Thesis for the Degree of Master of Arts

The Impact of Official Development Assistance (ODA) on the Economic Growth of Liberia

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라이베리아 경제성장에 공적개발원조 (ODA)가 미친 영향

Advisor: Prof. Utai Uprasen

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Abstract

The required capital to boost economic growth and development is inadequate domestically. As a result, the external capital is needed. Official Development Assistance (ODA) is one of important external capitals which contribute on economic development in developing countries significantly. The existing empirical literature implies inconclusive impact of the official development assistance on economic growth. The empirical findings on the impact of official development assistance on economic growth are either positive, negative or even insignificant. Consequently, this thesis examines the impact of official development assistance on the economic growth of Liberia, a country where an empirical study on official development assistance effectiveness has not been conducted yet. Using time series data for the period 1974 to 2014, this thesis employed the Autoregressive Distributed Lag (ARDL) model in the empirical estimation. Our theoretical framework is derived from the Endogenous Growth Model. The empirical results show that a 1 percent increase in official development assistance leads to 0.37 percent increase in real GDP of Liberia at 5 percent level of significance. The causality test based on the Toda-Yamamoto approach also confirms that the official development assistance leads to an increase in economic growth of Liberia.

Keywords: Official Development Assistance (ODA), Economic Growth, Endogenous Growth Model, Autoregressive Distributed Lag (ARDL) Model, Toda-Yamamoto, Liberia

라이베리아 경제성장에 공적개발원조(ODA)가 미친 영향

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국문초록

경제성장과 발전을 향상시키기 위해서 필요한 자본은 국내자본 만으로는 크게 불충분하다. 결과적으로 외부 자본을 필요로 해야 한다. 공적개발원조(ODA)는 개발도상국에서 경제발전에 크게 기여할 하나의 중요한 외부자본이다. 기존의 실증적인 문헌들은 경제성장에 미친 ODA의 영향에 대해 결론을 내지 못하고 있다. 경제성장에 미친 공적개발원조(ODA)의 영향에 대한 실증적 결과들은 긍정적이거나 부정적 또는 심지어 의미가 크지 않다. 이에 따라 본 논문은 공적개발원조(ODA)의 효과가 아직 실증적으로 연구되지 않은 라이베리아(Liberia)의 경제성장에 공적개발원조(ODA)가 미친 영향에 대해 조사를 실시했다. 1974년부터 2014년까지의 시계열 데이터를 사용한, 본 논문에서는 실증 예측을 위해 자기회귀시차분포(ARDL) 모델을 사용하였다. 이론적 틀은 내생적 성장모형을 기반으로 했다. 실증 결과는 공적개발원조(ODA)가 1% 증가하게 되면 유의수준 5%에서 라이베리아의 실질 GDP가 0.37증가로 이어지는 것을 보여주고 있다. Toda-Yamamoto 접근법에 기초한 인과관계검정은 공적개발원조(ODA)가 라이베리아(Liberia)의 경제성장을 증대로 이끌어 줌을 보여주고 있다.

주제어: 공적개발원조(ODA), 경제성장, 내생적 성장모형, 자기회귀시차분포(ARDL) 모델, 토다-야마모토, 라이베리아(Liberia)

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Chapter 1

Introduction

1.1 Background

It is widely common that the domestic capital needed to promote economic growth in developing countries is insufficient, therefore according to the Department for International Development (DFID), economic growth is the maximum instrument for minimizing poverty and improving the standard of living in developing countries. From a macroeconomic perspective, it is measured by the growth in Gross Domestic Product (GDP). The growth in GDP is a function of total productivity, capital, and labor produced by the economy of a country (DFID, 2015). Developing countries are no doubt characterized as capital resource constraint economics. The needed capital to boost economic growth and development is huge inadequate domestically, which as a result deserves the need for external capital. Foreign aid becomes one potential external capital that is expected to significantly boost economic development in developing countries. It has appeared as a supreme strategy for alleviating poverty in developing countries' economic growth. Yet it seems that the developing countries in the world steady

to suffer from economic hardship, upraising questions whether official development assistance is a useful and effective approach to boost growth and development in recipient economies. This question has interest in the investigation of many scholars over several decades.

As Morrissey (2001) points out (1) official development assistance enlarges investment, in physical and human capital; (2) official development assistance expand the magnitude to import capital goods and technology; (3) official development assistance does not have indirect impact that decreases investment or savings rates; and official development assistance is connected with technology transfer that enlarges the productivity of capital and elevates endogenous technical change.

The empirical evidence on the role of official development assistance in the economic growth process of developing countries obtained from extensive studies has been mixed. For example, Easterly, (1999); Brautigam and Knack, (2004) find evidence for the negative impact of foreign aid and growth, Papanek, (1973); Levy, (1988); Islam, (1992); Hansen and Tarp, (2000); Burnside and Dollar, (2000); Gomanee et al., (2013); Dalgaard et al., (2014); Karras, (2006) find evidence that foreign aid has positive impact on growth while Boone, (1996); Mosley et al.,

(1987); Mosley, (1980); Jensen and Paldam, (2003); Rajan and Subramaniam, (2005); Williamson, (2008) find evidence suggesting that aid has no significance on economic growth. Notwithstanding, yet Burnside and Dollar (2000) concluded that official development assistance has a positive impact, this conclusion reflects only to economies in which it is co-operating with good fiscal, monetary and trade policies. Doucouliagos and Paldam (2009), employing the mean examination covering 68 papers accommodating an amount of 543 straight estimates, it found that the impact of official development assistance on economic growth estimate scatter greatly and add up to a little positive but unimportant effort of growth. By and large, the relationship between aid and economic growth remains inconclusive.

Official Development Assistance (ODA) which is frequently known as Foreign Aid are resources transfer from the public sectors as grants and loans at certain financial agreement terms to developing countries. As most of developing countries lack the required driving force to captivate substantial foreign direct investment, the only outside capital willingly available to promote development promise has to come from official development assistance. For some, it can exceed half of GDP. After the Second World War, official development assistance has been one of the most significant policy tools that advantageous countries use for assisting poor countries to increase their economic growth by improving

population well-being and institutional development.

Official Development Assistance (ODA) is given by countries who are members of the Organization for Economic Cooperation and Development (OECD) and Development Association Committee (DAC) to promote both economic and welfare development in developing countries and is a concessional loan with a grant element relatively of 25 percent. ODA can be provided bilaterally or multilaterally through multilateral agencies such as the International Development Association (IDA), World Bank, regional development banks and United Nations Agencies. The global donor community subscribes to fostering economic growth and poverty alleviation in developing countries as the central motive for providing aid. The world attained the first Millennium Development Goal target to cut the 1990 poverty rate in half by 2015-five years ahead of schedule in 2010 (World Bank, 2015).

However, according to estimates in 2011 seventeen percent of the population living in developing countries lived below $1.25 a day. This means that although progress in alleviating poverty has been made, considerable actions still need to be implemented by developing countries; to end extreme poverty within a generation and promote shared prosperity in a sustainable manner across their

countries. (Global Monitoring Report, 2014). Given the ambiguous relationship between official development assistance and economic growth as summarized above and the primary objective of the Liberian government as envisaged in its poverty reduction strategy, this study aims to investigate the impact of ODA on the economic growth of Liberia using data covering the period 1974 to 2014.

1.2 Research Objective

The main objective of this study is to examine and estimate the impact of official development assistance on the economic growth of Liberia. Thus, the broad objectives of the study are:

First, to examine the impact of official development assistance on the economic growth of Liberia.

Second, to empirically test the causal relationship between official development assistance (ODA) on the economic growth of Liberia.

Third, to make policy implications and forward recommendations.

1.3 Research Question

What is the relationship between official development assistance (ODA) and the economic growth of Liberia?

1.4 Research Hypothesis

Official Development Assistance has a significant positive impact on the economic growth of Liberia.

1.5 Structure of the Study

This study is structured into seven chapters. The first chapter covers the introduction, background, research objective, research question, the research hypothesis and the structure of the study. The second chapter shows an overview of the Liberian economy. The third chapter covers an overview of Official Development Assistance (ODA) in Africa and Liberia which includes the background of ODA to Africa and the background of ODA to Liberia, and the

forms of aid. Chapter four presents the literature review which consists of the literature review on related theories and the literature review on related empirical studies. In the fifth chapter, the methodology and data with the model specification and techniques are displayed. The sixth chapter debates the empirical results. Lastly, chapter seven presents the conclusion and policy recommendations based on the main findings.

Chapter 2

Overview of the Liberian Economy

Liberia is a small country of 3.47 million people; the economy has experienced major devastation in all sectors as a result of its 16 years of civil war. The civil war which started in 1989 claimed over 300,000 lives ended in 2005 completely destroyed Liberia's infrastructure and displaced more than one million people with special general and presidential elections that ushered in a new government in 2006. According to the Liberian Government's Poverty Reduction Strategy (PRS-2007), the primary objective of the government has been to revamp the economy thereby stimulating saving, investment, employment, reducing poverty, reducing inflation and above all achieving economic growth.

The political situation in Liberia has a historical bearing starting from the founding of the country in 1847 by the ex-slaves from America. The descendants of the ex-slaves also known as the "Congos" dominated national politics from the founding of the country. The resources of the country were used by a privileged few, leaving the country underdeveloped and in abject poverty.

The Liberian economy has been operating in a capitalistic pattern, with some attributes of mixed economic activities but at an infinitesimal level since Liberia attained its independence in 1847. The economy began attracting potential investors in the 1940s when the government of President William V.S. Tubman launched its "Open Door Policy" to attract foreign investment, create employment and above all, accelerate economic growth. The emerging results were in terms of massive employment, relative alleviation of poverty and significant growth as evidenced by the establishment of viable concession companies such as Bong Mines, National Iron Ore Company and the Liberia Americo-Swedish Mining Company (LAMCO), (NHDR, 1999). This significant development continued until the 1080s when the economy began declining due to a "coup de tat" that ushered in a military regime.

While steady economic growth rate averaging 4 to 7 percent was witnessed in the 1960s, GDP growth rate declined from 5 percent in the early 1970s to less than 1 percent in the 1980s and the external debt rose from USD 750 million to USD 1.4 billion in 1985 (IPRSP, 2006). Thereafter, the country continued to experience intermittent political instability, which eventually led to the closure of some major investments thus stalling the process of growth. The "cope de tat" of 1980 brought an abrupt end to the uninterrupted rule of the "Congos". The

succeeding military administration did not fundamentally change the course of state rule. The same exclusionary policies of the past were adopted, not only against the “Congo” people but it looks at the tribal or ethnic dimension. The military government stayed in power for five years and was later transformed into civilian administration in 1985 from another five years.

The precipitating uncertainties follow the 1980s coup gave rise to massive capital flight. The accompanying socio-economic crisis hastened the decline of the economy, non-payment of debt servicing arrears and negative growth. Private investors disinvested from the country and productivity declined dramatically (UNDP – Liberia Report 200-2003). The repressive practices of the new military and police force against the Liberia people led to a rebel invasion in 1989. The civil war led to a near collapse of all democratic and socio-economic institutions in Liberia. Basic socio-economic infrastructure, including roads and bridges, market facilities, schools, health facilities, water and sanitation, and farm and other services of livelihood were destroyed or abandoned. Consequently, poverty increased massively and today approximately 76.2 percent of the Liberian people live below the national poverty line of US$365.00 per annum; unemployment is estimated at 85 percent; access to water and sanitation is 26 percent respectively; health services (urban 90 percent, rural 37 percent), education, 70 percent; housing

20 percent and HIV/AIDS prevalence stands at 8.2 percent and is on the increase (UNDP, 2000-2003).

The civil war officially ended in 1997 and was followed by elections in the same year. According to UNDP (2000), following these events, the country's GDP estimate at US$508 million was just about 50 percent of its pre-war level (1987) of US$1 billion, the per capita income dropped from US$340.00 pre-war to US$199.00 (2000). Another civil war erupted in 1999, which totally devastated the little progress made by the previous administration. The war did not end until international peacekeepers finally ousted Taylor in 2003 and established the basis for stability, peaceful elections and the beginning of recovery. By 2005, average income in Liberia was just one-quarter of what it had been in 1987 and just one-six of its level in 1979. In normal terms, GDP per capita was $160 in 2005 (Radelte, 2007). Following the elections in 2005 and the inauguration of the new government, the pace of economic recovery accelerated; economic growth reached 7.8 percent and 9 percent in 2006 and 2007 respectively but declined to 7 percent in 2008. This was due to the global economic meltdown and the rise in food and fuel prices (The Republic of Liberia, 2008).

As the Liberian economy imploded, poverty increased sharply and today more than 75 percent of Liberians live under the poverty line of $1 per day.

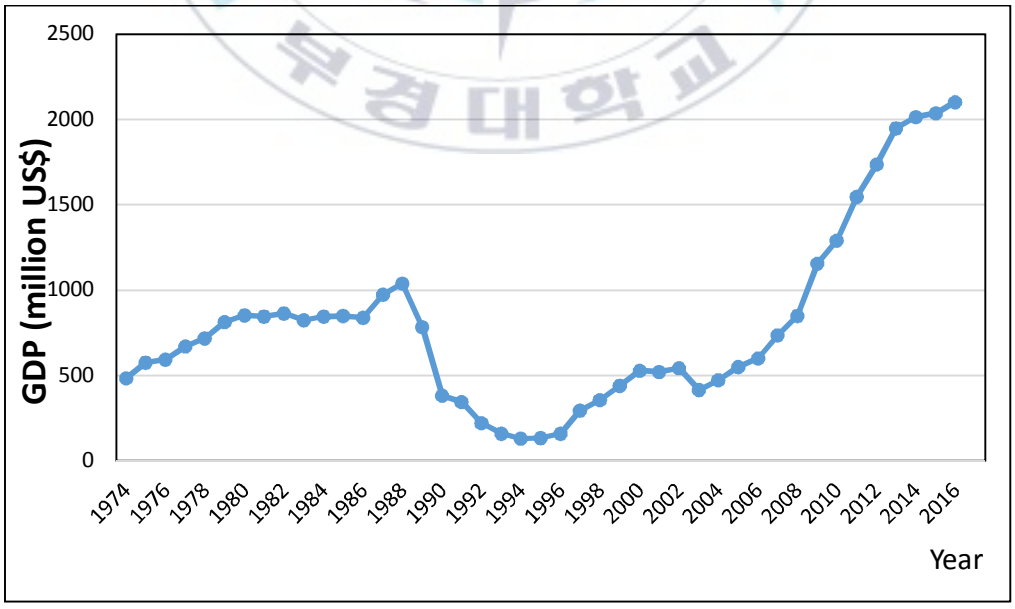
Unemployment and underdevelopment are high, as ex-combatants, returning refugees and internally displaced persons struggle to find work. Refugees returning to their farms lack seeds, fertilizers and tools and in some cases face uncertain land tenure. Schools, hospitals and clinics were badly damaged and most government buildings were left in shambles. Today, there are less than 50 Liberian physicians to take care of the country's public health needs, equivalent to one for every 70,000 Liberians. Government finances fell down in tandem with the economy. Government revenue collapsed to less than US$85 million one year between 2000 and 2005, resulting into the public spending of only about US$25 per person a year, which was one of the lowest levels in the world. However, the government revenue authority has recorded some increment in revenue generation in the 2007/2008 fiscal period. At the same time, years of mismanagement left a huge external debt burden, mostly as a result of large borrowing and expenditures in the 1980s and steady accumulation of arrears since then. Liberia's total debt of Liberia up to 2007 was estimated at about US$4.5 billion, equivalent to about 800 percent of GDP and 3,100 percent of exports. Domestic debt and arrears total at least $304 million with an additional US$17 million in claims deemed contestable. Nevertheless, the present administration has made some progress, including obtaining a waiver on external debts (Redelet 2007).

Prior to 1989, twelve banks existed in the country but most closed down while some were declared insolvent during the war period. At the moment, only nine commercial banks are operational: ECOBANK (Liberia) Limited, Liberia Bank for Development and Investment, Afriland First Bank Liberia, Access Bank Liberia, GN Bank (Liberia), Guaranty Trust Bank Liberia, Global Bank Liberia Internal Bank (Liberia), Liberia Bank for Development and Investment and United Bank for Africa Liberia Limited. In 1999, the National Bank of Liberia was transformed to the Central Bank of Liberia to effectively conduct the country's monetary policy. Banking activities are being restored in the rural areas to boost tread and investment after 15 years of non-banking there.

The 2008 census puts the population of Liberia at 3.476,608. However, Liberia growth potential is favorable and high. Liberia has a good natural resource certain, these include fertile land for agriculture and crops, diamonds, extensive forestry resources, gold, iron ore, and the Atlantic Ocean. The resource-based industries have the possibility to create important numbers of jobs, deliver substantial budget revenues for economic growth. To cultivate the favorable growth potential of Liberia and to meet the challenge of achieving rapid, inclusive and sustained growth, Liberia must take advantage of the near-term opportunities from agriculture and natural-resource based activities and establish the foundation

for diversification into processing downstream products and other manufacturing and service exports over time. Doing so will not be easy but according to Radelet (2007), “four sets of actions stand out as key priorities to accelerating economic growth: building infrastructure (most especially roads), adroitly managing natural resources and the potential side effects of their production, keeping business and production costs low through a favorable business climate and building strong training and education programs to develop workers with appropriate skills. The Ellen Johnson led government has considered this recommendation in her poverty reduction strategy plan for the country.

<Figure 1> Gross Domestic Product (GDP) of Liberia, 1974 - 2016



Source: The World Bank Database (https://data.worldbank.org)

As presented in <Figure 1>, the gross domestic product (GDP) of Liberia from 1974 to 2016 shows the increment in the indicator of the GDP of Liberia from 1974 up to 1988. From the end of 1988 to 1995 Liberia experience the worst decrease below the level in the GDP ever in the history of the country, which was due to the civil war. From 1996 to 2002, Liberia experiences a shift increment in the GDP but from the end of 2002 to 2003, there was another slight decrease in GDP. From 2004 to 2016, Liberia experienced a high increase in GDP rapidly as the country got back to stability.

Chapter 3

An Overview of Official Development Assistance (ODA) to Africa and Liberia

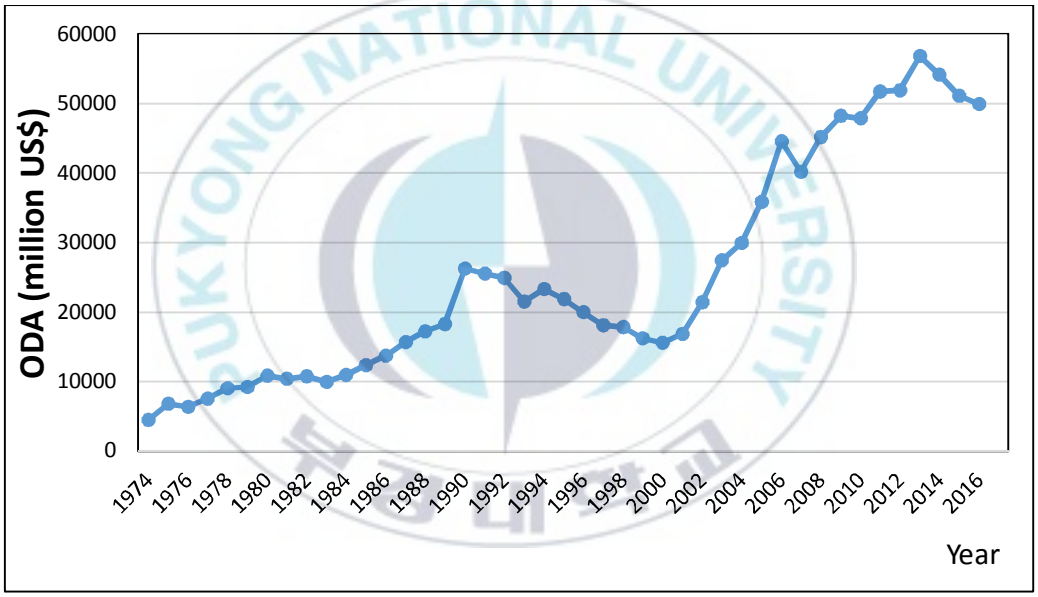
3.1 The Background of Official Development Assistance (ODA) to Africa

Foreign aid remains an important external source of income for many countries in Africa. African countries fall short of being able to provide adequate resources for its people with the basic needs to feed its population and suitable ground for development, the need for foreign aid in Africa is unquestionable. Especially, in recent years were soaring in fuel and food prices, aid to Africa has even become more important and timely.

The share of foreign aid to Africa has been not less than 30 percent of the total donor aid commitments to developing countries. As of the mid-1970s, the Development Assistance Committee has increase aid to Africa rapidly in response to the need for development. As a share of total aid to Africa, aid reached an optimum level in 1989 – 1994 on an annual mean basis for about 38 percent of all

to Africa. The inflow of aid to Africa constitutes both bilateral and multilateral are ranging between 26 percent and 34 percent of net aid disbursement. Grants and aid disbursement ratio send to Africa in most cases been over 80 percent constitutes about two-thirds of aid received.

<Figure 2> Official Development Assistance (ODA) to Africa, 1974 - 2016



Source: The OECD (http://www.oecd.org/dac/stats/idsonline.htm)

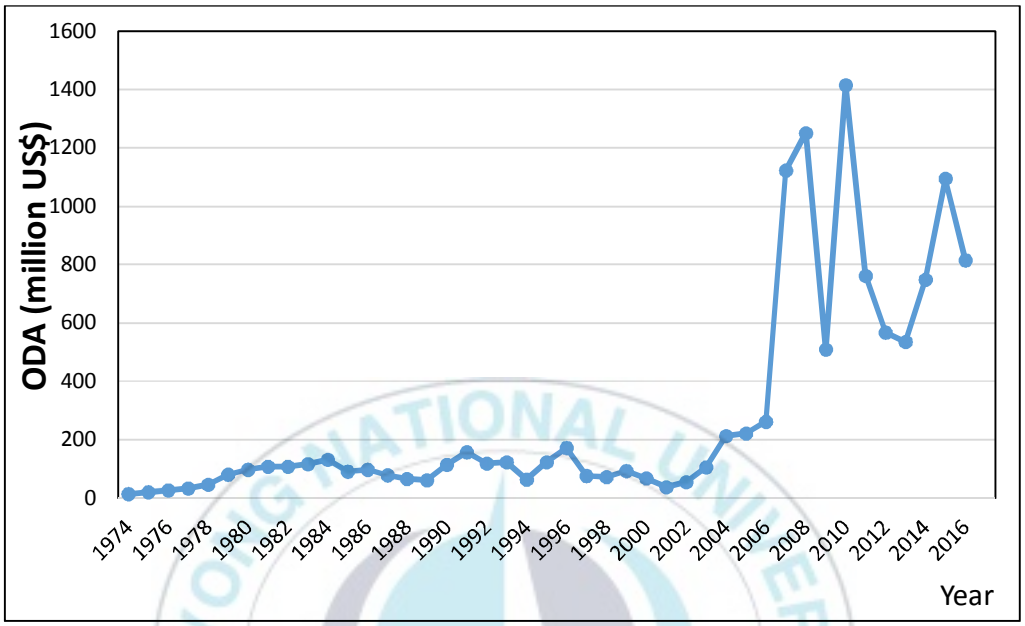
<Figure 2> presents the general perspective of ODA flows to Africa from 1974 to 2016. It is presented that there was a fairly significant rise in the dedication of donors support to Africa's economic growth and sustainability from 1974 to

1990. However, from 1991 to 2000 Africa experienced a dramatically collapsed decline. There had been substantial literature evidence pointing to the decline of ODA to Africa due to the post-cold war period. Between 2001 to 2005 a significant recovery from <Table 2> presenting a very high significant increase of ODA flows by donors during these periods but during 2006 to 2007 there was a slick decrease again, but from 2008 to 2013 ODA reached its highest pick of flows to Africa but from the end of 2013 to 2016 Africa started to receive a decrease in ODA.

3.2 The Background of Official Development Assistance (ODA) to Liberia

Liberia faces enormous challenges, ranging from the social economic condition in Africa. Over 63 percent of Liberian's population lives below the poverty line, with 48 percent of the population living in extreme poverty. Most children don't attend school and access to health care is limited, there is only about one doctor for every 70,000 Liberians. Under-five mortality rates are estimated at 133 deaths for every 1,000 live births. With all these challenges, foreign aid becomes one potential external capital that is expected to significantly improve the life of its citizens.

<Figure 3> Official Development Assistance (ODA) to Liberia, 1974 - 2016

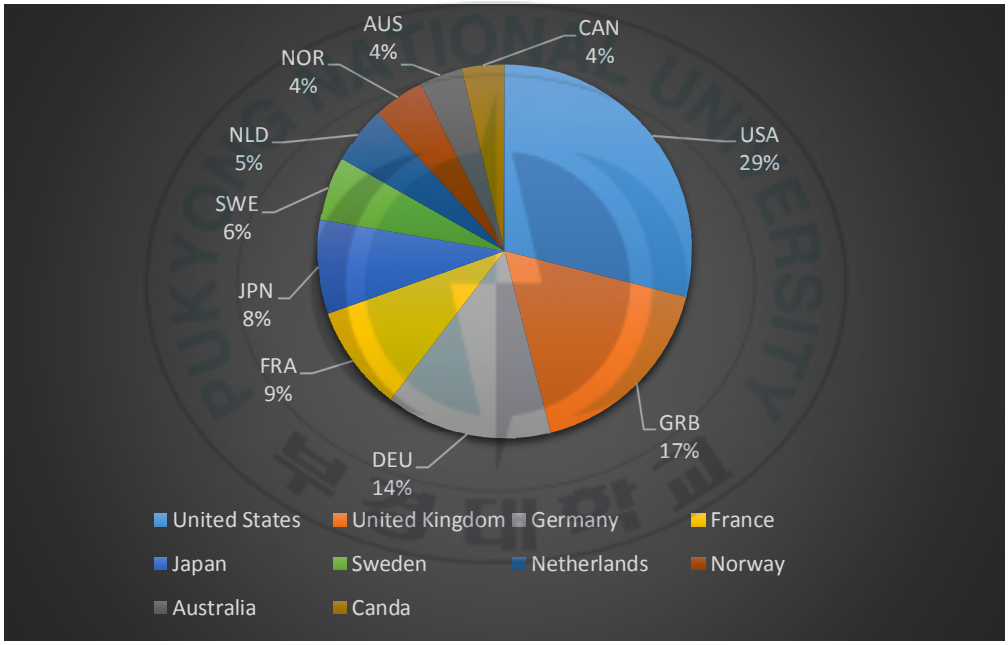


Source: The World Bank Database (https://data.worldbank.org)

As presented in <Figure 3>, Official Development Assistance (ODA) growth to Liberia from 1974 to 2016. From 1974 to 2001, ODA to Liberia had been fluctuating and low. ODA to Liberia has fluctuated with the instability and politics of the country. From 2002 to 2008 there was a high increase in the ODA to Liberia tremendously boosted particularly by the end of the civil war. While during 2009 there was a sharp decrease in the flow of ODA to Liberia. At the end of 2009 to 2010 Liberia experience a tremendous increase in ODA ever in the history of the country. Later at the end of 2010 to 2013 again shows a sharp

percentage decrease of ODA to Liberia. However, from the end of 2013 to 2015, Liberia once again started to receive an increase in ODA. Between 2015 to 2016, Liberia had a slight decrease in ODA.

<Figure 4> Net Disbursement of Official Development Assistance (ODA) by Major Donors to Liberia, 1974 – 2016 (Percent)



Source: The OECD Database (https://data.oecd.org)

<Figure 4> present the 10 top OECD donors to Liberia from 1974 to 2016. The United States is the highest donor to Liberia, providing 32 percent of all ODA

to Liberia. This is well above the next two major donors, Germany and France with 13 and 12 percent respectively. The United States has been the largest contributor to the total ODA to Liberia. The high level of the United States aid to Liberia considers the historical ties between the two nations.

3.3 Forms of Foreign Aid

It is Significant to Separate the forms of different aid because they are probable to apply different macroeconomic results to the recipient economies. For example, Ouattara (2005) tested empirically the effect of different forms of aid on savings in aid recipient countries. He establishes that comprehensive project aid flows and food aid (eliminating emergency and relief food aid) are connected with scaling down in domestic savings. On the other hand, financial program aid and technical assistance grants did not appear to reduce domestic saving (Ouattara 2005). There are four main forms of development aid which include project aid, financial program aid, technical assistance, food aid and humanitarian aid or emergency relief (Riddell, 2007). However, White (1998) identified three major forms of aid which include project aid, program aid (including food aid) and technical assistance.

3.3.1 Project Aid

Though there has been a decline of ODA in form of project aid from the mid-1990s, ODA to specific projects still exist. Project aid is dominated by funds channeled to interventions in subdivisions such as health, education, a rural development comprising transport and power, agriculture, housing and sanitation, and water supply. However, small amounts of project aid are channeled to industrial, mining, trade and cultural projects (Riddell 2007). Many ODA-funded development projects aimed at achieving specific outputs by providing resources, skills, and systems which the recipient country needs.

3.3.2 Program Aid

Program aid is defined by OECD as financial contributions not linked to specific activities (Riddell 2007). The program aid is divided into two forms, the budget support and the balance of payment (BOP) support. extending the budget support, aid funds are allocated to boost aggregate revenue and increase overall spending. Aid funds channeled to agencies of finance are titled as General Budget Support (GBS) while those channeled to particular sectors are titled as Sector

Budget Support (SBS). Under the GBS, donors provide funds for accomplishing of development and poverty-reducing strategies paying concentration to the magnitude of the recipient countries to use funds efficiently.

3.3.3 Technical Assistance

Technical Assistance (TA) comprises the service of knowledge know-how, skills, and advice. For several decades, technical assistance has also been given in form of teaching staff mostly in primary and secondary education in developing countries. Furthermore, more specialized instructors have frequently executed skills training operations to meet their wants and to achieve their instant objectives. For example, the London-based Overseas Development Institute (ODI) has been running its fellowship scheme for graduate economists and placing them in key ministries in developing countries (Riddell 2007). Notwithstanding, this definite impact of TA, there have been various problems include expensive costs of providing the TA (mainly the consultancy costs).

3.3.4 Humanitarian Aid or Emergency Aid

The meaning of humanitarian aid is explained according to its purpose, which is, "to save lives, alleviate suffering and enable those suffering to maintain (or retain) their human dignity during and in the aftermath of natural disasters and man-made crisis". Humanitarian aid has been effective in most cases in accomplishing its tangible ends results such as saving lives, supplying food to the hungry, healthcare and medicines for those vulnerable to acute disease in emergencies, water and sanitation, and shelter for the homeless. However, the sustained internal conflicts in war-prone areas reduce resources to meet development objectives as more resources are directed to meet humanitarian needs (Riddell 2007).

3.3.5 Food Aid

Food aid comprises of program food aid and humanitarian food aid. Program food aid may alleviate the foreign exchange limitations to the import of the obligatory middle inputs or by given fiscal resources through counterpart funds causing by the domestic sale of program food aid. These resources can be utilized

by the beneficiary country to provide capital for agricultural research and addition and enhancement of rural infrastructure in particular. However, program food aid may have Dutch disease effects on domestic food and producers thus hurting the food sector's competitiveness in the world markets (Barret, 1999).

Chapter 4

Literature Review

4.1 Literature Review on Related Theories

The earlier work on the impact of official development assistance on economic growth was persuaded by the early growth theories, which suggested that aid is considered to be forceful for economic growth through capital accumulation in the recipient country. Conventionally, the main principle limitation on the economic development of developing countries despite having surplus labor, there is a lack of savings which is crucial for investment. Additionally, low per capita income limits the capacity to generate savings for developing economies. Growth and development models indicate that the main factors that influence long-term growth and development are the availability of capital and labor as well as their productiveness (investment and savings) and technological process. For the purpose of this study, I will discuss five theories on economic growth.

1 The linear-staged-of-growth model

Rostow's Stage of Growth theory (1960) is a theory of economic development, associated with the American economic history Walt W. Rostow, according to which a country passes through sequential stages in achieving development. These include traditional society dependent on the rural economy; the traditional society consists of an agricultural economy of mostly subsistence farming, a minute of which is traded. Transitional Stage which dependent on the social appreciation of education and skill development, agriculture becomes more mechanized and more output is treading. Savings and investment grow yet they are still an insignificant percentage of national revenue. Some external funding is obligatory for example in the type of overseas aid or probably remittance income from migrant workers living overseas. Take Off dependent on the sub-urban economy, manufacturing industry assumes greater importance and both political and social adjustments take place in the economy. Agriculture as a sector declines and growth benefits concentrate in certain limited areas. There is often a double economy seeming with increasing productivity and capital in manufacturing and extra industries compare with resolutely low productivity and real incomes in real agriculture. Drive to Maturity dependent on growth and developed economies, the industry becomes more distinct, growth should advance to different parts of the country and as technology improves rapidly in the country, urbanization occurs.

The last stage is High Mass Consumption which dependent on global economic or market managing economies. As the level of output grows to allow increased consumer expenditure, the tertiary sector activity will experience a shift and the growth of the economy is sustained by the extension of a middle class of consumers.

Harrod-Domar growth model (1939) is a functional economic link wherein the growth rate of gross domestic product (g) rest exactly on the national net saving rate (s) and opposite way on the national capital-output ratio (c).

According to the model, the economy's rate of growth depends on the level of national saving. Savings demonstrate as a quantity of disposable income over a period of time. If the capital production ratio is low, an economy can generate a lot of output from a little capital.

2 Theories and patterns of structural change model

The Lewis two-sector model (1945) put forward a development model of dualistic economic, consisting of rural agriculture and urban manufacturing

sectors. Initially, the majority of labor is employed upon the land, which is a fixed resource. Labor is a variable resource and as more labor is put to work on the land, diminishing marginal returns eventually set in, there may be an insufficient task for the marginal worker to undertake, resulting in reduced marginal product and underemployment. The surplus allocation of labor over and above the quantity demanded at the growing free market wage rate. Marginal product is the increase in overall output cause from the use of a single additional unit of the variable factor of production (labor or capital). In this model, surplus labor is referred to as workers whose marginal product is zero. Urban workers, engaged in manufacturing, tend to produce a higher value of output than their agricultural counterparts. The resultant higher urban wages might, therefore, temp surplus agricultural workers to migrate to cities and engage in manufacturing activities. High urban profits would encourage firm to expand and hence result in further rural-urban migration. The Lewis model is a model of structural change since it outlines the development from a traditional economy to an industrialized one.

3 The international-dependence model

Outlook developing countries as setting up by institutional, political and economic rigidness, both domestic and international, and captive in a dependence

and superiority relation with rich countries. Three major streams of believed (The neocolonial dependence) model which state that underdevelopment is due to the historical evolution of a highly different international capitalist system of the wealthy country and poor country relationships. Developed nations are intentionally exploitative or unintentionally neglectful towards developing countries. Developing countries are destined to the sweatshops of the rich nations (through their multinationals for example) depend on developed nations for manufacturing goods that are high value added. Many developing countries were forced to become exporters of primary commodities by their colonial masters. Many of these countries still depend on primary commodities after independence.

The false-paradigm model describes underdevelopment as a result of faulty and inappropriate advice by well-mining but often uninformed, biased and ethnocentric international (often western) expert advisers to developing countries (IMF, World Banks, etc.). Some economists argue that loans provided to developing countries in the 1060s and 1970s contribute to the debt crisis in some developing countries in the 1980s. Eucalyptus is a fast growing tree and has good commercial value, encouraged by international advisers to grow in many parts of India in the 1970s. Recently, these eucalyptus trees were attacked by fungus and rendered the plantation useless. The losers, in this case, were the local Indian

farmers and the environmental quality of India.

The dualistic-development model recognizes the lifestyle and endurance of increasing dissimilarity between rich and poor nations, and between rich and poor people at various levels. The urban elites in developing countries will remain rich and become richer. The wealth of these elites will not trickle down to the rest of society. According to the World Bank, the average for the world 20 richest countries was 15 times the regular for the poorest 20 countries in 1960 and in 2000 it is 30 times twice as high.

4 The neoclassical model

The central argument is underdevelopment is like the results from poor resource distribution due to incorrect pricing guidelines and too much state interference by excessively active developing-nation governments. Developing countries are not developed because of the international agencies that are in controls but rather since the heavy hand of the state and the inefficiency. The neoliberals maintained that by permitting competitive free markets (promoting free trade, welcoming investors from developed countries, eliminating the plethora

of government regulations, etc.) both economic productivity and economic growth will be promoted. Promoting free markets and laissez-fair economics, allow the "magic of the market sight" and the "unseen hand" of market price to guide resource distribution and stimulate economic growth. The Component approaches of the free-market approach stressed that uncontrolled market performs better than one with government restrictions. The public-choice (or "political economy") approach – governments are inadequate and corrupt because people use government to chase their own agendas.

The "market-friendly" approach is profitable development policy mandate governments to set up an environment in which business can operate efficiently and meditate only a certain portion in the economy in regions where the market is unproductive. Traditional Neoclassical Growth Theory (the Solow Growth Model 1956) discussed that the free market is the best. Free market raises domestic savings rates, which enhances capital-growth ratios and capita incomes. Consider labor as a second function of production. It introduced a third independent variable (exogenous) technology. Solo's model demonstrates diminishing returns to labor and capital individually and a constant return to both factors of production jointly.

$$Y=A.F\ (K, L)$$

Y= output (production)

A= technology (exogenous)

K= capital

L= labor

The law of diminishing returns (principle of diminishing marginal productivity) which states that there is an increase in one input of a commodity while all other inputs are held constant, a point will finally be reached at which any additions of input will yield to a great extent smaller, or diminishing return.

5 The endogenous growth model (The New Growth Theory)

The model argues that technology comes from inside (endogenous technology) an economy (education, etc.)

$$Y=F(A, K, L)$$

The model implies an active role for government (intervention) to promote human capital formation (through education, better access to health care and better nutrition) and encourage knowledge-intensive industries.

4.2 Literature Review on Related Empirical Studies

There seems to be substantial work examining the direction between ODA and growth. As mentioned previously, the results from these diverse studies are mixed. On one hand, the World Bank study finds that aid efficiency is dependent on the macroeconomic policy surrounding the recipient country. The statistical evidence on the relationship between official development assistance (ODA) and economic growth remains inconclusive. Researchers have found different and contradicting empirical evidence. Some found that ODA promotes growth with a subset of claiming ODA to be growth enhancing in the certain macroeconomic policy environment. Others found that ODA has a negative impact on economic growth while others found a mixed view of ODA on economic growth. The surveyed resent empirical literature is organized according to the three views.

The studies that show ODA flows enhance economic growth

Mohapatra et al. (2016) estimated the foreign aid-economic growth relationship by using ARDL bound test approach and Vector Error Correction Model (VECM) techniques for India over the period 1970 to 2014. The empirical findings of the study reveal that there exists a long run co-integrating relationship between foreign aid, macroeconomic policy parameters and economic growth in India. The ARDL test result shows a significant positive effect on per capita growth of real GDP in the country. Refaei and Sameti (2015) use Rostow's stages of growth where $GGDP_{it}$ is the real GDP per capita rate of the country i in year time, INV is the investment of the country i in year time, the AID is foreign aid of the country i in year time, Gross Domestic Product (GDP), is the initial level of the GDP of country i, $GPOP_{it}$ is the growth rate of the population of country i in dear time. According to the study, the empirical findings identified that the impact of aid on the economic growth, in general, is positive, significant and not unimportant in size, the variable shows a positive indication of four out of the four cases in FMOLs Technique.

Neira *et al.* (2016), the call idea of the theory is the neoclassical model where log gdpit-1 is used to control for the persistence of economic growth over time, X_{it} includes the ODA and trust, the term S_i and W_{it} capture unobservable time and country heterogeneity. They analyzed the interaction among the ODA,

social capital and economic growth in order to investigate whether the effectiveness of development assistance in driving growth is conditional on the level of trust that exists in a recipient country. The findings of this paper suggest that Official Development Assistance will be more effective when used in a trust-rich environment. Moreira (2005), the call idea of the theory is the Harrod-Domar Model and GAP Models where indexes countries t indexes time, PCG_{it} represents per capita GDP growth rate, S_{it} represents domestic savings relative to GDP, ODA_{it} is official development assistance relative to GDP. The finding shows that aid is helpful to the economic growth of developing countries. Giving this one many may recommend that the method rather than the theoretical aspects which is the main fundamental problem in the assessments being carried out in the past.

Olanrele and Ibrahim (2015), the call idea of the theory is the Harrod-Domar model where RGDP is growth of per GDP, DA is developmental aid, NDA is non-developmental aid, MA is multilateral aid, BANC is bilateral aid from top five countries based on CDI and BATP is bilateral aid from Nigerian's main tread partners. The results deduced that multilateral aid and the three kinds of bilateral trade examine have impacted the growth of Nigeria. Nwaogu and Ryan (2015), the call idea is Rostow's stages of growth, the dependent variable Y_t measures the rate of growth for per capita real GDP, WY is a functional method of the weights

between any pair of countries i and j, p captures the overall strength of interdependence among countries. Examining the effect of foreign direct investment (FDI), foreign aid and remittances on economic growth. The estimation shows foreign aid are FDI affects economic growth in Africa, for the Caribbean and Latin America, foreign aid and remittances affect growth if been estimated separately, while as remittances affect growth if both are estimated at the same time. Both regions results verify geographical interconnection which is important in the justification of economic growth. This can be explained as the impact of economic growth in one country will depend on the economic growth of the neighboring countries.

The studies that show the negative impact of ODA on economic growth

Kumar (2013), the call idea of the theory is Solow Model where y output per worker in Guyanese dollar at 2010 prices; k is capital per worker in Guyanese dollars deflated at 2010 prices; REM is workers' remittances as a percent of GDP and ODA is net official development assistance as a percent of GDP. He investigated the credible nexus between remittances, aid, and financial deepening vis-à-vis growth. The result shows that remittances inflow is positive in both the short and long run. On the other hand, the effect of aid (ODA) on growth is not

important in the short run than, in the long run, is negative. Financial deepening impact is not significant.

Fenny (2005), the call idea of the theory is the Endogenous growth model, examine the effect of foreign aid on economic growth using time series data. The article examines whether aid effeteness is contingent on the levels of economic policy and governance. The empirical model was estimated by Pesaran and Shin (1995) using the Autoregressive Distributed Lag (ARDL) approach to co-integration proposed. The result shows no evidence that total aid to Papua New Guinea has increased GDP growth above the sample period. But there is evidence that projects aid provided has a contribution to the economic growth.

The studies that show mixed views of ODA on economic growth

E.M. Ekanayake and Chatrna (2007), the call idea of the theory is Rostow's stages of growth where $GGDP_{it}$ is the growth rating of real GDP per capita of the country i a year time. $GPOP_{it}$ is the growth rate of the population of country i in a year time, INV refers to an investment of country i in year time, AID represents foreign aid of the country i in year time and GDP_{io} refers to the starting level of

GDP of country i. they analyze the effect of aid on economic growth of developing countries. The findings of this paper show that foreign aid has a mixed impact on the economic growth of developing countries.

Girma (2015), the call idea the theory is Neo-classical Solow Model where Y is real GDP; DR is a proxy for drought. Girma examines whether aid effectiveness is dependent on a stable macroeconomic policy environment using Autoregressive Distributed Lag (ARDL) approach to co-integration.

The findings suggest that the negative coefficient of different foreign aid in regression model reveal aid has a negative effect on economic growth then the coefficient of aid policy index positively interplay reveal that aid has positively supported to economic growth if supplemented with stable macroeconomic policy environment. Aboubaca *et al*. (2015), the call idea of the theory is Rostow's stage of growth where AID, AGR, TPR, HUM, and EDU are shares of GDP; α_i is a country-specific fixed effort, β_{1i}, β_{2i}, β_{3i}, and β_{4i} perhaps be homogeneous across *i* and ε_{it} stands for error term. They investigated whether foreign aid (AID) has an important impact on economic growth. The result shows that the impact of aid on growth will contingent on the division in which it is distributed. It stressed

that during the long run, aggregate aid will have no significant impact on economic growth while aid allocated to a specific division in the economy such as trade policies, agriculture regulations, and education will boost economic growth.

While there is mounting evidence that aid does contribute to growth, there is some dispute as to whether the good policy is a necessary condition for aid effectiveness. To enhance our understanding of aid effectiveness, it is desirable to conduct a study that assesses the impact of official development assistance on the economic growth in a developing country like Liberia by taking into account the policy variables.

<Table 1> Summary of Literature Review (Studied Variables)

Author (year)	Dependent Variable	Independent Variable
Mahapatra et al. (2016)	Per capita gross domestic product	Official development assistance, the summation of ratio of gross capital formation to GDP and private sector credit to GDP, it represents the private capital domestic sources, government final consumption expenditure to include the effect of the fiscal policy, consumption price index, inflation to capture the impact of monetary policy and trade openness which is imports + exports/GDP.
Moreira (2015)	Per capita GDP growth rate	Indexes countries, indexes time, domestic savings relative to GDP, official development assistance relative to GDP, private flows relative to GDP, other official flows relative to GDP, population growth rate, time period effects, and the remainder error term
Neira et al. (2016)	Total production (GDP)	Official development assistance, trust, education, population, employment, investment, democracy and error term
Girma (2015)	Real GDP	Percentage of the total labor force to total population ratio, percentage of foreign aid to RGDP ratio, the total of secondary and tertiary gross enrolment ratio, foreign aid interacted by policy index, mean annual rainfall, broad money supply to RGDP ratio and the error term
Kumar (2013)	Output per work	Capital per work, worker's remittances as a percent of GDP and net official development aid as a percentage of GDP
Olanrele and Ibrahim(2014)	Growth of per GDP	Developmental aid, non-developmental aid, multilateral aid, bilateral aid from Nordic countries, bilateral aid from top-five countries based on CDI and bilateral aid from Nigerian's main tread partners.
Aboubacar et al. (2015)	GDP growth rate	Aid in agriculture, aid in trade policies and regulation, humanitarian aid, and aid in education

Refaei and Sameti (2015)	**The growth rate of real GDP per capita**	**Investment, foreign aid, the initial level of GDP, and the growth rate of the population**
Nwaogu and Ryan (2015)	**The growth rate of per capita real GDP**	**Weight between any pair countries, land and maritime boundaries, the strength of independence among countries and likelihood**
Fenny (2005)	**Growth in GDP**	**The ratio of investment to GDP (FDI), the ratio of exports plus imports to GDP (TRADE), an index of governance (GOV), variable takes the rate 1 during period at what time PNG undertook World Bank forms adjustment (SAP), a proxy for the labor force and to figure out technological improvements throughout the period (TREND), the ratio of foreign aid to GDP (AID) and a dummy variable which captures the impact of stocks not captured by the other explanatory variables CRISIS).**

<Table 2> Summary of Literature Review (Findings)

ODA→GDP	Author (year)	Case Study	Finding	Reason
+	Mohapatra et al. (2016)	India	The study finds a positive and significant impact of foreign aid on economic growth in India both in the long run and short run.	The ARDL test result shows a significant positive impact on RGDP per capita growth in the country. Further, trade openness (measured as the sum of trade/GDP) appears to have a positive and long run connection with RGDP per capita growth in India.
	Refaei and Sameti (2015)	Iran	The empirical findings show that the effect of foreign aid on economic growth is positive, statistically significant and not negligible in size. Therefore, aid is more positive than domestic resources and other capital inflows.	The empirical findings display that the impact of foreign aid on economic growth is positive, statistically important, and not negligible of size. This variable has a positive sign on four out of four cases in FMOLS technique. Therefore, aid is more productive the domestic resources and other capital inflows.
	Neira et al. (2016)	Latin America	The findings suggest that ODA will be more effective when used in a trust-rich environment.	The results are consistent within showing that the effectiveness of ODA is conditional upon other variables (fiscal, monetary and tread policies) and also on social capital.
	Moreira (2015)	Latin America and the Caribbean (16 countries) the	Foreign aid is profitable to the economic growth of developing countries. As a result, it can be stated that the method used rather than the theoretical	The empirical study shows that immediate and overall impacts of aid on growth contradict in terms of magnitude. Aid has less impact on growth in the short-

		Middle East and North Africa (4 Countries) Sub-Saharan Africa (14 Countries) Asia, Europe and Pacific (14 Countries)	idea is the main difficulty inherent in the evaluation being used in the past.	run than the long-run. This provides assistance to maintain that the time lags in the aid-growth connection should not be ignored.
	Olanrele and Ibrahim (2014)	Nigeria	The study concluded that multilateral aid and three kinds of bilateral trade measured have impacted on growth in Nigeria.	The four different types of development aid considered in this research has a positive impact on economic growth (measured by real GDP per capita).
	Nwaogu and Ryan (2015)	53 African, 34 Latin American and Caribbean Countries	Separate estimation shows foreign aid and FDI influence economic growth in Africa, for Latin America and the Caribbean foreign aid and remittances impact growth when estimated separately while remittances impact growth when they are estimated together. Both regions results verify geographical interconnection is important in describing economic growth. The growth in one country will depend on the growth of the neighboring countries.	The research controls for the three outer growth variables in the experiential model. The capacity to examine the impact of these variables yield proof on whether all three or a combination of them are significant in describing the economic growth in developing countries. The study controls for country interconnection by utilizing the recently developed dynamic spatial model. The model allows them to discover how growth in one country impact growth in neighboring countries and provides an understanding of how important the spillover effects Africa and LAC.

-	Kumar (2013)	Guyana	Remittances inflow is positive in both the short and long run, on the other hand, the effect of official development assistance on growth is not important in the short run than negative in the long run. The effect of financial expanding is not significant.	This is responsible because of the little share of domestic credit (as a percent of GDP) over the given period which is indicative of weak financial intermediation.
	Fenny (2005)	Papua New Guinea	The findings show that there is no indication that total aid to PNG has augmented GDP growth over the given period, there is some evidence that project aid had contributed to growth.	The approach encountered difficulties due to the endogeneity of the investment variable. This provides some evidence that aid disaggregation is significant in empirical research of aid effectiveness.
+/-	Girma (2015)	Ethiopia	The negative coefficients of different foreign aid in regression model reveal aid has a negative effect on economic growth nonetheless the positive coefficients of aid policy index interaction reveal that aid has positively backed to economic growth if supplemented with stable macroeconomic policy environment.	Foreign aid has a negative contribution to RGDP growth equally in the short run and long run period disproving the first hypothesis of the study. Both long and short run on average, a one percent increase in RGDP growth by about 0.65% and 0.28% individually, other variables held constant. Foreign aid interacted with policy index has a positive coefficient reveals that the effectiveness of aid rest on macroeconomic policy.
	Aboubacar et al. (2015)	Benin, Bukina Faso, Cote D'Ivoire, Mali, Nigeria, Senegal, Togo, and Guinea-Bissau	The impact of aid on economic growth is heterogeneous across sectors. Impact of aid on growth depends on the area in which it is distributed. It points out that in the long run, overall aid has no important effect on economic growth while aid target in particular sectors such	All the estimation method used show that in the long run, the total aid has no important effect on economic growth. Thus this finding leads to heterogeneous nature across sectors which can help policymakers to channel foreign aid properly into important sectors of the recipient countries.

as agriculture, trade policies and regulations and education improves economic growth.

Summary of Literature Review

In summary base on what had been discussed in the literature review, the theory we adopted in this study is the New Growth Theory (The Endogenous Growth Theory) which justified that technology comes from within an economy. The theory implies an active role for government intervention to promote human capital formation through education, better access to health care and better nutrition and encourage knowledge-intensive industries.

The limitations of the existing empirical studies did not take into consideration broad money (BM). Therefore, the original contribution of this research is to add broad money which is important for the economic growth of Liberia.

Chapter 5

Methodology and Data

5.1 The Model Specification

The main emphasis of our research is to investigate the impact of official development assistance (ODA) on the economic growth of Liberia. We used the standard unit root test of Augmented Dickey-Fuller Test (ARDL) to test whether our data are stationary or not. For the economic growth model, the studies used independent variables such as official development assistance (ODA), human capital index (HC), foreign direct investment stock (FDI), broad money (BM) and export of goods and services (EX). The following is an illustration of our model specifications:

We derive the endogenous growth theory from the neoclassical theory of economic growth developed by Solow. This model derived from a Cobb Douglas production function in only two factions of production was considered.

$$Y_t = A_t K_t^{\alpha} L_t^{1-\alpha} \quad (1)$$

Whereby K and L refer to capital stock and labor force respectively, A implies factor productivity which facilitates private capital stock and labor force to stimulate economic growth rate. From the endogenous growth model, the value of A implies factor productivity including technology and other foreign capital inflows such as foreign aid and FDI. Furthermore, a refers to the elasticity of labor or capital to the economic growth. However, during the 1980s, Romer and Lucas argued that there are more factors that can assure sustained economic growth in the long run. These factors include human capital, FDI and trade openness. Thus we derive the endogenous growth model from the Cobb Douglas production function.

$$A_t = F(ODA_t, HC_t, FDI_t, EX_t) \quad (2)$$

A refers to factor productivity, ODA refers to official development assistance, and HC refers to human capital index, FDI refers to foreign direct investment stock, and EX refers to the export of goods and services.

If we expand the equation (2) now we derive the following equation:

$$A_t = ODA_t^{\beta} HC_t^{\alpha} FDI_t^{\rho} EX_t^{\varepsilon} \quad (3)$$

A refers to externality generated by Foreign aid flows, human capital, foreign direct investment stock and export of goods and services which improve efficiency in factors of production. When we plug in equation (3) to equation (1), we obtained the following equation.

$$Y_t = (ODA_t^{\beta} HC_t^{\varphi} FDI_t^{\rho} EX_t^{\varepsilon}) K_t^{\alpha} L_t^{(1-\alpha)} \quad (4)$$

Since Y is represented by the log of GDP per capita then we take logarithms and factor out derivations of equation four.

$$LY_t = \beta LODA_t + \alpha LHC_t + \rho LFDI_t + \varepsilon LEX_t + \alpha LK_t + (1-\alpha) LL_t \quad (5)$$

In order to capture the impact of official development assistance on the economic growth of Liberia and because the data of labor for Liberia is unavailable on various websites, we adopted the equation of Mohapatra et al. (2016) by modifying only the variables. L indicates that the variables have been

changed into natural logs. Where LPGDP represents the economic performance of an economy. It is defined by per capita gross domestic product. LODA is aid denotes foreign aid (ODA) as a share of GDP. LPI constitutes the summation of the ratio of the gross capital formation to GDP (GCF) and private sector credit to GDP, it represents private capital domestic sources which is a crucial source of capital in addition to encourage economic growth. LGFCE is government final consumption expenditure. LINF is inflection and LTOP is to proxy the trade openness.

$$LPGDP_t = \beta_0 + \beta_1 LODA_t + \beta_2 LPI + \beta_3 LGFCE + \beta_4 LINF + \beta_5 LTOP + \varepsilon_t \quad (6)$$

This study modified the equation by adding real gross domestic product (LRGDP), official development assistance (LODA), human capital index (LHC), foreign direct investment stock (LFDI), export of goods and services (LEX), and broad money (LBM) because these are major determinants on the economic growth of any country.

Therefore, the original contribution of this study is the addition of broad money which is important for the economic growth of Liberia. Following the

underlying theories to examine the role of official development assistance on economic growth, we employed the Auto Regressive Distributed Lag (ARDL) approach to co-integration by using time series data (1974 - 2014). The empirical model framed to investigate the impact of ODA on the economic growth of Liberia is specified as:

$$LRGDP_t = \beta_0 + \beta_1 LODA_t + \beta_2 LHC_t + \beta_3 LFDI_t + \beta_4 LEX_t + \beta_6 LBM_t + \varepsilon_t \qquad (7)$$

LRGDP: (real gross domestic product) is the measurement of the country's economic output which accounts for the result of inflation or deflation. RGDP reports the gross domestic product as if the price never went up or down, which give a more realistic assessment of growth.

LODA: (official development assistance) is aid denotes foreign aid (ODA) as net official development assistance received current.

LHC: (constitutes human capital index), based on year of schooling and returns to education.

LFDI: (foreign direct investment stock) represents the value of the share of capital and reserves (including retained profits) as a result from the parent enterprise plus the net liabilities of affiliates of the parent enterprise.

LEX: Export of goods and services represents the worth of all goods and extra market services delivered to the rest of the world.

LBM: (broad money) refers to the sum of currency out banks, demand deposits other than the central government.

ε_t is the error term.

The expected signs of $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, and\ \beta_6$ are positive and they are the estimated coefficients of relevant variables respectively.

According to equation (7) real gross domestic product ($LRGDP_{it}$) is assumed to depend on the level of official development assistance ($LODA_t$),

human capital index(LHC_t), foreign direct investment ($LFDI_t$), the value of total goods and extra market services delivered to the rest of the world (LEX_t), and broad money (LBM_t). The coefficients in the equation (7) present the long run relations among the studied variables. Since the increase in official development assistance is expected to increase the real gross domestic product of Liberia, therefore, the expected sign of the coefficient β will give a positive sign from the estimation. The human capital index in equation (7) is based on a year of schooling and returns to education, therefore, the coefficient β is expected to be positive.

According to the aforementioned literature review, foreign direct investment stock promotes economic growth by delivering external capital and growth, spreads the assistance throughout the economy. FDI usually brings with its advanced technology and better management or organization. The coefficient β is expected to be positive. According to the literature, export of goods and services index (LEX) boost the growth of the economy, export is expected to be positive. coefficient β broad money (LBM) is expected to be positive in the equation.

Since the variables of our study are mixed with I(0) and I(1) variable (see

<Table 3>), therefore equation (7) is changed into the bounds testing co-integration approach or the ARDL co-integration model, which was established by Pesaran et al. this method holds four advantages. First, it is simple to use the bound test as compared to other multivariate co-integration technique like Johansen and Juselius (1990). It allows the relationship of co-integration to be estimated by Ordinary Least Square (OLS) once the order of the lag is selected. Secondly, during the bound testing, there is no need to pretest the variables comprised in the model for unit root as opposed to other techniques like Engle and Granger (1987). Using these approaches all the variables should be integrated of the similar order I (1); or else, the anticipating power will be missing (Kim et al., 2004; Perron, 1989, 1997). However, the ARDL technique is appropriate regardless of whether regressor in the model is I (0) or I (I). In the presence of I(2) series, the procedure will however crash. Thirdly, in a small sample size data, the test is relatively more efficient as the case of this study. lastly, the short run dynamics together with the long run equilibrium are integrated by using the error correction method without losing long-run information. The inclusion of dynamics helps in the correction of endogeneity bias (Pesaran and Pesaran, 1997). This methodology is the appropriate one, as foreign aid has been largely argued to be endogenous. To examine the long and short run connection, the unrestricted error correction model (UECM) of ARDL model is used taking the form.

$$\Delta rgdp_{it} = \pi + \sum_{j=1}^{n1} y_j \Delta rgdp_{it-j} + \sum_{j=0}^{n2} \delta_j \Delta oda_{t-j} + \sum_{j=0}^{n3} \rho_j \Delta hc_{t-j}$$
$$+ \sum_{j=0}^{n4} \lambda_j \Delta fdi_{t-j} + \sum_{j=0}^{n5} \varphi_j \Delta ex_{t-j} + \sum_{j=0}^{n6} \sigma_j \Delta bm_{t-j} + \alpha_1 rgdp_{it-1}$$
$$+ \alpha_2 oda_{t-1} + \alpha_3 hc_{t-1} + \alpha_4 fdi_{t-1} + \alpha_5 ex_{t-1} + \alpha_6 bm_{t-1}$$
$$+ u_t \qquad (8)$$

Where α_1, α_2,α_3,α_4,α_5,α_6 are the long rum multipliers. Δ is the first difference operator. $n_1, n_2, n_3, n_4, n_5, n_6$ are the optimal lag lengths that were chosen by minimizing the Akaike Information Criterion. For better understanding, the lowercase represents the natural logarithm of the uppercase: $rgdp_{it} = RGDP_{it}$

In step one of the ARDL bounds testing approach, we estimated equation (8) for the purpose of testing a long run relationship existence among the variables by conducting a F-test that shows the joint importance of the coefficients of the lagged levels of the variables, null hypothesis H0: $\alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = \alpha_6 = 0$ against the alternative hypothesis H1: $\alpha_1 \neq \alpha_2 \neq \alpha_3 \neq \alpha_4 \neq \alpha_5 \neq \alpha_6 \neq 0$.

In step two, when the long run relationship is estimated between the variables and there exist co-integration, the long run and short run coefficients will be estimated using the ARDL approach. We derived the conditional long-run model form from the reduced form of the situation in equation (8). When the variables are jointly equal to zero in the first difference ($\Delta rgdp = \Delta oda = \Delta hc = fdi = bm = ex = 0$). Thus,

$$rgdp_{it} = \Omega_0 + \Omega_1 oda_t + \Omega_2 hc_t + \Omega_3 fdi_t + \Omega_4 ex_t + \Omega_5 bm_t + v_t \quad (9)$$

Where, Ω_0 = - $\pi/\alpha_1, \Omega_1 = -\alpha_2/\alpha_1, \Omega_2 = -\alpha_3/\alpha_1, \Omega_3 = -\alpha_4/\alpha_1, \Omega_4 = -\alpha_5/\alpha_1, \Omega_4$ and v_t are error term.

Thirdly, we estimate an error correction model which is associated with the long run also we estimated the short run dynamic parameters with the error correction representation of the (speeds of adjustment) are obtained. This is as follows:

$$\Delta rgdp_{it} = \pi + \sum_{j=1}^{n1} y_j \Delta rgdp_{it-j} + \sum_{j=0}^{n2} \delta_j \Delta oda_{t-j} + \sum_{j=0}^{n3} \rho_j \Delta hc_{t-j}$$

$$+ \sum_{j=0}^{n4} \lambda_j \, \Delta fdi_{t-j} + \sum_{j=0}^{n5} \varphi_j \Delta ex_{t-j} + \sum_{j=0}^{n6} \sigma_j \, bm_{t-j} + \vartheta ECT_{t-1}$$

$$+ u_t \qquad (10)$$

Where ECT_{t-1} is the period lagged error correction term, that was obtained from equation (10). $\gamma_j, \delta_j, \rho_j, \lambda_j, \sigma_j, \varphi_j$ represents the model short run dynamic coefficients and ψ is the long run equilibrium speed of adjustment of convergence.

5.2 The Augmented Dickey-Fuller (ADF) Unit Root Test

Before co-integration analyses are considered to be implemented, first there must be an estimation of the unit roots test. Unit roots test is a test carried out to discover the stationarity of the variables. Generally, the variables to be estimated are integrated of order 1 which is required by co-integration. In the Johansen technique, the estimation of the long-run impact of aid on economic growth is a particular requirement. In the case of the Johansen technique, only when all the variables indicate the existence of unit root than there is a presence

of a long-run relationship.

In the ARDL approach, Pesaran and Shin (1999) argued that the method is developed in a way that does not need pre-testing for stationarity prior to estimation of the model. Nevertheless, the F-test for co-integration provides the critical values which are used to ascertain the reality of a co-integrating connection lie with the bounds of I(0) and I(1), it presupposes that the variables used with the estimation must be either I(0) or I(1) therefore, a unit root test is needed to ensure that not one of the variables go exceed I(1); or else, the ARDL technique cannot be used to implement the estimation. Further, the dependent variable is necessary to be integrated in order 1 (as is also argued by Afzal et al. 2010) so that the regressors can be a mix of I(0) and I(1). The dependent variable of regression with an I(0) created coefficients of the ECM term exceed the theoretical bounds of 0 to -1. The need to conduct a unit root test for the ARDL model which was suggested by Ouattara (2004), who argued that the method collapse in the presence of I(2) variables. Therefore, there is a need to conduct a unit root test for both co-integration techniques. Estimating the most commonly used Augmented Dickey-Fuller (ADF) approach, table 3 below shows the unit root test outcome for the variables used through the models. All the variables estimated in this model are I(0) or I(1) that is revealed by the test which allowed us to use the ARDL approach

to co-integration in our base model.

5.3 The ARDL Co-integration Bounds Test

The first stage of estimation in the ARDL approach is to estimate the equation by using OLS, for the purpose of testing the presence of a long run connection between the variables. By computing the bound F-Test (bound test for co-integration), it is easy in establishing a long run connection among the variable. The bounds F-statistic is estimated to each of the variables so that they stand as an endogenous variable while others are assumed as exogenous variables.

In practice, testing the connections among the driving variable(s) in the ARDL model leads to the hypothesis testing of the long run connections among the underlined variable. In doing this, the current values of the underlying variable(s) are eliminated from the ARDL model approach to co-integration. The F-statistic is performed on the joint null hypothesis so that the coefficients of the legged variables ($\delta_1 X_{t-1}\, \delta_1 Y_{t-1}\, or\, \delta_1 Y_{t-1}\, \delta_1 X_{t-1}$) are zero. ($\delta_1 - \delta_2$) correspond to the long-run relationship, where ($a_1 - a_2$) represent the short-run dynamics of the model. The null of the non-existence of the long run connection

is defined by:

H0: $\delta_1 = \delta_2 = 0$ (null, i.e. the long run relationship does not exist).

H1: $\delta_1 \neq \delta_2 \neq 0$ (Alternative, i.e. the long run relationship exists)

This is tested in each of the models as identified by the number of variables. The hypothesis is tested via means of the F-statistic. The allocation of the F-statistics is non-standard irrespective of whether the variables to be tested are I(0) or I(1). The critical values of the F-statistics for a different number of variables (K), and even if the ARDL model holds an intercept and or trend is available in Pesaren and Pesaran (1996), and Pesaran et al. (2001). They give two sets of critical values. One set supposing that all variables are I(0) i.e. lower critical bound which supposes that all the variables are I(0), confirming that there is no co-integration among the underlying variables and another supposing that all the variables within the ARDL model are I(1) i.e. upper critical bound which assumes that the entire variables are I(1), implying that there is co-integration between the underlying variables. If the relevant calculated F-statistic for the combined significance of the variables level in each of the equations falls outside the band,

a decisive decision can be made, without the demand to know whether the underlined variables are I(0) otherwise I(1), or partly integrated. That is, when the computed F-statistic is greater than the critical value of the upper bound, then the H0 is disallowed (the variables are co-integrated). If the F-statistic is lower than the critical value, at that point the H0 can't be rejected (there not co-integration among the variables). If long run (or multiple long-run relationships) relationships exist in both equations, the ARDL approach cannot be applied, hence, Johansen and Juselius (1990) approach become the alternative.

If the computed statistic falls within (between the lower and upper bound) the critical value band, the result of the conclusion is inconclusive and conditional on whether the principal variables are I(0) or I(1) or mutually co-integrated (Chigusiwa et al. 2011). However, to forestall an effort in futility, it may be advisable to first perform unit roots, though not as a necessary condition in order to confirm that no variable is I(2) or beyond, before carrying out the bound F-test.

The second step is to choose the appropriate leg length for the ARDL model or estimation of the long-run estimations of the selected ARDL model. If a long run connection exists between the principal variables, while the hypothesis of none long-run relations between the variables in the other equations cannot be

rejected, then the ARDL approach to co-integration can be applied. The problem of finding the right lag length for every underlying variable in the ARDL model is very significant between we want to have Gaussian error terms i.e. the standard normal error terms that do not experience non-normality, autocorrelation, heteroscedasticity etc. In order to choose the right model of the long run underlying equation, it is important to decide on the optimum lag length (k) by using appropriate model order selection criteria, for instance, Akaike Information Criterion (AIC), Schwarz Bayesian Criterion (SBC) or Hannan-Quinn Criterion (HQC). The ARDL model should be estimated given the variables in their levels (non-differenced data) form. The lags of the variables should be alternated, model re-estimated and compared. Model selection criteria. The model with the smallest AIC, SBC estimates or small standard errors and high R^2 performs relatively better. The estimates from the best performed become the long run coefficients. This is appropriate to embark on if it is satisfied that there exists a long-run relationship among the underlying variables in order to avoid spurious regression. The best-performed model provides the estimates of the associated Error Correction Model (ECM).

The third step is a parameterization of the ARDL model into Error Correction model. As we said earlier, when non-stationary variables are regressed

in a model we may get results that are spurious. One way of resolving this is to difference the data in order to achieve stationarity of the variables. By doing this, the estimations of the parameters from the regression model might be correct and the false equation problem is resolved. On the other hand, the regression equation gives us exclusively the short-run relationship amid the variables. It does not give any information about the long run behavior of the parameters in the model. This form an issue since researchers are mainly concerned in long-run connections between the variables under thought. In order to resolve this, the idea of co-integration and the ECM becomes imperative. With the description of ECM, we now hold both long run and short run statistics absorb. The term EC_t as the speed of adjustment parameter or feedback effect is derived as the error term from the co-integration models whose coefficients are acquired by normalizing the equation. The EC_t Shows how much of the instability is being corrected. As a result, the extent to which any disequilibrium in the earlier period is being adjusted. A positive coefficient shows a divergence, whereas a negative coefficient indicates the union. If the estimate of EC_t = 1, then 100% of the adjustment takes place within the period or the adjustment is instantaneous and full, if the estimate of EC_t = 0.5, then 50% of the adjustment takes place each period year. EC_t = 0, shows that there is no alteration and to claim that there is a long run relationship does not make sense anymore.

To discover the goodness of fit of the ARDL model, diagnostic and stability tests are carried out. The diagnostic test investigates the serial correlation, practical form, standard, and heteroscedasticity connected with the model. The framework of the stability test is carried out by applying the cumulative residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ).

5.4 The Toda-Yamamoto Approach to Granger Causality Test

Conventionally, the co-integration amidst the variables does not identify the direction of causal relation amidst the variables. As a result, to strengthen our findings in this study, we perform further causality analysis to augment the long run and short run concluded results. The Granger Causality test is an approach to discovering the causal relationship between two or more variables. To perform causality analysis among the variables, we adopted the Toda-Yamamoto version of Granger non-causality analysis which is justifiable regardless both even if the studied variables are I(0), I(1) or I(2) and even if non-co-integrated or co-integrated of any random order.

The Toda-Yamamoto approach adopts a revised Wald test for restriction on each parameter of the Vector Autoregression VAR (k), the lag length is k. The actual order of the system (k) is augmented by the highest order of integration (d_{max}). The VAR ($k + d_{max}$) is then estimated together with the coefficients of the last lagged d_{max} vector being ignored. The Wald statistic adopts chi-square allocation of a function with degrees of freedom corresponds to the number of eliminated lagged variables. For us to undertake the Toda-Yamamoto model of the Granger non causality test, we constitute our empirical model as following in the Vactor Autoregressive (VAR) system:

$$rgdp_t = \alpha_0 + \sum_{i=1}^{k} \alpha_{1i}\, rgdp_{t-i} + \sum_{j=k+1}^{dmax} \alpha_{2i}\, rgdp_{t-j} + \sum_{i=1}^{k} \beta_{1i} oda_{t-i}$$

$$+ \sum_{j=k+1}^{dmax} \beta_{2i} oda_{t-j} + \sum_{i=1}^{k} y_{1i}\, hc_{t-i}$$

$$+ \sum_{j=k+1}^{dmax} y_{2i} hc_{t-j} + \sum_{i=1}^{k} \delta_{1i}\, fdi_{t-i}$$

$$+ \sum_{j=k+1}^{dmax} \delta_{2i} fdi_{t-j} + \sum_{i=1}^{k} \emptyset_{1i}\, ex_{t-i} \sum_{j=k+1}^{dmax} \emptyset_{2i} ex_{t-j}$$

$$+ \sum_{i=1}^{k} \theta_{1i}\, bm_{t-i} + \sum_{j=k+1}^{dmax} \theta_{2i} bm_{t-j}\, u_{1t} \qquad (11)$$

$$oda_t = \varsigma_0 + \sum_{i=1}^{k} \varsigma_{1i}\, oda_{t-i} + \sum_{j=k+1}^{dmax} \varsigma_{2i}\, oda_{t-j} + \sum_{i=1}^{k} k_{1i} rgdp_{t-i}$$

$$+ \sum_{j=k+1}^{dmax} k_{2i} oda_{t-j} + \sum_{i=1}^{k} \lambda_{1i}\, hc_{t-i}$$

$$+ \sum_{j=k+1}^{dmax} \lambda_{2i} hc_{t-j} + \sum_{i=1}^{k} \rho_{1i}\, fdi_{t-i}$$

$$+ \sum_{j=k+1}^{dmax} \rho_{2i} fdi_{t-j} + \sum_{i=1}^{k} \sigma_{1i}\, ex_{t-i} + \sum_{j=k+1}^{dmax} \sigma_{2i} ex_{t-j}$$

$$+ \sum_{i=1}^{k} \epsilon_{1i}\, bm_{t-i} + \sum_{j=k+1}^{dmax} \epsilon_{2i} bm_{t-j}\, u_{2t} \qquad (12)$$

$$hc_t = \vartheta_0 + \sum_{i=1}^{k} \vartheta_{1i}\, hc_{t-i} + \sum_{j=k+1}^{dmax} \vartheta_{2i}\, hc_{t-j} + \sum_{i=1}^{k} \tau_{1i} rgdp_{t-i}$$

$$+ \sum_{j=k+1}^{dmax} \tau_{2i} rgdp_{t-j} + \sum_{i=1}^{k} \omega_{1i}\, oda_{t-i}$$

$$+ \sum_{j=k+1}^{dmax} \omega_{2i} oda_{t-j} + \sum_{i=1}^{k} \pi_{1i}\, fdi_{t-i}$$

$$+ \sum_{j=k+1}^{dmax} \pi_{2i} fdi_{t-j} + \sum_{i=1}^{k} \varepsilon_{1i}\, ex_{t-i} + \sum_{j=k+1}^{dmax} \varepsilon_{2i} ex_{t-j}$$

$$+ \sum_{i=1}^{k} \Omega_{1i}\, bm_{t-1} + \sum_{j=k+1}^{dmax} \Omega_{2i} bm_{t-i} u_{3i} \qquad (13)$$

$$fdi_t = \delta_0 + \sum_{i=1}^{k} \delta_{1i} fdi_{t-i} + \sum_{j=k+1}^{dmax} \delta_{2i} fdi_{t-j} + \sum_{i=1}^{k} \vartheta_{1i} rgdp_{t-i}$$

$$+ \sum_{j=k+1}^{dmax} \vartheta_{2i} rgdp_{t-j} + \sum_{i=1}^{k} \theta_{1i} oda_{t-i}$$

$$+ \sum_{j=k+1}^{dmax} \theta_{2i} oda_{t-j} + \sum_{i=1}^{k} \rho_{1i} hc_{t-i}$$

$$+ \sum_{j=k+1}^{dmax} \rho_{2i} hc_{t-j} + \sum_{i=1}^{k} \varphi_{1i} ex_{t-i} \sum_{j=k+1}^{dmax} \varphi_{2i} ex_{t-j}$$

$$+ \sum_{i=1}^{k} \gamma_{1i} bm_{t-i} + \sum_{j=k+4}^{dmax} \gamma_{2i} bm_{t-j} u_{4t} \qquad (14)$$

$$ex_t = \psi_0 + \sum_{i=1}^{k} \psi_{1i}\, ex_{t-i} + \sum_{j=k+1}^{dmax} \psi_{2i}\, ex_{t-j} + \sum_{i=1}^{k} \lambda_{1i} rgdp_{t-i}$$

$$+ \sum_{j=k+1}^{dmax} \lambda_{2i} rgdp_{t-j} + \sum_{i=1}^{k} \varsigma_{1i}\, oda_{t-i}$$

$$+ \sum_{j=k+1}^{dmax} \varsigma_{2i} oda_{t-j} + \sum_{i=1}^{k} \Omega_{1i}\, hc_{t-i}$$

$$+ \sum_{j=k+1}^{dmax} \Omega_{2i} hc_{t-j} + \sum_{i=1}^{k} \varepsilon_{1i}\, fdi_{t-i} \sum_{j=k+1}^{dmax} \varepsilon_{2i} fdi_{t-j}$$

$$+ \sum_{i=1}^{k} \vartheta_{1i}\, bm_{t-i} + \sum_{j=k+1}^{dmax} \vartheta_{2i} bm_{t-j}\, u_{1t} \qquad (15)$$

$$bm_t = \lambda_0 + \sum_{i=1}^{k} \tau_{1i}\, bm_{t-i} + \sum_{j=k+1}^{dmax} \tau_{2i}\, bm_{t-j} + \sum_{i=1}^{k} \sigma_{1i} rgdp_{t-i}$$

$$+ \sum_{j=k+1}^{dmax} \sigma_{2i} rgdp_{t-j} + \sum_{i=1}^{k} \epsilon_{1i}\, oda_{t-i}$$

$$+ \sum_{j=k+1}^{dmax} \epsilon_{2i} oda_{t-j} + \sum_{i=1}^{k} \vartheta_{1i}\, hc_{t-i}$$

$$+ \sum_{j=k+1}^{dmax} \vartheta_{2i} hc + \sum_{i=1}^{k} \varepsilon_{1i}\, fdi_{t-i} \sum_{j=k+1}^{dmax} \varepsilon_{2i} fdi_{t-j} + \sum_{i=1}^{k} \psi_{1i}\, ex_{t-i}$$

$$+ \sum_{j=k+1}^{dmax} \psi_{2i} ex_{t-j}\, u_{1t} \qquad (16)$$

According to equation (11), Granger causality from $rgdp_t$, oda_t, hc_t, fdi_t, ex_t to bm_t implies $\beta_{1i} \neq 0$ or $\gamma_{1i} \neq 0$ or $\delta_{1i} \neq 0$ $\emptyset_{1i} \neq 0$ or θ_{1i} repectively. Equation (12) presents Granger Causality from oda_t, $rgdp_t, hc_t, fdi_t, ex_t$ to bm_t if $k_{1i} \neq 0$ or $\lambda_{1i} \neq 0$ or $\rho_{1i} \neq$ or $\sigma_{1i} \neq 0$ or $\epsilon_{1i} \neq 0$. Equation (13) present Granger Causality from $hc_t, rgdp_t, oda_t, fdi_t, ex_t\ to\ bm_t$ if $\tau_{1i} \neq 0$ or $\omega_{1i} \neq 0$ or $\pi_{1i} \neq 0$ or $\varepsilon_{1i} \neq 0$ or $\Omega_{1i} \neq 0$ respectively. With the same idea, equation (14) and (15) shows the Granger Causality from fdi_t, $rgdp_t$, oda_t, hc_t, ex_t, bm_t and

$bm_t, rgdp_t, oda_t, hc_t, fdi_t$ *to* ex_t respectively.

5.5 The Pairwise Granger Causality Test

Even though the Toda-Yamamoto Granger Causality test results in <Table 9> suggest that official development assistance to Liberia cause an increase in RGDP, the causalities among human capital index, foreign direct investment, export, and broad money are not acquired yet. We re-analyzed the causality between the pair real gross domestic product (RGDP) of Liberia on one hand and the official development assistance (ODA) on the other hand by conducting a Pairwise Granger Causality Test of the stationary variable to augment the result from the Toda-Yamamoto Granger Causality Test. The vector autoregressive (VAR) model is structured to test the pairwise Granger Causality of the stationary variables. The pair of Liberia's official development assistance ($\Delta loda$) and the real gross domestic product ($\Delta lrgdp$) is investigated by using equation (17) and (18), the pair of ($\Delta lrgdp$) and human capital index (lhc) is tested through equation (19). The pair of ($\Delta lrgdp$) and foreign direct investment ($\Delta lfdi$) is tested through both equations (20) while the pair of RGDP and export (lex) is tested through equation (21). The pair of broad money (Δlbm) and ($\Delta lrgdp$) is tested through equation (22).

$$\Delta loda_t = \sum_{i=1}^{n} a_i \, \Delta lrgdp_{t-i} + \sum_{j=1}^{n} \beta_j \, \Delta loda_{t-j} + u_{1t} \quad (17)$$

$$\Delta lrgdp_t = \sum_{i=1}^{n} y_i \Delta loda_{t-i} + \sum_{j=1}^{n} \delta_j \, \Delta lrgdp_{t-j} + u_{2t} \quad (18)$$

$$\Delta lrgdp_t = \sum_{i=1}^{n} \theta_i lhc_{t-i} + \sum_{j=1}^{n} k_j \Delta lrgdp_{t-j} + u_{3t} \quad (19)$$

$$\Delta lrgdp_t = \sum_{i=1}^{n} \lambda_i \Delta lfdi_{t-i} + \sum_{j=1}^{n} \nu_j \, \Delta lrgdp_{t-j} + u_{4t} \quad (20)$$

$$\Delta lrgdp_t = \sum_{i=1}^{n} \pi_i lex_{t-i} + \sum_{j=1}^{n} \varphi_j \Delta lrgdp_{t-j} + u_{5t} \quad (21)$$

$$\Delta lbm_t = \sum_{i=1}^{n} \rho_i \Delta lrgdp_{t-1} + \sum_{j=1}^{n} \sigma_j \Delta lbm_{t-j} + u_6 \quad (22)$$

5.6 Data Description

In the present context, this study uses the annual data from the period 1974 to 2014. The data sources are the International Financial Statistics Yearbooks published by the International Monetary Fund (IMF), the World Bank database and the Organization for Economic Cooperation and Development (OECD).

Real Gross Domestic Product is measured by economic output that considers the effects of inflation and deflation. It reports the gross domestic product as if the price never went up or down, which give a more realistic assessment of growth.

Net Official Development Assistance (ODA) comprises of payout of loans made on negotiation terms (net of refunds of loan) and grants by the Development Assistance Committee (DAC) official agencies, by non-Development Assistance Committee (DAC) countries, and by multilateral institutions to encourage economic growth and well-being in countries and territories in the DAC list of ODA recipients. It comprises loans that have a grant component at the minimum of 25 percent (calculated at a cost of discount of 10 percent).

Human Capital represents the human capital index, based on years of schooling and returns to education.

Foreign direct investment stock is the worth of the share of capital and savings (comprising retained profits) preferable to the parent enterprise, plus the net liability of partners of the parent enterprise. It is approximated by the accumulated value of past FDI flows.

Broad money is the total amount of currency outside banks; demand deposits apart from the central government; savings, the time and foreign currency deposits of resident sectors except the central government; traveler's and banks checks; and other securities such as commercial paper and certificates of deposit.

Exports of goods and services constitute the value of every goods and extra market services supply to the world. They comprise freight, the value of merchandise, transport, insurance, license fees and other services such as construction, royalties, communication, travel, financial information, personal and government services, and business. They exclude investment income (formerly called factor services), compensation of employees and transfer payments.

Chapter 6

Empirical Results

6.1 Stationarity Test

Because the ARDL method is valid if the variables are otherwise I(0) or I(1) and even a joining of them, we utilized the Augmented Dickey-Fuller (ARDL) test to all the studied variables to make sure the non-existence of I(2) variable. The results in <Table 3> verified that there is no I(2) variable in our study.

<Table 3> Augmented Dickey-Fuller (ADF) Unit Root Test

Variables	Descriptions	Level	1st-diff.	I(n)
$lrgdp$	Real Gross Domestic Product	-2.28	-3.81***	I(1)
$loda$	Official Development Assistance	-2.35	-9.37***	I(1)
lhc	Human Capital Index	1.55*	n/a	I(0)
$lfdi$	Foreign Direct Investment Stock	-0.25	-8.25***	I(1)
lex	Export of Goods and Services	-2.22**	n/a	I(0)
lbm	Broad Money	-1.66	-5.08***	I(1)

Note: Statistical significance is presented as (***) 1%, (**) 5% and (*) 10%

Source: Estimation results from Eviews 10

According to the unit root test estimation, real gross domestic product, official development assistance, foreign direct investment stock, and broad money are integrated at its first difference form while the human capital index and export of goods and services are integrated at its level form. As a result, our estimated variables are mixed with I(0) and I(1) which indicate that the ARDL approach is appropriate for our estimation. After determining the order of integration, this study employed the ARDL approach to co-integration in order to ascertain the long run connection amidst the variables. The result of the bounds testing approach is presented in <Table 4> and <Table 5>. The bounds test confirms the long run connection because the estimated F-statistics is greater than the critical values of the upper bound level at 1 percent level of significance.

6.2 The ARDL Bounds Test

To test whether there is a long-term co-integration between real gross domestic product, official development assistance, human capital index, foreign direct investment stock, broad money and export of goods and services, we apply

the Bounds Test in this paper.

<Table 4> ARDL Bounds Test

Estimated Equation	***rgdp = f(oda, hc, fdi, ex, bm)***
Optimal lag	ARDL (4,4,3,4,3,4)
F-Statistic	7.10***

Note: Statistical significance is presented as (***) 1%, (**) 5% and (*) 10%

Source: Estimation results from Eviews 10

<Table 5> Bounds Test Critical Value

Significance	**I(0) Bound**	**I(1) Bound**
10%	2.08%	3
5%	2.39%	3.38
2.5%	2.7%	3.73
1%	3.06%	4.15

Note: Statistical significance is presented as (***) 1%, (**) 5% and (*) 10%

Source: Estimation results from Eviews 10

The F-Statistic (7.10***) in <Table 4> for the estimated equation passes the upper bound of the critical value (4.15) in <Table 5> at 1 percent significant

level, indicating a long-term equilibrant relationship between our dependent and independent variables. The optimal lag numbers are in the parentheses of <Table 4>. (Pesaran et al., 2001).

6.3 The ARDL Short Run Result

<Table 6> Estimated Short Run Coefficients from ARDL Approach

Variables	Coefficient	t-Statistic	Prob.
Δoda_t	0.24**	2.95	0.02
Δoda_{t-1}	0.01	0.12	0.91
Δoda_{t-2}	-0.22	-1.68	0.12
Δoda_{t-3}	-0.00	-0.00	0.99
Δoda_{t-4}	0.29**	2.72	0.02
Δhc_t	0.94	0.17	0.87
Δhc_{t-1}	-11.48	-1.21	0.26
Δhc_{t-2}	-2.79	-0.30	0.77
Δhc_{t-3}	13.97**	2.68	0.03
Δfdi_t	0.65**	2.30	0.05
Δfdi_{t-1}	0.06	0.19	0.85
Δfdi_{t-2}	-0.24	-0.77	0.46
Δfdi_{t-3}	0.04	0.18	0.86

Δfdi_{t-4}	0.25	1.06	0.32
Δex_t	0.16	1.39	0.20
Δex_{t-1}	0.05	0.26	0.80
Δex_{t-2}	0.04	0.22	0.83
Δex_{t-3}	0.26**	2.21	0.05
Δbm_t	0.01	0.09	0.93
Δbm_{t-1}	0.21**	2.39	0.04
Δbm_{t-2}	0.29**	2.89	0.02
Δbm_{t-3}	0.28**	2.71	0.02
Δbm_{t-4}	0.23**	2.46	0.04

Note: Statistical significance is presented as (***) 1%, (**) 5% and (*) 10%

Source: Estimation results from Eviews 10

According to <Table 6>, the short run coefficients are presented through the first-difference terms. For the short run coefficients of ODA, there are two out of four that are significant (positive effect of two ODA, negative effect of two ODA). The short-run coefficient of human capital, there is at least one out of three that is significant (positive effect of one human capital index, the negative effect of two human capitals). The short-run coefficient of FDI, there is at least one out of four that is significant (positive effect of one FDI, negative effect of three FDI). The short-run coefficient of export of goods and services, there is at least one out

of three that is significant (one positive effect of export of goods and services, negative effect in three export of goods and services). For the short run coefficient of broad money, there are four out of four that are significant (positive effect of four broad money, no negative effect of broad money).

6.4 The ARDL Long Run Result

<Table 7> Estimated Long Run Coefficients Using ARDL Approach

Variable	Coefficient	T-Statistic	Prob.
oda	0.37**	2.70	0.02
hc	0.75*	2.01	0.08
fdi	0.90	1.00	0.35
ex	0.59***	10.92	0.00
bm	1.21***	4.28	0.00

Note: Statistical significance is presented as (***) 1%, (**) 5% and (*) 10%

Source: Estimation results from Eviews 10

The long-run once in <Table 7> are shown as the coefficients of lagged variables at the level form. The long-run coefficient shows the positive impact of official development assistance (ODA) on the real gross domestic product (RGDP).

A 1 percent increase in ODA leads to 0.37 percent increase on the real GDP at 5 percent level of significance. Furthermore, the coefficient of the human capital index, in the long-run, shows a highly positive impact on the RGDP. A 1 percent increase in the human capital index leads to a 0.75 percent increase on the real GDP at a 10 percent level of significance. This implies that the human capital index is very important for Liberia's growth and development. The long-run coefficient shows no statistically significant impact of foreign direct investment stock (FDI) on real GDP. The coefficient export of goods and services show a positive impact on the real GDP. A 1 percent increase in the export of goods and services leads to 0.59 percent increase in the real GDP at 1 percent level of significance. There is a positive impact of broad money in the long run coefficient. A 1 percent increase in broad money leads to 1.21 percent increase in real GDP at 1 percent level of significance. These results support the findings by Mahapatra et al. (2016).

6.5 The Diagnostic Tests of the ARDL Model

To examine the reliability of the acquired coefficients and the coherent of the methodology, we performed diverse diagnostic tests on our model, as presented in <Table 8>.

<Table 8> Diagnostic Statistics of the ARDL Model

ECM_{t-1}		R^2	LM (F-Statistic)	RESET (F-Statistic)
Coefficient	Prob.	0.88	12.12^b	0.55
-0.85	0.00			

Note: LM = LM statistic, RESET = Chi-square statistic, b = Fail the test, R^2 = Goodness of fit, ECM_{t-1} = Coefficient or speed of adjustment.

Source: Estimation results from Eviews 10

According to <Table 8>, the value of the coefficient of ECM_{t-1} is lower than 1 in absolute term with a negative sign. Therefore, the convergence from a short run toward long-run equilibrium exists in the variable at 1 percent of significance level. The R^2 Measures the goodness of fit of the model. The Residual Diagnostic serial correlation LM test with 1 degree of freedom of X^2 distribution shows that the variable fails the test, implying autocorrelation residuals in our model at 1 percent level of significance. On the other hand, the Ramsey's RESET Test, at a 10 percent level of significance, indicating that our model is correctly specified in general.

Stability Test Results

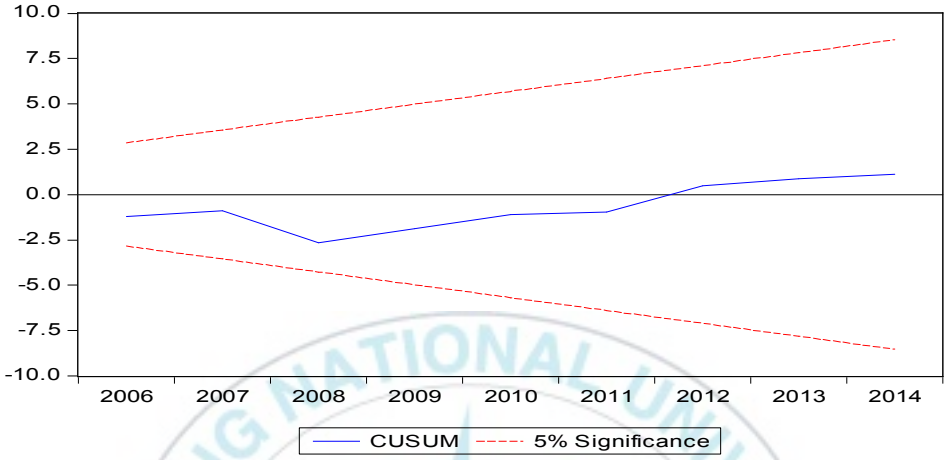
The stability of the coefficient evaluates in due time is investigated by

using the cumulative sum of recursive residuals (SUSUM) test and the cumulative sum of squares of recursive residual (SUSUM of Squares). The stability and instability are denoted by “S” and “US”, respectively.

Finally, the CUSUM and CUSUMSQ are estimated and plotted to check the structural stability of the long run parameters jointly with the short run movements. The test suggests that if the plots of the CUSUM and CUSUMSQ residuals remain inside the critical bounds of 5% level of significance, all the coefficients in the given regression are stable. Examination of the plots in <Figure 5> and <Figure 6> reveals that CUSUM and CUSUMSQ statistics are well within the 5% critical bounds suggesting that short-run and long-run coefficients in the ARDL models are stable.

<Figure 5> Plot of CUSUM (Stability Test)

The Plot of Cumulative Sum of Recursive Residuals

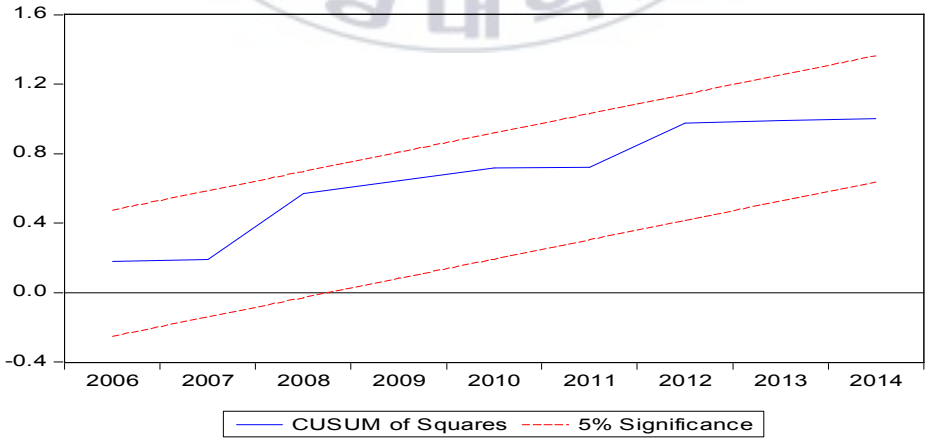


Note: The Straight line represents critical bounds at 5% significance level.

Source: Estimation results from Eviews 10

<Figure 6> Plot of CUSUMSQ (Stability Test)

The Plot of Cumulative Sum of Squares of Recursive Residuals



Note: The Straight line represents critical bounds at 5% significance level.

Source: Estimation results from Eviews 10

6.6 The Toda-Yamamoto Approach to Granger Causality Test

The order of integration (d_{max}) of the series under deliberation and the optimal lag k have to be resolute for causality test expand on equation (11) through equation (16), we adopt the Lutkepohl's procedure by connecting both lag length and a number of endogenous variables within the system to the sample size. The causality test results are presented in <Table 9>. The null hypothesis of causality from each variable (real gross domestic product, official development assistance, human capital index, foreign direct investment, export, and broad money) to the RGDP of Liberia can be rejected at 10 percent level of significance and the direction of causality reveals the patterns of bi-directional Granger Causality.

<Table 9> Result from Toda-Yamamoto Granger Causality Test

Independent Variable	Dependent Variable	Wald test	Prob.	Causality Direction
$loda$	$lrgdp$	4.70*	0.10	$loda$ => $lrgdp$
lhc		18.25***	0.00	lhc => $lrgdp$
$lfdi$		7.18**	0.03	$lfdi$ => $lrgdp$

lex		4.81*	0.09	lex => $lrgdp$
lbm		5.56***	0.06	lbm => $lrgdp$
All		18.36**	0.05	All => $lrgdp$

Independent Variable	Dependent Variable	Wald test	Prob.	Causality Direction
$lrgdp$	$loda$	12.57***	0.00	$lrgdp$ => $loda$
lhc		39.26***	0.00	lhc => $loda$
$lfdi$		6.25**	0.04	$lfdi$ => $loda$
lex		70.63***	0.00	lex => $loda$
lbm		1.28	0.53	
All		126.79***	0.00	All => $loda$

Independent Variable	Dependent Variable	Wald test	Prob.	Causality Direction
$lrgdp$	lhc	0.62	0.73	
$loda$		1.58	0.45	
$lfdi$		4.64*	0.10	$lfdi$ => lhc
lex		0.44	0.80	
lbm		3.04	0.22	
All		10.68	0.38	

Independent Variable	Dependent Variable	Wald test	Prob.	Causality Direction
$lrgdp$	$lfdi$	2.34	0.31	
$loda$		13.45***	0.00	$loda \Rightarrow lfdi$
lhc		1.75	0.42	
lex		0.03	0.98	
lbm		3.37	0.19	
All		36.60***	0.00	$All \Rightarrow lfdi$

Independent Variable	Dependent Variable	Wald test	Prob.	Causality Direction
$lrgdp$	lex	1.26	0.53	
$loda$		0.65	0.72	
lhc		8.92*	0.01	$lhc \Rightarrow lex$
$lfdi$		1.58	0.45	
lbm		2.73	0.26	
All		14.88	0.14	

Independent Variable	Dependent Variable	Wald test	Prob.	Causality Direction
$lrgdp$	lbm	0.52	0.77	
$loda$		1.12	0.57	
lhc		10.73***	0.00	$lhc \Rightarrow lbm$
$lfdi$		4.10	0.13	

lex		0.66	0.72	
All		12.30	0.27	

Note: Statistical significance is presented as (***) 1%, (**) 5% and (*) 10%

Source: Estimation results from Eviews 10

The results above of the Granger Causality test catalog the confirmation of bidirectional causal relationships between official development assistance and real gross domestic product. The tests confirm that ODA leads to an increase in the economic growth of Liberia. The results catalog the evidence of a unidirectional causal relationship between RGDP to human capital (HC) index and broad money (BM) of Liberia respectively. On the other hand, the results record the evidence of a bidirectional causal relationship between RGDP to foreign direct investment (FDI) and export (EX) respectively. All of these defend the findings from the ARDL model that ODA induce economic growth in Liberia.

6.7 The Pairwise Granger Causality Test

From the outcome of the Pairwise Granger Causality Test in <Table 10>, there is a bi-directional Granger Causality between official development assistance and RGDP of Liberia also there is a bi-directional Granger Causality

between human capital index and foreign direct investment while there is unidirectional Granger Causality from human capital index to RGDP, from human capital to export, from human capital to broad money, from broad money to RGDP and from broad money to foreign direct investment.

<Table 10> Result from Pairwise Granger Causality Test

Independent Variable	Dependent Variable	Wald Stat.	Prob.	Causality Direction
$\Delta loda$	$\Delta lrgdp$	5.11*	0.01	$\Delta loda \Rightarrow \Delta lrgdp$
$\Delta lrgdp$	$\Delta loda$	2.98*	0.06	$\Delta lrgdp \Rightarrow \Delta loda$
lhc	$\Delta lrgdp$	3.23**	0.05	$lhc \Rightarrow \Delta lrgdp$
$\Delta lrgdp$	lhc	0.32	0.73	
$\Delta lfdi$	$\Delta lrgdp$	0.33	0.27	
$\Delta lrgdp$	$\Delta lfdi$	0.18	0.83	
lex	$\Delta lrgdp$	2.98*	0.06	$lex \Rightarrow \Delta lrgdp$
$\Delta lrgdp$	lex	0.64	0.53	
Δlbm	$\Delta lrgdp$	3.07*	0.06	$\Delta lbm \Rightarrow \Delta lrgdp$
$\Delta lrgdp$	Δlbm	1.46	0.25	
lhc	$\Delta loda$	3.53**	0.04	$lhc \Rightarrow \Delta loda$
$\Delta loda$	lhc	0.21	0.81	
$\Delta lfdi$	$\Delta loda$	0.59	0.56	
$\Delta loda$	$\Delta lfdi$	0.11	0.89	
lex	$\Delta loda$	1.97	0.15	

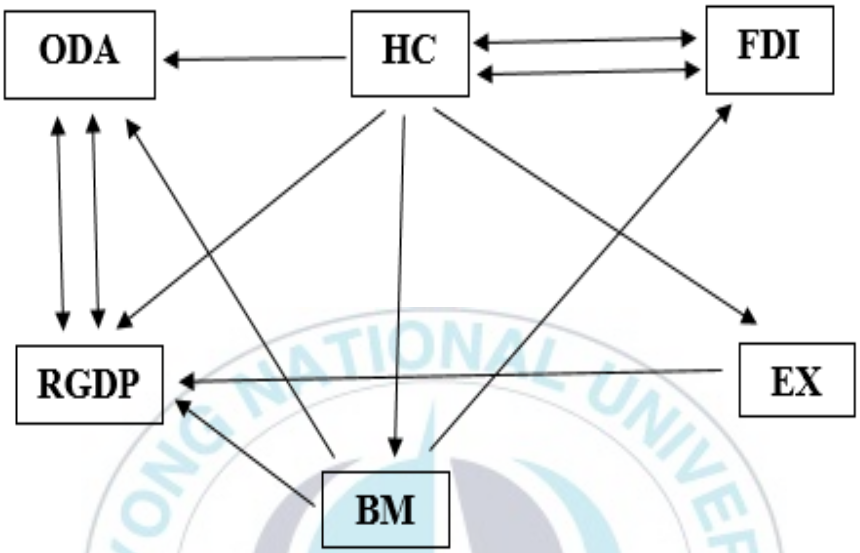
$\Delta loda$	lex	1.69	0.20	
Δlbm	$\Delta loda$	9.58***	0.00	$\Delta lbm => \Delta loda$
$\Delta loda$	Δlbm	0.29	0.75	
$\Delta lfdi$	lhc	5.31***	0.01	$\Delta lfdi => lhc$
lhc	$\Delta lfdi$	10.34***	0.00	$lhc => \Delta lfdi$
Δlbm	lhc	0.02	0.98	
lhc	Δlbm	12.17***	0.00	$lhc => \Delta lbm$
lex	lhc	0.56	0.58	
lhc	lex	5.15***	0.01	$lhc => lex$
Δlbm	$\Delta lfdi$	7.23***	0.00	$\Delta lbm => \Delta lfdi$
$\Delta lfdi$	Δlbm	0.34	0.72	
lex	$\Delta lfdi$	1.21	0.31	
$\Delta lfdi$	lex	0.87	0.43	
lex	Δlbm	0.35	0.71	
Δlbm	lex	0.94	0.40	

Note: Statistical significance is presented as (***) 1%, (**) 5% and (*) 10%

Source: Estimation results from Eviews 10

When we join the results from the Pairwise and Toda-Yamamoto Granger Causality Test together, the direction of causality among six variables in this study can be summarized in the <Figure 7>.

<Figure 7> Summary of Granger Causality Direction



According to <Figure 7> the summary of the Granger Causality direction shows that there are four out of five variables (official development assistance, human capital index, export of goods and services and broad money) cause to change the RGDP of Liberia in both directly or indirectly ways. The impact of ODA on the economic growth of Liberia can be explained under the Endogenous growth model. ODA impact the economic growth of Liberia through investment in physical and human capital and also expand the capacity to import of capital goods or technology.

Chapter 7

Conclusion and Policy Recommendations

7.1 Conclusion

The existing empirical literature has been inconclusive on the impact of official development assistance on economic growth. However, our finding through the Augmented Dickey-Fuller (ADF) equation technique is in support to the portion of the empirical literature that reveal foreign aid has a significant and positive impact on economic growth. Emerging from time series analysis, this result supports the empirical finding of Mohapatra at al. (2016), Olanrele and Ibrahim (2014) and Karbo P.M (2012) who also use time series analyses in different country studies to show that official development assistance has an important and positive impact in ascertaining economic growth. The Autoregressive Distribution Lag (ARDL) approach to co-integration was also employed in these papers which is the main approach employed also in our study to investigate the impact of official development assistance on the economic growth of Liberia. The Toda-Yamamoto approach to Granger Causality test of stationary variable shows that the impact of official development assistance on the

economic growth of Liberia can be explained under the Endogenous Growth Theory.

Foreign aid in the form of Official Development Assistance (ODA) is an important source of public expenditure in many developing countries in the world. Its impact on economic growth and development has been debated for many multi-country cases over the years. However, the aid effectiveness analyses for the single country case are few. Further, in a country like Liberia where aid effectiveness is yet to be examined in recent years, this study fills the gap by providing empirical evidence as a source for policy consideration. To do so, we estimated the foreign aid-economic growth relationship by using ARDL bound test approach for Liberia over the period 1974 to 2014.

The empirical findings of this study reveal that there exists a long run co-integrating relationship between ODA and economic growth in Liberia. The ARDL test result shows the significant positive impact of ODA on real GDP growth in Liberia. A 1 percent increase in ODA leads to 0.37 percent on the real GDP at 5 percent level of significance. Further, human capital (measured by human capital index) is established to have a positive and important impact on the long run growth of the economy. A 1 percent increase in the human capital index

leads to 0.75 percent on the real GDP at a 10 percent level of significance. This implies that the level of the human capital index is an important factor in determining the long-run economic growth of Liberia. Further, the study found that foreign direct investment stock which is the worth of the share of capital and savings (comprising retained profits) as a result from the parent enterprise plus the net liabilities of affiliates of the parent enterprise which is approximated by the accumulated value of past FDI flows is not statistically significant on the economic growth of Liberia. Also, export (export of goods and services comprising the worth of every goods and extra market services delivered to the rest of the world) is found to have a positive impact on the real GDP. A 1 percent increase in export of goods and services leads to 0.59 percent increase in real GDP at 1 percent level of significance. And broad money (measured by the sum of currency outside banks, demand deposit other than those of central government) is found to have a positive impact on the real GDP. A 1 percent increase in broad money leads to 1.21 percent increase in real GDP at 1 percent level of significance on the economic growth of the country. The causality test based on the Toda-Yamamoto approach also confirms that the official development assistance leads to an increase in economic growth of Liberia.

The relationship between ODA and economic growth indicate that official

development assistance can be used as a driving force in achieving the desired rate of economic growth in Liberia par with the findings of Mohapatra et al. (2016). We also found that foreign direct investment (FDI) is not a significant determinant in boosting the economic growth of Liberia.

The evidence in the case of Liberia has provided support for the supplemental theories that official development assistance is vital in the stimulation of a country's economic development.

7.2 Policy Recommendations

Donor's intervention in Liberia does not seem to be in vain but has confirmed to be largely useful instead. It implies that Liberia's persistent poverty characterization amidst notable donor's presence and participation in the country's economy has less to do with the fact that ODA has been unsuccessful in fostering economic growth, but preferably that the magnitude of the impact has not been adequately strong to abolish poverty completely.

This study provides strong evidence that ODA can be used as a major tool in achieving the required rate of economic growth. Therefore, the government of

Liberia should create a framework that will encourage more flows of ODA to Liberia by increasing activities with several donor countries. The government of Liberia should also divert a larger portion of ODA to investment in the desired sectors of the economy.

To advert this human capital index problem, effective investment in an early quality education from childhood level is highly recommended. Productive public policies must be designed to support effective education standard that will ensure a new productive and innovative generation of young Liberians. Human capital also constitutes the primary productivity force for Liberia, the Liberian government should invest more in education to achieve economically sustainable development.

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