THE IMPACT OF FOREIGN DIRECT INVESTMENT ON ECONOMIC GROWTH IN TANZANIA 1975-2013

USWEGE ASAJILE

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CERTIFICATION

The undersigned certifies that he has read and hereby recommend for acceptance by the Open University of Tanzania a dissertation titled*: " The Impact of Foreign Direct Investment on Economic Growth in Tanzania 1975-2013"* in fulfillment of the requirement for the award of degree of Master of Science (Economics) of the Open University of Tanzania

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Dr. Felician R. Mutasa

(Supervisor)

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DECLARATION

I, Uswege Asajile do hereby declare that this dissertation is my own original work and it has not and will not be submitted in any other University for similar or any other degree award.

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DEDICATION

I dedicate this work to my wife Wiltrudis and my son Allan and to my beloved parents Mr & Mrs Asajile who inspired me in my education.

I love you all.

ABSTRACT

This study examined the dynamic relationships among GDP growth rate, FDI, trade openness, inflation rate and government spending in Tanzania over the period 1975-2013. There is influx of FDI in Tanzania but its contribution to GDP growth and human development is limited, the FDI attraction like tax holiday bring a hot debate. The study utilized both the Augmented Dickey-Fuller (ADF) and the Philip Perron (PP) tests to examine the properties of the variables. It was observed that the variables were stationary, although not in their level form but in their first difference. It was also observed that all the variables except GROWTH, are not cointegrated .

The study also found that GROWTH is cointegrated with the rest of the variables (i.e., there exists a long run relationship between growth and the rest of the variables). The ARDL results show that the coefficient of GDP growth lagged once, The rest of the variables, however, appear to be not statistically significant.

Furthermore, the results show that GROWTH and trade openness considered individually Granger cause FDI and the rest of the variables do not. However, when considered jointly, the variables jointly appear to Granger cause FDI. In addition, GROWTH appears to Granger cause trade openness. Also, no variable appear to Granger cause the government spending. We therefore, accept the null hypothesis and conclude that, there is no causality of whatever. As a policy options, the Tanzania's government should encourage macroeconomic policies that favour and promote the FDIs, and also should be more open to the international markets in light of promoting economic growth and development while at the same time, trying to curb inflation.

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LIST OF ABBREVIATIONS AND ACRONYMS

ADF	Augmented Dickey-Fuller
AIC	Akaike Information Criterion
ARDL	Autoregressive Distributed Lag
DF	Dickey –Fuller
ERP I & II	Economic Recovery Programme I & II
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GNP	Gross National Product
HIPC	Highly Indebted Poor Countries
HQC	Hannan –Quinn Criterion
IMF	International Monetary Fund
IPC	Investment Promotion Center
M & A	Mergers & Acqusations
MNCs	Multinational Corporations
MNEs	Multinational Enterprises
NIPPA	National Investment Promotion and Protection Act, 1990
OECD	Organization for Economic Cooperation and Development
TIC	Tanzania Investment Center
TIR	Tanzania Investment Report
TNCs	Transnational Corporations
SSA	sub-Saharan Africa
WB	World Bank
WIR	World Investment Report

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background to the Problem

Over recent decades, foreign direct investment (FDI) by multinational corporations (MNCs) has become a prime source of external financing for developing countries. This is important because, given the smallness of the economies of these countries, the revenue collection is small and hence FDIs supplement domestic saving efforts and narrow down the resource gaps. FDI are also important to developed and emerging economies.

FDI is defined as business investment in another country, which often takes the form of setting up local production facilities (through Greenfeld) or purchase of an existing business through merger and acquisitions (Rutherford, 1992: pp 178; 1995: pp 178-179) FDI are normally undertaken by multinational enterprises (MNEs) also known as transnational corporations (TNCs) which must have at least 10 percent of the equity shares.

The OECD has defined FDI to be a category of cross-border investment made by a resident in one economy (the direct investor) with the objective of establishing a lasting interest in an enterprise (the direct investment enterprise) that is resident in an economy other than that of the direct investor." The "lasting interest" is defined as an investment that allows the investor to own at least 10 percent of the voting power of the target enterprise. FDI do not include the purchase of shares (OECD benchmark definition of FDI-fourth edition, 2008).

FDI is a powerful instrument for economic growth and human development. Economic growth refers to an increase in the capacity of an economy to produce goods and services, compared from one period of time to another. Economic growth can be measured in nominal terms, which include inflation, or in real terms, which are adjusted for inflation. For comparing one country's economic growth to another, GDP or GNP per capita should be used as these take into account population differences between countries. Economic growth rate is a measure of economic performance from one period to another in percentage terms. In practice it is a measure of the rate of change that a nation's gross domestic product goes through from one year to another. Gross national product (GNP) can also be used if a nation's economy is heavily dependent on foreign earnings of its nationals. By increasing openness to the international economy, a country may benefit in a number of ways including through technological diffusion. For the purpose of this study, openness strictly refers to trade openness and is proxied by the ratio of the sum of exports and imports to the real GDP of a country.

Within the economic theory framework, several channels are identified through which FDI can affect economic growth of the host country (Khalid & Noy, 2007). There is a general theoretical consensus among development practitioners that FDI inflows are likely to play a critical role in explaining growth of recipient countries (de Mello, 1997). Empirical evidences on FDI-growth nexus, however, are mixed and sometimes ambiguous and inconclusive. Such a contradiction between theory and empirical evidence thus calls for further empirical scrutiny of the static and dynamic relationship between the two variables, in Tanzania's context.

In theory, the mechanism by which FDI may affect host country's economies is largely through externalities. The mechanisms for these externalities are the adoption of foreign technology and know-how which can happen via licensing agreements, imitation, employees training, and the introduction of new processes, and products by foreign firms; and the creator of linkages between foreign and domestic firms (Alfaro & Canda, 2006). Due to its potential knowledge transfer, job creation, boost overall productivity and enhance competitiveness and entrepreneurship, attracting FDI to developing countries is an important endeavor to boost GDP growth, achieve sustainable development and hence reduce poverty.

1.2 Statement of the Problem

The macroeconomic and institutional reforms in Tanzania that started in the mid-1980s have resulted into restoration of macroeconomic stability. Despite increasing openness and the country receiving huge influx of FDI over recent decades, policy makers, researchers and politicians are concerned that their contribution to GDP growth and human development is limited. Recently, the special merits of FDI and particularly the kinds of incentives offered to foreign firms in practice have begun to be questioned. This is so because empirical evidence for FDI generating positive spillovers for host countries is mixed at both micro and macro levels. While FDI positive spillovers is reported by Cave (1974) in Australia and by Kokko (1994) in Mexico, Haddad and Harrison's (1993) findings in Morocco and Aitken and Harrison's (1999) in Venezuela do not support the positive spillovers hypothesis. In addition, the determinants of FDI attraction to Tanzania including incentives like tax holidays have spurred a hot debate in many front and their valid needs a closer

empirical scrutiny. Given this backdrop, the current study seeks to address the problem of FDI-growth relation in Tanzania using the wide span of data set from the period from 1975 to 2013, with the aim of invoking some useful policy implications.

Previous empirical studies done on the relationship between FDI-GDP growth nexus have tendered to employ Ordinary Least Squares (OLS) estimation method which may suffer from the problem of endogeneity and if proper care is not taken may results into spurious regression. Given this backdrop, the current study employs the Autoregressive Distributed Lag (ARDL) Model or "Bounds Testing" procedure for Cointegration. This approach is more robust than other methods since it has many advantages including its ability to address the problem of endogeneity automatically. Moreover, we expect to extend the period of study from 1975 to 2011 hoping that given a wide range of time, our results might be more robust than previous studies.

The relationship between FDI and the rate of economic growth is critically important for policy making and therefore, calls for further empirical scrutiny. The current study seeks to re-examine the determinants of FDI in Tanzania and then re-assess the FDI-GDP growth nexus in the context of Tanzania. More overall, the current study sets out to examine the causal relationship between FDI and GDP growth in Tanzania.

1.3 Objectives of the Study

The general objective of the study is to analyze the dynamic relationships between FDI and GDP growth rate in Tanzania for the period 1975-2013. Specific objectives are:

i) To analyze the causal link between FDI and GDP growth rate;

ii) To examine the impact of trade openness on economic growth measured in terms of GDP per capita growth;

iii) To examine the causal impact of government spending (GOV) on GDP growth rate;

iv) To examine the causal link between inflation and economic growth; and

1.4 Significance of the Study

It is hoped that the current study will bring new evidence on the relationship between FDI and GDP growth in Tanzania and therefore, invoke some important policy debate that are important for policy makers. It will also bring out some current issues on the effectiveness of FDI to host countries and how they relates to GDP growth especially during this the period of the global economic and financial crisis aftermath.

1.4 Hypotheses

i) In the current study, it is postulated that FDI has a positive impact on GDP growth rates. The impact emanates from the impact that FDI may compliment domestic saving efforts and hence promote investment in the economy. It is also hypothesized that FDI may have spillover effect on the domestic economy and therefore promote high GDP growth;

ii) In the endogenous growth theory (EGT), trade openness is postulated to impact GDP growth positively, through innovation, incentives, technology diffusion and

knowledge dissemination.

iii) Government spending is hypothesized to have positive effect on GDP growth largely through expansionary power in the aggregate demand framework, although this depends on the nature of spending since some spending (unproductive) may retard economic growth.

iv) Inflation has positive impact on GDP growth rates.

1.5 Organization of the Study

Apart from this introduction, the rest of the dissertation is organized as follows: chapter two discussed the economic performance and FDI. In chapter three reviews the existing theoretical and empirical literature both from outside Tanzania and on Tanzania. In chapter four, we discuss modeling issues and explain the methodology, specify the model to be estimated and provide the nature and sources of the data that is used in estimation. Chapter five provides the estimation results and their discussion. Chapter six provides the conclusion and draws up policy implications based on the estimated results.

CHAPTER TWO

2.0 ECONOMIC PERFORMANCE AND FDI

2.1 Economic Performance

The Tanzania's economy recorded robust GDP growth and development from 1961 to early 1970s, thereafter; however, the economy underwent a severe recession. Beginning mid-1970s up to mid-1980s, the economy deteriorated sharply largely on account of institutional weaknesses and macroeconomic policy failure. The origin, nature, consequences and the various attempts to address these economic drawbacks are well documented in literature (Lele, 1995; Lipumba & Ndulu, 1989). Due to economic slowdown from mid-1970s to mid 1980s, foreign resources in the form of foreign aid, FDIs became scarce in Tanzania.

Beginning 1986, the government of Tanzania embarked on the pursuit of serious and deep institutional and macroeconomic reforms under the auspices of the IMF/WB. The reforms included liberalizing the country's economy in light of fostering rapid economic growth and achieving fast human development. The reforms included liberalizing agricultural markets and inputs distribution; deregulating prices, exchange rates liberalization, wages and interest rates; rationalizing the tariffs structure; adopting a national investment policy; initiating fiscal and monetary policy; civil service reform, restructuring parastatals; and financial sector reforms. In effective implementation of the reforms, the private sector was envisaged to become the engine of the economy with the government playing a role of creating an enabling environment. Immediately the country initiated the Economic Recovery

Programmes implemented from 1986 up to 1992 [ERP I (1986-1989) and ERP II (1989-1992)]. Foreign resources became available, although the economy did not immediately stabilize. It was during this same period that the influx of FDI to the country had started to increase (Economic Surveys, various). As part of the reforms, in February 1990, the government adopted a National Investment Promotion and Protection Act, 1990 (NIPPA, 1990) to enhance the investment climate. The Act established an Investment Promotion Center (IPC) to approve, monitor, and facilitate FDI inflows as well as local investment. NIPPA was subsequently replaced by the Tanzania Investment Act 1997, and the IPC was transformed into the Tanzania Investment Centre (TIC). Economic stability and peace and tranquility in the country, coupled with other FDI attracting incentives have paid a positive dividend (Table 1). Generally, Tanzania is now an investor friendly country attracting more FDI than many sub-Saharan African (SSA) countries as a result of sound market environment. Between 1992 and 1995, FDI increased from US$ 12 million to US$ 150 million, and further to US$ 260.2 in 2004. The ratio of investment to GDP increased from 14.8 percent in 1997 to 21 percent in 2004.

Table 2.1: Tanzania's Selected Macroeconomic Indicators, 2005-2011

Indicator	2008	2009	2010	2011
Population	39.3	40.7	43.2	44.5
GDP growth (%)	7.4	6	7	6.4
GDP per capita (US$)	525	526	547	558
CPI average inflation rate (%)	10.3	12.1	7.6	12.6
Exports of goods and services/GDP(%)	26.9	23.8	27.6	30.6
Imports of goods and services/GDP(%)	41.9	35	39.1	49.9
CAB/GDP (%)	-12.4	-8.4	-8.5	-16.5
CAB*/GDP* (%)	-15.3	-11.4	-11.9	-19
Average exchange rate (TZS/US$)	1,196.9	1,306.0	1,395.7	1,557.4
Official reserves (US$ million)	2,872.6	3,552.5	3,948.0	3,744.6
Reserve months of imports	4	5.6	5.2	3.7

Source: Bank of Tanzania, National Bureau of Statistics, 2012

2.2 FDI trends

FDI is considered a "key driver of international economic integration" that, given the right policy frameworks and strong institutions can provide financial stability, promote economic development and enhance the well being of societies (UNCTAD, 2013). In the context of growing global financial integration in the last few decades, FDI flows have been increasing steadily, at least until the recent economic crisis that began in 2007-2008, when things started to turn sour. However, according to UNCTAD (2013), which manages worldwide FDI statistics, 2011 saw some growth of global FDI inflows, coming in at US$1,524 billion compared to US$1,309 billion in 2010. Even in 2008, for example, when the crisis had already begun, global FDI inflows measured US$1,790 billion (Table 2).

Table 2.2: Recent Trends in FDI flows by region 2007-2011 (in Billion US$)

	Inward FDI						Outward FDI			
Economy	**2007**	**2008**	**2009**	**2010**	**2011**	**2007**	**2008**	**2009**	**2010**	**2011**
World	2,100	1,791	1,198.4	1,309	1,524.5	2,268	1,969.4	1,175.1	1,451.3	1,694.40
Developing economies	565	650	519.	616.7	684.4	292	328.1	268.5	400.1	383.80
Transition economies	91	121	73.4	73.8	92.2	52	60.5	48.8	61.6	73.10
Developed economies	1,444	1,020	606	618.6	747.9	1,924	1,580.8	857.8	989.6	1,237.50

Source: UNCTAD, 2012 [see also: UNCTAD, FDI/TNC database (www.unctad-org/fdistatistics)]

Since independence, the country has formulated and implemented various economic growth and development strategies that were embodied in the two-long term development Visions, the first, Socialism and Self Reliance (1967-1986) and; the second one which is still ongoing is the Tanzania Development Vision 2025 (Phase I & II). The main focus of the early Vision was to fight the three arch enemies namely

ignorance, poverty, and disease. During the first years of independence the country recorded robust economic growth and development in various measures were highly encouraging, though soon, these successes were eroded in what was termed the economic crisis of Tanzania.

Despite these efforts, Tanzania started experiencing a number of problems beginning in the early and mid-1970s, which were both internal and external shocks, but largely on account of institutional weaknesses and macroeconomic imbalances. The national efforts to improve economy and combat poverty through centrally directed that resulted in a significant improvement in per capita income and access to education, health and other social services until 1970s. Thereafter, these gains could not be sustained due to various domestic and external problems as well as policy weaknesses.

2.3 Investment Trends

In 2012, Tanzania Investment Center (TIC) has recorded a remarkable volume of investment projects, amounting to a total of 869 projects worth USD 19.7 billion compared to 826 projects worth USD 7.2 billion in 2011 (Economic Surveys, 2013). These projects created 174,412 employment potentials compared to 79,101 employment potentials in 2011. Out of 869 projects registered, 469 projects (54 percent) were owned by Tanzanians, 205 projects (23.5 percent) were owned by foreign investors, and 195 projects (22.5 percent) were joint ventures between Tanzanians and foreign investors. Projects owned by Tanzanians invested USD 10.6 billion and created 94,130 employment opportunities, foreign investors' projects

invested USD 4.6 billion and created 41,144 employment opportunities, and the joint venture projects invested USD 4.4 billion and created 39,137 employment opportunities (Economic Surveys, 2013).

The mining sector has also continued contributing to economic growth, although its share has not been increasing over recent years. In 2012, the mining sector contributed merely 4.6 percent of the GDP, despite the increase in investment in the sector. Gold mining in particular has received a handsome influx of investments and there are several gold mines in the country. Historically, the gold mining started well during the colonial period. The first gold mine in what was then Tanganyika, the Sekenke Gold Mine, began operation in 1909, and gold mining in Tanzania experienced a boom between 1930 and World War II (Wikipedia: retrieved 07/27/2014, 15:07 hrs). By 1967, gold production in the country had dropped to insignificance but was revived in the mid-1970s, when the gold price rose once more. In the late 1990s, foreign mining companies started investing in the exploration and development of gold deposits in Tanzania, leading to the opening of a number of new mines, like the Golden Pride mine, which opened in 1999 as the first modern gold mine in the country, or the Buzwagi mine, which opened in 2009. Today, Chinese firms have been showing major interest in Tanzania's mineral deposits; an announcement was made in late 2011 of a plan by the Sichuan Hongda Group, to invest about USD3 billion to develop the Mchuchuma coal and Liganga iron ore projects in the south of the country. It was also announced in August 2012 that China National Gold Corp are in talks to purchase mining assets in Tanzania from African Barrick Gold, in a deal that could be worth more than £2 billion.

Tanzania has regained a worldwide recognition on its potentials of other minerals, including uranium, diamonds and cobalt. Several foreign companies are either operating or have shown interest to invest in Tanzania. During the period of 2000-2013, a discovery of huge deposits of natural gas was made in Mkuranga (2007), Kiliwani (2008), Ntorya (2012) and in deep sea.Leading companies in the sector include PETROBRAS, SHELL, OPHIL, and STATOIL. It is evident that investment in the petroleum sector will keep on increasing as more wells are discovered.

According to the WIR (2011), FDI in services sector (business services, finance, transport and communications and utilities), and the financial industry declined in 2010. The share of manufacturing activity rose to almost half of all FDI projects except for business-cycle sensitive industries such as metal and electronics. The food, beverages and tobacco, textiles and garments, and automobile industries recovered in 2010 but the mining and quarrying industries registered a decline compared to the growth recorded during the crisis. Likewise the chemical industry (including pharmaceuticals) remained resilient in attracting FDIs throughout the crisis period (Tanzania Investment Report, 2012).

Over recent years, Tanzania has managed to attract a significant influx of foreign resources in various sectors both FDIs and domestic direct investment (Malyamkono and Mason, 2006). The influx is especially huge in the mining sector, whose contribution was smaller during the pre-reform period. The mining activities particularly natural gas and petroleum are today in the vanguard in terms of attracting FDIs although its contribution to GDP is still low. According to

Malyamkono *et. al.,* (2006), sound national and sectoral policies and investment legislations has drawn in investors from more than 70 countries. FDI have increased from an average of US$ 18 million per annum between 1990/97 to an average of US$ 325 million per annum between 1998 and 2003.

Generally, Tanzania is now an investor friendly country attracting more FDIs that many Sub-Saharan African countries as a result of sound market environment. The management of national debt stock has been contributing to strong and stable economic growth. The national debt stock stood at USD 8.02 billion in 1995 and declined to USD 7.3 billion in 1998, however, the stock slightly increased to USD 9.22 billion in 2004. With the objective strengthening debt management (both external and domestic), Government launched a National Debt Strategy in August 2002. Through the guidance of the World Bank, the Poverty Reduction Strategy Paper (PRSP I) was introduced and the country became illegible to HIPC debt relief initiative and hence, Tanzania managed to secure debt relief from both bilateral and multilateral institutions.

Over recent years, the private sector has been taking a vanguard position is considered to be the engine of growth. The government continued with its efforts to foster private sector development by creating conducive investment and business environment for investors. During the past decade, a remarkable achievement has been registered in terms of projects established, revenue and employment generated. In respect to privatization process, about 80 percent of public enterprises earmarked for divestiture had been privatized, divested to local, foreign and on joint ventures

between local and foreign investors by the end 2004. With objective of improving business environment, the Government has strengthened the effectiveness of Tanzania Investment Center (TIC) in promoting and facilitating private sector development. In addition, Business Environment Strengthening for Tanzania (BEST) Programmed has be launched and aims at providing enabling environment for private sector development in terms of better policy, administrative, legal regulatory and judicial environment.

Table 3 shows that FDI inflows to Tanzania has increased several fold between 2000 and 2012. The amount increased from US$ 463.0 to US$ 1806.0 in 2012, equivalent to 290 percent. This surge has been largely on account of the investment boom in the petroleum and natural gas activities in Tanzania. This impetus has contributed significantly not only to economic growth but also to increase in employment in Tanzania (Table 2.3).

Table 2.3: Recent Trends of FDI Inflows to Tanzania 2000-2012

2000	463.40
2001	467.20
2002	387.60
2003	308.20
2004	330.60
2005	447.60
2006	616.60
2007	653.40
2008	744.00
2009	558.40
2010	1800.00
2011	1330.00
2012	1806.00

Source: WIR, 2012

With increasing integration of international capital markets, global FDI flows grew strongly in the 1990s at the rates well above those of world economic growth and trade (Petterson, *et.al.,* 2004). Recorded global inflows grew by an average of 13 percent a year during 1990-97. Driven by large cross-border mergers and acquisition (M&A), these inflows increased by an average of nearly 50 percent a year during 1998-2000, reaching a record US$ 1.5 trillion in 2000 (Table 4). Inflows declined to US$ 729 billion in 2001, mostly as a result of the sharp drop in cross-boarder M&A among the industrial countries, coinciding with the correction in world equity markets. Worldwide, the value of cross-border M&A declined from the record US$ 1.1 trillion in 2000 to about US$ 600 billion in 2001. The industrial countries have long dominated the FDI inflows and outflows and accounted for 94 percent of outflows and over 70 percent of inflows in 2001 (Table 3). Inflows to developing countries grew by an average of 23 percent a year during 1990-2000.

Table 2.4: Regional Allocation of FDI Inflows (Billions US$)-1990-2001

	1990-94 (Average)	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**
Total	**197.7**	**327.9**	**372.9**	**461.4**	**690.4**	**1076.6**	**1489.8**	**729.2**
Industrial Countries	137.7	205.5	226.4	272.3	486.5	844.8	1241.5	513.8
Developing Countries	59.9	122.4	146.5	189.1	203.9	231.8	248.3	215.4
Africa	2.7	5	5.3	9.8	7.5	9.7	7.5	17.7
Asia of which	33.5	66.3	74.4	82.8	87	99.9	128.2	91.4
China	16.1	35.8	40.2	44.2	43.8	38.8	38.4	44.2
Hong Kong SAR	0	0	0	0	14.8	24.6	61.9	22.8
Europe	4.4	17.4	16.7	22.3	26.6	29.3	30.1	31.2
Middle East	3.6	3.2	5.8	8	9.3	4.9	6.5	5.7
Western Hemisphere of which	15.7	30.5	44.4	66.2	73.5	88	76	69.5
Argentina	3	5.6	6.9	9.2	7.3	24	11.7	3.2
Brazil	1.7	4.9	11.2	19.7	31.9	28.6	32.8	22.6
Mexico	5.4	9.5	9.2	12.8	11.9	12.5	14.2	24.7

Source: IMF, 2004

According to the World Investment Report (WIR, 2014), in 2013, FDI flows returned to an upward trend. Global FDI inflows rose by 9 per cent to $1.45 trillion in 2013. FDI inflows increased in all major economic groupings − developed, developing, and transition economies. Global FDI stock rose by 9 per cent, reaching $25.5 trillion.

Table 2.5: FDI Flows, by Region 2011-2013 (Billions of Dollars & Percentage)

Region	FDI Inflows			FDI Outflows		
	2011	2012	2013	2011	2012	2013
World	**1700**	**1330**	**1452**	**1712**	**1347**	**1411**
Developed Economics	880	517	566	1216	853	857
European Union	490	216	246	585	238	250
North America	263	204	250	439	422	381
Developing Economies	725	729	778	423	440	454
Africa	48	55	57	7	12	12
Asia	430	414	414	369	362	367
Eastern and Southern Asia	333	334	334	334	334	334
Southern Asia	44	32	36	13	9	2
West Asia	53	48	44	22	19	31
Latin America and Caribbean	244	256	292	111	124	115
Oceania	2	3	3	1	2	1
Transitional Economies	95	84	108	73	54	99

Source: UNCTAD, FDI – TNC-GVC, 2013

Table 2.5 shows that the FDIs share between developed and developing economies have been fluctuating. Inflows to developing economies have been high in 2012 (55 percent) and 2013 (54 percent) compared to the percentage received by developed economies in the same period. In contrast, however, FDI outflows, however, has always been high from developed economies to developing economies. Transitional economies have received and given out the least shares which are well below 10 percent (Table 2.5).

UNCTAD projects that global FDI flows could rise to $1.6 trillion in 2014, $1.75 trillion in 2015 and $1.85 trillion in 2016. The rise will be mainly driven by investments in developed economies as their economic recovery starts to take hold and spread wider. The fragility in some emerging markets and risks related to policy uncertainty and regional conflict could still derail the expected upturn in FDI flows. As a result of higher expected FDI growth in developed countries, the regional distribution of FDI may tilt back towards the "traditional pattern" of a higher share of developed countries in global inflows. Nevertheless, FDI flows to developing economies will remain at a high level in the coming years.

In the previous Report, (WIR, 2013), it was shown that the global FDI flows declined to 38.1 percent to US$ 2,366.3 billion in 2009 following the global financial crisis. Afterwards the flows rose to US$ 2,913.5 billion in 2010 and further to US$ 3,329.5 billion in 2011. Despite the increase however, the flows still remained some 23 percent below the 2007 peak. In terms of inflows, FDI dropped in 2009 and then picked up gradually in 2010 as the global economy recovered from the financial crisis (Table 6).

Table 2. 6: Global FDI Flows, 2005-2013 US$ Billion

FDI Flows	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Total	**1,864.7**	**2,878.4**	**4,274.7**	**3,821.7**	**2,366.3**	**2,913.5**	**3,329.5**	**2,677.0**	**2,863.0**
FDI Infows	982.6	1,463.4	2,002.7	1,816.4	1,216.5	1,408.5	1,651.5	1,330.0	1,452.0
FDI Outflows	882.1	1,415.1	2,272.0	2,005.3	1,149.8	1,504.9	1,678.0	1,347.0	1,411.0
Change in FDI (%)		54%	49%	-11%	-38%	23%	14%	-20%	7%

Source: World Investment Report, 2013

According to the WIR (2013), although FDI to developed economies resumed its recovery after the sharp fall in 2012, it remained at a historically low share of total global FDI flows (39 per cent), and still 57 per cent below its peak in 2007. Thus, developing countries maintained their lead over developed countries by a margin of more than $200 billion for the second year running. Developing countries and transition economies now also constitute half of the top 20 economies ranked by FDI inflows. Mexico moved into tenth place. China recorded its largest ever inflows and maintained its position as the second largest recipient in the world.

FDI by transnational corporations (TNCs) from developing countries reached $454 billion – another record high. Together with transition economies, they accounted for 39 per cent of global FDI outflows, compared with only 12 per cent at the beginning of the 2000s. Six developing and transition economies ranked among the 20 largest investors in the world in 2013. Increasingly, developing-country TNCs are acquiring foreign affiliates of developed-country TNCs in the developing world (WIR, 2013)

During the past decade, a remarkable achievement has been registered in terms of projects established, revenue and employment generated. In respect to privatization process, about 80 percent of public enterprises earmarked for divestiture had been privatized, divested to local, foreign and on joint ventures between local and foreign investors by the end 2004. In the last few decades, influx of FDI to both developing and developed countries has increased several folds over recent years. Global inward FDI flows, for example rose from US$ 54.1 billion in 1980, reaching US$ 207.7 billion in 1990 to a peak of US$ 1,401 billion in 2000. The amount dropped to US$ 565.7 billion between 2001 and 2003, though it peaked again to US$ 2,100 billion in

2007 (UNCTAD, 2010a). The World Investment Report (WIR) issued by the united nations centre for trade and development (UNCTAD) focusing on the period June 2011-june 2012, shows that for the past three years, Tanzania has attracted about 47 percent of all FDI flows in the five East African countries (Kenya, Uganda, Rwanda and Burundi).

Increased foreign capital inflows can help to narrow the savings gap (the gap between the domestic savings ratio and the desired level of investment ratio). FDI, therefore, should have positive effect on economic growth, particularly in developing countries which experience low productivity and capital stock deficiencies. The notion that FDI compliments sources of capital is, especially in developing countries is and therefore, it is important to create an FDI attracting environment, which is an important policy challenges. A central challenge is therefore; to create the necessary local and international environment to facilitate direct investment flows conducive to achieving national development priorities especially in the less developed SSA (United Nations, 2002: pp 9).

CHAPTER THREE

3.0 REVIEW OF LITERATURE

3.1 Introduction

In this chapter, we set out to review the literature on the FDI-economic growth nexus in the Tanzania context. We start by looking at the theoretical and conceptual framework in order to show how the theories link FDIs and other related variables to influence economic growth in Tanzania. The concepts are defined largely on account of avoiding potential ambiguities that might arise on their usage. Next we discuss the empirical evidences pertaining to the relations among the variables, in which we divide it into two sections. In the first we review some selected literature from outside Tanzania and in the second, we review the literature on Tanzania.

3.2 Theoretical Literature

3.2.1 The Theory Linking FDI and Economic Growth

Findlay (1978) re-modeled the Solow's model and assumed that the growth rate of technology diffusion is an increasing function of FDI. By distinguishing between inputs into foreign capital (a developed country) and domestic (a developing country), he argues that an increase in foreign capital increase domestic capital. However, he finds that the rate of technological transfer in a developing country is a decreasing function of both the relative technology gap and the share of FDI in the total capital stock.

Mankiw, Romer and Weil (1992) also modified the Solow's model and argued that omitting capital accumulation in the model would cause biased estimation of the

coefficient on saving and population growth. They argued that cross-country variations in income per capita are a function of variations in the rate of saving, the rate of population growth and the level of labor productivity.

Romer (1986) developed the endogenous growth theory in which technological change was introduced into a production process. Helpman (2004) argues that endogenous growth theory emphasized two critical channels for investments to affect economic growth: firstly, through the impact on the range of available products, and secondly, through the impact on the stock of knowledge accessible for research and development (R&D).

The endogenous growth frameworks have been applied extensively to examine the effects of FDI on economic growth through the diffusion of technology (Barro, 1990). The FDI can also promote economic growth through creation of dynamic comparative advantages that leads to technological progress (Balasubramanyam *et. al.,* 1996; Borensztein *et al.,* ,1998). Romer (1990) and Grossman and Helpman (1991) have calibrated Romer's (1986) model and assume that endogenous technological progress is the main engine of economic growth.

Romer (1990) argues that FDI accelerates economic growth through strengthening human capital, the most essential factor in R&D effort; while Grossman and Helpman (1991) emphasize that an increase in competition and innovation will result in technological progress and increase productivity and, thus, promote economic growth in the long run. In contrast to all these positive conclusions, Reis (2001)

formulated a model that investigates the effects of FDI on economic growth when investment returns may be repatriated. She states that after the opening up to FDI, domestic firms will be replaced by foreign firm in the R&D sector. This may decrease domestic welfare due to the transfer of capital returns to foreign firms. In this model, the effects of FDI on economic growth depend on the relative strength of the interest rate effects. If the world interest rate is higher than domestic interest rate, FDI has a negative effect on growth, while if the world interest rate is lower than domestic interest rate, FDI has a positive effect on growth.

Furthermore, Firebaugh (1992) lists several additional reasons why FDI inflows may be less profitable than domestic investment and may even be detrimental. The country may gain less from FDI inflows than domestic investment, because multinationals are less likely to contribute to government revenue; FDI is less likely to encourage local entrepreneurship; multinationals are less likely to reinvest profits; are less likely to develop linkages with domestic firms; and are more likely to use inappropriately capital-intensive techniques. FDI may be detrimental if it "crowds out" domestic businesses and stimulates inappropriate consumption pattern.

The endogenous growth theory provided a framework for a positive growth effects of trade though innovation, incentives, technology diffusion and knowledge dissemination (See for example., Young, 1991; Grossman and Helpman, 1991). Hausman *et. al.,* (2007) proposed an analytical framework linking the type of goods (as defined in terms of productivity level) a country specializes in to its rate of economic growth. In order to test empirically for this relationship, they defined an

index aiming at capturing the productivity level (or the quality) of the basket of goods exported by each country. Using various panel data estimators during the period 1962-2000, their growth regression showed that countries exporting goods with higher productivity levels (or higher quality goods) have higher growth performances.

In the monopolistic competition trade models with heterogeneous firms and endogenous productivity provide theoretical support for a positive impact of trade openness on growth. Indeed, the theory predicts productivity improvement in the country due to the exit of less efficient firms after trade liberalization or reduction in transport costs for example (Melitz, 2003).

In addition, a higher share of the most productive firms will start exporting, which translates into an increase in the variety of exports. As exporters are more productive on average than domestic firms, an increase in exports variety can be associated to rising country productivity (Huchet-Bardon, M., Le Movel, C and Vijil, M, 2009).

3.2.3 The Theory Linking Government Spending and Economic Growth

Proponents of government spending claim that it provides public goods that market generally do not, such as military defense, enforcement of contracts and police services. Standard economic theory holds that individuals have little incentive to provided these types of goods because others tend to use them without paying (free rider problem).

John Mynard Keynes (1936), advocated government spending, even if government has to run a deficit to conduct such spending. He hypothesized that when the economy is in a downturn and unemployment of labour and capital is high, government can spend money to create jobs and employ capital that have been unemployed or underutilized. Government spending in this context refers to the purchase of goods and services done by the government. The spending may be productive or unproductive. Government spending is said to be productive if it is directed to the productive sector in the sense of spending on investment (development expenditure). However, if the government spends its revenues on recurrent issues, such spending is deemed to be unproductive.

Keyne's theory has been one of the implicit rationales for stimulus spending during the global financial crisis. Taxes finance government spending, Therefore, an increase in government spending increase the tax burden on citizens-either now or in the future-which leads to a reduction in private spending and investment. This effect is known as "crowding out." In addition, to crowding out private spending, government outlays may also crowd out interest-sensitive investments (Fridmann, 1978).

Government spending reduces savings in the economy, thus increasing interests rates. This can lead to less investment in areas such as home building and productive capacity, which includes the facilities and infrastructure used to contribute to the economy's output. Analysis on a panel of OECD countries found that government spending also has a strong negative correlation with business investment (NBER).

Conversely, when governments cut spending, there is a surge in private investment.

3.2.4 The Theory Linking Inflation and Economic Growth

The inflation-growth nexus remains ambiguous both in theory and empirical literature. Theoretical models analyze the impact of inflation on growth focusing on the effects of inflation on the steady state investment and output. Different results are encountered on the relationship between inflation and economic growth in theoretical context. These are positive, neutral, negative or non-linear relationship between the two variables. The first result is originally related with the work of Mundell (1963) and Tobin (1965) that concludes positive relationship between economic growth and inflation.

Mundell (1963) is the first to show that expected inflation has a real economic effect using the IS-LM curves. He argues that the money rate of interest rises by less than the rate of inflation and therefore that the real rate of interest falls during inflation. He assumes that real investment depends on the real interest rate and real savings on real balances and also inflation decreases real money balances. This creates decline in wealth which in turn stimulates increased saving. He claims that the advantages and disadvantages of inflation are not only due to the failure of the community to anticipate it. Expectation of fluctuations in the rate of inflation has real effects on economic activity. When prices are expected to increase, the money rate of interest rises by less than the rate of inflation giving impetus to an investment boom and an acceleration of growth and vice versa (See also Girma, 2012).

Tobin (1965) assumes money as a store value in the economy and shows that

inflation has positive effect on economic growth. Money serves no useful role other than as a financial capital asset like physical capital. Tobin effect suggests that inflation causes individuals to acquire more capital than holding money because money and capital ratio depends negatively on the inflation rate, which leads to greater capital intensity and promotes economic growth. Tobin's framework shows that a higher inflation rate raises the level of output. However, the effect on output growth is temporary, occurring during the transition from one steady state capital stock to another steady state capital. Output and consumption therefore rise in the steady state. He also argues that, because of the downward rigidity of prices, the adjustment in relative prices during economic growth could be better achieved by the upward price movement of some individual prices.

Drazen (1981) studies the effect of inflation on demand for capital and the aggregate capital labor ratio in a finite-horizon utility-maximization model. The result shows that deriving saving and asset choice decisions from utility maximization do not in itself lead to superneutrality and that a finite horizon is crucial in explaining this difference. It is further shown that it is possible under very general conditions to show that increases in the rate of inflation will increase the aggregate capital-labor ratio which supports the conclusion of Mundell and Tobin.

Foreign Direct Investment (FDI) is particularly a key ingredient of successful economic growth in developing countries because the very essence of economic development is the rapid and efficient transfer and cross-border adoption of "best practices", be it managerial and technical best practice on deployment of technology

from abroad (Borensztein *et al.,* 1998). The proximity and better access to large market is also well known to attract FDI that in turn implies often accelerated technology transfer. As such better worker training dispensed by foreign investors has often been argued to raise the level of productivity. Countries can effect use such firms as catalysts that allow them to leapfrog stages in development. FDI can thus speed up the structural shift of the economy. FDI has also been argued to act as catalyst for inward investment by complementing local resources and providing a signal of confidence in investment opportunities (Agosin and Mayer, 2000).

Despite these theoretical underpinnings for anticipating a positive relationship between FDI on GDP growth, available empirical evidences are mixed (Wijeewere, Villano & Dollery, 2008). For instance, de Mello (1999) found that whether FDI contributes to the economic growth depends primarily on host country characteristics, especially the quantum of skilled labor. Borensztein *et. al.,* (1998) also established that although FDI has a positive impact on GDP, the magnitude of this effect depends on the level of human capital in the host country. It is also hoped that, the results from the study will inform policy makers on the key determinants of FDI in Tanzania and the better ways the country can reap from them.

According to Carkovic *et. al.,* (2002), theory provides conflicting predictions concerning the growth effects of FDI. Many countries offer special incentives to attract FDI with a belief that foreign investment produces externalities in the form of technology transfers and spillovers. Romer (1993), for example, argues that important "idea gaps" between rich and poor countries exist. He notes that foreign

investment can ease the transfer of technological and business know how to poorer countries (Carkovic *et.al.,* 2002). This view assumes that FDI may boost the productivity of all firms-not just those receiving foreign capital. Thus transfer of technology through FDI may have substantial spillover effects for the entire economy. In contrast, however, some theories predict that FDI in the presence of preexisting trade, price, financial, and other distortions will hurt resources allocation and slow growth (Boyd and Smith, 1992). In this regards, theory produces ambiguous predictions about the growth effects of FDI, and some models suggest that FDI will promote growth only under certain policy conditions (Carcovic *et. al.,* 2002).

Redlin *et. al.,* (2010) examines the short run and long run term dynamics between per capita GDP growth and openness for 158 countries over the period 1970-2009. They use panel cointegration tests and panel error-correction models (ECM) in combination with GMM estimation to explore the causal relationship between these two variables. Their results suggest a long run relationship between openness and economic growth with a short run adjustment to the deviation from the equilibrium for both direction of dependency. The long run coefficients indicate a positive significant causality from openness to growth and vice versa.

By contrast the short run coefficients show a negative short run adjustment, suggesting that openness can be painful for an economy undergoing short term adjustments. In addition to the entire panel they subdivided the data into income related subpanels. While the long run effect remains predominantly positive and

significant, the short run adjustment becomes positive when the income level increases. These results suggest that different trade structures in low income nd high income countries have different effects on economic growth.

The relationship between openness and economic growth has been a subject of much interest and controversy in international trade literature. With regards to a theoretical relationship openness and economic growth most of the studies provide support for the proposition that openness affects growth positively. Romer, Grossman and Helpman (1991) and Barro and Sala-i-Martin (1995) among others, argue that countries that are more open have a greater ability to catch up to leading technologies of the rest of the world. Chang, Kaltani, Loayza (2005) point out that openness promotes the efficient allocation of resources through comparative advantage, allows the dissemination of knowledge and technological progress, and encourage competition in domestic and international markets. However there exists also the opposed position. For example Krugman (1994) and Rodrik and Rodríguez (2001) argue that the effect of openness on growth is doubtful. Furthermore, if we include the gains from trade debate we look at a long lasting debate discussing conditions and circumstances when openness and trade may be favorable and may improve the economic performance or not. These controversial theoretical findings also appear in the empirical literature. Numerous econometric studies have tried to identify the relationship and the causal direction between openness and economic growth. These studies can be divided into three groups. First, conventional regression analyses trying to capture the effect of openness by regressing it on per capita growth. Empirical evidence from firm-level studies for particular countries

often find that FDI does not boost economic growth, and these studies frequently do not find positive spillovers running between foreign-owned and domestically owned firms. Aitken and Harrison (1999) study finds

New FDI projects may invite complementary local private investments that provide inputs to, or use outputs of, the foreign firm. It is also likely that private investment increases by more than the FDI flows because foreign equity capital finances only part of the total investment project. A substantial part of foreign investment projects is usually financed from local financial markets as well. It should be noted that the foreign capital inflows, by themselves, can lead to an increase in domestic credit supply (Jansen, 1995).

FDI also beneficially affect the productive efficiency of domestic enterprises. Local firms have an opportunity to improve their efficiency by learning and interacting with foreign firms. FDI can also raise the quality of domestic human capital and improve the know-how and managerial skills of local firms (the learning by watching effect). Moreover, FDI stimulates the development and propagation of technological skills through multi-national corporation's (MNC's) internal transfers and through linkages and spillovers among firms (Borensztein, 1998). FDI can also help to increase local market competition, creates modern job opportunities and increase market access of the developed world (Noorbakhsh, Paloni, Youssef, 2001) all of which should ultimately contribute to economic growth in recipient countries.

Hermes and Lensink (2000) summarized different channels through which positive externalities associated with FDI can occur namely: competition channel where

increased competition is likely lead to increased productivity, efficiency and investment in human and/or physical capital. Increased competition may lead to changes in the industrial structure towards competitiveness and more export-oriented activities; training channel through increased training of labour and management; linkages channel whereby foreign investment is often accompanied by technology transfer; such transfers may take place through transactions with foreign firms; and domestic firms imitate the more advanced technologies used by foreign firms commonly termed as the demonstration channel.

Despite of the positive impact that FDI can have on a recipient economy, there are also potential negative consequences that may arise from it. FDI may have negative effects on the growth prospects of the recipient economy if they give rise to a substantial reverse flows in the form of remittances of profits, and dividends and/or if transnational corporations (TNCs) obtain substantial or other concessions from the host country. FDI may not lead to growth since MNCs tend to operate in imperfectly competitive sectors (with high barriers to entry or a high degree of concentration). As a consequence, FDI may crowd out domestic savings and investments. In addition, FDI may have a negative impact on the external balance because profit repatriation will tend to affect the capital account negatively. It is also at times associated with enclave investment, sweatshop employment, income inequality and high external dependency (See Ramirez, 2000).

There exists a handful of literature that examined the importance of FDI on economic growth. However, one should note that robust economic growth with

favorable macroeconomic and institutional framework in the host economic are important factors in attracting FDIs. The importance of economic growth to attracting FDI is closely linked to the fact that FDI tends to be an important component of investing firms' strategic decisions. Brewer (1993) suggests three hypotheses in explaining strategic FDI projects, namely: "efficiency seeking hypothesis"; "resource seeking hypothesis"; and "market seeking or market size hypothesis." The importance of economic growth in determining FDI flows can be experienced by the market size hypothesis.

Pfefferman & Madarassy (1992) stated "market size is one of the most important considerations in making investment location decisions for three reasons: larger potential for local sales, the greater profitability of local sales than export sales and the relatively diverse resources which sourcing is more feasible.

The growth-enhancing effect of FDIs is the advanced technology that often accompanies foreign capital investment. On the other hand the influx of foreign aid would supplement domestic savings efforts if wisely invested in productive undertakings and therefore can induce economic growth.

In addition, domestic investors can also adopt this advanced technology (Wijeweera et. al., 2008). In other words, FDI generates positive externalities through technology spillovers. Moreover, increased foreign capital inflows can help to narrow the savings gap (the gap between the domestic savings ratio and the desired level of investment ratio). Theoretically, FDI and foreign aid are envisaged to have positive

effect on economic growth, particularly in developing countries which experience low productivity and capital stock deficiencies.

3.3 Empirical Literature

3.3.1 Selected Empirical Literature from Outside Tanzania

The influential work on the FDI-growth nexus is due to Borensztein, De Gregorio, and Lee (1998). They tested the effect of FDI on economic growth in a framework of cross-country regressions of 69 developing countries over the 10 years period. Their results suggest that FDI was in fact an important vehicle for transfer of technology, contributing to growth in large measure than domestic investment. Moreover, the authors also find that there was a strong complimentary effect between FDI and human capital, that is, the contribution of FDI to economic growth was enhanced by its interaction with the level of human capital in the host country.

Williams (2010) suggests that the flow of FDI in developing countries is likely to be affected by high debt, high inflation, and constraints on the executive (XCONST), market size and good infrastructure quality. However, the flow of FDI in Latin America and the Caribbean (LAC)is affected differently. Infrastructure is more important (relative to the developing countries) for the type of FDI attracted to LAC. The impact of FDI on growth is direct. i.e., not conditional on other country characteristics contrary to Alfaro *et. al.,* (2004), Hermes and Lensink (2003) and Borensztein *et. al.,* (1998) that argue that the effect of FDI on growth is conditional. However, LAC can boost economic growth by investing in human capital development, as FDI does not induce growth directly in LAC.

Balasubramanayam *et. al.,* (1996) found that in developing countries pursuing outward-oriented trade policies, FDI flows were associated with faster growth than in those developing countries that pursued inward oriented trade policies. Alfaro (2003) argues that the impact of FDI on a host economy depends not only on local conditions and policies but also on the sector into which FDI occurs. In an effort to further examine the effects of FDI on economic growth, she explores the roles different types have played in different sectors. She thus model and disaggregated the FDIs on different sectors for a sample covering 47 countries.

The results find little support for FDI having an exogeneous positive effecet on economic growth, supporting previous work by Borensztein *et. al.,* (1998) and Carkovic et. al., (2002) and Alfaro *et al.,* (2003). When she distinguishes among different sectors, however, she also finds little support for FDI spillovers or positive effects in the primary sector, a positive effect of FDI in manufacturing on growth, or ambiguous evidence from the service sector. These measures are robust to the inclusion of other growth determinants, such as human capital measures, domestic financial development, institutional quality, different samples, and conditioning information sets, and the use of lagged values of FDI.

Using both cross-section and panel data analysis, Johnson (2006) demonstrated that FDI inflows boosted economic growth in developing countries, but not in advanced nations. Alfaro (2003) conducted a cross-country analysis and found that total FDI exerted an ambiguous effect on host country economic growth; FDI inflows into the primary sector tendered to have a negative effect on growth.

Selaya and Sunesen (2012) examine the idea that aid and FDI are complementary sources of foreign capital. They argue that the relationship between aid and FDI is theoretically ambiguous: aid raises the marginal productivity of capital when used to finance complementary inputs (like public infrastructure and human capital investments), but may crowd out private investment when it comes in the shape of pure physical capital transfers. Empirically, they find that aid invested in complementary inputs draws in FDI while aid invested in physical capital may crowd it out. They also show that the composition of aid matters for its overall level of efficiency. A number of other empirical studies have also provided mixed evidence on the link between economic growth and FDI (Wijeweera et. al., 2007; Zhang, 2001; Johnson, 2006).

Anyanwu (2012) attempts a cross-country regression for the period 1996-2008 to explain why FDI goes where it does. The results show that: (i) there is a positive relationship between market size and FDI inflows; (ii) openness to trade has a positive impact on FDIs inflows; (iii) higher financial development has a negative effect on FDI inflows; (iv) the prevalence of the rule of law increases FDI inflows; (v) higher FDI goes where foreign aid also goes; (vi) agglomeration has a strong positive impact on FDIs inflows; (vii) natural resources endowment and exploitation (such as oil) attracts huge FDI; (viii) east and southern African sub-regions appear positively disposed to obtain higher levels of inward FDI.

On a multi-country study, Burnside and Dollar (2000) found that aid had been effective in promoting economic growth in countries with good policies. Using a

simultaneous-equation model, Burke and Ahmadi-Esfani (2006) did not find sufficient evidence to conclude that aid had a significant effect on economic growth in Thailand, Indonesia, and Philippines during 1970 to 2000.

Girma (2012) uses VAR model to examine the short run and long run relationship between inflation and economic growth in Ethiopia for the period between 1980-2011. The results show that increase in economic growth decreases inflation whereas inflation does not have significant effect on economic growth in the short run. He also include money supply and exchange rate to control their effects on the relationship between inflation and economic growth. Increase in money supply results in a high inflation while increase in exchange rate does not have significant effect on inflation.

Furthermore, using Granger causality test, he shows that economic growth has forecasting power about inflation while inflation does not have predicting power about economic growth. The Impulse Response Function shows that economic growth does not indicate any response to impulse of inflation while the response of inflation rate to impulses in growth is effective up to seventh year in the future. The forecast error decomposition supports the earlier conclusion which shows that more than 20 percent of inflation volatility is explained by output growth innovations. Both inflation and economic growth respond significantly to their own shocks through time.

Girma (2012) also tests for copintegration relationship. The results show that there exists a long run relationship between economic growth and inflation in Ethiopia.

Vector Error Correction estimates indicate that economic growth significantly reduces inflation in the short run while inflation does not have any significant effect on economic growth. If inflation had previously been larger than normal share than economic growth causes inflation to be lower in the long run.

3.3.2 Selected Empirical Literature on Tanzania

Despite the importance of foreign capital inflows and related variables being important for economic growth and development, still empirical evidence on Tanzania remains scant. As Mutasa (2008) argues, most of the existing literature has focused on the macroeconomic impact of foreign development assistance. Even when the role of FDIs has been analyzing the issue of the methodology employed has always been a subject of concern.

Of most recent comprehensive empirical analysis of the macroeconomic impact of foreign private capital inflows in Tanzania is attributed to Mutasa (2008). His study focused on the impact of private capital inflows on the real effective exchange rate and domestic private investment in Tanzania for the period 1970-2003. Mutasa (2008) uses the Engle-Granger cointegration and error-correction procedures to estimate the real effective exchange rate and provate investment models for Tanzania for the cited period. His empirical findings show that private capital inflows proxied by FDI does not influence domestic private investment in the long run. It is shown that important long run private investment determinants in Tanzania include public investment, credit to the private sector, real economic growth and inflation. In the short run, he shows, that private investment is influenced positively by lagged

private investment, contemporaneous credit to the private sector and public investment.

The empirical results from the real effective exchange rate model show that FDI does not appreciate the real effective exchange rate and therefore the "Dutch Disease syndrome" is not proved. Furthermore, he shows that important long run determinants of the real effective exchange rate including government expenditure, degree of openness, change in nominal exchange rate and terms of trade. His results show that in the short run, real exchange rate is influenced by lagged real exchange rate, lagged degree of openness.

Other related studies in this front include Mjema (1994) and Assey (1998). Mjema (1994) uses the simultaneous equations model and 2SLS estimation techniques to test the impact of foreign aid on savings, investment and growth for the 1961-1985 period. His findings shows that domestic savings rate and foreign aid are negatively related. The implications is that the inflows of foreign aid substitute domestic savings instead of complementing it as the theory postulates. He further shows that domestic savings is positively related to foreign aid, indicating that foreign aid increased domestic investment in Tanzania.

Assey (1998) analyzed the determinants of capital inflows in Tanzania using a simgle equation technique. His results points to the fact that creditworthiness was partly responsible for the capital inflow. However, he does not find any quantitative evidence to support the assertion that low domestic savings has been responsible for

the increase in capital inflows. The study does not also support the role of domestic pull factors in attracting capital inflows specifically FDIs. He concludes that the fact FDI re-emerged in Tanzania after the country embarked on deep macroeconomic reforms measures, it is possible to assert that domestic factors have not been a strong influence in attracting foreign capital in the form of FDI.

Yona (1999) attempts an empirical examination of the impact of FDI on several macroeconomic variables. His findings reveal varying results: (i) FDI has no significant impact on domestic investment; (ii) FDI did not explain changes in merchandize imports and exports; and that (iii) FDI is found to have significant but negative effect on domestic consumption. On another empirical study, Prosper (2001) uses 2SLS techniques to examine the impact of FDI inflows on economic growth for the 1970-1999 periods. His findings show a positive and significant relationship between FDI inflows and economic growth.

Madete (2000) uses both qualitative and quantitative the impact of public choices on the quality and effectiveness of FDI inflows in Tanzania for the 1961-1997 period. His findings reveal that annual economic growth has a significant positive effect on the net FDI inflows, indicating that higher rates of economic growth stimulated FDI inflows. In addition, the results show that high corporate tax rates significantly discouraged FDI inflows. Qualitative results shows that the speed of government decision, bureaucracy and corruption were major obstacles both in attracting and in operations of FDI ventures.

On another study, Mjema *et. al.,* (1999) analyze the impact of FDI on selected

macroeconomic variables. The selected macroeconomic variables included domestic savings, domestic investment, real exchange rate, inflation and money supply. As Mutasa (2008) argues, this study is not very reliable since it uses a simple regression analysis and lacks a comprehensive model to explain the respective relationships.

In the study, in order to show the impact of FDI on savings, the following model was estimated:

$$\frac{S}{Y} = a10 + a11\frac{FDI}{Y},$$

The findings shows that domestic savings as a ratio of GDP is inversely related to FDI as a proportion of GDP.

Similarly, the impact on domestic investment was analyzed using simple regression equation of the following nature:

$$\frac{I}{Y} = a20 + a21\frac{FDI}{Y},$$

where,

$\frac{I}{Y}$ is investment as a ratio of GDP and $\frac{FDI}{Y}$ is FDI as a ratio of GDP. The results show that there is a positive but weak relationship between FDI and domestic investment.

The impact of FDI on the real exchange rate was examined using the following equation:

$$EXR = a40 + a41\frac{FDI}{Y},$$

Estimation results show that the inflow of FDI was inversely related to real exchange rate. This indicates that there was an appreciation of the real exchange rate resulting from an inflows of FDI. Generally, the study hypothesizes existence of Dutch disease, while the impact on domestic investment was considered weak.

Using co-integration and error correction analysis for Tanzania, Nyoni (1998) found positive long run effect of aid on the equilibrium real exchange rate during 1967-1998, suggesting a likely negative effect of aid on growth. Kabete (2008) examined the relationship between foreign aid and economic growth in Tanzania. She finds that foreign aid and total debt service have a negative impact on GDP growth. On the other hand, export growth and net national savings have shown a positive impact on GDP growth as it was expected because they increase the country's capacity to invest.

Shawa and Shen (2013) have examined the causal relationship between FDI, exports and GDP growth for Tanzania for the period from 1980-2012. They employ Granger causality test to accomplish their task. The cointegration results reveals that there is existence of the long run association among the variables in questions. While the Granger causality results suggest that there is a causal relationship which is

unidirectional running from FDI to export and no causal relation is found between FDI and GDP growth suggesting that FDI is a good predictor of export and hence FDI led growth for Tanzania might be necessary for the country to boost exports.

3.3.3 The Research Gap

Previous empirical studies done on the relationship between FDI-GDP growth nexus have tendered to employ Ordinary Least Squares (OLS) estimation method which may suffer from the problem of endogeneity and if proper care is not taken may results into spurious regression. Given this backdrop, the current study employs the Autoregressive Distributed Lag (ARDL) Model or "Bounds Testing" procedure for Cointegration. This approach is more robust than other methods since it has many advantages including its ability to address the problem of endogeneity automatically. Moreover, we expect to extend the period of study from 1975 to 2013 hoping that given a long span of time, our results might be more robust than previous studies. The relationship between FDI and the rate of economic growth is critically important for policy making and therefore, calls for further empirical scrutiny. The current study seeks to re-examine the causal relationship between FDI, trade openness, government spending and inflation on one hand and the gross domestic product (GDP) on the other in the context of Tanzania.

CHAPTER FOUR

4.0 DATA, METHODOLOGY AND MODEL SPECIFICATION

4.1 Introduction

In this Chapter, we present the theoretical and empirical models that will be used in the estimation. We start with the theoretical model which traditionally, it is formulated under the neoclassical framework in which the contribution to output growth is decomposed into various factor inputs. We then describe the variables that are used in the study. The chapter also includes the description of data types and their sources from where the data will be drawn. We also provide the theoretical underpinnings and structure of the autoregressive distributed lag model of which its advantages are also discussed.

We further provide the functional and econometric models and also the necessary tests of the nature of the data before estimation to avoid possible spurious results. We discuss the nature and the tests of unit roots using the Dickey-Fuller (DF) and Augmented Dickey-Fuller (ADF) unit root testing approach. We finalize the chapter by discussing the nature and the estimation of long run relationships among variables using the error correction model, test of the predictive power using the Granger causality estimation and the estimation methods and data analysis.

4.2 Theoretical Model

The neoclassical growth model pioneered by Solow (1956) has generated a theoretical basis for growth accounting. In this kind of modeling we can decompose

the contribution to output growth of the growth rates of inputs such as technology, capital, labor, inward FDI or by incorporating vector of additional variables in the estimating equation such as imports, exports, institutional dummies. The neoclassical form of production function is a specification that assumes constant returns to scale, diminishing returns to each factor input, and some positive and smooth elasticity of substitution between the inputs.

The growth accounting framework is derived from the following general functional form equation:

$$Y = AF[K, L, \Omega] \quad (1)$$

where,

Y, K, L and A are output, capital, labor and efficiency of production (technology) respectively; and Ω is a vector of auxiliary variables. In a Cobb-Douglas production setting, Equation (1) becomes:

$$Y = AK^{\alpha} L^{\beta} \Omega^{\gamma} \quad (2)$$

Equation (2) can then be re-specified in natural logarithmic form and becomes:

$$\ln Y = \ln A + \alpha \ln K + \beta \ln L + \gamma \ln \Omega \quad (3)$$

Then by taking time-derivatives of equation (3) we get:

$$g_Y = g_A + \alpha g_K + \beta g_L + \gamma g_{\Omega} \quad (4)$$

where,

g_i, $i = Y, A, K, L, \Omega$ (the lower case define the per capita terms) and α, β, γ are respectively, the elasticities of output with respect to K, L, Ω.

4.3 Variables Description

In this study the real per capita gross domestic product growth, $GROWTH_t$ is modeled as a measurement of economic growth (the dependent variable) while the independent variables are the natural logarithm of FDI $(LOGFDI_t)$, the natural logarithm of trade openness $(OPENLOG_t)$, natural logarithm of government spending, $LOGGOV_t$, and natural logarithm of inflation $(LOGINFL_t)$. The $(LOGOPEN_t)$, $(LOGFDI_t)$ and $(LOGGOV_t)$ are standardized by GDP_t to remove the problems associated with absolute measurement. Trade openness is measured as the ratio of the sum of exports and imports to GDP following Gries *et. al.,* (2009) and Yanikkaya (2003). Although in econometric theory a more parsimony model is preferred, in this study we include trade openness, government spending and inflation to avoid potential bias. The $GROWTH_t$ could not be modeled in natural logarithm since some of the data are negative.

4.4 Data Sources

The study will be done in Tanzania with time series data spanning from 1975 to 2013. The rationale of choosing this period is data availability and also it is was during this period that the Tanzania's economy has changed from Socialism and Self-reliance (command economy) to reforms (mixed economy) that began in 1986. The study uses multiple data sources for estimation purposes. Data for the gross domestic product (*GDP*) will be drawn from various Economic Surveys issued by the United Republic of Tanzania, Ministry of Finance (MoF) and the National Bureau of Statistics (NBS). Data for Foreign Direct Investment (*FDIs*) will be

drawn from the Tanzania Investment Centre (TIC) (various reports) and the MoF together with PWTs. Trade Openness will be computed based on the GDP and also the data for exports and imports that are drawn from the Ministry of Trade and Industry (MTI) and the Bank of Tanzania (BoT). We also obtained data from the IMF International Financial Statistics.

4.5 The Autoregressive Distributed Lag (ARDL) Model

The empirical analysis of the long-run relationship between economic growth measured in terms of per capital real GDP i.e., $GROWTH_t$ on one hand and the natural logarithm of Foreign Direct Investment $LOGFDI_t$, the natural logarithm of trade openness $(LOGOPEN_t)$, natural logarithm of government spending, $LOGGOV_t$, and the natural logarithm of inflation $(LOGINFL_t)$ on the other will be done by making use of the recently developed autoregressive distributed lag $(ARDL)$ model or "bounds" testing approach to cointegration by Pesaran and Shin (1996); Pesaran and Pesaran (1997); Pesaran and Smith (1998); and Pesaran *et al.*, (2001).

The rationale of using the $ARDL$ in the current study is based on its various advantages. The first advantage is that the $ARDL$ model is more appropriate in small samples (Ghatak and Siddiki, 2001). The second advantage is that the $ARDL$ can be applied regardless of whether the regressors are $I(1)$ and/or $I(0)$. it therefore avoids the pre-testing problems associated with standard co-integration approach which requires that the variables be already classified into $I(1)$ or $I(0)$

(Pesaran et al., 2001). In the *ARDL* approach estimation it is even when possible that different variables have different optimal numbers of lags. In the *ARDL* cointegration "bound" approach is free of residual correlation and hence endogeneity is less of problem (Pesaran and Shin, 1999).

The *ARDL* model rather than a static one is used in this study to capture all the dynamic responses in the dependent variable brought about by changes in its own lags and the contemporaneous and lagged values of the other explanatory variables. In addition, the *ARDL* model is more desirable for small samples like the one used here. Starting by directly estimating a static long run equation may fail to capture any immediate, short run and long run responses in the system thus generating imprecise coefficient estimates (See Banerjee *et al.*, 1993; Charemza and Deadman, 1997; and Johnston and Dinardo (1997).

The *ARDL* approach is done in two steps. First, any long-term relationship among the variables of interest used is determined using an F -test; and second, to determine the estimates of the coefficients of the long-run relationship, followed by the estimation of the short-run elasticity of the variables with the error correction representation of the *ARDL* model.

4.6 Functional and Econometric Models

It is customary in econometric analysis modeling to start by specifying the functional form of the model, and this is given as:

$$GROWTH = f(FDI_t, OPEN_t, GOV_t, INFL_t) \quad (8)$$

where,

$GROWTH_t$ = is the real GDP per capita at time t (in Tshs).

FDI_t = is the foreign direct investment (FDI) as a percentage of GDP at time t.

$OPEN_t$ = is the measure of trade openness (which is exports plus imports as a percentage of GDP) at time t.

GOV_t = is the ratio of government spending to the GDP.

$INFL_t$ = is the rate of inflation measured interms of percentage changes in consumer price index (CPI) at time t.

In the Cobb-Douglas framework, Equation (9) takes the following form:

$$GROWTH = AFDI_t^{\beta_1} OPEN_t^{\beta_2} GOV_t^{\beta_3} INFL_t^{\beta_4} \quad (9)$$

In logarithm form, Model (9) can be re-specified as Model (10) below:

$$GROWTH = \beta_0 + \beta_1 LOGFDI_t + \beta_2 LOGOPEN_t + \beta_3 LOGGOV_t + \beta_4 LOGINFL_t + \varphi_t \quad (10)$$

Note that this time we have included the error term φ_t which captures all other factors that influence the dependent variable other than the included independent variables in the model. Having studied the data we discovered that there are some negative entries in the real GDP growth per capita and therefore, we cannot include the log of $GROWTH_t$ as seen in Equation (11).

In this kind of modeling we use natural logarithm mainly for two reasons. First, the

coefficient of the Cointegrating vector can be interpreted as long-term elasticities if the variables are in logarithm. Second, if the variables are in logs, the first difference can be interpreted as growth rates.

Model (11) can be stated as unrestricted error correction model (ECM) as below:

$$\Delta GRWOTH_t = \beta_0 + \beta_1 GROWTH_{t-1} + \beta_2 LOGFDI_t + \beta_3 LOGOPEN_t + \beta_4 LOGGOV_t + \beta_5 LOGINFL_t + \sum_{i=1}^{a} \beta_{6,i} \Delta GROWTH_{t-i} + \sum_{i=1}^{b} \beta_{7,i} \Delta LOGFDI_{t-1} + \sum_{i=1}^{c} \beta_{8,i} \Delta LOGOPEN_{t-i} + \sum_{i=1}^{d} \beta_{9.i} \Delta LOGGOV_{t-1} + \sum_{i=1}^{e} \beta_{10,i} \Delta LOGINFL_{t-1} + \varphi_t \quad (11)$$

The expected signs of the parameters are: $\beta_0, \beta_1 \succ 0, \beta_2 \succ 0, \beta_3 \succ 0, \beta_4 \succ 0, \beta_5 \prec 0.$ The error term (φ_t) is assumed to be identically, independently and normally distributed i.e., $\varphi_t \sim iid\ N(0, \sigma^2)$ and (t) index time. For the examination of long-run relationship the bound Cointegration test based on critical values taken from Pesaran *et al.*, (2001) is used with the null and alternative hypotheses are as below:

$H0: \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0$ (no long-run relationship)

$H1: \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq 0$ (a long-run relationship exists)

4.7 Regression Analysis of Non-Stationary Data

Regression analysis of time series data necessarily uses data from the past to quantify historical relationships. If the future is like the past, then these historical relationships can be used to forecast the future. But if the futures differs fundamentally from the past, then those historical relationships might not be reliable

guides to the future (See Stock and Watson, 2007). In the context of time series regression, the idea that historical relationships can be generalized to the future is formalized by the concept of stationarity (Stock and Watson, 2007: pg 544). A time series Y_t is stationary if its probability distribution does not change over time, that is, if the joint distribution of $(Y_{S+1}, Y_{S+2}, ..., Y_{S+T})$ does not depend on S; otherwise, Y_t is said to be non-stationary. A pair of time series, X_t and Y_t are said to be jointly stationary if the joint distribution of $(X_{S+1}, Y_{S+1}, X_{S+2}, Y_{S+2}, ..., X_{S+T}, Y_{S+T})$ does not depend on S. Stationarity requires the future to be like the past, at least in a probabilistic sense.

Often Ordinary Least Square (OLS) is used to estimate the slope coefficients of the autoregressive model. Use of OLS relies on the stochastic process being stationary. When stochastic process is non-stationary, the use of OLS can produce invalid estimates. Granger and Newbold (1974) called such estimates 'spurious regression' results: high R-squared and high t-ratios yielding results with no economic meaning (See also Greene (2008)). To estimates the slope coefficients, one should first conduct a Unit Root Test (URT), whose null hypothesis is that a unit root is present. If that hypothesis is rejected, one can use OLS. However, if the presence of a unit root is not rejected, then one should apply the difference operator (differencing) to the series. If another unit root test shows the differenced time series to be stationary, OLS can then be applied to estimate the slope coefficients.

If y_t and x_t are mutually independent unit root processes, i.e. the Ordinary Least

Square (OLS) regressions of y_t on x_t for $t = 1,....,n$ with or without an intercept, will yield a significant estimates of the slope with probability converging to 0, when $n \to \infty$. The conclusion might be that y_t depends on x_t while in reality the $y_t's$ are independent from the $x_t's$.

If the time series involved are unit root processes, careless application of regression analysis may yield nonsense (spurious) results. The work of Granger (1986, 1988), however, provides a technique of dealing with time series problem by testing for stationarity in time series data to determine the order of integration. We will conduct Unit Root Test (URT) (at their levels or differenced where appropriate) for all variables using the Augmented Dickey Fuller (ADF) test. If two or more series are themselves non-stationary, but a linear combination of them is, then the series are said to be co-integrated.

4.8 The Dickey-Fuller and Augmented Dickey-Fuller tests

The Dickey-Fuller test performs the Augmented Dickey-Fuller (ADF) test that variable follows a unit-root process. The null hypothesis is that the variable contains a unit root and alternative is that the variable was generated by a stationary process. You may optionally exclude the constant, include a trend term, and include lagged values of the difference of the variable in the regression. Dickey & Fuller (1979) developed procedure for testing whether a variable has a unit root, or equivalently, that the variable follows a random walk.

Hamilton (1994, 528-529) describe four different cases to which the ADF test can be

applied. The null hypothesis is always that the variable has a unit root. They differ in whether the null hypothesis includes a drift term and whether the regression used to obtain the test statistic includes a constant term and time trend. Becketti (2013) provides additional examples showing how to conduct these tests. The true model is assumed to be:

$$y_t = \beta_0 + y_{t-1} + u_t \tag{12}$$

where, $u_t \sim iid\ N\left[0, \sigma_u^2\right]$

In cases one and two, presumably $\alpha = 0,$ which is a random walk without drift. In cases three and four, we allow for a drift term by letting α be unrestricted. The Dickey-Fuller test involves fitting the model.

$$y_t = \beta_0 + \rho y_{t-1} + \delta t + u_t \tag{13}$$

by OLS, perhaps $\alpha = 0$ or $\delta = 0$. However, such a regression is likely to be plagued by serial correlation. To control for that, the ADF test instead fits a model of the form:

$$\Delta y_t = \alpha + \beta y_{t-1} + \delta t + \Psi_1 \Delta y_{t-1} + \Psi_2 \Delta y_{t-2} + \ldots\ldots\ldots + \Psi_k \Delta y_{t-k} + \varepsilon_t \tag{14}$$

where, k is the number of lags specified in the lags option. The non-constant option removes the constant term α from this regression, and the trend option includes the

time trend δt, which by default is not included. Testing $\beta = 0$ is equivalent to testing $\rho = 1$ or equivalently, that y_t follows a unit root process.

In the random walk with drift model, the best forecast of the series tomorrow is the value of the series today, plus the drift β_0. A first order autoregression is abbreviated by AR(1), where the "1" indicates that it is the first order. The population AR(1) model for the series Y_t is

$$Y_t = \beta_0 + \beta_1 Y_{t-1} + u_t \qquad (15)$$

The random walk model is a special case of the AR(1) model in which $\beta_1 = 1$. In other words, if Y_t follows an AR(1) with $\beta_1 = 1$, then Y_t contains a stochastic trend and is non-stationary. If however, $|\beta_1| < 1$ and u_t is stationary, then the joint distribution of Y_t and its lags does not depend on t. The analogues condition for an AR(p) to be stationary is more complicated than the condition $|\beta_1| < 1$ for an AR(1). Its formal statement involves the roots of the polynomial, $1 - \beta_1 z - \beta_2 z^2 - \beta_3 z^3 - ..... - \beta_P z^P$. (The roots of this polynomial are the solutions to the equation $1 - \beta_1 z - \beta_2 z^2 - \beta_3 z^3 - ..... - \beta_P z^P = 0.)$. For an AR(p) to be stationary, the roots of this polynomial must all be greater than 1 in absolute value. In the special case of an AR(1), the root is the value of z that solves $1 - \beta_1 z = 0$, so its root is $z = 1/\beta_1$.

Thus the statement that the root be greater than 1 in absolute value is equivalent to

$|\beta_1| < 1$ (Stock and Watson, 2007:pg 557). If AR(p) has a unit root that equals 1, the series is said to have a unit autoregressive root or, more simply, a unit root. If Y_t is stationary (and thus have a unit root), then it contain a stochastic trend. This means the terms "stochastic trend" and "unit root" are being used interchangeably. The Augmented Dickey-Fuller (ADF) test for a unit autoregressive root tests the null hypothesis $H0: \delta = 0$ against the one-sided alternative $H1: \delta \prec 0$ in the regression

$$\Delta y_t = \beta_0 + \delta y_{t-1} + \gamma_1 y_{t-2} + \gamma_2 y_{t-3} + ... + \gamma_P y_{t-P} + u_t \qquad (16)$$

Under the null hypothesis, y_t has a stochastic trend; under the alternative hypothesis, Y_t is stationary. The ADF statistic is the OLS t-statistic testing $\delta = 0$ in Equation (17). If instead the alternative hypothesis is that Y_t is stationary around a deterministic linear time trend, then this trend, "t" (the observation number), must be added as an additional regressor, in which case the Dickey-Fuller regression becomes

$$\Delta y_t = \beta_0 + \alpha t + \delta y_{t-1} + \gamma_1 y_{t-1} + \gamma_2 y_{t-2} + ... + \gamma_P y_{t-P} + u_t \qquad (17)$$

where α is an unknown coefficient and the ADF statistic is the OLS t-statistic testing $\delta = 0$ in Equation (17). The lag length can be estimated using the BIC or AIC. The ADF statistic does not have a normal distribution, even in larger samples (Stock and Watson, 2007: pg 562).

4.9 The Error Correction Model (ECM)

The error correction model (ECM) is very crucial in the co-integration test as it drives from the fact that, if macroeconomic variables are integrated of order zero, $I(0)$ i.e., they are co-integrated, they can be modeled as having been generated by the ECM. The ECM produces better short run forecasts that hold together in economic meaningful way. Even in the absence of co-integration, the ECM produces good forecasts (Lesage, 1990). The long run model will then be reformulated into an ECM, which integrates short and long- run dynamics of the models. The ECM will take the following form:

$$\Delta y_t = \alpha + \sum_{i=1}^{p} \phi_i \Delta y_{t-i} + \sum_{i=0}^{p} \delta_i \Delta x_{t-i} + \prod ECT_{t-i} + \varphi_t , \qquad (18)$$

where,

ECT_{t-1} is one period lag of the residual term (disequilibrium) from the long run relationship, φ_t is white noise error term, and $\alpha, \phi_i, \delta_i, \prod$ are parameters. Bearing these facts in mind, equation (18) can be estimated by the usual Ordinary Least Square (OLS) method since all its terms (in first difference) are $I(0)$ and therefore standard hypotheses testing using $t-$ratios and related diagnostic tests can be conducted on the error term.

4.10 Granger Causality Tests

One useful application of the $F-$statistic in time series forecasting is to test whether the lags of one of the included regressors has useful predictive content, above and

beyond the other regressors in the model. The claim that a variable has no predictive content corresponds to null hypothesis that the coefficients on all lags of that variable are zero. The $F-$statistic testing this null hypothesis is called the Granger causality statistic, and the associated test is called a Granger causality test (after Granger, 1969). See also Stock and Watson (2007) for more discussion on this test. We also performed Granger causality tests to ascertain whether lagged values of one variable predict changes in another, or whether one variable in the system explains the time path of the other variables. The test for Granger causality will be performed by estimating equations of the following form:

$$\Delta y_t + \alpha_0 + \sum_{i=1}^{m} \alpha_{1,i} \Delta y_{t-1} + \sum_{i=0}^{m} \alpha_{2,i} \Delta x_{t-i} + \delta ECM_{t-1} + \varphi_t , \tag{19}$$

$$\Delta x_t + \beta_0 + \sum_{i=1}^{m} \beta_{1,i} \Delta x_{t-1} + \sum_{i=0}^{m} \beta_{2,i} \Delta y_{t-i} + \gamma ECM_{t-1} + \mu_t , \tag{20}$$

where,

φ_t and μ_t are white noise disturbance terms (normally and independently distributed), m are the number of lags necessary to induce white noise in the residuals, and ECM_{t-1} is the error correction term from the long run relationship. x_t is said to Granger-cause y_t if one or more $\alpha_{2,i}$ $(i = 1,2,.....,m)$ and δ are statistically different from zero. Similarly, y_t is said to Granger-cause x_t if one or more $\beta_{2,i}$ $(i = 1,2,.....,m)$ and γ are statistically different from zero. A feedback or bi-directional Causality is said to exist if at least $\alpha_{2,i}$ and $\beta_{2,i}$ $(i = 1,2,.....,m)$ or

δ and γ are statistically different from zero. If on the other hand $\alpha_{2,0}$ or $\beta_{2,0}$ are statistically significant, then we have an instantaneous Causality between y_t and x_t. To test for Causality use is made of either the significance of the t-statistic of the lagged error correction term or the significance of $F-$statistic of the sum of the lags on each right hand side variable. We tested for causality by modifying Equations 19 and 20 to obtain Equations 21 and 22 respectively:

$$\Delta y_t = \alpha_0 + \sum_{i=1}^{m} \alpha_{1,j} \Delta y_{t-i} + \sum_{i=0}^{m} \alpha_{2,i} \Delta x_{t-i} + \sum_{i=0}^{m} \alpha_{3,i} \Delta z_{t-i} + \delta ECM_{t-1} + \varphi_t \qquad (21)$$

$$\Delta x_t = \beta_0 + \sum_{i=1}^{m} \beta_{1,i} \Delta x_{t-i} + \sum_{i=0}^{m} \beta_{2,i} \Delta y_{t-i} + \sum_{i=0}^{m} \beta_{3,i} \Delta z_{t-i} + \gamma ECM_{t-1} + \mu_t \qquad (22)$$

4.11 Estimation Methods and Data Analysis

The *ARDL* procedure involves two stages. At the *first stage* the existence of the long run relation between the variables under investigation is tested by computing the F-statistic for testing the significance of the lagged levels of the variables in the error correction of the underlying *ARDL* model. The *second stage* of the analysis is to estimate the coefficients of the long run relations and make inference about their values. The econometric packages to be used will be the MICROFIT 4.1 version and STATA 12 version.

CHAPTER FIVE

5.0 ESTIMATION AND DISCUSSIONS OF THE RESULTS

5.1 Introduction

In this chapter we provide the estimation results based on the methodology we outlined before. We start by reporting the descriptive statistics which provide the measures of various summary statistics. We then provide the DF and ADF unit root test results both when the intercept is included and no trend term and when both are included (i.e., the intercept and trend). In the same chapter we provide the ARDL or "Bounds" testing results for cointegration, again both when we include a trend but no intercept, and when both are included. We then report the ARDL coefficient results and provide their interpretation. The chapter also includes the error correction estimation results, the Granger causality results and provides the diagnostic and parameters stability results and their discussion.

Table 5.1: Descriptive Statistics of the Variables at Level

Variables	GROWTH	FDILOG	OPENLOG	GOVLOG	INFLLOG
Maximum	8.4800	2.083	4.0132	0.669	3.5868
Minimum	-0.1700	-8.5085	2.6045	-1.6541	1.4586
Mean	4.6900	-2.1248	3.6355	-0.8216	0.7114
Std. Deviation	2.3693	3.9709	0.3922	0.6054	0.7114
Skewness	-0.3777	-0.4144	-1.2608	1.2066	-0.1777
Kurtosis-3	-0.8227	-1.5556	0.5787	0.7055	-1.5138
Coeff. Variation	0.5052	1.8688	0.1079	0.7368	0.2709

Source: Microfit Software

5.2 Descriptive Statistics

The results in Table 5.1 show that all the data except government spending are negatively skewed meaning that most values are concentrated on the left of the mean with extreme values to the right, Hence, the data are not normally distributed in this case. In addition, the coefficient of variation shows that there is no much dispersion of the data for each variable.

Table 5.2: ADF and Phillips-Perron Tests for Unit Root

	ADF Tests Statistics (with intercept and no trend)		Phillips-Perron Statistics (with intercept and no trend)	
Variable	**Level**	**First Difference**	**Level**	**First Difference**
GROWTH	-2.497	-5.836*	-2.516	-5.901*
LOGFDI	-1.833	-6.897*	-1.528	-8.385*
LOGOPEN	-0.973	-4.066**	-1.332	-4.120**
LOGGOV	-0.973	-4.066**	-1.332	-4.120**
LOGINFL	-1.528	-8.686*	-1.630	-8.035*
Critical Values				
1%	-3.662	-3.668	-3.662	-3.668
5%	-2.964	-2.966	-2.964	-2.966
10%	-2.614	-2.616	-2.614	-2.616

Notes:
*=Significance at 1% level; **= Significance at 5% level; and ***= Significance at 10% level

Source: Microfit Software

5.3 Augmented Dickey-Fuller and Phillips and Perron Unit Root Tests

Table 5.2 depicts the ADF and PP tests when the variables are tested for unit root with an intercept included but no trend term. The results show that all the variables, at their levels are non stationary and therefore, the null hypothesis of non-stationarity is not rejected and we conclude that the variables are actually non- stationary. Again,

since when the test is conducted at first difference, all the variables become stationary at either 5 percent or 10 percent significance level. This conclusion is based on the comparison between the test statistics and tabulated critical values. This means that the variable/data re integrated of order one i.e., $I(1)$ (which means they are non-stationary). The null hypothesis of non stationarity is therefore rejected.

Table 5.3: ADF and Phillips-Peron Tests for Unit Root

	ADF Tests Statistics (with intercept and trend)		**Phillips-Perron Statistics (with intercept and trend)**	
Variable	**Level**	**First Difference**	**Level**	**First Difference**
GROWTH	-2.841	-5.772*	-2.238	-5.825*
LOGFDI	-3.558**	-6.799*	-3.448	-8.231*
LOGOPEN	-1.702	-4.010**	-2.131	-4.068**
LOGGOV	-1.702	-4.010**	-2.131	-4.068**
LOGINFL	-2.081	-8.851*	-2.189	-8.245*
Critical Values				
1%	-4.26	-4.27	-4.26	-4.27
5%	-3.548	-3.552	-3.548	-3.552
10%	-3.209	-3.211	-3.209	-3.211

Source: Microfit Software

When the ADF and PP is conducted on the variables when both the intercept and trend term are included, we obtain slightly different results. As depicted in Table 5.3 above, FDILOG appears to be stationary at its level, while the rests of the variables are non-stationary. In this case, the null hypothesis of non-stationary cannot be rejected for the rest of the variables except LOGFDI. When the test is conducted on the variables at their first difference, they all appear to be stationary. The level of significance for the variable LOGFDI improves from 5 percent to 1 percent.

Now having satisfied ourselves that all variables under consideration are non-stationary at their levels but becomes stationary at their first difference, long-run equilibrium relationship will now be investigated by using the "Bounds" testing approach to cointegration within the ARDL modeling approach. Table 9 gives the results of the Bounds test for cointegration between GROWTH, LOGFDI, LOGOPEN, LOGGOV and LOGINFL. Critical values for the F-and t-statistics are presented in the Table 9 below as taken from Pesaran *et. al.,* (2001) to be used in this study.

5.4 The ARDL or "Bounds" Testing Approach to Cointegration

In time series, before running the causality test the variables must be tested for stationarity. For this purpose, in the current study we use the conventional Augmented Dickey-Fuller (ADF) tests. The ARDL bounds test is based on the assumption that the variables are $I(0)$ or $I(1)$. So, before applying this test, we determine the order of integration of all variables using the ADF Unit Root tests. The objective is to ensure that the variables are not integrated of order 2 i.e., $I(2)$ so as to avoid spurious regression results. The ADF and the PP Unit Root tests have been done and their results reported in Table 8 and Table 9; and discussed thereon.

In the first step of the ARDL analysis we tested for the presence of the long-run relationships in Equation (12), using Equation (6). We used a general-to-specific modeling approach guided by the short data span and AIC respectively to select a maximum lag of 3 for the conditional ARDL-VECM. In Bound testing procedure, we estimated an OLS regression "bounds tests" for regression for the first

differences part of Equation (8) and then test for the joint significance of the parameters of the lagged variables when added to the first regression. In fact, the OLS regression in first differences are of no direct interest to the "bounds" Cointegration test. The F-statistic tests the joint null hypothesis that the coefficients of the lagged level variables are zero (i.e., no long run relationship exists between them).

To execute the ARDL "*Bounds*" testing approach, each of the variable is treated as a dependent, and the equations are specified as under:

$$\Delta GROWTH_t = \beta_{01} + \beta_{11} GROWTH_{t-1} + \beta_{21} \log FDI_{t-1} + \beta_{31} \log OPEN_{t-1} + \beta_{41} \log GOV_{t-1} + \beta_{51} \log INFLATION_{t-1} + \sum_{i=1}^{p} \alpha_{1i} \Delta GROWTH_{t-i} + \sum_{i=1}^{q} \alpha_{2i} \Delta \log FDI_{t-i} + \sum_{i=1}^{q} \alpha_{3i} \Delta \log OPEN_{t-i} + \sum_{i=1}^{q} \alpha_{4i} \log GOV_{t-i} + \sum_{i=1}^{q} \alpha_{5i} \log \Delta INFLATION_{t-i} + \varphi_{1t} \quad (23)$$

$$\Delta \log FDI_t = \beta_{02} + \beta_{12} GROWTH_{t-1} + \beta_{22} \log OPEN_{t-1} + \beta_{31} \log GOV_{t-1} + \beta_{41} \log INFLATION_{t-1} + \sum_{i=1}^{q} \alpha_{1i} \Delta \log FDI_{t-i} + \sum_{i=1}^{p} \alpha_{2i} \Delta GROWTH_{t-i} + \sum_{i=1}^{q} \alpha_{3i} \Delta \log OPEN_{t-i} + \sum_{i=1}^{q} \alpha_{4i} \log GOV_{t-i} + \sum_{i=1}^{q} \alpha_{5i} \log \Delta INFLATION_{t-i} + \varphi_{2t} \quad (24)$$

$$\Delta \log OPEN_t = \beta_{03} + \beta_{13} GROWTH_{t-1} + \beta_{23} FDI_{t-i} + \beta_{33} \log GOV_{t-1} + \beta_{43} \log INFLATION_{t-1} + \sum_{i=1}^{q} \alpha_{1i} \Delta OPEN_{t-i} + \sum_{i=1}^{p} \alpha_{2i} \Delta GROWTH_{t-i} + \sum_{i=1}^{q} \alpha_{3i} \Delta FDI_{t-i} + \sum_{i=1}^{q} \alpha_{4i} \log GOV_{t-i} + \sum_{i=1}^{q} \alpha_{5i} \log \Delta INFLATION_{t-i} + \varphi_{3t} \quad (25)$$

$$\Delta \log GOV_t = \beta_{04} + \beta_{14} GROWTH_{t-1} + \beta_{24} FDI_{t-1} + \beta_{34} \log GOV_{t-1} + \beta_{44} \log INFLATION_{t-1} + \sum_{i=1}^{q} \alpha_{1i} \Delta \log GOV_{t-i} + \sum_{i=1}^{p} \alpha_{2i} \Delta GROWTH_{t-i} + \sum_{i=1}^{q} \alpha_{3i} \Delta FDI_{t-i} + \sum_{i=1}^{q} \alpha_{4i} \Delta OPEN_{t-i} + \sum_{i=1}^{q} \alpha_{5i} \log \Delta INFLATION_{t-i} + \varphi_{4t} \quad (26)$$

$$\Delta \log INFLATION_t = \beta_{05} + \beta_{15} GROWTH_{t-1} + \beta_{25} \log FDI_{t-1} + \beta_{35} \log OPEN_{t-1} + \beta_{35} \log GOV_{t-1} + \sum_{i=1}^{q} \alpha_{1i} \Delta \log INFLATION_{t-i} + \sum_{i=1}^{p} \alpha_{2i} \Delta \log GROWTH_{t-i} + \sum_{i=1}^{q} \alpha_{3i} \Delta \log FDI_{t-i} + \sum_{i=1}^{q} \alpha_{4i} \Delta \log OPEN_{t-i} + \sum_{i=1}^{q} \alpha_{5i} \Delta \log GOV_{t-i} + \varphi_{5t} \quad (27)$$

Table 5.4 reports the results when each of the variables is considered as a dependent variable (normalized) in the ARDL-OLS regressions. At this stage, the calculated F-statistic is compared with the critical values tabulated by Pesaran *et.al.,* (2001). These critical values are calculated for different regressors and whether the model contains an intercept and/or trend. According to Bahmani-Oskooee (2004), these critical values include an upper and a lower bound covering all possible classifications of the variable into I(1) or I(0) or even fractionally integrated.

The null hypothesis of no cointegration is rejected if the calculated F-statistic is bigger than the upper bound critical value, in which case we conclude that the variables are actually cointegrated. If however, that the F-statistic calculated appears to be less than the lower bond critical value, the null hypothesis cannot be rejected and we conclude that the variables are not cointergated. Finally, if it falls between the lower and the upper bound, then the results is inconclusive. Kremers *et.al.,* (cited in Bahmani-Oskooee (2004) argues that in such as inconclusive situation an

efficiency way of establishing cointegration is by applying the ECM version of the ARDL model.

Table 5.4: The ARDL or "Bounds" Testing Results of Level Variable (with trend but no intercept)

		Critical Value Bounds			
		95%		99%	
Dependant Variable	**F-Statistics**	**I(0)**	**I(1)**	**I(0)**	**I(1)**
GROWTH	3.85	3.219	3.8	4.385	5.615
LOGFDI	1.52	3.219	3.8	4.385	5.615
LOGOPEN	0.653	3.219	3.8	4.385	5.615
LOGGOV	1.137	3.219	3.8	4.385	5.615
LOGINFL	3.079	3.219	3.8	4.385	5.615

Source: Microfit Software

In Table 5.4 the second column depicts the calculated $F-$statistics which are compared with the $I(0)$ or $I(1)$ at first 95 percent and 99 percent critical values. In this case, we have considered the case where we have an intercept but no trend. The results shows that all variables except GROWTH, the null hypothesis of no cointegration cannot be rejected since the calculated $F-$statistic when LOGFDI, LOGOPEN, LOGGOV, LOGINFL are treated as dependent variables each in turn are smaller than the tabulated critical values. We therefore conclude that, the variables are not cointegrated (i.e., meaning that they don't have a long run relationship). The $F-$ statistic for GROWTH is larger than the tabulated critical values, in this case we reject the null of no cointegration, and conclude that there is cointegration (i.e., there exists a long run relationship between growth and the rest of the variables).

Table 5.5: The ARDL or Bounds Testing Results of Level Variable (with trend and intercept)

Dependent variable	F-Statistics	Critical Value Bounds			
		95%		99%	
		I(0)	I(1)	I(0)	I(1)
GROWTH	6.1877	4.066	5.119	5.315	6.414
LOGFDI	3.4397	4.066	5.119	5.315	6.414
LOGOPEN	3.0437	4.066	5.119	5.315	6.414
LOGGOV	0.9995	4.066	5.119	5.315	6.414
LOGINFL	2.644	4.066	5.119	5.315	6.414

Critical values are due Pesaran *et. al.,* (1996)

However, when we include an intercept and a trend, we see that again the null of no cointegration for GROWTH at the two level of significance (i.e., 95 percent and 99 percent) is rejected and we conclude that GROWTH is actually cointergated with the rest of the variables. However, for the rest of the variables, we cannot reject the null of no cointegration, and therefore we accept it and conclude that the variables are actually not cointegrated.

Table 5.6: ARDL (1,1,2,0,0) selected based on Schwarz Bayesian Criterion

Regressor	Coefficient	Standard Error	T-Ratio	Prob.
GROWTH(-1)	0.69292*	0.17147	4.0411	0.000
LOGFDI	-0.076179	0.1896	-0.40179	0.691
LOGFDI(-1)	0.38299**	0.17459	2.1936	0.038
LOGOPEN	2.9832	2.5829	1.15501	0.259
LOGOPEN(-1)	0.2069	3.8825	0.053301	0.958
LOGOPEN(-2)	-4.4315***	2.4682	-1.7954	0.085
LOGGOV	-0.21624	0.63309	-0.34156	0.736
LOGINFL	-1.4591	0.89536	-1.6296	0.116
_CONSTANT	12.6141	6.2271	2.0257	0.054
TREND	-0.11087	0.095787	-1.1575	0.258
R-Squared	0.6923	R-Bar-Squared	0.58153	
S.E of Regression	1.6148	F-Stat. F(9,25)	6.2498[0.000]	
Mean of Dependent Variable	4.7097	S.D of Dependent Variable	2.4962	
Residual Sum of Squares	65.1868	Equation Log-Likelihood	-60.5463	
AIC	-70.5463	SBC	-78.323	
DW-statistic	2.2094	Durbin's h-statistic	*NONE*	

Source: Microfit Software

The results in Table 12 show that the coefficient of GROWTH (-1) lagged once has a correct sign (0.69292) and is significantly at 1 percent level. This means that the current growth rate is explained by its own lag. By implications, higher past growth may influence the current growth to be higher. The LOGFDI (-1) is found to positively influencing the current GDP growth and hence FDI inflows should be encouraged. The significance is at 5 percent level, with the coefficient having the correct sign positive sign of 0.38299. The coefficient of LOGOPEN(-2) also appears to influence GDP growth in the long run, has a correct sign and is significant at 10 percent level.

The rest of the variables, however, appears to be not statistically significant and the signs of the coefficients are mixed as shown in the table. What is the economic interpretation of your results. More economic discussion is required. Econometric results means nothing if they are not given an economic meaning.

5.5 Error Correction Model for Cointegration Testing

Before estimating the Error Correction Model (ECM) based on the estimated ARDL model , it is customary to identify the lag selection criterion. Upon executing the appropriate commands, the results so obtained are tabulated in Table 13. In the current results, the lag order was selected using the Shwarz-Bayesian Criterion (SBC) as depicted in the Table 13.

Table 13 depicts the error correction mechanism (ECM) which represents the speed of adjustment to equilibrium after the shocks. In this kind of modeling, the only

meaningful number is the ecm(-1), whose sign is supposed to be negative. From the results we see that the model has the correct negative sign -0.3071 as expected meaning that the model returns to equilibrium at moderately high speed of 30.7 percent.

Table 5.7: Short-Run Results and the Error Correction Representation for ARDL (1,1,2,0,0) based on the Schwarz-Bayesian Criterion

Dependent variable= ΔGROWTH

Independent variables	**Coefficients**	**Standard Error**	**T-Ratio [Prob]**	**Prob.**
ΔLOGFDI	-0.7618	0.1896	-0.4018	0.6910
ΔLOGOPEN	2.9832	2.5829	1.1550	0.2580
ΔLOGOPEN1	4.4315	2.4682	1.7954	0.0840
ΔLOGGOV	-0.2162	0.6331	-0.3416	0.7350
ΔLOGINFL	-1.4591	0.8954	-1.6296	0.1150
ΔCONSTANT	12.6141	6.2271	2.0257	0.0530
ΔTREND	-0.1109	0.0958	-1.1575	0.2570
ecm(-1)	-0.3071	0.1715	-1.7908	0.0850

R-Squared = 0.49275	R-Bar Squared =0.31014
SE of regression = 1.6148	F-Statistic [7,27] =3.493,prob. [0.009]
Mean of dependent variable =0.0829	S.D of dependent variable =1.9441
Residual sum of squares =65.1868	Equation log-likelihood =-60.5463
AIC =-70.5463	Schwarz Bayesian Criterion =-78.3230
DW-statistic = 2.2094	

5.6 Granger Causality Test Results

The Granger causality Wald test results are reported in Table 14 below. We make decision on the causality based on the value of the probabilities. Our null hypothesis is that, each variable taken individually does not Granger cause the other (s). If the

probability value of any given combination of two variables is less than 5 percent, then we reject the null hypothesis and conclude that Granger causality exists between the two in which case the direction of causality run from the excluded variable to the equation variable (dependent variable).

The results in Table 5.7 show that LOGFDI, LOGOPEN and LOGINFL taken individually Granger cause GROWTH at 5 percent significance level and the direction of causality is indicated by the arrow in the Table. Also, when taken together, the variables LOGFDI, LOGGOV, LOGINFL jointly Granger causes GROWTH. However, it appears that GOVLOG considered individually does not Granger cause GROWTH. In the second equation, we look at causality of the rest of the variables on LOGFDI. The results show that GROWTH and LOGOPEN considered individually Granger because FDILOG and the rest of the variables do not. However, when considered jointly, the variables jointly appear to Granger cause LOGFDI.

In the third equation, it is only GROWTH that appear to Granger cause LOGOPEN. When taken together, however, that is when they are considered jointly, they appear to Granger cause LOGOPEN, since the probability is less than 5%. In the fourth equation, no variable appear to Granger cause the LOGGOV. We therefore, accept the null hypothesis and conclude that, there is no causality of whatever. Looking at equation five, we see that LOGFDI and LOGGOV Granger cause LOGINFL, while GROWTH and LOGOPEN do not Granger cause LOGINFL. However, when they are considered jointly, they appear to Granger cause LOGINFL.

Table 5.8: Granger Causality Wald Tests

Equation	Excluded	Chi 2	df	Prob>Chi2	Remarks
GROWTH	FDILOG	9.7098	4	0.046	FDILOG→GROWTH
GROWTH	OPENLOG	39.249	4	0.000	OPENLOG→GROWTH
GROWTH	GOVLOG	3.2846	4	0.511	No causality
GROWTH	INFLLOG	32.506	4	0.000	INFLLOG→GROWTH
GROWTH	ALL	80.167	16	0.000	ALL→GROWTH
LOGFDI	GROWTH	18.96	4	0.001	GROWTH→FDILOG
LOGFDI	OPENLOG	50.009	4	0.000	OPENLOG→FDILOG
LOGFDI	GOVLOG	0.911	4	0.923	GOVLOG→FDILOG
LOGFDI	INFLLOG	8.9	4	0.064	INFLLOG→FDILOG
LOGFDI	ALL	79.82	16	0.000	ALL→FDILOG
LOGOPEN	GROWTH	10.051	4	0.040	GROWTH→OPENLOG
LOGOPEN	FDILOG	6.0077	4	0.199	FDILOG→OPENLOG
LOGOPEN	GOVLOG	1.3254	4	0.857	No causality
LOGOPEN	INFLLOG	4.1889	4	0.381	No causality
LOGOPEN	ALL	30.95	16	0.014	ALL→OPENLOG
LOGGOV	GROWTH	8.7934	4	0.066	GROWTH→GOVLOG
LOGGOV	FDILOG	3.103	4	0.541	No causality
LOGGOV	OPENLOG	1.7529	4	0.781	No causality
LOGGOV	INFLLOG	6.3793	4	0.173	No causality
LOGGOV	ALL	16.239	16	0.436	No causality
LOGINFL	GROWTH	9.1132	4	0.058	GROWTH→INFLLOG
LOGINFL	FDILOG	35.323	4	0.000	FDILOG→INFLLOG
LOGINFL	OPENLOG	7.5212	4	0.111	No causality
LOGINFL	GOVLOG	38.931	4	0.000	GOVLOG→INFLLOG
LOGINFL	ALL	132.89	16	0.000	ALL→INFLLOG

Note: the → depicts the direction of causality.

5.7 Diagnostic and Parameter Stability Tests

Hansen (1992) warned that estimated parameters of a time series data may vary overtime. As a result, it is important that we conduct parameters stability tests since model misspecification may arise as a result of unstable parameters, Hence, Pesaran (1997) advises that we always employ the cumulative sum of recursive residuals (CUSUM) and cumulative sum of squares of recursive residuals (CUSUMQ) tests

based on their graphs. These tests were proposed by Brown, Durbin and Evans (1975). Figure 1 and 2 report plots of the CUSUM and CUSUMQ graphs. Both CUSUM and CUSUMQ graphs are confined within the 5 percent critical bounds of parameter stability. This means that, we are confidence that the estimated parameters are stable.

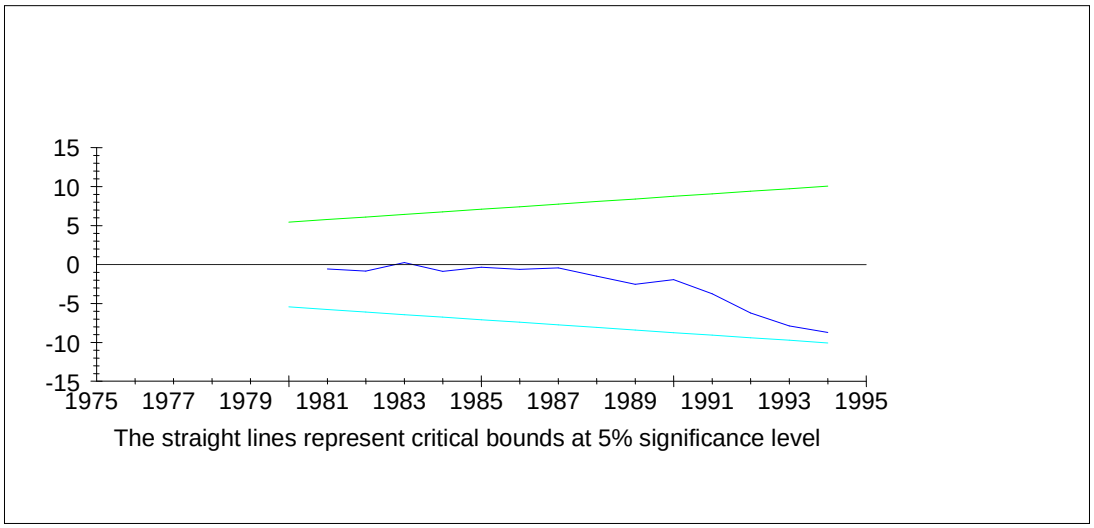

Figure 5.1: Plot of Cumulative Sum of Recursive Residuals

Source: Microfit Software

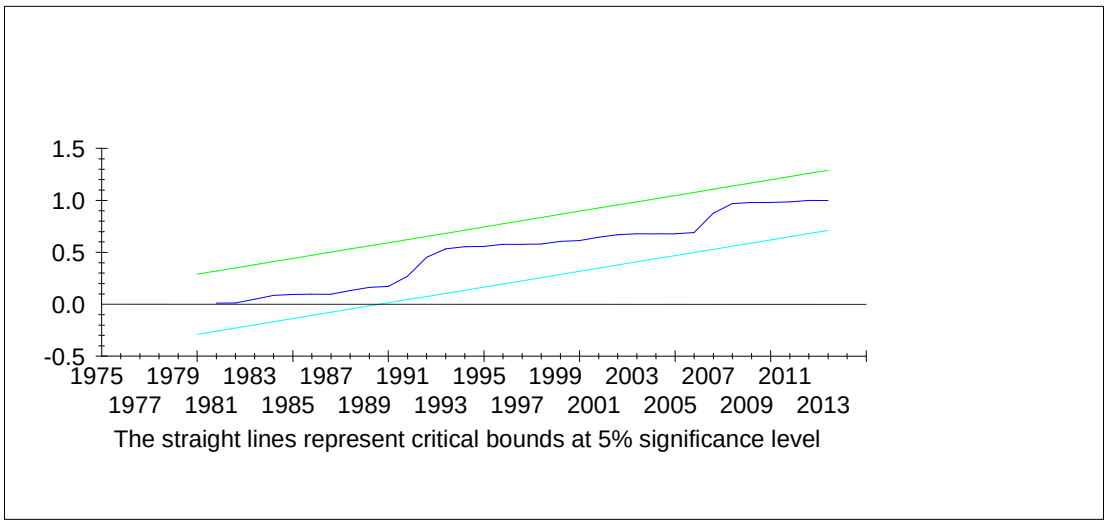

Figure 5.2: Plot of Cumulative Sum of Squares of Recursive Residuals

Source: Microfit Software

CHAPTER SIX

6.0 CONCLUSION AND POLICY IMPLICATIONS

6.1 Summary

The current chapter is summarized in three parts. Part one provides the summary of key findings of the study. The second part draws up some useful policy implications based on the results, whereas, the third part suggests area (s) for further research.

The general objective of the study was to attempt an empirical analysis of the dynamic relationships among GDP growth rate, FDI, trade openness, inflation and government spending in Tanzania for the period 1975-2013. In theory, FDI inflows, if well managed is envisaged to increase GDP growth rates, so does government spending, although this depend on the nature of spending. In addition, it is postulated that trade openness may also increase GDP growth although in many empirical studies; inflation is shown to have ambiguous effect on economic growth.

The current study employed the ARDL modeling or the "*Bound*" testing approach to cointegration using time series data for Tanzania for the period from 1975 to 2013. The per capita GDP growth rate was taken as a dependant variable and is used as a proxy for economic growth. In addition, the natural logarithms of FDI, trade openness, government spending and inflation have been used as independent variables. We have used a combination of the softwares, STATA 12 and MICROFIT 4.1. MICROFIT is more robust for regression analysis involving time series and more specifically for estimating the ARDL model.

From the results and discussion above, we confirm that the parameters are fairly

stable and also based on the ECM, the system returns into equilibrium fairly faster once it undergoes disturbances (disequilibrium), at about 30 percent. Based on the "*Bound*" testing results, we have shown that GROWTH is actually co-integrated with the rest of the variables (independent variables). This means that, there exists a long-run relationships between GDP growth and the rest of the explanatory variables. In addition, the Granger causality test results, shows that most of the causation are consistent with the hypothesis, meaning that explanatory variables have a predicting power to GDP Growth in Tanzania. As a policy options, the Tanzania's government should encourage macroeconomic policies that favour and promote the FDIs, and also should be more open to the international markets in light of promoting economic growth and development while at the same time, trying to curb inflation. This is so because, these variables have an effect /influence on per capital GDP growth rate.

6.2 Policy/Implications

The framing of effective policies and their implementation is crucial in the effectiveness of the FDI and trade OPENNESS in Tanzania. As was expected international trade appears to have positive effect on economic growth in Tanzania, therefore there is a need to have strong domestic policies that foster international trade (trade openness) and hence, economic growth. Policies towards strengthening macroeconomic environment need to be redressed especially those fiscal policies like government spending, since though it can encourage economic growth; this depends very much on the type of spending under discussion. This is so because, if spending is rampant on unproductive activities, at time it may jeopardize economic

growth. Moreover, strong institutional framework need to be reviewed and policies to attract FDI should be reviewed since empirical evidence do not support the importance of policies like tax incentives including tax cut and tax holidays since these appears to be negatively affecting FDI attraction and hence may be growth deterrence. In terms of Granger causality tests, we have seen that LOGFDI, LOGOPEN, and LOGINFL when considered individually, Granger cause Growth. This means that, these three variables have predictive power over GROWTH. In terms of policy therefore, the results call for a need continue attracting more FDIs, and become more open to the international trade. However, these policies should be designed in such a manner that would ensure a shared growth and hence development.

6.3 Areas for Further Research

Like in many developing countries, the current study was limited with the data availability and differences between data from different sources. The study was also limited due to lack of data in disaggregated from in which case micro analysis was highly ignored. Recent development in the natural gas and petroleum sector coupled with the discovery of uranium in different places, it is evident that FDI will still be flocking to Tanzania. In addition, there has been a general outcry that FDI have not produced desired results at micro level. One area of research interest we suggest is that of trying to look at the impact of FDI at micro-level, particularly by disaggregating the data into their respective sector. In this way, we will be able to know the sectoral effects of FDI in Tanzania. Another area of study may be to analyze macroeconomic and institutional policy frameworks and to see why the

existing one have not brought desired results of FDI in promoting shared growth and reduction of poverty in Tanzania.

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APPENDIX

Data Used In the Study

YEAR	GDPGROWTH (%)	FDI/GDP	OPEN/GDP	GOV/GDP	INFLATION
1975	4.82	0.00038335	32.86078102	0.361414444	25.93
1976	5.15	0.00222684	32.86626441	0.337605963	6.62
1977	4.5	0.00078542	31.20639092	0.321705695	11.72
1978	3.6	0.00156327	30.7673804	0.406130506	11.73
1979	3.7	0.00181178	29.04313087	0.415952374	13.81
1980	6.8	0.00090077	27.95207957	0.423809298	30.2
1981	7.29	0.00357677	23.43972933	0.429636267	25.37
1982	2.88	0.00331264	16.35991635	0.401040772	29.27
1983	-0.14	0.00029235	13.52500854	0.338867298	26.96
1984	1.02	0.00365346	15.15277233	0.34428779	36.12
1985	3.82	0.00393338	16.23209966	0.271752017	33.33
1986	4.45	0.00301482	23.50679585	0.23341351	32.4
1987	5.74	0.00020563	34.9651784	0.241017845	29.98
1988	5.98	0.07371963	35.01113272	0.329747567	31.2
1989	4.22	0.13212169	34.98467304	0.345622347	25.82
1990	8.25	0.00023481	41.6788662	0.386802774	19.71
1991	2.44	0.00020175	36.27521312	0.361659046	22.29
1992	-0.17	0.26447611	41.60704795	0.413668388	22.07
1993	0.33	0.48048838	50.35408479	0.408762123	25.32
1994	0.65	1.10845908	49.14239788	0.407429953	35.5
1995	2.69	2.28223804	54.75362634	0.434549199	27.4
1996	3.59	2.31006555	49.65975083	0.483205169	21
1997	2.57	2.05476438	46.40085747	0.513280252	16.1
1998	2.02	1.8437992	55.32292289	0.58637546	12.9
1999	4.06	5.32799301	52.34382765	0.583278176	7.8
2000	3.7	4.54948544	50.66734746	0.757411358	6.9
2001	5.57	3.74438018	46.29056472	0.791719019	5.1
2002	6.73	3.6670315	48.29812481	1.262670454	4.3
2003	7.01	3.12423715	50.23272808	1.515976095	5.3
2004	6.77	6.8	51.21288803	1.70301874	4.7
2005	7.08	6.615232	52.14304935	1.953440178	5
2006	8.48	2.81231239	50.18716238	1.924004154	7.3
2007	7.89	3.4561242	51.56492491	0.231131605	7
2008	7.53	6.67754887	50.72025444	0.242534475	10.3
2009	5.72	4.45817403	50.43119222	0.265582604	12.1
2010	5.55	8.02990821	50.14213	0.296807916	5.5
2011	6.5	5.14951322	49.85306778	0.252348892	6.5
2012	7	6.0439078	49.56400556	0.191259346	7.2
2013	6.5	4.421776	49.27494334	0.221258641	6.5

Source: Pennsylvania World Tables (PWTs); Ministry of Finance (MoF) Economic Surveys (various years); and National Bureau of Statistics (NBS)