-static and within R^2 within. However, between R-square value went down and the heteroskedasticity and autocorrelation tests showed that output was suffering from heteroskedasticity and autocorrelation.

4.5.3.3 Model

The study further incorporated one more variable (domestic investment) in the equation and regressed per capita GDP growth on FDI, trade and investment. The findings show that impact of FDI on per capita GDP growth is still positive but not significant. However, in model 4.5.3.2 impacts was positive as well as

significant at 5 per cent level. At the same time, coefficient of the FDI came down by little. In the case of trade, coefficient also came down but that was still positive and significant at 1 per cent level. The impact of the new variable investment on GDP per capita growth was positive and significant at 1 per cent level. Furthermore, on the one hand, the value F- static decreased. On the other hand both R-square (within and between) went up. In addition, the specification results show that results were still suffering from heteroskedasticity and autocorrelation.

4.5.3.4 Model

When the study combined another variable expenditure on R&D (RDExp) in the model and regressed per capita GDP growth on FDI, trade, investment and expenditure on R&D, the results suggest that coefficients of FDI and trade dropped but positive, and coefficient of trade is significant at 1 per cent level. There is an enhancement in the coefficient of investment and that was significant at 1 per cent level, like model 4.5.3.3. Furthermore, impact of expenditure on R&D on dependent variable is positive but not significant. In addition, on the one hand, there was an improvement in R^2 between. On the other hand, R^2 within and F- static went down. Moreover, results of the specification tests indicate the existence of heteroskedasticity and autocorrelation.

4.5.3.5 Model

The study further enlarges the research and took in another variable, government consumption in the analysis. The findings indicate that there is a downward trend in the coefficients of FDI and trade but there was an upward trend in the coefficient of investment and expenditure on R&D. However, now trade is significant at 5 per cent level, earlier that was on 1 per cent level. Investment is still significant at 1 per cent level. The government consumption effect on per capita GDP growth is negative and significant at 1 per cent level. Besides, there is an improvement in the F-static and R^2 within but a downward trend in R^2

between. The specification tests for heteroskedasticity and autocorrelation exhibit the availability of both in the results.

4.5.3.6 Model

The study incorporates one more variable (tax) in the equation and regressed per capita GDP growth on FDI, trade, investment, expenditure on R&D, government consumption and tax. The results suggest that there is an improvement in the coefficients of FDI, trade and investment. At the same time, trade and investment show positive and significant at 1 per cent level. In the model 4.5.3.5, trade was positive and significant at 5 per cent level. But now it is significant at the level 1 per cent. One important happening was that till now investment is positive and significant at 1 per cent level. It has faced some fluctuation in coefficient. But its significant level has been maintained at 1 per cent. In addition, on the one hand, there is a downward trend in coefficient of expenditure on R&D. On the other hand, there is an improvement in the coefficient of government consumption. Even after that it is negative and significant at the level 5 per cent. In the model 4.5.3.5, it was also negative and significant, but at the level 1 per cent. Tax shows positive, but not significant effect on dependent variable. In addition, there is an improvement in R^2 within and F-static, but deterioration at the value of R^2 between. Furthermore, the specification test for this model also indicates the presence of heteroskedasticity and serial correlation in the model.

4.5.3.7 Model

The study further include inflation in the model and regress dependent variable on FDI, trade, investment, expenditure on R&D, government consumption, tax and inflation. The findings suggest that there is negative impact of FDI on dependent variable, but not significant. There is an enhancement in the coefficients of trade, investment and expenditure on R&D. At the same time, the impact of trade and investment on dependent variable is positive and significant at the level 1 per cent level. The impact of expenditure on R&D is positive but not

significant. The severity of negative effect of government consumption on dependent variable increases in this model and is significant at the level 1 per cent. There is an improvement in the coefficient of tax, and its impact on dependent variable is positive, but not significant. The impact of new incorporated variable (inflation) is negative, but not significant on dependent variable. Furthermore, there is an enhancement in the F-static and R^2 within, but deterioration in the between R^2 . In this model also, the specification tests indicate the problem of heteroskedasticity and serial autocorrelation.

4.5.3.8 Model

Finally, the study incorporates political instability in the model and regresses dependent variable on FDI, trade, investment, expenditure on R&D, government consumption, tax, inflation and political stability. The empirical findings show that impact of FDI, government consumption, inflation and political stability is negative, and the government consumption is negative as well as significant at 1 per cent level. At the same time, there is an improvement in the coefficients of trade, investment, and expenditure on R&D and tax in respect of previous model. In addition, trade and investment are positive as well as significant at 1 per cent level. In addition, impact of expenditure on R&D and tax are positive, but not significant. The last variable, political stability impact on dependent variable is negative but not significant. Moreover, there is little improvement in the F-static, R^2 within and between. The specification test results also suggest the existence of heteroskedasticity and autocorrelation.

4.5.4 Random Effect Model:

Random effects model is worthwhile if one suspects that there might be omitted variables, which are consistent over time, while there are fluctuations between them. Consequently, random effects model has distinct advantage of allowing for time invariant variables to be included among the repressor (Yaffee, 2003).

Table 4 - Interrelationship between Per capita GDP Growth and FDI and Trade:
Random Effect Estimation

	Model3.1	Model3.2	Model3.3	Model3.4	Model3.5	Model3.6	Model3.7	Model3.8
LFDI	.15773 (.043)***	.13647 (.045)***	.08799 (.047)***	.04935 (.047)	.04564 (.047)	.05080 (.043)	.03779 (.045)	.4462 (.046)
LTrade		.21384 (.110)**	.17708 (.107)*	.19929 (.114)*	.25293 (.116)**	.26790 (.106)**	.30426 (.112)***	.32750 (.119)***
LInvestment			.52280 (.162)***	.50534 (.169)***	.52203 (.167)***	.63871 (.157)***	.65081 (.163)***	.69425 (.166)***
LRDExp				.07581 (.072)	.16554 (.079)**	.11740 (.072)	.12542 (.078)	.13347 (.081)
LGC					-.54757 (.182)***	-.51018 (.170)***	-.58303 (.181)***	-.65997 (.187)***
LTax						-.16212 (.078)**	-.17076 (.082)**	-.18578 (.082)**
LInflation							-.01495 (.037)	-.01662 (.039)
LPolitical Stability								.00625 (.028)
R ² Within	0.0262	0.0425	0.0613	0.0595	0.0950	0.1024	0.1125	0.1426
R ² -Between	0.1407	0.1006	0.1900	0.1741	0.1230	0.2649	0.2475	0.2579
Wald chi2	12.92	16.58	27.48	23.63	32.98	42.95	43.60	50.81
Prob>chi2	0.0003	0.0003	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000
Wooldridge Test	13.685	13.071	13.660	25.289	16.469	23.200	21.504	21.504
Prob>F	0.0009	0.0012	0.0009	0.0000	0.004	0.0000	0.0001	0.0001

Standard errors are in parentheses

***= Significant at 1% level, **= Significant at 5% level, *= Significant at 10% level.

4.5.4.1 Model

First the study regress dependent variable on FDI, and the findings suggest that the impact of FDI on dependent variable positive and significant at the level 1 per cent. The serial correlation specification test shows the existence of auto correlation in the model.

4.5.4.2 Model

The study incorporates one more variable in model and regress dependent variable on FDI and trade. The outputs demonstrate that the impact of both

variables on dependent variable is positive and significant at the level 1 per cent and 10 per cent respectively. However, there is little downward trend in the coefficient of FDI. At the same time, there is an improvement in Wald chi 2 and R^2 within in respect of model 4.5.3.1. But, R^2 between is less than previous model. The test for autocorrelation suggest the presence of it in the model

4.5.4 .3 Model

The study includes another variable, investment in the model and regress dependent variable on FDI, trade and investment. The empirical findings indicate that impact of FDI, trade and investment is positive and significant at the level, 10 per cent, 10 per cent and 1 per cent respectively. But, when the study includes investment in the model then coefficient of FDI and trade get deteriorates. In previous model FDI was positive and significant at 1 per cent level, but now it is significant at 10 per cent level. Besides, there is an improvement in Wald chi2, and both within as well as between R^2 . When the study conduct xtserial test the study found that the results are suffering from autocorrelation.

4.5.4 .4 Model

The study introduces one more independent (R&D) variable in the model and regress dependent variable on FDI, trade, investment and expenditure on R&D. The study find that impact of FDI on dependent variable is positive but no more significant at any level as well as there was fall in the coefficient of FDI, trade and investment. However, trade and investment are still positive and significant at their previous level. The impact of new introduced variable on dependent variable is positive, but not significant. In addition, after induction of new variable in the model, there is up-gradation in Wald chi2, and within R^2 , but deterioration in between R^2 . When the study runs the xtserial test and the finding result show the existence of the same in the model.

4.5.4 .5 Model

The study incorporates government consumption as a new variable in model and regress per capita GDP growth on FDI, trade, investment, expenditure R&D and government consumption. The results suggest that the impact of FDI, trade, investment and expenditure on R&D was positive on per capita GDP growth. However, now impact of trade and expenditure on R&D is significant at different level. In previous model trade was positive and significant at 10 per cent level but now it is significant at 5 per cent level. Like that R&D was positive but not significant. Now it is positive as well as significant at 5 per cent level. At the same time, there is convergence in the coefficient of trade, investment and expenditure on R&DE. The impact of the new incorporated variable government consumption is negative and significant at the level 1 percent. Moreover, after induction of new variable there is an upgrading in the value of Wald chi2, and R^2 within. But down turn in R^2 between. Furthermore, when the study conduct model specification test for autocorrelation, the study finds that the results are suffering from the same.

4.5.4 .6 Model

The study accommodated tax as a new variable in the model and regressed dependent variable on FDI, trade, investment, expenditure on R&D, government consumption and tax. The findings suggested that consequence of FDI on dependent variable was positive but not significance. Impact of trade was positive and significant at the level 5. Investment effect was positive and significant at 1 per cent level. Impact of expenditure R&D was positive but no more significant, earlier it was significant at 5 per cent level. Effect of government consumption was negative and significant at 1 per cent level. Impact of new inducted variable tax was negative and significant at 5 per cent level. Moreover, after induction of new variable there was catch-up in the coefficient of most of the variables, Wald chi2 and R-square within. But there was fall in between R^2 . Like earlier model, this time also the study finds existence of autocorrelation in the results.

4.5.4 .7 Model

The study took in inflation in the model and regress per capita GDP growth on FDI, trade, investment, expenditure R&D, government consumption, tax and inflation. The empirical results suggest that there is positive effect of FDI, trade, investment, and expenditure on R&D, on dependent variable. However, after induction of new variable in this model there is change in the coefficient of FDI, trade, investment, expenditure on R&D, government consumption and tax. There is an upswing in the coefficient of trade, investment and expenditure on R&D. At the same time there is change in the significant level of variables. Earlier, trade and investment were positive and significant at 5 and 1 per cent level respectively, but after induction of inflation, both are significant at the level 1 per cent. In addition, the study finds that the impact of government consumption, tax and inflation are negative. Although, effect of new introduce variable is negative but not significant. While effect of government consumption and tax are negative and significant at the level 1 per cent and 5 per cent respectively. Besides, after induction of inflation in model, the study finds that there is boost in the value of Wald chi², and both R² within and between. When, the study performed Wooldridge test (xtserial) for autocorrelation, the study finds that the results are suffering from AR (1) correlation.

4.5.4 .8 Model

Finally the study ended the random effects research after introducing political stability as a variable in the research. The findings indicate that the effect of FDI, trade, investment and expenditure on R&D is positive. After induction of new variable there is an up gradation in the coefficient of FDI, trade, investment and R&D. At the same time, negativity of government consumption and tax has increased. However, there is little improvement in the negative effect of inflation. The impact of the last independent variable is positive but not significant. Furthermore, after induction of last variable in the model there is boost in the value of Wald chi² and R² within but deterioration in the value of R² between. When the study perform Wooldridge test for autocorrelation the study find the presence of it in the model.

4.5.5 Hausman Test

This is an established rule that if the study want to choose between fixed and random effects model, the study have to perform Hausman test. Although, statistically fixed effect consistently gives consistence result. But, sometimes random effect can bring in better p-value. Because of that in some cases, random effect model will give more logical estimation. The study knows that Hausman test gives an opportunity to identify the more suitable by comparing the coefficient estimates. Hausman test infers the null hypothesis that coefficient estimates random effect estimator estimates the same as once by fixed estimator. If difference is not statistically significant (low p-value>5 %), it is safe to employ random effect. However, if the p-value is significant (low p-value<5 %), the fixed effect model should apply.

For the expectation, the study assumes that there should be significant variance between individual countries. As it is known that there is some inherent positive and negative aspect of FDI and trade, which determined by particular country context and specialization. Because of that the study thought that random effect model might be appropriate to account of these differences.

Therefore, the results confirm the followings as per Hausman test indication:

Test: H0 : difference in coefficients not systematic

$$\begin{array}{rcl} \text{chi2 (8)} & = & (b-B)' [(v_b - v_B)^{-1}] (b-B) \\ & = & 25.36 \\ \text{Prob>chi2} & = & 0.0014 \end{array}$$

The above-mentioned results indicate that the study should choose fixed effect mode.

The study adopted fixed effect model, but as per study findings during the analysis; the fixed effect model is suffering from autocorrelation; as well as

heteroskedasticity and the random effect model is suffering from autocorrelation.

To deal with problem of heteroskedasticity and autocorrelation, the study explored the possible alternative methodology, which might give reliable and suitable output. Also to overcome from these problems, a fit panel data methodology (GLS) was also embraced

4.5.6 Fixed Panel- Data Models by Using GLS

The GLS is put in application when the problem of heteroskedasticity and autocorrelation do arise. In the case of ordinary least square results may be misleading. Furthermore, this model allow us estimation in the presence of AR (1) autocorrelation within panel and cross sectional correlation on and heteroskedasticity across panels. In addition, it is well known that GLS outcome is more efficient than OLS and PC, if there is heteroskedasticity and autocorrelation (Giannone and Reichlin, 2006, Choi, 2008).

Table 5 - Interrelationship between per capita GDP growth and FDI and Trade: Fixed Panel Estimation

	Model 4.1	Model4.2	Model4.3	Model4.4	Model4.5	Model4.6	Model4.7	Model4.8
LFDI	.17306 (.039)***	.15932 (.041)***	.109300 (.0424)***	.10200 (.043)**	.10798 (.0434)**	.10615 (.039)***	.09646 (.041)**	.10104 (.042)**
LTrade		.08690 (.0732)	.06461 (.0718)	.07635 (.073)	.13162 (.078)*	.10241 (.072)	.11347 (.077)	.117 (.078)
LInvestment			.55298 (.136)***	.49898 (.144)***	.45906 (.144)***	.64056 (.136)***	.65064 (.144)***	.68731 (.148)***
LRDExp				.04988 (.048)	.11954 (.059)**	.09732 (.054)*	.09220 (.056)	.09102 (.059)
LGC					-.30849 (.153)**	-.45136 (.146)***	-.48819 (.154)***	-.51892 (.157)***
LTax						-.29165 (.056)***	-.32128 (.060)***	-.33220 (.060)***
LInflation							-.02053 (.060)	-.00664 (.037)
LPstability								.00990 (.027)
Wald chi2	18.73	20.22	37.51	35.59	40.07	71.85	71.25	78.67
Prob>chi2	0.0000	0.0000	0.0000	0.00000	0.0000	0.0000	0.0000	0.0000
Log likelihood	-391.83	-391.12	-383.11	-338.93	-336.92	-296.44	-288.39	-262.58

Standard errors are in parentheses

***= Significant at 1% level, **= Significant at 5 % level, *= Significant at 10 % level.

4.5.6 .1 Model

First the study regress dependent variable on FDI and the study find that FDI has positive effect on per capita GDP growth, and significant at the level 1 per cent.

4.5.6 .2 Model

The study included trade as new variable in the model and regress dependent variable on FDI and trade. The findings suggest that after inclusion of new variable, there is fall in the coefficient of FDI. However, even after that FDI is significant at 1 per cent level. At the same time, impact of trade is positive, but not significant. In addition, there is an improvement in Wald chi2.

4.5.6 .3 Model

When the study incorporates another variable, investment in the model and regress dependent variable on FDI, trade and investment. The results indicate that the impact of FDI, trade and investment on dependent variable is positive. But now, FDI is significant at 5 per cent level. And impact of investment on dependent variable is positive as well as significant at 1 per cent level. But at the same time there is a fall in the coefficient of FDI and trade. However, after induction of investment in the model there is an improvement in the Wald chi2.

4.5.6 .4 Model

The study took in one more variable in the model and regress dependent variable on FDI, trade, investment and expenditure on R&D. The empirical findings suggest that impact of FDI, trade, investment and expenditure on R&D is positive. But, after incorporation of one more variable in the model there is little drop in the coefficient of FDI and investment on the one hand and the other hand

there is little improvement in the coefficient of trade. In addition, significant level of FDI goes down, however, Wald chi2 improve.

4.5.6 .5 Model

The study comprises government consumption as a one more variable in the model and regress dependent variable on independent variables. The results show that the impact of FDI, trade, investment and expenditure on R&D has positive and significant. At the same time, impact of government consumption is negative and significant at 5 per cent level. After inclusion of new variable in the model the study finds that there is huge convergence in the coefficient of trade and expenditure on R&D. In addition, now trade and R&D are positive and significant at 10 per cent and 5 per cent level respectively. In addition, there is an improvement in Wald chi2.

4.5.6 .6 Model

The study further enlarges the model and incorporates tax as a one of the new variables and regress dependent variable on independent variables. The findings show that FDI, trade, investment and expenditure on R&D has positive effect on dependent variable. But after incorporation of new variable, the study finds that FDI has now positive and significant at 1 per cent level. In previous mode it was positive and significant but at 5 per cent level. Impact of trade is positive but no more significant. In previous model it was significant at 10 per cent level. Expenditure on R&D is now positive and significant at 10 per cent level. Earlier, it was significant at 5 per cent level. However, investment is still significant at 1 per cent level. In addition there is slip in the coefficients of FDI, trade and expenditure on R&D. At the same time, there is almost 50 per cent increase in the coefficient of investment. Furthermore, negativity of government consumption increases after the induction of new variable in the model. Previously, it was negative and significant at 5 per cent level. Now, it is negative and significant at 1 per cent level. Besides, impact of new variable is negative and significant at 1 per cent level. However, Wald chi2 do improve.

4.5.6 .7 Model

The study broadens the horizon of the research and combines one more variable in the analysis. When the study regresses dependent variable on independents variables. The study finds that effect of FDI, trade, Investment and R&D is positive on per capita GDP growth. But, now FDI is significant at 5 per cent, previously, it was significant at 1 per cent. Expenditure on R&D is no more significant. Earlier, it was significant at 10 per cent level. As usual, investment is positive and significant at 1 per cent level. The impact of government consumption and tax is negative and significant at 1 per cent level. However, impact of inflation was negative but not significant.

4.5.6 .8 Model

Finally, the study regress dependent variable on independents variables after incorporating political stability as the last independent variable in the research. The empirical results suggest that FDI, trade, investment, expenditure on R&D and political stability have the positive impact on per capita GDP growth. In addition, FDI is significant at 5 per cent level. Investment is significant at 1per cent level. At the same time government consumption, tax and inflation have negative impact on GDP per capita growth. The negative impact of both government consumption and tax are significant at 1 per cent level. At the same time, impact of inflation is negative but not significant.

4.6 Empirical Results and Discussion

The purpose of the empirical investigation is to analyze the effects of FDI and trade on growth. The study tests the effect of FDI and trade on economic growth in framework of cross-country equations using data from 1996 to 2010. The system has three equations, where the dependent variables are the per capita GDP growth rates

In fixed effect analysis, the results showed that initially trade was positive and significant at 1 per cent level. At the same time, estimated coefficient of trade was greater than FDI coefficient. This situation was exactly opposite to OLS findings. Later on, study included tax (model 1.6) then results showed that there was an improvement in the estimated coefficients of FDI, trade, investment as well as government consumption. In addition, impact of tax was negative but not significant. This finding was quite relevant for policy makers because generally tax has been seen as distortionary. But here finding indicated that tax had positive effect on other variables including FDI, trade, investment and government consumption. However, itself had negative effect on per capita GDP growth

If, this variable is properly utilize for policies formulation that may be a guiding principle subjected to calculation of negative and positive effect. The study further, included macroeconomic indicators such as inflation, impact of FDI become negative but not significant, whereas there was an improvement in the estimated coefficient of trade. It shows that inflation has positive effect on trade.

However, it is matter of further research that whether inflation increases exports of imports. When study included political stability in the model then find that there was an increase in the estimated coefficient of trade, tax and domestic investment, which showed that political instability, did play an important role in the determination the effect, of other economic variables; which was contrary to economic and social principal.

Finally, study finds that impact of trade and investment are positive and significant at 1 per cent level. Impact of expenditure on R&D is also positive but not significant. This shows that the all three variables contribute to economic growth. However, impact of FDI and political stability was negative; which was contrary to empirical findings; whereas, impact of tax was positive. But, when the study performed specification test, the study finds that the model is suffering from heteroskedasticity and autocorrelation.

In random effect, results showed that after controlling other variables, the study regress per capita GDP growth on FDI and trade. The study finds that both are positive and significant at the level 5 per cent and 10 per cent level respectively. However, estimated coefficient of trade was greater than estimated coefficient of FDI. When the study incorporated other macroeconomic variables in the model, the results show that FDI, trade, domestic investment, and expenditure on R&D, political stability have positive effect on per capita GDP growth. This shows that all these variables contribute to economic growth. Hence the results were as per the hypothesis.

However, the study also finds that, it is domestic investment that was leading to per capita GDP growth. Its estimated coefficient was highest and significant at 1 per cent level throughout the random effect analysis. In addition, the random affect analysis shows that government consumption and tax have negative and significant effect on per capita GDP growth. At the same time, impact of inflation on per capita GDP growth was negative, but not significant. It shows that moderate inflation rate can tolerate for the sake of growth. All results were as per the expectation but specification test shows that the model is suffering from autocorrelation.

Now the study has best available results, which are free from autocorrelation and heteroskedasticity. After controlling every variable except FDI (4.5.6.1), the study regresses per capita GDP growth on FDI. The empirical finding shows that effect of FDI is positive and significant at 1 per cent level. When the study incorporates trade in the model the study finds that both have positive effect on per capita GDP growth. It shows that they contribute to economic growth. But, the estimated coefficient FDI is positive and statistically significant at 1 per cent level while estimated coefficient for trade is not statistically significant.

However, since the estimated coefficient of FDI is larger than coefficient of trade. It indicates the differential impact of FDI on the host country's economic growth. And the coefficient of domestic investment and expenditure on R&D are positive. This also indicates that these two variables contribute to growth. One important

happening the study find during the empirical research was that the coefficients of domestic investment and expenditure on R&D are always positive be it OLS, fixed effect, random effect or GLS. At the same time coefficient of domestic investment always maintain 1 per cent significant level during whole research process. This indicates that domestic investment and domestic expenditure on R&D play far more important role in economic growth than FDI and trade.

When the study incorporated government consumption in the model the study finds, almost 10 percent drop in the coefficient of domestic investment. It indicates that government consumption has distortionary effect on domestic investment thus on economic growth. But, at the same time there is an improvement in the coefficient of FDI, trade and expenditure on R&D. In addition, now the effect of trade and expenditure on R&D is positive as well as significant at 10 per cent and 5 per cent respectively. It exhibits that government consumption does not always bad for growth and productive government consumption does increase the growth rate, which effect may act indirectly. As we have been seen it contributes to increase in the coefficients of trade and expenditure on R&D as well as their significant level. Therefore, if government consumption is increasing for productive purpose, that is good for economy. The study further finds that when tax was incorporated (4.5.6.6), the estimated coefficients of FDI, trade and R&D decline. It shows that tax has negative effect on per capita GDP growth as well as other growth determinants variables.

In addition, trade is no more significant at any level. However, at the same time, there is negligible improvement in the estimated coefficient of domestic investment. It indicates, tax on income, profits and capital gains has very distortionary effect on economic growth. This finding was contrary to the findings of fixed effect. The study further finds that inflation has negative effective on per capita GDP growth but not significant. In addition, in the research after incorporation of inflation, there is little increase in the estimated coefficient of trade and domestic investment. At the same time there is little downfall in the estimated coefficient of FDI and expenditure on R&D. This is a very contradictory finding, however, it helps us to determine what led growth

strategy we should follow? In other words, if we want trade and domestic investment led growth, should tolerate moderate inflation. And if we want to FDI and R&D led growth, and then we should strictly tackle the problem of inflation. Finally, the study find that political stability has positive impact on economic growth both direct and indirect way. Because, the study find that it also helps in improvement in the estimated coefficient of FDI, trade and domestic investment.

CHAPTER FIVE

5. CONCLUSION AND RECOMMENDATION

5.1 Introduction.

This chapter will address research aim, objective and hypothesis. It will also gives conclusion, limitation and the policy recommendations.

5.2. Address of research aim/ objectives/ Hypothesis:

5.2.1 The research first objective was to investigate the relationship between the FDI and economic growth of developing and transition countries. Study finds that there is positive and significant effect of FDI on economic growth. At the same time, our first hypothesis was that there is positive impact of FDI on economic growth. Our research shows that FDI has positive and significant effect on economic growth so we could reject the hypothesis. Therefore, on both account our research find as per objective and hypothesis.

5.2.2 The study second objective was to analyze and evaluate the effect of trade on economic growth, and hypothesis was that there is positive trade is positively related to per capita GDP growth. On this account also our study find that there is positive impact of trade on per capita GDP growth. So, here also our objective is met and we could not reject the null hypothesis.

5.2.3 Our third objective was to assess and evaluate through econometric model the effect of FDI and trade on economic growth. Our empirical results show that there is positive and significant effect of FDI on economic growth and trade has positive effect on growth. We find that our third objective met and our findings show expected results on the line of other empirical studies.

5.3 Conclusion:

The empirical research analyzes the role of FDI and trade in economic growth of developing and transition economies within endogenous growth theory framework. Using panel data relating to a sample of 29 developing and transition economies over the period 1996 to 2010. During research we come across theoretical, empirical and econometric analysis. Our research find hat there is contradiction among theories and empirical findings show mixed results. Our econometric analysis shows that the FDI and trade contribute towards advancing economic growth in developing and transition economies.

Furthermore, the results implying that there is strong positive effect of domestic investment and growth of indigenous R&D on economic growth. FDI and trade are not the only way to achieve long-term economic growth in developing and transition economies. Our study also finds that sound macroeconomic policies and political stability play an important role in the determining the effect of other variables on economic growth. In addition, our findings show that tax structure is major huddle in the economic growth of developing and transition countries. Inflation and government consumption do affect growth but not like tax. At the same time, we also find that increase in government consumption for productive purpose does not have negative effect on economic growth. We can say that FDI and trade help in economic growth to developing and transition countries but they are not the sole determinants of growth rate as well as their ultimate effect depends on the tax structure, inflation rate, quality of government consumption and country specific other economic and social determinants of growth.

5.4 Limitations of the Study.

First, there is large number of countries as per World Bank list of developing and transition economies, but FDI and trade related data are not available for some of the countries. Therefore, number of countries may be less than World Bank list of developing and transition economies.

Second, there is large number FDI and trade theories available in the literature but due to time constrain and word limit of the dissertation, this research work only gave overview of some of the relevant theories to the purpose of the academic writing.

5.4 Policy Implications

The study show that FDI and trade have positive effect on per capita GDP growth as well as domestic investment and expenditure on R&D are important determinants of growth. At the same time tax, inflation and government consumption have negative on growth. Therefore policies recommendation can divide into two parts in the case of the study:

- Policies that can help in extract maximum benefit from FDI and trade.
- Policies that contribute to maximizing the gains from domestic investment and R&D development.

5.4.1 Policies, which can help to extract maximum benefit from FDI and trade.

- As we found during our research that technological gap and human resources quality are major determinant of spillovers effect of FDI and trade. Therefore, government should spend more on education and training. Because, this will increase the gains from FDI and trade as well as it also increase the domestic investment.
- We have found in our research that incidence of tax has harmful effect on gains from FDI and trade as well as domestic investment. Therefore government should liberalize tax structure so that its impact on growth should be minimized.
- Special attention should be paid towards the creation of good infrastructure. Because, it's not only enhance gains from FDI and trade

but also increase total factor productivity and domestic investment in the economy.

- Attention should be given to creating effective regulatory body. Because, in absence of effective regulatory body, cost of business and other distortary effect get increased.
- Policy maker should ensure sound macroeconomic policies, stable exchange rate, low inflation rate and proper property rights because all these factors directly and indirectly affect the gains from FDI and trade.

5.4.2 Policies recommendation that can contribute to enhancement in domestic investment and R&D.

As we found in our research that domestic investment and expenditure on R&D play an important role in growth. Keeping these findings in mind we can recommend following steps:

- Government should promote the saving habit of the people. In this regards, government should make proper and accessible facilities for saving mobilization. Such as banking operation should penetrate into non-banked areas.
- Special saving products should design so that even low-income group can take part into savings mobilization.
- Incentive should give to the group or individual who save more and spend less.
- Government should increase the spending on indigenous R&D. For this purpose, special tax may impose on highly profits generating activities for resources mobilization.
- Research and development institutions should collaborate with industrial houses.

- Tax and other benefits should be provided to the industries which are spending more on the development of indigenous technology

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7. Appendix

7.1 List of Countries

Table 6 - List of Countries

Argentina	Georgia	Mongolia	
Armenia	India	Pakistan	
Azerbaijan	Indonesia	Peru	
Belarus	Kazakhstan	Philippines	
Bulgaria	Kyrgyz Republic	Poland	
China	Latvia	Romania	
Estonia	Lithuania	Russia	
Czech Republic	Malaysia	Slovak Republic	
Estonia	Mexico	Slovenia	
Tajikistan	Ukraine		

Appendix 7. 2. List of variables

Table 7 - List of variables

Variables	Source
Growth	GDP per capita growth (WDI, 2012)
Government Consumption	Government final consumption expenditure (% GDP)[WDI, 2012]
Expenditure on R&D	Total government expenditure on R&D(% of GDP)[WDI, 2012]
Investment	Gross Capital formation ((% of GDP) [WDI 2012] express in log form
Inflation	Measure by CPI (annual %)[WDI, 2012].
Trade	Exports plus imports (%of GDP) [WDI,

	2012]
FDI	Foreign direct investment (%of GDP) [WDI, 2012]
Tax	Tax on income, profits and capital gains in the host country expressed as percentage of revenue [WDI, 2012]
Political Stability	Estimate of governance (ranges from approximately -2.5 (weak) to 2.5 (strong) governance performance) [WGI,2011]

Appendix 7.3 Pairwise Correlation

```
. pwcorr LGDPPC LFDI LInvestment LTrade LGC LInflation LTax LRDex LPstability
```

	LGDPPC	LFDI	LInvestment	LTrade	LGC	LInflation	LTax	LRDex	LPstability
LGDPPC	1.0000								
LFDI	0.2215	1.0000							
LInvestment	0.2597	0.3483	1.0000						
LTrade	0.1190	0.2349	0.2046	1.0000					
LGC	-0.0147	0.0619	0.0907	0.2931	1.0000				
LInflation	-0.0133	-0.0802	-0.1207	-0.0001	-0.0542	1.0000			
LTax	-0.1359	-0.0185	0.1555	-0.1085	-0.3548	-0.1748	1.0000		
LRDex	0.1077	0.0195	0.2180	0.0337	0.5808	-0.0095	-0.1042	1.0000	
LPstability	0.1563	0.2290	0.1189	0.1275	0.0760	-0.0400	-0.0214	-0.0214	1.0000

Appendix-7.4 Descriptive Statistics

```
sum LGDPPC LFDI LInvestment LTrade LGC LInflation LTax LRDex LPstability
```

Variable	Obs	Mean	Std. Dev.	Min	Max
LGDPPC	371	1.574823	.738541	-2.169322	3.497431
LFDI	423	1.123482	.9528687	-3.498454	3.809987
LInvestment	435	3.171141	.2931756	2.201901	4.060278
LTrade	435	4.35553	.5485393	2.703562	5.395475
LGC	435	2.665927	.330574	1.738757	3.380761
LInflation	417	1.850388	1.070346	-2.228324	6.964489
LTax	412	2.794837	.6728724	.3185636	4.163589
LRDex	393	-.8429396	.8292977	-3.045694	.6807709
LPstability	369	2.972125	1.5943	-6.204574	4.560937

Appendix-7.5 Hausman Test

Appendix 7.7 Random Effect Model

```
xtreg LGDPPC LFDI LTrade LInvestment LRDex LGC LTax LInflation LPstability, re
```

Random-effects GLS regression

Group variable (i): country

Number of obs = 292
Number of groups = 29

R-sq: within = 0.1426
between = 0.2579
overall = 0.1702

Obs per group: min = 3
avg = 10.1
max = 14

Random effects u_i ~ Gaussian
corr(u_i, X) = 0 (assumed)

Wald chi2(8) = 50.81
Prob > chi2 = 0.0000

	LGDPPC	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
LFDI		.0446229	.0461068	0.97	0.333	-.0457448 .1349906
LTrade		.3275053	.1190867	2.75	0.006	.0940997 .560911
LInvestment		.6942519	.1665418	4.17	0.000	.3678359 1.020668
LRDex		.1334746	.0819688	1.63	0.103	-.0271813 .2941305
LGC		-.6599737	.1877738	-3.51	0.000	-1.028003 -.2919439
LTax		-.1857836	.0826347	-2.25	0.025	-.3477446 -.0238226
LInflation		-.0166299	.0398777	-0.42	0.677	-.0947888 .0615291
LPstability		.0062506	.028645	0.22	0.827	-.0498925 .0623937
_cons		.3136614	.8368427	0.37	0.708	-1.32652 1.953843
sigma_u		.30043977				
sigma_e		.51718406				
rho		.25231507	(fraction of variance due to u_i)			

Appendix 7.8 Generalized Least Square

```
xtgls LGDPPC LFDI LTrade LInvestment LRDex LGC LTax LInflation LPstability
```

Cross-sectional time-series FGLS regression

Coefficients: generalized least squares
Panels: homoskedastic
Correlation: no autocorrelation

Estimated covariances = 1
Estimated autocorrelations = 0
Estimated coefficients = 9

Number of obs = 292
Number of groups = 29
Obs per group: min = 3
avg = 10.06897
max = 14

Wald chi2(8) = 78.67
Prob > chi2 = 0.0000

Log likelihood = -262.5879

	LGDPPC	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
LFDI		.1010485	.0420393	2.40	0.016	.0186529 .1834441
LTrade		.1170944	.0788777	1.48	0.138	-.037503 .2716919
LInvestment		.6873129	.1483399	4.63	0.000	.3965719 .9780539
LRDex		.0910291	.0599546	1.52	0.129	-.0264799 .208538
LGC		-.5189249	.1576389	-3.29	0.001	-.8278914 -.2099584
LTax		-.3322094	.0606113	-5.48	0.000	-.4510052 -.2134135

LInflation		-.0066438	.0372028	-0.18	0.858	-.0795599	.0662723
LPstability		.0099015	.0272228	0.36	0.716	-.0434541	.0632571
_cons		1.148901	.6685318	1.72	0.086	-.1613974	2.459199
