T.R.

BANDIRMA ONYEDİ EYLÜL UNIVERSITY

INSTITUTE OF SOCIAL SCIENCES

DEPARTMENT OF ECONOMICS

Master's Thesis

THE DETERMINANTS OF ECONOMIC GROWTH IN SENEGAL

Mohamed Moustapha BARRY
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Supervisor:

Assoc. Prof. Fatih AYHAN

Bandırma 2022

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ETHICAL STATEMENT
TO
BANDIRMA ONYEDİ EYLÜL UNIVERSITY
INSTITUTE OF SOCIAL SCIENCE

I hereby declare that all the information is gathered and presented in accordance with academic rules and ethical principles in this dissertation. As stated by these rules and principles, I also declare that all data, opinions, and results that aren't my own are given reference to and cited accordingly. (10/06/2022)

ABSTRACT

THE DETERMINANTS OF ECONOMIC GROWTH IN SENEGAL

Mohamed Moustapha BARRY

This research aims to examine the macroeconomic determinants of economic growth in Senegal using time series data over the period 1974 to 2019. The study applies the bound test procedure to find out if there is a cointegration or not, the ARDL model to investigate the relationship between GDP growth and independent variables (inflation, external debt, foreign aid, and foreign direct investment), the Toda Yamamoto causality to analyse the causal relationship between variables. The empirical results show the variables are cointegrated. In long run, external debt has positive and significant impact on GDP growth while foreign direct investment has negative effect and insignificant on GDP growth. However, inflation has a negative impact but is insignificant on GDP growth, and foreign aid has a negative impact and significant on GDP growth. The short-run results show that foreign direct investment has positive and significant impact on GDP growth while external debt has negative and insignificant effect on GDP growth and inflation has positive impact but insignificant on GDP growth. The Toda Yamamoto causality results show that there is bidirectional causality between GDP growth and the following determinants inflation, external debt, and foreign aid while there is unidirectional causality between GDP growth and foreign direct investment. Hence, external debt is an important determinant of growth in Senegal.

Keywords: Research Performance, Economic Growth, Bound Test, Toda Yamamoto Causality, Senegal.

ÖZET

SENEGAL'DE EKONOMİK BÜYÜMENİN BELİRLEYİCİLERİ

Mohamed Moustapha BARRY

Yapılan bu çalışma 1974 ile 2019 yıllarını kapsayan bir zaman serisi veri setiyle Senegal için ekonomik büyümenin makro ekonomik belirleyicilerini incelemeyi amaçlamaktadır. Çalışmada eş bütünleme olup olmadığı Sınır Testiyle, Ekonomik Büyüme (Gayri Safi Yurtiçi Hasıla Büyümesi) ile Enflasyon, Dış Borç, Dış Yardım ve Doğrudan Yabancı Yatırımları kapsayan bağımsız değişkenler arasındaki ilişkiyi incelemek için ARDL modeli ve değişkenler arasındaki nedensellik ilişkisini incelemek içinde Toda Yamamoto nedensellik testi uygulanmıştır. Bulunan ampirik sonuç değişkenler arasında eş bütünleme olduğunu göstermektedir. Dış borcun uzun dönemde büyüme üzerinde istatistiksel olarak anlamlı pozitif bir etkiye sahip olduğu, fakat doğrudan yabancı yatırımlarının ise büyüme üzerinde uzun dönemde negatif ama istatistiksel olarak anlamsız bir etkiye sahip olduğu bulunmuştur. Öte yandan enflasyonun büyüme üzerinde istatiksel olarak anlamsız bir negatif etkiye sahip olduğu ve dış yardımların ise büyüme üzerinde istatistiksel olarak anlamlı negatif bir etkiye sahip olduğu bulunmuştur. Kısa dönemdeki sonuçlar ise doğrudan yabancı yatırımların ekonomik büyüme üzerinde istatistiksel olarak anlamlı pozitif bir etkisinin olduğu, ancak dış borcun istatiksel olarak anlamsız olarak negatif ve enflasyonun ise istatiksel olarak anlamsız fakat büyüme üzerinde pozitif bir etkiye sahip olduğunu göstermektedirler. Toda Yamamoto nedensellik testi ekonomik büyümeyle enflasyon, dış borç ve dış yardım değişkenleri arasında çift yönlü nedensellik olduğu, ekonomik büyüme ile doğrudan yabancı yatırımları arasında ise tek yönlü bir nedensellik olduğunu göstermektedir. Sonuç olarak dış borcun Senegal'de büyüme üzerinde önemli bir belirleyici olduğu saptanmıştır.

Anahtar Kelimeler: Araştırma Performansı, Ekonomik Büyüme, Sınır Testi, Toda Yamamoto Nedensellik, Senegal

PREFACE

This research study is part of the validation of a master's program in economics at the Bandırma Onyedi Eylül University. We are not unaware of what constitutes the importance of economic growth for a country. However, it is necessary to know where this growth can come from and how it evolves. Therefore, it is with this in mind that the choice of this research subject "the macroeconomic determinants of economic growth in Senegal" has arisen.

The goal of this thesis is to research the factors that determine economic growth in order to be able to improve them and stimulate economic growth that will generate sustainable economic development in Senegal.

The problem encountered in this study was to have data covering the period from Senegal's independence until 2021, something which was not possible but nevertheless it has forty-five years which are used in the study.

I would like to thank my supervisor Assoc. Prof. Fatih AYHAN for his support and kindness during this research study and also, thank all professors in the economics department for what they have done for me.

My deepest gratitude goes to my parents, family, and friends who have been always there for me by supporting and standing with me for my success during my entire education life and I am very grateful for every time they took to accompany me. Without their support, I couldn’t reach this step.

Mohamed Moustapha BARRY

Bandırma 2022

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ABBREVIATIONS

AIC : Akaike Information Criterion

ARDL : Autoregressive Distributed Lag

BCEAO : Central Bank of West African States

DPEE : Department of Forecasting and Economic Studies

ECM : Error Correction Model

FSDE : Forecasting and Studies Department Economic of Senegal

GDP : Gross Domestic Product

GFCF : Gross Fixed Capital Formation

HICP : Harmonised Indices of Consumer Prices

IMF : International Monetary Found

MEFP : Ministry of Economy, Finance and Planning of Senegal

MEPC : Ministry of Economy, Planning and Cooperation of Senegal

NASD : National Agency for Statistics and Demography of Senegal

NASD : National Agency for Statistics and Demography of Senegal

NCPI : National Consumer Price Index

PAP : Priority Action Plan

PSI : Policy Support Instrument

PWB : Public Works Building

SEP : Senegal Emergent Plan

SIC : Schwarz Information Criteria

VECM : Vector Error Correction Model

WAEMU : West African Economic and Monetary Union

WB : World Bank

CHAPTER 1

1. INTRODUCTION

1.1. Background of the Study

Giving the best way to promote economic growth is hotly debated in all countries in the world. A country's long-term sustainable economic growth rate determines its ability to improve the well-being of its people. Therefore, the development of the economy constitutes a primary objective of countries because it is one of the main problems for the international economy (Mostafa, 2010). Thus, understanding the determinants of a country's growth is therefore not only an important part from a political point of view, but also a key element in macromanagement for policymakers. It depends on the internal and external macroeconomic parameters of the economy, such as investment, supply chain, employment, average interest rates, budget deficits, foreign capital, international standards, etc. (Biswas and Kumar, 2014).

Although there is no single theory, there are several specific theories which examine the role of different factors for determining economic growth. Currently the two most used currents are: The first is called neo-classical strand based on growth model of Solow showed that the major sources of economic growth are total factor productivity and factor accumulation. The second and recent is called the endogenous growth developed by Romer (1986) and Lucas (1988) has focused on human capital and innovation capacity (Arvantids et al, 2009).

Nowadays the diverse economic growth patterns are very common in the world. The source and stages of economic growth are considered by countries to be among the most important, most interesting and very difficult areas to master in contemporary social science and the performance of these economic indicators of growth from one country to another is deverse and varied. Therefore, the source of economic growth is a matter of great debate for many economists, politicians and policymakers who want to know and analyze the factors that make some countries progress and develop while others suffer from poverty (Gebru, 2015).

Economic growth is synonym of production of goods and services in a nation for usually a year by creating enough effective jobs. It is conventionally measured by the year-on-year GDP growth rate. Therefore, GDP shows the total market value or monetary value of all finished goods and services produced during a year by resources located in a country and calculated on annual basis. Methods to measure economic growth uses national income approach or expenditure approach or production approach. Economic growth is generally linked to the capacity to produce. It is an indicator of economic health and it measures the level of wellness in a country (Song, 2006). It is certain that economic growth is not the perfect solution to a country's problems, but it promotes the implementation of public development policies that improve economic shortcomings. In summary, growth is a primary and fundamental indicator but insufficient to ensure social well-being (Mamoudou, 2011).

The Senegalese economy has not experienced significant change, despite more than six decades of independence. Real economic growth was (2%) in the first decade of independence but it fell during the 1970s to (0.6%) before becoming negative (-0.4%) in the 1980s when the programs structural adjustment measures panned by the government to boost the economy were unable to bring about gradual economic growth for real development (Noula, 1994: 4).

The production technique based on the improvement of agricultural and mining rent that had been implemented since 1960 in Senegal has not, despite the mobilization of the necessary resources, allowed an allocation of factors favourable to sustained economic growth. During the first two decades, the GDP growth rate remained inflexible, settling at around (2.3%) on an annual average, while the population growth rate was (3%) (Noula, 1994: 4).

Presenting an overview of the economic progress of a country, it is fundamental to analyze the evolution of macroeconomic indicators and figure 1.1 below presents the GDP growth rate, domestic savings rate, investment rate and inflation rate. It shows that public policymakers made a great effort to keep the inflation rate below 4% during this period to avoid diminishing the purchasing power of consumers and disrupting the economic growth of the country. Similarly, economic growth did not progress much during this period but nevertheless in 2017, it had reached its highest of 7.39% due to

structural adjustments through the Emerging Senegal Plan. However, the Senegalese economy recorded its lowest level of economic growth of 1.32% in 2020 which is caused by the effects of health restrictions to prevent the propagation of the Covid19 virus. Also the savings rate, which was 6.66% in 2009, reached to 12.24% in 2021, i.e. an increase of 50% during this period. We know that savings are an important element for investment in an economy, but their weight is very low in developing countries because of the low level of income of employees. The investment which constitutes a main factor for the economic growth of any country and which comes from foreign aid and foreign investment for Senegal increases from 30.75% in 2021 against 19.7% in 2009. Senegal recorded its rate of highest investment in 2020 which was 34.95%.

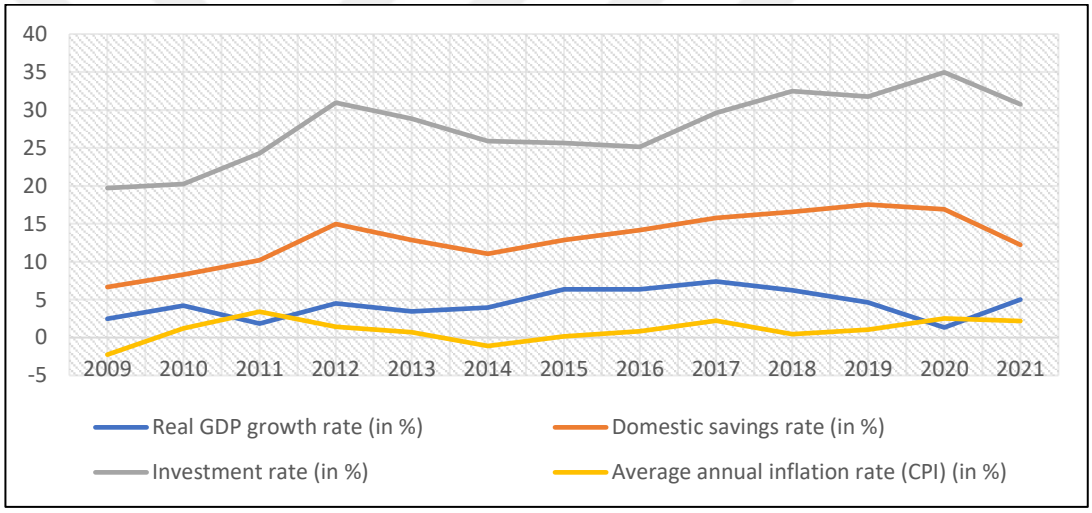

Figure 1.1. Evolution of Macroeconomic Indicators for Senegal (2009-2021)

Source: BCEAO, 2022.

This imperfect economic situation will be aggravated by the international economic and financial crisis of the early 1970s, to drive the country into an uninterrupted cycle of deficits and multiple imbalances (Noula, 1994: 5).

To fight against this economic situation, the government set up in 1979, an urgent short-term stabilization program (1979-80) which led to the medium and long-term structural adjustment program (1985-1992). And finally, more recently, the economic emergency plan commonly known as the "Sakho-Loum Plan" and cover the period from 1993 to 1995 (Noula, 1994: 5).

The Senegalese state seeks, through these successive program plans, to improve macroeconomic management as part of the implementation of an orderly policy of concerted and sustained adjustment.

In 2013 economic growth remained disappointing, real GDP growth was 3.5%. It was very close to that of 2012 (3.4%) and was below the expected level of 4.0% as given in Figure 1.1. The service sector served as a growth engine for the economy with an increase of 6.4%. The low GDP growth rate observed in 2013 is attributable to declines both in the secondary sector (–1.5%) and in the food and cash crops sector (–8.3%) (Cinyabuguma and English, 2014: 3).

From 2014 onwards, Senegal entered into a new growth dynamic with 6.6% on an annual average. This performance has been achieved in a context of low inflation and a significant lessening of budget deficit. It comes from the efforts put in the implementation of reforms and investment projects from 2014 (MEFP, 2018: 3).

The implementation of the emergence strategy for the period 2014-2018 has made it possible to place Senegal among the rapidly growing countries of sub-Saharan Africa. This growth is based on consumption, export of agricultural materials and investments in economic and social infrastructure such as roads and on a reform of agriculture. The investment is mainly oriented towards agriculture, public buildings, roads and renewal or development of several industrials equipments (textiles, agro-food firms). In this phase, Senegal aims to increase production out and decrease unemployment. So to reach this, the GDP growth rate should go from an annual average of 6.6% over the time period 2014-2018 to 9.1% per year from 2019 to 2023. Regarding employment, the target would be 4.3% growth in 2023 against 3.2% in 2016. The sectors below are identified (MEFP, 2018).

The risks weighing on the outlook for growth relate in particular to the rise in oil prices, thus increasing subsidies and the oil bill. In addition, there is the possibility of accumulation of internal arrears which may slow down activity in the public works building (PWB) sectors; as well as the increase in current expenditure induced by social demands characteristic of an election year. In addition, the effects of the poor security context in the Sahel countries could weigh more on public finances.

Inflation remained moderate in 2018, below the community convergence threshold set at 3% by WAEMU. It was 1.3% in 2017 against 0.8% in 2016. For 2018, an inflation rate of less than 2% was expected. This development reflects the good performance of the agricultural sector at the national level and the pursuit of a prudent monetary policy (Gassama et al., 2018).

The pre-electoral context with the presidential elections scheduled for February 2019 and also by the government's desire to show positive results in the implementation of the first Priority Action Plan (PAP) and which extends over a period of Five years (2014-2018) had marked the budgetary policy for the year 2018. Thus, there was a risk of a budget increase which could be reduced by efforts to mobilize internal revenue and control public expenditure within the framework of the cooperation program with the IMF and the government to support economic policy. In that context, the budget deficit was 3.7% in 2018 and to fill this deficit and meet its investment needs, the government resorted to external capital through technical and financial partners such as the World Bank, the IMF or the financial markets (Gassama et al., 2018: 2-4).

The arrival of the Covid-19 pandemic slowed down economic activities in all countries, including Senegal. A decline in economic activity was expected of 0.7% in 2020 against a forecast for growth of 6.8% in September 2019. So compared to the year 2019, a solution had to be found in order to support the economy in 2020. The State budget policy that was put in place was boost and increase economic activities for a more favourable situation for the national economy (MEPC, 2021: 8).

Overall, economic growth was expected to rise by 5.0% in 2021 against 1.5% in 2020. This dynamic recovery is to be linked to the strong recovery in economic activity in the secondary sector (+8.8 %). The tertiary (+4.4%) and primary (+4.1%) sectors should also record good performance (MEPC, 2022: 12).

The level of the primary sector, the increase in activity in 2020 is mainly explained by the good performance of the fishing and agriculture sectors and of livestock. Therefore, primary sector activity was expected to grow 5.1% in 2020, compared to 2.9% growth in 2019. The level of the secondary sector, despite the provisions relating to market control, the development of security stocks for basic foodstuffs, tax exemption and injection of

liquidity into the economy, this sector has suffered a slowdown in activities due to health precautionary measures such as curfews. Thus, the sector decreased by 1.1% in 2020, against + 5.8% in 2019. The tertiary sector, a decline caused by the Covid-19 pandemic was expected in hospitality, trade, transport, and specialized and scientific services. The tertiary sector, which represents more than 40% of GDP, was expected to decline by 2.8% in 2020, against an increase of 5.0% in 2019. In 2020 final consumption decreases by 1.7% against an increase of 5.5% in 2019 and the domestic savings rate was from 17.6% in 2019 to 17.2% in 2020. The investment which was measured by gross fixed capital formation fell down by 3.0% in 2020 because of private investment which fell by 6.5% due to the effects of the Covid-19. As for external demand, imports of goods and services are expected to decline in 2019 by 12% and 0.8% respectively in 2020, with domestic demand decreasing by -4.6% in real terms in 2020, against an increase of 4, 2% in 2019 (MEPC, 2021: 14).

In 2021, growth in **the primary sector** decreased in 2021 compared to 2020 due to insufficient activity in the fishing sector and a return to normal growth in agriculture, which had an incredible performance in 2020 to the tune of (23.4%). As given in Table 1.1. Thus, the activities of the main sector would increase in 2021 by (4.1%) against an increase in 2020 of (15.9%). The government had made available to farmers through a subsidy quality inputs as well as suitable agricultural materials in the context of strengthening agricultural productivity. These efforts have been further supported by the reforms undertaken by the State in the rice sector, in particular, within the framework of the continuation of the National Program for Self-sufficiency in Rice. In this context, the growth of agriculture and other related activities was projected at (4.6%) in 2021 against (23.4%) in 2020. Breeding activities was to resume after the lifting of restrictive measures to combat Covid-19, in particular the opening of borders, hotels, bars and restaurants as well as the resumption of religious and socio-cultural ceremonies. The growth of livestock activities was expected to increase by (4.8%) in 2021 against (0.8%) in 2021. Fishing, faced with the scarcity of fishery resources, had fallen by (-2.9%) in 2021 against an increase in its activity of (3.6%) during the same year.

Table 1.1. Growth of Primary Sector in Senegal (2015-2021)

Years	2015	2016	2017	2018	2019	2020*	2021**
Primary Sector	**10,6%**	**5,4%**	**11,5%**	**8,1%**	**4,5%**	**15,9%**	**4,1%**
Agriculture and related activities	16,0%	3,8%	16,4%	10,2%	4,8%	23,4%	4,6%
Breeding and hunting	2,7%	8,7%	3,5%	3,8%	2,9%	0,8%	4,8%
Silviculture and lumbering	1,7%	3,1%	2,7%	1,5%	3,5%	2,7%	3,0%
Fishing and fish farming	3,4%	8,5%	3,8%	6,9%	7,5%	3,6%	-2,9%

Source: DPEE/MEPC; * Estimated, ** Forecasts**.**

The secondary sector was strongly affected by the Covid-19 health crisis and despite this situation, the growth of activity in this sector increased by (8.8%) in 2021 against (0.1%) the previous year as given in Table 1.2. Extractive activities had increased by (15.6%) in 2021 against (4.8%) in 2020 and the manufacture of agri-food products had increased by (8.2%) after a decline of (6.9%) in 2020. Refining activity shows a less disappointing trend in 2021, after the decline of recent years. Refining activity was expected to increase to (6.6%) during 2021, confirming the positive evolution observed in the first half, compared to the first half of 2020, a growth of (22.3%) was recorded. Electricity generation continue at the productive level to ensure the security of electricity supply and improve the availability of electricity for the population. Thus, electricity and gas increased by (4.8%) in 2021 against (6.9%) in 2020. Hydraulics continued to meet the progressive demand for water in urban and rural areas. In total, the growth of water and sanitation activity should show an increase of (7.3%) in 2021 against (5.3%) the previous year. The construction of infrastructure marked by the continuation of major State works, in particular, the construction program of flyovers to relieve congestion in the main arteries, the continuation of the development of the urban center of Diamniadio and the development of that of Lac Rose as well as social housing programs and development work on platforms in the context of the exploitation of oil and gas resources. Consequently, the growth of infrastructure construction was (15.2%) in 2021 against (7.8%) in 2020.

Table 1.2. Growth of Secondary Sector in Senegal (2015-2021)

Years	2015	2016	2017	2018	2019	2020*	2021**
Growth of Secondary Sector	**9,8%**	**3,6%**	**7,1%**	**6,5%**	**3,7%**	**0,1%**	**8,8%**
Extractive activities	31,1%	-16,2%	12,5%	29,6%	-8,2%	4,8%	15,6%

Meat slaughter, processing and preservation	-9,7%	24,6%	-1,6%	4,7%	6,9%	-4,9%	4,1%
Processing and preservation of fish, crustaceans and molluscs	-1,5%	-6,8%	4,7%	-2,1%	4,6%	-27,2%	3,3%
Production of dietary fats	31,9%	-3,1%	-3,3%	-1,1%	21,4%	-47,0%	58,9%
Husked rice and flours	1,9%	25,0%	5,6%	15,9%	3,4%	0,2%	6,9%
Manufacture of animal feed	-0,8%	4,2%	0,1%	22,8%	2,8%	1,2%	6,2%
Manufacture of bread and pastries	0,3%	1,4%	5,7%	5,7%	6,3%	14,7%	8,1%
Manufacture of grain-based food products	-4,9%	2,3%	6,3%	4,7%	1,9%	4,7%	3,3%
Canned fruits and vegetables	6,8%	3,3%	5,2%	7,0%	5,5%	6,6%	3,9%
Manufacture of dairy products and ice cream	15,4%	-10,8%	5,1%	2,3%	0,9%	-5,9%	-11,2%
Manufacture of sugar, chocolate and confectionery	20,3%	16,7%	0,9%	14,4%	-4,5%	11,1%	3,2%
Manufacture of other food products	30,0%	9,7%	9,0%	13,3%	0,7%	-1,8%	7,8%
Beverage manufacturing	6,3%	5,4%	6,9%	-2,1%	2,1%	-2,8%	14,6%
Tobacco products	5,0%	3,4%	-13,6%	-1,2%	-12,8%	-8,3%	15,3%
Petroleum refining, coking	35,2%	5,2%	1,2%	-15,1%	-5,9%	-11,5%	6,6%
Chemical manufacturing	31,4%	21,5%	4,4%	15,1%	6,4%	-3,9%	-3,7%
Construction materials	17,9%	7,3%	6,4%	4,2%	0,2%	3,9%	11,6%
Cotton ginning and textile manufacturing	-0,9%	3,6%	5,1%	2,5%	4,1%	10,0%	3,5%
Cotton ginning	-70,2%	-497,5%	-16,6%	-15,2%	8,2%	-10,4%	-5,9%
Spinning, weaving and textile finishing	0,3%	10,6%	10,4%	2,8%	1,8%	26,9%	5,3%
Manufacture of articles of clothing	0,6%	5,1%	2,3%	2,0%	5,2%	2,3%	2,3%
Leather work; manufacture of travel articles; shoes	4,5%	-8,3%	-5,5%	-0,3%	4,5%	-40,8%	-2,4%
Sawing and planing wood	0,7%	7,4%	-0,4%	2,7%	-4,5%	-21,2%	-3,2%
Paper, cardboard and paper or cardboard articles	1,3%	3,6%	0,7%	5,6%	4,3%	-13,2%	10,3%
Pharmaceutical products	-13,5%	-13,3%	-30,4%	20,9%	-4,9%	-3,8%	-6,5%
Soaps, perfumes and cleaning products	4,7%	10,4%	12,7%	3,9%	15,2%	37,3%	-33,5%
Rubber and plastic products	17,8%	6,9%	11,1%	9,5%	-0,6%	13,8%	4,1%
Basic metallurgical and foundry and manufacture of metal works	-4,0%	13,0%	11,8%	-1,6%	-1,1%	-3,0%	8,1%
Other transport equipment	1,0%	6,1%	14,8%	9,3%	5,2%	-28,2%	16,6%
Other manufactured products	2,4%	4,2%	13,8%	-1,3%	7,6%	3,4%	20,4%
Electricity and Gas	18,3%	7,4%	6,6%	6,4%	7,4%	6,9%	4,8%
Water, Sanitation and Waste Treatment	8,7%	3,0%	7,6%	2,7%	5,2%	5,3%	7,3%

buildings	15,5%	5,6%	15,9%	5,7%	13,3%	7,8%	15,2%

Source: DPEE/MEPC; * Estimated, ** Forecasts.

The tertiary sector can regain momentum with various support measures initiated by the Senegalese government. In addition, the country's economy will benefit from a good international environment, supported by the gradual lifting of restrictions on the movement of goods and people. In other words, the performance of the tertiary sector is expected to increase by (4.4%) in 2021 against a decrease of (0.7%) in 2020, representing an estimated contribution of (2.0%) to the growth of the GDP as given in Table 1.3. The transport sector would benefit from the recovery of businesses and the dynamism of industry. Growth in transport activity was (4.7%) in 2021 compared to a decline of (–3.5%) in 2020. Accommodation and catering activities have had a difficult time due to the restriction health from Covid-19 pandemics and growth observed from 2016 risked being affected and the State was obliged to come to the aid of companies operating in this area. Thus, the gradual lifting of health restrictions allowed the resumption of activities and the growth of accommodation and catering had reached an increase of (1.3%) in 2021 against a decline of (18.7%) in 2020. In 2021, financial services and insurance benefited from the economic recovery by responding to demand, including insurance of agricultural products and industrial development, as well as other government-sponsored programs in sectors deeply impacted by the Covid-19. Thus, financial services and insurance obtained growth of (3.1%) in 2021, i.e. an expected gain of nearly (1.7%) percentage point compared to the previous year (PDEE, 2021).

Table 1.3. Growth of Tertiary Sector (2015-2021)

Years	2015	2016	2017	2018	2019	2020*	2021**
Growth of Tertiary Sector	**3,3%**	**7,6%**	**5,8%**	**5,4%**	**4,6%**	**-0,2%**	**4,4%**
Trade	7,8%	6,1%	8,5%	7,4%	5,6%	2,0%	4,1%
Transport	-0,2%	4,7%	7,6%	6,0%	6,7%	-3,5%	4,7%
Accommodation and catering services	-1,6%	3,7%	6,2%	4,3%	4,4%	-18,7%	1,3%
Information and communication	2,8%	0,1%	8,3%	1,8%	1,3%	-0,6%	11,1%
Telecommunications Services	1,6%	-0,2%	7,3%	2,4%	-0,6%	-1,0%	12,1%
Other Information and Communication Services	8,6%	1,7%	12,6%	-1,1%	9,8%	0,8%	7,3%
Financial and insurance services	11,5%	2,6%	10,8%	6,0%	12,0%	1,4%	3,1%
Real estate services	4,0%	7,1%	3,7%	2,3%	3,3%	3,1%	2,9%

Specialized, scientific and technical services	-19,5%	36,9%	2,2%	6,5%	0,0%	1,6%	1,2%
Office support services	10,1%	12,5%	4,2%	8,6%	6,1%	-7,1%	7,9%
Public administration services	10,7%	10,7%	5,0%	8,5%	5,6%	4,8%	4,2%
Education	3,1%	1,1%	2,1%	2,7%	5,0%	-5,8%	2,7%
Health and social work activities	-0,5%	4,5%	2,4%	6,3%	4,5%	1,5%	4,8%
Activities of a collective or personal nature	19,1%	15,9%	7,5%	5,2%	-0,2%	-57,2%	32,7%
Domestic services	1,7%	9,4%	3,7%	3,7%	3,5%	0,7%	3,1%
Other services	4,1%	3,4%	3,4%	5,2%	3,2%	-1,3%	3,7%

Source: DPEE/MEPC; * Estimated, ** Forecasts

In terms of demand, however, final consumption will fall to (1.7%) in 2020, compared to (5.5%) in 2019. Its weight in GDP would drop from (82.4%) in 2019 to (82. 9%) in 2020, mainly due to an increase in public demand of (16.8%) in 2020 compared to 14.3% in (2019); the private sector will fall from (2.1%) to be (66.0%) in 2020 of GDP. However, the domestic savings rate decreased by (17.2%) in 2020 against (17.6%) in 2019 as given in Table 1.4. Investments measured by Gross Fixed Capital Formation (GFCF) are expected to decline by (3.0%) in 2020 compared to private investments, which will fall by (6.5%) due to the impact of Covid-19. On the other hand, the formation of fixed capital and existing investments should be increased by (3.0%) in 2020 against (8.8%) in 2020 coming from the program of resilience of the national economy. Overall, domestic demand will decline by (-4.6%) in 2020 against (+4.2%) in 2019. Based on external demand, exports and imports of goods and services are projected at (12. 2%) and (0.8%) respectively in 2020. Inflation, as measured by the GDP deflator, would be (2.1%) in 2020 compared to (1.1%) in 2019. This price trend reflects the growth in those of raw materials on the international market. given the decline in domestic demand. However, inflation, as measured by the National Consumer Price Index (NCPI), would remain below the community threshold of (3.0%), under multilateral surveillance within WAEMU. In the first nine months of 2020, inflation was (2.5%) year-on-year, corresponding to an increase in the price of local products by (+2.6%) and imported products by (+1 .9%) (DPEE, 2020).

In terms of final demand, final consumption was estimated in 2021 by (5.0%) compared to the previous year by (3.5%), with a moderate recovery in inflation and economic growth. Overall, final consumption in 2021 reached (84.1%) of GDP against (84.4%) in 2020, bringing the national savings rate to (15.9%), namely 0.3 percentage

point better than in 2020. Investment, assessed by gross fixed capital formation (GFCF), should increase significantly to reach (29.6%) of GDP in 2021 against (27.6%) of GDP compared to the previous year as given in Table 1.4. Thus, the gross fixed capital formation would increase by (10.1%) in 2021 due to the return on public and private investment, the benefits of the creation of special economic zones, the improvement of energy supply and the growth in foreign direct investment in research and development and set up for oil and gas production from 2023 (DPEE, 2021).

Table 1.4. Macroeconomic Indicators for Senegal (2014-2021)

Macroeconomic Aggregates	2014	2015	2016	2017	2018	2019	2020*	2021**
Real growth rate	6,6%	6,4%	6,4%	7,4%	6,2%	4,4%	1,5%	5,0%
GDP deflator (%)	-2,1%	1,1%	0,9%	0,6%	-0,8%	1,9%	2,3%	2,5%
Investment rate	25,9%	25,8%	25,4%	29,8%	32,6%	31,9%	30,5%	31,0%
GFCF rate	23,5%	23,0%	23,9%	25,8%	28,3%	28,9%	27,6%	29,6%
Tax pressure rate	15,2%	15,2%	15,9%	15,1%	15,5%	17,6%	16,7%	17,6%
Domestic savings rate	11,0%	13,1%	14,4%	16,0%	16,8%	17,7%	15,6%	15,9%
Public	4,0%	4,3%	5,9%	5,6%	4,4%	4,9%	2,7%	4,6%
Private	7,0%	8,8%	8,5%	10,4%	12,4%	12,8%	12,9%	11,4%
National savings rate	17,6%	19,1%	19,8%	21,2%	21,8%	23,9%	22,8%	22,8%
Total public debt stock (local currency)	4.112,9	4.597,7	5.312,1	5.848,5	7.937,6	7.825,3	8.903,3	10.295,3
GDP at market price (billions of CFA Franc)	9.775,0	10.508,7	11.283,4	12.191,8	12.840,2	13.655,4	14.184,9	15.280,9

Source: DPEE/MEPC; * Estimated, ** Forecasts

In general, domestic demand had increased by (5.3%) in real terms in 2021 against (4.0%) in 2021. On the side of the external demand for goods and services should grow by (7.1%) for imports and (7.6%) exports in 2021 as given in Table 1.5.

Table 1.5. Use of GDP Growth in Senegal (2015-2021)

GDP growth	2015	2016	2017	2018	2019	2020*	2021**
Production of goods and services	6,8%	5,8%	8,4%	6,2%	4,6%	1,6%	7,4%
Imports of goods and services	7,7%	6,7%	16,7%	9,0%	5,3%	6,4%	7,1%
Net taxes on products	8,9%	8,1%	10,9%	6,9%	5,0%	-7,2%	1,5%

TOTAL RESOURCES	7,0%	6,1%	10,0%	6,8%	4,7%	2,1%	7,1%
Intermediate consumption	7,6%	5,4%	10,1%	6,2%	4,9%	0,4%	9,8%
Final consumption	4,6%	5,1%	4,7%	4,5%	3,7%	3,5%	5,0%
Public	5,7%	4,3%	4,0%	3,5%	5,5%	9,5%	7,2%
private	4,4%	5,3%	4,9%	4,7%	3,4%	2,3%	4,6%
Gross fixed capital formation	5,9%	15,3%	15,4%	13,7%	8,4%	-2,0%	10,1%
public	8,9%	18,2%	7,4%	-3,1%	5,0%	5,4%	12,9%
private	4,8%	14,2%	18,5%	19,5%	9,3%	-4,0%	9,3%
Change in inventory (stock)	75,4%	-3,6%	116,8%	7,2%	-22,7%	49,7%	-11,4%
Aquisation of Valuable objects	1,9%	2,3%	7,0%	6,5%	8,0%	1,9%	4,8%
Exports of goods and services	9,4%	4,1%	8,2%	8,2%	11,2%	-2,3%	7,6%
TOTAL EMPLOYED	**7,0%**	**6,1%**	**10,0%**	**6,8%**	**4,7%**	**2,1%**	**7,1%**

Source: DPEE/MEPC; * Estimated, ** Forecasts

Inflation as measured by the GDP deflator should be 2.5% in 2021, compared to 2.3% in 2020. This price trend indicates in particular an expected rise in the price of a barrel on the international market, which will lead to a real increase in food prices. However, inflation as measured by the National Consumer Price Index (NCPI) remains below the community threshold of 3.0% under the multidimensional monitoring of WAEMU. In the first nine months of 2021, inflation reached (1.8%) year on year, mainly "food and non-alcoholic beverages" (+2.4%) and gas, water, housing, electricity and other fuels" (+1.1%) (DPEE, 2021).

According to the National Agency for Statistics and Demography (NASD), the inflation rate increased by 2.5% in 2020 against 1.0% in 2019 and this increase is mainly due to the increase in the prices of transport services. (+ 4.2%), food products (+ 3.3%), restaurant and hotel services (+ 2.0%), as well as those of various goods and services (+ 1.3%).

The main intention of this research is to analyse the macroeconomic determinants of economic growth in Senegal using time series data over the period from 1974 to 2019.

The study applies the bound test procedure to find out if there is a cointegration or not, the ARDL model to examine the relationship between GDP growth and independent variables (inflation, external debt, foreign direct investment and foreign aid), the Toda Yamamoto causality to analyse the causal relationship between variables. The empirical results show the variables are cointegrated. In long run, external debt has positive and significant impact on GDP growth while foreign aid has negative and

significant effect on GDP growth. However, inflation and foreign direct investment have insignificant impact on GDP growth. The short run results show that inflation has positive and significant impact on GDP growth while external debt and foreign direct investment have negative and significant effect on GDP growth. Also, the Toda Yamamoto causality results present that there is bidirectional causality between GDP growth and these determinants inflation, foreign direct investment and foreign aid while there is unidirectional causality between GDP growth and external debt.

This research study is structured into five chapter , in the first chapter there is the introduction; the second chapter present the literature review, relationship between determining factors of economic growth; the third chapter describes the methodology and the data; the fourth chapter shows the empirical results and the last chapter contain the conclusion.

1.2. Problem Statement

Depending on the importance of economic growth in the economic progress of nations, policy makers always seek to put in place new strategic programs to improve GDP growth in order to raise the standard of living of the population. These programs depend from one country to another according to its financial means, its human resources, its technological capacities and its primary objectives. So economic growth is a very important indicator in a country's economy and political leaders seek to improve continuously.

Since Senegal's accession to independence to the present day, the national economy has been going through recurring difficulties which are characterized by low growth in the nation's economy and this growth is not reflected in a gradual reduction in poverty. Likewise, the bad redistribution of national income is not geared towards collective well-being and this is what accentuates the gap in economic inequalities. The Senegalese economy is an economy supported and maintained by international technical and financial partners and which often impose budgetary restriction measures according to preferences less important for the economy of developing countries, so in this case the decision-makers are put in a dilemma and such is the case of Senegal.

Senegal does not have a sufficient supply of qualified labour due to the poor allocation of national income; the poorest population does not have the necessary means to pursue high-level studies. The Senegalese government must imperatively make a fair redistribution in order to reduce the inequalities within its population and to improve the labour factor which constitutes an essential key for the GDP growth of the nation.

To increase the growth of the economy, the Senegalese government initiated a poverty reduction program in 2001 by establishing a poverty reduction strategy document (PRSD 1) and in that document there were questions of poverty reduction and the creation of new economic activities which will be the source of the increase in the country's wealth, increase in the living conditions of vulnerable people by promoting basic social services and decrease unemployment, with the aim of achievement of the Millennium Development Goals. In 2006, that development program was renewed by a second poverty reduction strategy document (PRSD 2) in order to continue to boost economic growth.

Despite economic growth since 1994, there has been no reduction in poverty due to structural competitive problems due to insufficient infrastructure and a business environment unfavourable to investment (Sandrine and Robillard, 2010: 4).

Economic growth remained disappointing in 2013. For the year 2013, real GDP growth was (3.5%). It was very close to that of 2012 (3.4%) and was below the expected level of (4.0%). The service sector served as a growth engine for the economy with an increase of (6.4%). The low GDP growth rate observed in 2013 is attributable to declines both in the secondary sector (–1.5%) and in the food and cash crops sector (–8.3%) (Cinyabuguma and English, 2014).

Since 2015, Senegal's GDP growth recorded growth of more than 6.5% for the third consecutive year. It is forecast at (6.9%) in 2017 against (6.7%) the previous year. It is expected in 2018 and 2019 at (7%). This increase in growth comes mainly from the strengthening and restructuring of the agricultural sector, the improvement of the tourism policy and the increase in public investment such as the expansion of the energy network and the construction of new infrastructures which are planned under the Emerging Senegal Plan (PSE) by 2035. The expected increase in energy production capacity should

be a determining factor of the economic growth in the medium term in Senegal (Gassama et al., 2018).

The economy has remained on its upward trend since the implementation of the first phase of the Senegal Emerging Plan (SEP). This performance of economic activity is mainly attributable to the strength of agriculture and the revival of activity in the mining and construction industries.

During 2017, the Senegalese economy maintained the same growth trend as that observed since 2015, recording a growth rate of over (6.5%). Thus, for 2017, a rate of (6.9%) was observed against (6.7%) in 2016. This dynamism of the economy is mainly driven by the implementation of the PSE. The growth that has started should continue over the 2018-2019 period with a growth rate of (7%). Public investment, agriculture, fisheries and tourism are expected to continue to drive this growth (Gassama and Sylla, 2018).

Inflation, measured by the Harmonised Indices of Consumer Prices (HICP), increased by (0.5%) in 2018 against (1.3%) in 2017. This change is principally came from the increase in food prices and non-alcoholic drinks (+ 1.1%) (MEFP, 2018).

1.3. Research questions

Many factors influence the economic growth of a country. In this study, we focus on some macroeconomic determinants of economic growth, including inflation, external debt, foreign aid, and foreign direct investment.

Therefore, it is better to find the answer of these questions:

- Where the main determinants of growth in Senegal come from ?
- Which variables are the most powerful on growth in Senegal?
- Under what condition do these macroeconomic variables affect growth?

Is there a long-term relationship between GDP growth and selected variables?

1.4. Objective of the research study

1.4.1. General objective of the study

This research aims to examine an in-depth study and essential of the macroeconomic determination of Senegal's GDP growth between the periods 1974 to 2018.

1.4.2. Specific objectives of the study

- Investigate the main macroeconomic determinants of economic growth in Senegal to find out the impact of inflation, external debt, foreign aid and foreign direct investment to the economic growth.
- Analyse the long-term and short-term relationship between real GDP growth and its determinants. We want to find out the impact of each independent variable to the dependent variable.
- Advise a good economic policy to the leaders for improving and accelerating the evolution of GDP growth and success in Senegal. According to the result of this study we want to provide some advices to help policy makers to be aware and make better decision for the economics of nation and also to let people know about the economic growth.

1.5. Study Significance

This study uses the variables inflation, external debt, foreign aid and foreign direct investment and which have been shown to be factors affecting economic growth in both developing and developed countries in the long term. However, a multidisciplinary study is needed to understand the relevant political implications of the Senegalese economy.

This study contributes empirical knowledge by finding the potential macroeconomic determinants of real economic growth in Senegal. This study will provide very relevant information for actors in economic life such as political decision-makers, scientists, international institutions, non-governmental organizations, etc. So as to know the effects of its determining factors on Senegal's economic growth. In addition, this study will allow students to see the overview on the economic growth of Senegal and even see another study similar to that for new Senegalese economy studies.

By studying the relationship between independent variables and economic growth, this research can help provide solutions to the current Senegalese economy. And the objective of this research is to present recommendations to the leaders for an effective improvement of the economic growth of the country and for the well-being of the population. Policymakers need to put in place the right policy to play a vital role in designing an appropriate policy and filling the knowledge gap, otherwise knowing the relationship between economic growth and its determinants will not be enough. In addition, this study will serve as a research study benchmark for other researchers and provide policy direction on Senegal's path to economic prosperity.

1.6. Limitation of the Study

This research study covers the period between 1974 and 2019, which is forty-five years of time series data with macroeconomic variables that can impact economic growth.

This study uses five variables, one dependent variable which is GDP growth and four independent variables which are external debt stocks, inflation, official development assistance and foreign direct investment.

The availability of data was a major challenge in carrying out this study. Lack of sufficient data, and which may have significant impact on GDP growth, in particular on human capital and physical capital, over the chosen study period. Then there is the lack of consistency using data from different institutions, so to keep away from inconsistencies it was necessary to use a single data source. The main objective in this research is to analyse the macroeconomic determinants of economic growth in Senegal. No matter how, there are several non-economic factors which have an effect on growth such as political stability, institutional factors, natural factors such as climate change, economic regulation by rulers (monetary and fiscal policies) and the rule of law (property rights) are not discussed in this study and could be considered as other limitations.

1.7. Organization of the thesis

The study has five chapters accompanied by various sections and subsections. The first chapter deals with the introduction of the study, the statement of the issue and the purpose of the study. The second chapter reminds reviews of the theoretical, determining factors of economic growth and empirical literature relating to economic growth. Chapter

three provides an overview of the methodological aspect of the study which contains the origin of the data and their types, the specification of the model, the estimation procedure and the definition of the variables. The fourth chapter contains both description and empirical results. So, it presents the results and it gives the interpretation. In the end, chapter five presents the conclusion and policy recommendation depending on the results found.

CHAPTER 2

2. THEORIES AND RELATIONSHIPS WITH GROWTH

The first part of this chapter reminds us about the history of the theory of economic growth going from contravention to the evolution of this theory until today. The second part presents the relationship between growth and certain variables that can be determinants of growth. The last part presents the result of some empirical studies similar to this study.

2.1. LITERATURE REVIEW

Economic growth remains a very controversial and complex subject to study in the economic process. Many scientific studies of economic growth have yielded different and insufficient results in the past, and the theory of growth is still the subject of much debate among economists. Economic theories on growth have followed one another over time, providing solutions to current economic situations. Opinions have been different depending on the currents of economic thought on the components that promote economic growth, and economic growth is a fundamental element in an economy because it makes it possible to determine the national wealth created generally during a year an economy and measured by the state's public accounts. Economic growth has a very complex and varied evolution and even the greatest economic scientists have always had difficulty in understanding this evolution and until today we try to understand the best way to have a sustainable growth in order to improve the standard of living in a given economy. Each nation is rushing to make further reform with its fiscal policy to maintain and improve economic growth in its country.

Economic growth determines the value of goods and services produce usually a year in a nation and it can have an impact on the standard of living of the population. Studies have shown that there is no clear, straightforward blueprint for a process of economic growth. It's not like building a highway where everything is known in advance, from the start of the construction project to completion. For example, two nations can use different economic policies and all result in economic growth. Economic growth can be boost by an increase in the quality and quantity of goods and services available on average per person for a specified time. And increasing long-term factors of production and

putting in place good government policy can be a source of economic growth and an improvement in the standard of living of the population. Also, economic growth is brought by an increase in the stock of capital and the supply of labour and they are achieved by an increase in investment in the economy. And that translates into an improvement in the economy. Improving production is based on the availability and quality of resources and the use of more efficient technology contributing to economic development. Growth can depend on the level of technology, the quality of resources and leadership to carry out production and trade. Weak economies lack the resources of physical capital, technology and institutional support that allow sufficient production due to the weakness of a sufficiently skilled workforce. However, an economy with a high-quality workforce will achieve more productivity and growth. Per capita production determines the standard of living of an economy and while the growth of per capita production determines improvements in living standards. In a given economy, when the number of workers is growing faster than the population or labour productivity is rising, then there is population growth per capita (Begg et al., 2014: 423-432).

2.1.1. Classic growth models

The economists Smith, Ricardo, Malthus, and Mill are among the main actors of classical theory, they have made a great contribution to modern theories of economic growth through their works.

According to classical theories the improvement of technology and the accumulation of capital in the economy is the main source of economic growth. All capital accumulation is subject to the extent and type of overproduction used for reinvestment. The division of labor and the change in the mode of production are impacted by the evolution of incorporated technology. Economic society in a process that involves capital, labor and land is determined reciprocal dependence. According to Smith, a lack of manpower, insufficient accumulated wealth and depletion are a brake on growth. And the process of economic growth is considered endogenous, because the supply of labor depends on wage rates. And that the division of labor makes it possible to increase growth because everyone will specialize in the area where they are more productive (Hill, 2007: 341-347).

The classical theory speaks of an economy which will reach a steady state in the long run and production will be stable and this means that there is no growth at this point in the evolution of the economy. According to David Ricardo (1772-1823) The Classical School was unanimous that investment is a source of economic growth and that entrepreneurial capitalists utilize their savings to invest, so investment depends heavily on the redistribution of income, the higher the income of the population, the higher the investment. While, because of decreasing land profitability, the distribution of income becomes increasingly unfavorable to investment. The national income is shared between three types of economic agents who are the landowners who receive the rent according to the fertility of their land, the households which provide the labor receive the salary and finally the investors receive the profit that they reinvest in the economy to increase growth. The law of diminishing returns describes the impoverishment of lands as a result of their exploitation and this results in a decrease in agricultural harvests; while the number of the population keeps increasing. Since the fertility of cultivable land decreases, more must be spent to have fertile land and this leads to an augmentation in the cost of production for the capitalists and it conducts to an increase in the prices of agricultural products. And following this increase in products, households are demanding a wage increase to meet their food needs. Despite the increase in agricultural prices as the costs are high, the profits of the capitalists gradually decrease, so they can no longer invest enough and the national production decreases until it is zero (Harris, 2007: 2-6).

At this level of the economy, the classics have realized that the economy cannot be closed, that is, by limiting itself to the actors of economic life who are households, landowners and capitalists. The economy had to be opened up to the rest of the world by importing agricultural products in order to revive economic growth, and this is where David Ricardo's theory of comparative advantages comes from. Malthus agrees with Ricardo in saying that the economy cannot have long-term growth and that it will have a slowdown to reach a steady state, because the rate of population growth is greater than the rate of growth of the economy. And to remedy this situation it was necessary to encourage late marriage and chastity before marriage to limit the number of births (Harris, 2007: 7-8).

2.1.2. Keynesian and New Keynesian Theory of Growth

Keynes's book on the theory of employment, interest, and money (1936) provides a source for Keynesian growth theories. Keynes shows that economic growth is generated by expanding global demand and the variation in the level of economic activity is explained by national income, consumption, savings and investment. And investment, consumption and savings are based on national income.

Keynesian theory of economic growth is based on consumer demand. This theory means that, the source of economic growth comes from the consumption power of households and in this context the higher the disposable income of households, the more they tend to consume a lot and this consumption results in an increase in demand. Consequently, this increase in demand by households pushes companies to increase their production to meet consumer demand and this mechanism makes it possible to increase the profile of companies and at the same time increase investment in the economy. So all this will end with an increase in national wealth which is economic growth. While otherwise, the decrease in household income will result in decreased economic growth by following the process of decreasing household consumption expenditure and low business income (McEachern, 2016).

Keynes emphasizes state intervention in economic activity to increase aggregate demand and support businesses through government fiscal policy, public spending increases or tax cuts. The tax reduction makes it possible to reduce companies' production costs and lower the selling prices of goods and services which translate into increased consumption. Also, the government can also use monetary policy to facilitate monetary borrowing by lowering the central bank's policy rate for secondary banks to make lending easy for investment. In addition, the government must invest in carrying out major projects such as the construction of roads, hydroelectric dams, and airports, hospitals to create jobs and facilitate investment (McEachern, 2016).

Keynesian theory of economic growth is based on the basis of aggregate demand, and increasing aggregate demand is a prerequisite for balanced economic growth. It is through aggregate demand that it will have an increase in investment and this investment is considered the fundamental element of economic growth which generates an increase

in national wealth. Also, this approach does not take into account other factors of production such as technology, labor qualification, reduction of unemployment. And the Keynesian model is specifically for a depressed economy and in a short period (McEachern, 2016).

However, the approach to short-term Keynesian economic growth (Keynes, 1936) was improved by the New Keynesians. Economists Evsey Domar (1946, 1947) and Roy Harrod (1939, 1948) made their study of the long-run dynamics of capitalist market economies by referring to Keynes's short-run statics. They show the relationship between the stock of labor and the growth rate of an economy and they justify increasing the productive capacity of a given economy through investment spending. While according to Keynes, aggregate demand is impacted by investment (a supply-side effect) (Tewodros, 2015).

The Harrod-Domar (HD) model assumes that the economy is closed and that there is the gross output of a homogeneous good Y. So since we are in a closed economy, this output is utilised as a consumption (C) or an investment (I). And in this model, the rate of economic growth depends entirely on savings and production (the economy must save and invest part of the national income to achieve economic growth). The model estimates a rate of population growth (n), a technology that contains the fixed factors (capital "K" and labor "L"). Considering an economy made up of households and businesses, they establish an aggregate production function with a fixed technological coefficient as follows:

$$Y_t = \min\left[\frac{K_t}{v}, \frac{L_t}{u}\right] \quad \textbf{(2.1)}$$

Where:

Y_t = total output at a time t

K_t = physical capital at a time t

L_t = labor force at a time t

v = represented capital-output ratio (constant, i.e.$\frac{K}{Y}$)

u = used labor-output ratio (constant, i.e.$\frac{L}{Y}$)

considering in an economy with two types of economic agents which are households and companies, then the national income is written as the following equation:

$$Y_t = C_t + S_t \quad \textbf{(2.2)}$$

Where Y_t = represented by the GDP, C_t= total consumption and S_t= total saving.

In the Harrod-Domar growth model, investment (I_t) is supposed to be equal to aggregate saving (S_t):

$$\text{This is } I_t = S_t \quad \textbf{(2.3)}$$

Subtracting equation [2.3] from equation [2.2] yields equation [2.4]

$$Y_t = C_t + I_t \quad \textbf{(2.4)}$$

The change of the capital stock over time given by:

$$K_{t+1} = (1 - \delta)K_t + I_t \quad \textbf{(2.5)}$$

Where δ represent the rate of depreciation of capital stock by supposing that total saving (S_t) is some proportion (s) of GDP (Y_t),

$$S_t = sY_t \quad \textbf{(2.6)}$$

It is know as $V = \frac{K}{Y}$ so it deducts K=vY and $I_t = S_t = sY_t$, therefore we can rewrite equation [2.5] as:

$$vY_{t+1} = (1 - \delta)vY_t + sY_t \quad \textbf{(2.7)}$$

Dividing the two sides by **v** and subtracting $\boldsymbol{Y_t}$ from both sides from equation [2.7] gives the following equation.

$$Y_{t+1} - Y_t = \left(\frac{s}{v} - \delta\right) Y_t \quad \textbf{(2.8)}$$

Dividing both sides of equation [2.8] by Y_t gives the following equation.

$$\frac{\Delta Y}{Y} = \left(\frac{s}{v}\right) - \delta, \text{ This gives } g_y = \left(\frac{s}{v}\right) - \delta \quad \textbf{(2.9)}$$

This equation 2.9 shows that the GDP growth rate (g_y) is jointly defined by the savings rate (s) divided by the capital / output ratio(v). With rising savings, falling capital production and falling interest rates, the economy grows faster (Snowdon and Vane, 2005).

2.1.3. Theory of Neoclassical Growth

According to the neoclassical growth model established by Robert Solow and Trevor Swan in 1956, the increase in the growth of gross domestic product come from the quantity and quality of physical capital, labor employed and the qualification of the labor force. Thus, when the economy reaches equilibrium only an improvement in the workforce or an increase in the capital stock can lead to growth (Gebru, 2015: 14).

Neoclassical theory presents its model of long-term economic growth. Production depends on household savings, so to increase production, households need to save more. Thus, this increase allows more capital to be accumulated in the economy. However, it demonstrates the gradual decrease in marginal productivities in the case of capital stock. Thus, without technological progress, growth will gradually return to zero and the economy may find itself in a situation where production no longer increases but stagnates. Technical progress can improve the productivity of capital if it allows more to be produced with the same amount of factors. For example, a worker who manages to produce more than he is used to thanks to technical progress. Thus, any improvement in technical progress will maintain the progress of economic growth to avoid any stagnation. Since savings are the source of growth according to Solow, while Keynesians argued, in the short term, an increase in savings directs to a low in spending and in this case there will lead an increase in the supply of goods and services against a decrease in demand in the market. This can lead to a decrease in production and increase unemployment. On the contrary, according to Keynesian theory, it is increased demand that causes companies to produce more. Economist Solow establishes a model emphasizing technical progress as the source of long-term growth without knowing where technical progress is coming from. This model does not determine the origin of the determinants of long-term economic growth (Chizonde, 2016: 25-28).

2.1.4. Endogenous Growth Theory

The economists Lucas, Barro and Romer were the founders of the theories of endogenous growth. They demonstrated through their models that growth can sustain itself and it is internal as well.

This theory has led to widening the range of production factors traditionally taken into account in formalizations, learning, human capital, public infrastructure, etc. The theories determine the conditions for obtaining purely endogenous growth and they have studied the positive external effects on the role of knowledge in productivity growth. Most endogenous growth models therefore incorporate positive and/or negative externalities linked to the accumulation of knowledge and innovation as well as imperfections linked to market power. This therefore opened up the possibility for corrective public interventions in order to modify the growth rate. Most endogenous growth models predict a persistence of differences in the level of development. This point gave rise to an abundant empirical literature in order to determine whether one could detect trends towards convergence after correcting for structural differences, whether one witnessed the formation of convergence clubs or whether growth trajectories remained specifically national. The theories of endogenous growth are based on three conditions which are: The present of increasing returns, the existence of positive externalities and the role of the state in the economy. Endogenous growth models are based on the accumulation of growth factors. Growth has an internal source and the economy creates economic growth. This is possible thanks to the accumulation of labor and the positive externality. Growth is self-sustaining through the accumulation of capital (Onyimadu, 2015: 502-511).

According to Romer (1986), the accumulation of physical capital will allow the investment and incorporation of new technologies and this will lead to the accumulation of knowledge which in return will favor the new technology and thus it will always have growth. According to Lucas (1988), the accumulation of human capital is the working population, depends on the level of education and the health of the population and this will give the accumulation of knowledge and the incorporation of technology and which will lead to better education of the population and this educated population will work in different companies and brought new technology. According to Barro(1989), the accumulation of public capital will bring good education and good medical care and this

results in the improvement of human capital and followed by an improvement in technology which also goes through infrastructure to improve the flow of goods and services (Chizonde, 2016: 28-30).

2.2. DETERMINING FACTORS OF ECONOMIC GROWTH

What drives economic growth? This is one of the main macroeconomic questions that has attracted the attention of many thinkers in the economic literature. There are a number of models that theoretically include the determinant and source of economic growth. Various studies are made to find out the determinants of growth in different countries and under different circumstances.

Although a unified and universal growth model is not theorized, there are several partial theories that address the driving factors of growth. The review of the literature in this study recalled the theories of economic growth. Basically, there are several theories that deal with the source and determinants of economic growth but we will focus on the two most relevant theories and approaches of the source and determinants of economic growth. The first theory of growth comes from the neoclassical economist which is the growth model of Solow (1956). According to the same theory, capital, investment, labor and the quality of technology are characterized as the principal source of economic growth.

The second growth theory is that of Romer (1986) and Lucas (1988) which is endogenous growth. It is the newest theory of growth and it emphasizes innovation and human capital as key factors of growth. This model is focused on human capital development, technological change, the role of government and trade policy.

In addition, the growth literature of economic growth leads to a number of growth prospects classified as “estimates” focusing on capital, employment and technology; the focus is on the 'foundations', institutions, laws and policies, socio-economic factors, geography and demography (Kogid et al. 2010; Balcha 2011; Petracos et al. 2007). This section focuses on assessing the prospects for economic growth using basic models and empirical data. Some of these variables used in this secteur are not included in the model of this study.

2.2.1. Economic Policies and Macroeconomic Conditions

A stable macroeconomic environment is an main determinant of economic growth. The country's economic indicators are straight appertained to the effectiveness of economic policy and the stability of the macroeconomic situation. Fiscal and monetary policies are considered fundamental elements for economic growth, even if they are not enough (Fischer, 1991).

In several studies growth is associated with economic policies and macroeconomic conditions. Inflation negatively impacts economic growth by decreasing investment and productivity growth. The budget deficit leads to reduced economic growth because it reduces capital accumulation and productivity growth.

Fischer (1993) found that economic growth was negatively correlated with macroeconomic policy indicators such as high inflation, high fiscal deficits, and foreign exchange market distortions, and that the causal link between macroeconomic policy and economic growth was widening. Similarly, Bruno and Easterly (1998) report that growth slows while inflation is high and increases rapidly after inflation falls.

Fischer (1991) examines the correlation between external debts to economic growth and concludes that foreign debt has negative effect on growth. With this in mind, a study by Clements et al. (2003) found that reducing external debt leads to higher personal growth in low-income countries.

Prasad et al (2007) found positive relationship between growth and current account growth in non-industrialized nations. Similarly, Edwards (2004) observed that the reverse effect of a current account has negative effect on real growth. In addition, Calderon et al (2002) noted negative relationship between the indices, but the reason is to move from economic growth to a current account deficit.

Generally, macroeconomic instability and uncertainty can impede growth by reducing productivity and capital accumulation while reducing uncertainty and ensuring macroeconomic stability by promoting growth. The ability of governments to plan and manage their economy and thus ensure a policy of macro-economic stability can be measured by the effects of high inflation and large budget deficits (Fischer, 1991).

2.2.2. Domestic Investment

Investments in a country are the principal determinants of growth. In neoclassical growth school, capital is seen as the main source of growth during the transition period. However, endogenous growth models include investment as an important and permanent determinant of economic growth. Empirical studies on investment and growth also support this thesis.

According to Oketch (2006), large-scale investment in physical and human capital are the main source of per capita growth and labor productivity in African countries. On the other hand, De Long and Summers (1990) strongly discussed the correlation between investment and growth, such that investment in machinery and equipment leads to rapid growth. Moreover, according to Blomstrom et al (1993), higher levels of capital formation lead to faster increases in individual income.

2.2.3. Human Capital Formation

The formation of human capital in an economy is one of the most important determinants of economic growth. And human capital appears in various models of endogenous growth theories. It is generally measured in a country by variables of education and health of the population. Educational human capital refers to the accumulation of knowledge and skills that people in a country can acquire through education and training. In several research studies, it is considered by variables such as different levels of schooling or educational expenditure or school enrollment rates or scientific skills. On the other hand, according to Petrakos et al. (2007), human health capital can be considered as variables such as life expectancy, disease prevalence or health expenditure.

Several empirical studies have examined the relationship between human capital and growth and they have shown the importance of their relationship. According to some research studies by Mankiw et al. (1992), de Barro (1989), Temple (1999), Kalaitzidakis (2001) and Glaeser et al. (1995), for example, human capital shows positive and significant impact related to economic growth. However, other studies question these results and therefore the importance of human capital as a main determinant of growth.

Among them are Benhabib and Spiegel (1994), Pritchett (2001) and Krueger and Lindahl (2001).

It has been shown that research and innovation are also considered important factors in the process of human capital formation. These make it possible to improve the new mode of production by improving the technical and technological progress of the work. Currently, growth models integrate research and innovation as an essential growth factor. It is usually measured by issued patents, patent applications or research and development expenditures. In relation to this, Ulku (2004) analyzed the empirical relationship between GDP per capita and patent stock (innovation) and he found a positive and significant relationship for both OECD and non-OECD countries.

2.2.4. Foreign Direct Investment

As one of the main determinants of growth, foreign direct investment contributes to growth through foreign investment in an economy. It has a great function in the internalization of economic activities and the transfer of know-how in the economy. Foreign direct investment is part of growth and its importance is emphasized in several endogenous growth models (Petrakos et al. 2007).

A positive and significant relationship between foreign direct investment and growth has been confirmed by numerous empirical results. According to Borensztein et al. (1998), foreign direct investment has constructive role on growth in developing countries and he concludes that foreign direct investment is an essential factor for technology transfer, assuming a large capacity for reception in the host country. According to Mello's study (1999) shows that in the long run foreign direct investment stimulates economic growth through technological upgrading and this depends on the level of complementarity and substitution between domestic investment and foreign direct investment. According to the study of Balasubramanyam et al. (1996) by classifying countries according to their trade policies, the beneficial effect of foreign direct investment is less strong in countries which adapt an inward-oriented policy than in development that follow an outward-oriented trade policy. According to Alfaro's study (2003) the effect of foreign direct investment on growth by sector and he concludes that foreign direct investment in the manufacturing sector has positive impact on growth while

foreign direct investment in the primary sector and the service sector tend to show negative and ambiguous effect.

2.2.5. External Debt

Many developing countries, especially developing countries in Africa, are facing a budget deficit. This budget deficit can be covered by foreign debt and it represents a major asset for the financing of sustainable GDP growth in developing countries. It is money that comes from foreign countries, multinationals or other countries to other countries to finance their lack of resources. The foreign aid theory shows that foreign loans have positive effect on investment and growth to some extent and in a certain way; Beyond this point, the effect is negative.

According to some empirical studies, most developing countries in Latin America and Africa (Ayadi et al. 2008; Pattillo & Ricci, 2002; Clements et al. 2003; Ajayi et al. 2012; Schclarek, 2005), a rational external debt increases economic growth. However, excessive indebtedness can reduce growth.

A study by Ajayi et al. (2012) on the Nigerian economy shows that the external debt has negative impact on national income and per capita income. Also, a very high mount of external debt has led to the depreciation of the national currency, an rise in job loss, the continuation of industrial strikes and a weak education system.

Moreover, according to Pattillo & Ricci (2002), a reasonable level of external indebtedness makes it possible to support investment and should stimulate growth, but beyond a certain limit, additional indebtedness can decrease growth.

2.2.6. Inflation

Keeping inflation at a level favorable to growth has always been a major problem in all countries. It is a monster that threatens the whole economy due to its negative impact and it is the first public enemy of the 21st century (Asmaaw, 2011). According to the classical theory, inflation results in an increase in the overall level of prices in an economy and the increase in demand for goods and services. According to Keynesian theory, inflation happens when demand is greater than the total output of the economy. Tobin (1965) and Sidrauski (1967) showed positive impact on growth with very high inflation.

Growth and inflation had positive relation in both long and short run in the 1960s. When inflation was high, wealth was reallocated to physical capital.

However, a lot of empirical studies present negative relationship between economic growth and inflation (Barro, 2013; Bawa and Abdullahi, 2012; Veiga et al. 2014; Mulusew, 2012). Anyway; rate of inflation varies from study to study, high inflation slows down growth. According to the classification of inflation into three categories by Barro (2013), low inflation is below 15%, medium inflation is between 15% to 40% and high inflation is above 40% and negatively affects the rate of economic growth. However, Bruno and Easterly, (1996) say that the inflation threshold does not exceed 40%.

According to a research study investigated in 140 countries (developing and developed countries) by Khan and Senhadji (2000), inflation rates in developed countries varied between 1 to 3% and those in developing countries varied between 11 to 12% on the study period. Identically, in a study by Bawa and Abdullahi (2012) in Nigeria from 1981 to 2009 using quarterly data and using a regression model found an inflation rate of 13%. Furthermore, their results suggest that inflation below the threshold has reasonable effect on economic activity and while above the threshold, inflation has a very large negative impact on growth.

2.2.7. Foreign Aid

Foreign aid represents the transfer of resources from a country that has the capacity to finance (rich countries) to a country in need of funding (developing countries). The Development Assistance Committee (DAC) which represent foreign assistance as official development assistance (ODA) and technical assistance but except military assistance. In other words, foreign aid is an important political tool that developed countries or international financial institutions use to support developing nations in order to inhence growth and subtenal development. Foreign aid is important used and seen as a flow of financial resources from developed nations to less developed nations for the purpose of supporting development programs. However, the purpose and impact of foreign aid on the economic growth of less developed nations has been highly controversial (Refaei and Sameti 2015).

Refaei and Sameti (2015) examine the effect of official development assistance on economic growth, they find that in the long term official development assistance had positive impact and significant on growth in Iran.

Veledinah (2014), states that according to the theory, a rise in ODA flows leads to rise of growth. However, the empirical literature on the effect of GDP growth does not provide interesting results on whether ODA stimulates GDP growth. Even if the ODA coefficient showed positive sign but not significant; thus, in Kenya ODA flows are not stimulating GDP growth in the short term. However, the results showed a long-term causality from ODA to GDP per capita growth.

ODA is used to help increase wealth by decereasing poverty. Das and Sethi (2019) foundd that ODA plays a principal role to enhance the level of GDP growth. But provided that the governments fight corruption and strengthen the country's financial.

Zardoub and Sboui (2021) find that ODA on growth has negative impact and significant in some developing countries. They suggest developing countries enhance their governance to more transparency in the management of foreign the aid. ODA aims to support the growth of less developed countries. But, in most cases, the result is disastrous because this aid is not used wisely due to corruption or poor governance.

Erkinharju (2021) examines the impact of development aid in a set of 169 nations during the period from 1960 to 2019. The result shows that official development aid has no impact on GDP growth and development indicators mentioned above.

Siraj (2012), ODA in economic growth is a controversial issue. Contrary to those who claim that aid will have negative effect on the growth of grantee nations, it will play an substantial role in Ethiopia's growth. The results revealed positive involvement to GDP growth in Ethiopia, especially when the GDP growth rate of the country reached high level successively for several years. Thus, the country is highly dependent on foreign aid and loans, which has made it sensitive to variations in the flow of foreign aid.

2.2.8. Openness to Trade

Trade openness is extensively embedded in different growth models and it constitutes one of the main drivers of growth. Petrakos et al. (2007) consider, openness to the outside world can be presented of exchange by means such as transfer of

technology, diffusion of knowledge, exploitation of comparative advantage, increase in economic scale and exposure to competition. Openness to trade is constituted as the ratio of the number of exports and imports to GDP. According to Sachs et al. (1995) Petrakos et al. (2007), list certain criteria for a country to be considered "open to trade". This includes an average coverage of less than 40% of import quotas, tariffs and licenses; black market price below 20%; lack of effective export control; and the non-social economic system. Several literatures reveal an important and positive relationship between growth and openness.

Sachs et al. (1995) argued that trade openness is considered a determining factor of growth. Findings from research studies reveal that developing nations with open economies grew 4.4% while unopened economies grew 0.69% from 1970 to 1989. Similarly, open developed countries grew by 2.29% over the same period, while closed countries only grew by 0.74%.

According to Yanikkaya (2003), trade openness has positive effect and significant on GDP growth in long-term. However, trade barriers turn out to be positive and, in most specific cases, closely related to growth in developing countries, as the growth and development literature assumes. Moreover, a research study by Andersen and Babula (2009) showed a likely positive association between openness and long-term economic growth. However, he concludes that investing in education, strengthening property rights and strengthening institutions are essential for developing countries to improve their ability to achieve productive growth after trade openness.

2.2.9. Demographic Conditions

Social changes, such as population growth which results in the increase of a population which is due to a high birth rate, mass migration seem to play an important role in shaping a country's economic growth . In literary theory, rapid population growth is seen as destructive as well as constructive for economic growth. The increase in the population rate has negative impact on economic growth by affecting the rate of dependency, the quality of human capital and savings behavior.

It can also be advantaged by bringing economies of scale, it can be creative by bringing positive attitudes and habits and positive attitudes and preferences of the younger

generation (Petrakos et al, 2007). Growth depends on the population that is of working age, and this population increases the supply of cheap labor available in the economy and thus promotes production (Easterlin, 1967). Economic growth affects population density through the further increase in specialization and the diffusion of knowledge. Similarly, migration affects the growth of host countries and countries of origin (Petracos et al., 2007).

Some research studies have been examined to demonstrate the impact of demographic conditions on growth but others have not found a link between them. As cited in the study by Paul (2002), it is stated that the proportion of people in the working age group than that of the dependent population increased faster the growth of East Asian countries between the years from 1965 to 1990. According to Anderson (1998), the age structure has major impact on GDP growth of the Scandinavian nations. Also, Bloom et al. (1998) reveal that the retardation of economic growth in several African countries is mainly due to the demographic structure of the continent, explained by a high increase in the demographic rate.

Dos Santos and Vinay (2000) concluded that migration has an substantial role in promoting growth in developing nations, and similarly, Ozgen et al. (2010) showed a positive trend of migration to revenue growth. According to Dao (2012), the dependency ratio and the mortality rate are significantly linked to the growth of GDP per capita in developing countries and the rise in population has negative impact on growth of GDP per capita. According to Crenshaw et al. (1997), an rise in child population slows the evolution of economic growth while an rise in adult population enhances GDP growth in developing countries. As cited in Kassahun (2003) population growth represent a major determinants of GDP growth. However, studies by Pritchett (2001), Easterlin (1967), and Grier and Tullock (1989) reveal that demographic trends and economic growth are not significantly related.

2.2.10. Natural Resources and Geographical Conditions

The geographical location and the abundance of natural resources have significant effect on economic growth in nations. The natural situation such as the climate and the geographical location of the country mainly affect the levels of income growth. Bad

weather conditions, can the good agricultural production and this can negatively affect the growth of a country. Thus, the good location of a country can have an advantage in the growth process by modifying the involvement of a country in international trade. According to Gallup et al. (1999), temperate regions are more favored in terms of growth than tropical regions due to the prevalence of diseases and limited agricultural productivity. Moreover, coastal areas are experiencing relatively rapid economic growth compared to rural areas in terms of access to the sea, facilitation of international trade and migration.

Several empirical literatures examine the relationship between the affluence of natural resources and growth. The empirical literature of several studies seeks to find the correlation between the natural resources and economic growth. According to Sachs et al. (1995), nations with a high natural resource exports to GDP growth had slower growth rates from the 1970s to the 1990s. Similarly, Gilfason and Zoega (2001) find that the quantity of natural resources can slow economic growth because it can reduce physical capital and reduce saving and investment.

Climate is a main drivers of economic growth, especially in nations where agriculture is very important for growth. This is the case of Senegal and like many developing countries. Several studies have shown a strong correlation between climatic conditions and economic growth. Dell et al. (2011) reveals that high temperatures slow economic growth in poor countries and it has significant impact on agricultural and industrial production. Similarly, according to Barrios et al. (2010) reveals that rainfall constitutes a major determinant of low economic growth in African countries. Moreover, a study by Brenner and Lee (2014) shows that in developed countries with higher temperatures, economic growth decreases as temperatures increase. Moreover, it reveals the negative effects of global warming on the production and growth of tropical countries.

2.2.11. Institutional Factors

Many studies and experiences have confirmed the importance of institutions as a key determinant of growth. The growth of the country is partly explained by the diversity and quality of the institutions operating in the country and these institutions can be an explanatory factor of the growth from one country to another according to the strength of

the institutions. In a speech by US President Obama in Kenya, he said that Africa does not need strong men rather than strong institutions. According to Acemoglu (2008), he asserts that institutions have three important values that must be taken into account. Institutions are "man-made", that is, they are created and run by humans and unlike other things that humans cannot control, such as geographical forces. Institutions are the “rules of the game” that govern human behavior when established and in this context they will positively impact growth. The influence of institutions on the formation of human behavior and, therefore, the reasons they provide are clear. In addition, institutions also promote economic, political and civil freedoms.

Various research studies have been examined to determine the function of institutions in the growth of a country. Barro (1996) sought to link growth institutions to their outstanding achievements in democracy and growth, where the rule of law, low public spending and the existence of large human resources lead to the growth. However, ignoring this starting point and gross domestic product (GDP), the overall relationship between democracy and economic growth is considered weak. Moreover, it shows that democracy promoting growth is reflected in the low level of political freedom. Moreover, Tavares and Wacziarg (2001) concluded that democracy is not the engine of development. Research shows that the unexpected results are due to measurement and specification issues.

Examining the relationship between freedom and growth, Ali and Crain (2002) and Ali (1997), argue that economic independence is stronger to affect growth than political freedom and civil liberty. Vijayaraghavan and Ward (2001) studied the relationship between product growth and institutional changes in rights protection, governance, political freedom and size of government. The results show that the size of the state (public consumption) and the security of property rights are conducive to growth.

In a study by Mo (2001) regarding corruption and growth, it was found that corruption has significant effect on share of private investment, human capital and economic growth. The study on corruption and development made by Mo (2001), it emerged that corruption has detrimental effect on private investment human capital and growth. Acemoglu et al. (2003) sought to link the root cause of institutional stability to macroeconomic stability and showed that countries with weaker institutions experience

greater economic instability through a variety of measures, including various measures micro and macroeconomic.

2.3. EMPIRICAL LITERATURE

On this part of the study, we will see empirical results from some previous studies related to the research topic. This allows us to have a broad view on the subject of research and to understand more deeply the paths taken and the results obtained. Knowing that, many studies have been conducted on this subject using panel data or time series data in one or several countries.

Abessolo (1998) studies the determinants of economic growth in several countries of sub-Saharan Africa during the period from 1975 to 1992 and he uses the augmented Solow model and the theory of endogenous growth in his analysis. The results show that reducing the budget deficit and maintaining a low rate of inflation are sources of increased economic growth. In addition, increased investment has positive effect on growth.

Gani (1998) in his research study on the macroeconomic determinants of growth in the countries of the South Pacific, covering the period from 1980 to 1992 and using cross-national data. The results show that exports, inflation, capital, labor and currency have positive impact on economic growth. However, the budget deficit has negative impact on economic growth.

Barro (1999) analyzes the determinents of economic growth in a group of 100 nations with a period from 1960 to 1995. The results found show that, low government consumption expenditure, high rule of law, high investments and low population rates increase economic growth.

Tenou (1999) makes a study of the determinants of economic growth in the WAEMU countries which covers the period from 1971 to 1995 using the generalized ordinary least squares method. The results show that population growth, exports, human capital, public consumption and investment are variables that influence per capita growth in this currency area. However, the inflation rate does not have a significant effect on economic growth in the WAEMU nations. He recommends to the leaders of these countries to implement a policy of improving human capital, investments, control of

demographic growth, an increase in exports and the maintenance of prices at low levels in order to increase economic growth. in these WAEMU countries.

Yelou (2000) researches the determinants of economic growth in Senegal over period 1971 to 1997 using the growth model with Solow residuals, a human capital model and another model of control variables. The results reveal a misuse of the resources of physical capital and human capital. climate change causing severe drought which had negative impact on economic growth. However, state consumer spending and trade liberalization policies have positive impact on economic growth.

Dewan and Hussein (2001) demonstrate in their article on the determinants of growth over the period 1965 to 1997 with a number of 41 developing countries using an empirical growth model with a panel data approach. The results show that increasing the workforce, improving physical and human capital, reducing inflation and reducing trade barriers are fundamental to economic growth. In addition, technological progress is very important for growth.

Barro (2003) in his research study " the determinants of growth in a panel of nations " with a period going from 1965 to 1995. In the results of the study, he mentions the notion of conditional convergence which will be the source of growth. The increase in the nation's wealth per capita depends on the performance of education, health, longevity of the people with a low population rate, low public consumption, lower inflation and maintenance of the rule of law.

Kida (2009) in her research on the determinants of economic growth in the WAEMU nations (Senegal, Burkina Faso, Benin, Guinea-Bissau, Togo, Mali and Niger), during the period from 1980 to 2005; it uses a panel data model. He finds that exports, investment and the development of the financial system have positive effect on the economic growth of WAEMU countries. However, political instability and debt have negative impact on economic growth. Finally, he advises leaders of his countries to improve infrastructure, exports, adopt a tolerant debt policy and maintain political stability in his countries.

Hammam (2010) in his research on the determinants of economic growth in Egypt, he uses the ordinary least squares method over a period 1985-2007. The results

reveal that foreign direct investments, investments in instruments, household consumption, taxes on international trade, exports have positive effect significant on economic growth. However, government consumer spending has negative effect and significant on economic growth.

Moral-Benito (2012) does a research on the determinants of economic growth in 73 countries with a panel data set during the period from 1960 to 2000 by applying the Solow model augmented with four independent variables which are population growth , the initial noise domestic product and the rate of human capital accumulation and the rate of physical capital accumulation. The results show the price of investment, political rights and air distance to major cities affect economic growth with the expected sign. It should be remembered that a low investment cost, a higher level of democracy and a better geographical location are very favorable to economic growth.

Damoense-Azevedo (2013) analyzes the determinants of economic growth in Mauritania in covering the period from 1983 to 2008 applying the Engle-Granger cointegration methodology. The results indicate that prices, labor and financial development contribute to improved economic growth. In addition, trade liberalization, foreign direct investment, price stability and human capital promote financial development. So, for an increase in growth in Mauritania, the rulers must promote commercial and financial freedom and maintain macroeconomic stability in the economy.

Adu (2013) in his article examines the determinants of growth in Ghana using time series data covering the period 1960-2009 by applying the aggregate production function model. The results show that the rate of investment, terms of trade, labor force, trade openness and financial development are the principal determinants of growth in Ghana. While, in long run, inflation has not been a determinant of economic growth.

Havi et al. (2013) investigate the macroeconomic determinants of economic growth in Ghana between the period 1970-2011 using the Johansen cointegration method. The results show that foreign direct investment, labor, foreign aid, physical capital, government spending and the consumer price index are the main determinants of GDP per capita growth. For increased growth, rulers must improve physical capital, solicit

more foreign aid and improve the workforce. Also, the Granger Causality revealed that none of independent variables leads to economic growth in Ghana.

Biswas and Saha (2014) analyse the macroeconomic determinants of economic growth in India over the period 1980-81 to 2010-11 using the multivariate Johansen and Juselius co-integration test and the vector error correction model (VECM). The results prove that foreign direct investment, employment, exports, gross domestic capital and money supply have positive impact on GDP growth while inflation and the budget deficit have negative impact. In long run, GDP growth and its determinants have stable relationship between them and in the short run, gross domestic capital formation strongly influences GDP.

Ismaila and Imoughele (2015) examine the macroeconomic determinants of economic growth in Nigeria covering the period 1986 to 2012 utilizing the ordinary least squares and the Johansen co-integration test. The results reveal that foreign direct investment, gross fixed capital and public expenditure are the principal determinants of GDP growth with low inflation rate. In addition, the constricted infrastructure tightened a great lever for investment so that to bring economic growth to Nigeria.

Gebru (2015) studies the determinants of economic growth in Ethiopia covering the period 1974-2013, using Autoregressive Distributed Lag model and Error Correction model. The results obtained show that in long run real GDP and the export variables, human capital, physical capital, foreign aid, foreign debt and inflation have a stable relationship. Human capital and physical capital have positive impact and significant on economic growth, however debt has more significant negative effect on economic growth. Since physical capital and human capital are determinants of economic growth, then investment must be increased to improve human capital and physical capital to achieve economic growth.

Antoine (2015) makes a comparative analysis of some countries with resilient economic growth against the WAEMU countries on the determinants of economic growth to provide solutions to the economies of the WAEMU. For this, he uses the method of ordinary least squares over a period from 1980 to 2013. The results show that human capital, investment and foreign direct investment flows have positive effect on the

economic growth of countries with strong growth. Whereas, in long run, human capital and investment have an effect on economic growth. So to increase economic growth in WAEMU countries, leaders must focus on good governance in order to attract national and international investment.

Lado (2015) studied the factors that determine economic growth in Sudan, using ordinary least squares estimation method over a period from 1980 to 2011. The steep results present both in long and short run term the development of the financial sector and the foreign direct investment have significant and positive impact, then the improvement of these two determinants directs to an increase in economic growth. However, infation is meaningful and positive in long run. That shows that in long run, any increase in inflation leads to a decrease in economic growth. As for government consumer spending showing a significant result with an unexpected sign. This means that increased public spending brings increased economic growth. In short term, opening up the economy has significant impact in stimulating economic growth. Infrastructure has negative impact on economic growth because of insufficient infrastructure. Ultimately, population is not a determinant of economic growth in Sudan.

Mbulawa (2015) researches the determinants of economic growth within the Southern African development community. It uses the generalized method of moments to estimate the model over a period from 1996 to 2010 with annual panel data. He found that trade openness has positive effect and significant on economic growth. However, human capital and foreign direct investment have negative effect and significant on GDP growth. In addition, the savings rate had negative impact with the inclusion of the quality of institutions on economic growth. improving government efficiency and government stability have direct impact on economic growth. Good quality institutions are the main source of the determinants of economic growth in the Southern African development community.

Seeking in developing and developed coutries the macroeconomic determinants of economic growth by Chirwa and Odhiambo (2016). They review numerous empirical growth studies that have applied a methodology of cross-national or panel country or single-country regressions. The results reveal that in developing countries, foreign direct investment, monetary policy, foreign aid, human capital, investment, fiscal policy, natural

resources, demography, Political and financial reforms and geographic factors are the principal determinants of economic growth. And in developed countries, fiscal policy, monetary policy, physical capital, demography, human capital, trade, financial factors, and technological progress are the major determinants.

Chizonde (2016) studies the determinants of economic growth in Zambia during the period 1961 to 2015 utilizing the Autoregressive Distributive Lags (ARDL) and Bound Test model. The results reveal that in long run, the exchange rate, the price of crude oil, physical capital, and agricultural productivity, inflation, government spending determine economic growth. Zambia being a large producer of copper priced internationally will not have negative effect on economic growth even if the price of the latter falls.

Mekonnen (2017) examines the determinants of economic growth in Ethiopia with a period from 1974 to 2015, the ARDL Bound Test model is applyed to examine the correlation between the variables. The results revealed that a stable long-term correlation between real GDP growth and its determinants. Gross capital formation and human capital have significant and positive effect on real GDP growth while external debt has significant and negative effect. The dynamic short-term results show that gross capital formation, human capital and the inflation rate also have positive impact on real GDP growth while foreign aid has significant and negative effect. Supporting long-term growth, policymakers should make convenable policies which result in helpfull utilize of resources to economic growth and appropriate management of the variables leading to negative growth (external debt and foreign aid) in order to reverse their effect on production.

Altaseb and Singh (2018) uses the Qualitative Inquiry Approach method by reviewing seventeen (17) empirical growth studies that concentrate their study on finding out the determinants of economic growth in Ethiopia. The results reveal that physical capital, exogenous factors (external debt, foreign direct investment and foreign aid), human capital, political taxation, demography, monetary policy, trade and financial factors significantly affect economic growth.

Ahmadou and Diatta (2018) study the main determinants of economic growth in WAEMU and BRICS countries during the period 1990 to 2015 using simple linear models. The results show that human capital, physical capital, public expenditure and labor force as the source of economic growth in the BRICS countries. They recommend improving the above-mentioned variables in WAEMU countries to stimulate economic growth.

Okombi (2019) examines the factors of economic growth in Congo for a period from 1999Q1 to 2016Q4 utilising the error correction model. The results show two categories of variables; the first category, which are public expenditure, fixed capital formation and the degree of economic freedom, are determinants of economic growth. The second category which are the price of oil, trade openness and instability are variables which slow down economic growth in Congo.

We have gone through several studies on the determinants of economic growth whether in a single nation or a group of nations. These studies use several types of data, ranging from panel data to time series data with different types of methodologies. And each study depends firstly on the independent variables taken into account and secondly on the results obtained from the analysis. According to some results, variables such as human capital, physical capital, technical progress, foreign aid, investment, infrastructure and so many other variables constitute a source of economic growth. However, political instability, the massive height of inflation, the impacts of global warming, population growth and so many others can have negative impacts on economic growth. We have found that the source of growth may be different from country to country.

CHAPTER 3

3. RESEARCH METHODOLOGY

3.1. Specification of the Model

This chapter presents a mere growth model that seeks to understand certains macroeconomic keys factors impacting economic growth in Senegal. Macroeconomic theory has presented several factors that have effect on the growth of a nation from the different classical, neoclassical and recent growth theories. Those factors consist of inflation, unemployment, foreign direct investment, foreign aid, technology, capital humain, investment, natural resources, trade openness, innovation, political factors, social factors, and so on. Understanding the determinants and characteristics of economic growth, demand an empirical framework which may be used over the long term. Some of these factors are intended to test strong obviousness of the determinants of economic growth in Sénégal. Thus, the research aims to reach the objectives throughout the analyze. The study design uses descriptive design to achieve its stated purpose. This is the best way to identify the causal link between real economic growth and the determinants of growth considered in this research study. As shown in the review of the theoretical literature, the provenance of the econometric model is the extended neo-classical growth model:

$$Y = f(K, L) \quad \textbf{(3.1)}$$

Where Physical capital and Human capital is represented by K and L respectively.

Broadly speaking, Senegal's economic growth function is defined according to the extended neoclassical growth model approach as follows: GDP growth is a function of foreign aid, external debt, inflation and foreign direct investment. Sanyang (2019) and Mekonnen (2017) have done similar studies by using same economic method to examine the macroeconomic determinants of economic growth in Gambia and Ethiopia respectively.

In addition, these variables are chosen according to their pertinence and the availability of data. Also data for this research analyze were took from the World

Development Indicators in the World Bank website in 2022 as given in Table 3.1. It uses the time series data and covering the period from 1974 to 2019 in Senegal economy.

Table 3.1. The Definition of Variables

Variable	Symbol	Definition	Source
Economic Growth (dependent variable)	GDPG	GDP Growth (annual%)	World Bank
Inflation (independent variable)	INF	Inflation, GDP deflator (annual %)	World Bank
External debt stocks (independent variable)	EDS	External debt stocks (% of GNI)	World Bank
Foreign direct invest. (independent variable)	FDI	Foreign direct investment, net inflows (% of GDP)	World Bank
Official Development Assistance (independent variable)	ODA	Net ODA received (% of GNI)	World Bank

The relationship between GDP growth and the independent variables is therefore mathematically expressed as :

$$Y = f(GDPG, INF, EDS, FDI, ODA) \quad \textbf{(3.2)}$$

The researchers transform all the variables studied to avoid heteroscedasticity into log data (Gujarati, 2004) and display the flexibility of the variables. The growth function of equation [5.3] is presented as follows:

$$lnY_t = \beta_0 + \beta_1 lnGDPG + \beta_2 lnINF + \beta_3 lnEDS + \beta_4 lnFDI + \beta_5 ODA + \varepsilon \quad \textbf{(3.3)}$$

Where Yt represents GDPG growth at time t; *INFt* stand for general inflation, *EDS**t*** is for external debt stocks, *FDIt* represents foreign direct investment and *ODAt* stand for foreign aid.

The statistical error term $\boldsymbol{\varepsilon}$ is supposed to be independently distributed with a constant zero and a constant variation, which gathers all other illustrative variables that affect the product of GDP growth in a nation that is not included in the model. β_i are the partial elasticities GDP growth with regard to the macroeconomic variables mentioned above.

3.2. Analyses and Model Estimation technique

This study on the determinants of economic growth in Senegal use Autoregressive Distributed Lag model to analyze long run relationship between the dependent variable (GDP growth) and the independent variables (Foreign direct investment, net official development assistance, External debt and Inflation).

This research study on the determinants of economic growth in Senegal uses the boundary testing process for cointegration, estabilited by Persaran and Shin (1999) and later ameliorated by Persaran, et al. (2001).

3.3. Unit-root tests

Unit root tests are applyed to find out whether trend data should first be differentiated or regressed on deterministic functions of time to make the data stationary. In addition, economic theory often supposes the existence of long-term equilibrium relationships between non-stationary time series variables.

The stationary has a major role in the use of time series, the range of variables vary between stationary or non-stationary series. Stationarity is very important in time series modeling, the spurious regression problem showing that linear regression with non-stationary variables is not valid.

The unit root test is essential for testing the statistical properties of variables, when employing data of time series. More often, they are not stationary in level. When regression containing non-stationary variables often results in a false regression problem. This occurs when no relationship exists but the regression results show a significant and high relationship between the variables. It should be noted that the test of unit root is necessary to verify if any of the variables entered in the regression is not in order 2 to apply the ARDL model. However, before applying any kind of regression with the variables, that is essential to examine the variables with time series data.

This study has used Augmented Dickey Fuller Test, Phillips Perron Test, Kwiatkowski Phillips Schmidt Shin Test and Ng Perron Test to find the stationarity level of variables and 5% is used as critical value.

Following the Bound Test procedure for unit root all variables included in the study have to be stationary in level l(0) or l(1) to apply the procedure. So the ARDL model by Persaran and Shin (1999) and then ameliored by Persaran, et al. (2001).

3.4. Post Estimation Tests

Before beginning any estimated regression model, it is important to perform relevant resudial diagnostic and stability diagnostic tests to verify the validity of the regression model and its stability. Therefore, before confirming the results, the specifications of any econometric model should be carefully considered. These tests include serial correlation test, normality test, linearity test, heteroscedasticity test and stability tests. These analytical tests are necessary to verify the authenticity of the estimated coefficients. Depending on the results of the analysis, it may be necessary to reset the model.

3.4.1. Normality Test

The normality test checks if the distribution of sample is normal or whether is not normal. If they have normal distribution, so until here everything is good because normal assumption is well. Otherwise, if they don't have normal distribution, so all we did before is wrong. Jacque-Bera Statistics test is performed to chech the normality test by comparing the critical value and the probability. If the probability of Jacque-Bera is bigger than the critical value then we conclude that error terms have normal distribution but if the probability of Jacque-Bera is smaller the critical value then we decide that error terms do not have normal distribution.

Setup hypothesis :

H_o : Error terms have normal distribution

H_1 : Error terms don't have normal distribution

3.4.2. Serial Correlation Test

This test is applyed to find out whether the successive value of the error term are momentary independent; it expected, the value of each error term supposes in any one period is assumed to be independent of the value which it supposed in any past time. Whether the value of the error terms are serially correlated and the predictions are based

on regression estimation, then they become inefficient. The test is performed by using Breusch-Godfrey LM test.

Setup hypothesis :

H_o : There is no serial correlation problem in the estimated model

H_1 : There is serial correlation problem in the estimated model

3.4.3. Heteroscedasticity Test

The regression results to be valid, the homoscedasticity assumption has to be satisfied. Each of the disturbance term is supposed to have the same finite variance. So, the failure of this assumption is an indication of the existence of heteroscedasticity in the model. This test is performed to see if the error term exposes constant variance. There are several tests to perform heteroscedasticity tests in Eviews, but the study used ARCH Test to perform it. When the probability Chi-Square is greater than the critical value then we conclude that the model is homoscedastic if the probability Chi-Square is smaller than the critical value then we decide that the model is heteroscedasic.

Setup hypothesis :

H_o : There is no heteroscedasticity in the model

H_1 : There is heteroscedasticity in the model

3.4.4. Stability Test

The cumulative sum (CUSUM) and the cumulative sum of square (CUSUMQ) tests are executed to see the rightness and the stability of the model. These tests are employed to find out if the model is stable and suible for making long run decision. The result presents whether all the coefficients are stable or not in the model.

When the frame of the CUSUM and CUSUMQ remains inside the 5% critical bounds, the null hypothesis parameter stable is accepted. Hence, the parameters of the model is not affected from any structural instability.

When the frame of the CUSUM and CUSUMQ goes outside the 5% critical bounds, then the null hypothesis of parameter stable is not accepted at 5% significant level. Hence, the parameters of the model is affected from structural instability.

3.5. The Autoregressive Distributed Lag Model

According to Pesaran and Shin (1999), the estimated ARDL model makes it possible to verify the cointegration or the presence of a long or short term relationship between the variables of the model. For estimating the long run and short run relationship between dependent variable (GDP growth) and independent variables (foreign aid, external debt, inflation rate and foreign direct investment), the study applies Autoregressive Distributed Lag model to cointegration and error correction depending on the degree of stationary levels of the variables.

The ARDL model can be applied in the case where all the variables are integrated at level I (0) and at order I (1) or reciprocally co-integrated (Pesaran and Shin, 1999). Using the Bound Test approach for co-integration works better than the co-integration tests of Engle and Granger (1987), Johansen (1991) and the co-integration of Philips and Hansen (1990) cointegration tests in small data samples as is the case in this study. Also, it is probably that different variables obtain an optimal number of different offsets, whereas in Johansen-type models this is not allowed. And, in ARDL estimation, long term and short term parameters are estimated at the same time. Finally, using the ARDL technique is better, we will have an unbiased and efficient estimator of the model.

Null hypothesis: there is no long-term relationship

When the occured F-statistic is bigger than the upper bound critical value given by Persaran et al. (2001), then the null hypothesis is not accepted.

When the F-statistic is less than the lower bound critical values, the null value is accepted, and if the F-statistic value is between lower and upper bound critical values, so there is no conclusion for the test. This situation has the following advantages over other cointegration approaches:

* Contrary to Johansen's approach for multi-equation approaches, the Bounds test procedure is an equation approach and therefore it may utilize if the degree of freedom is limited.

*The bound procedure is valid even if the time series variables contain an equivocal order of integration. Therefore, even if variables are all I(0), all I(1), or a

combination of both, the approach remain valid while certains approaches require all variables to have the identical integration order.

* Employing at the same time both the short run and long run coefficients. So it makes this cointegration approach simple.

Essentially, the ARDL model process to cointegration (Pesaran et al., 2001) implicate estimating of the error correction model (ECM) type of the ARDL model for the determinants of economic growth:

Estimated Unrestricted Error Correction Model (UECM)

$$\Delta GDPG_t = \beta_0 + \sum_{i=1}^{m} \beta_{1i}\, \Delta GDPG_{t-i} + \sum_{i=0}^{m} \beta_{2i}\, \Delta INF_{t-i} + \sum_{i=0}^{m} \beta_{3i}\, \Delta EDS_{t-i} + \sum_{i=0}^{m} \beta_{4i}\, \Delta FDI_{t-i} + \sum_{i=0}^{m} \beta_{5i}\, \Delta ODA_{t-i} + \beta_6 GDPG_{t-1} + \beta_7 INF_{t-1} + \beta_8 EDS_{t-1} + \beta_9 FDI_{t-1} + \beta_{10} ODA_{t-1} + \varepsilon_t \quad \textbf{(3.4)}$$

Where:

$\boldsymbol{m}$ represents the highest lag of a regressor in the model.

$\boldsymbol{\beta_0}$ represents the intercept while $\boldsymbol{\varepsilon_t}$ represents error term.

The symbols and variables in the model are defined in the chapter above.

This model is estimated by utilizing Eviews and the highest lag of each regressor ($\boldsymbol{m}$) is held by understating the Akaike information Criteria.

3.6. Toda Yamamoto Causality Analysis Test

The Toda Yamamoto Test examines the presence of a long-term causal relationship between two variables. ECM is applied when there is cointegrating relationship or long-term equilibrium relationship. In the absence of a cointegrating relationship, the short-term relationship is examined by different variables. However, the test of Granger causality is a method to analyze if one variable assists to predict another. The Granger causality method must secure the stability of time series data and the integration procedure must be clear. However, the efficiency of the Granger causality test is low when the procedure of integrating the time series is different or unclear. As an alternative, we will use the Toda and Yamamoto method analysis (Toda and Yamamoto, 1995).

CHAPTER 4

4. EMPIRICAL RESULTS

This chapter presents the analysis of the evolution of variables and their graphic representations over the study period and the empirical results of the study. Starting with the unit root tests results and the bound test procedure then the long run and short run relationship and Toda Yamamoto causality analysis test between variables and the correlation coefficient and the Normality Assumption and the homoscedasticity assumption.

4.1. Variable's Description and Analysis

The Senegalese economy did not have an evolutionary growth during this period of study, it was characterized by a great fluctuation upward and downward. In 1976 the Senegalese economy reached its greatest growth with a gross domestic product of 8.9 in the year. Yet in 1983 the economy suffered the biggest setback with a noise domestic product of -5.3 in the year as shown in Figure 4.1. It should be remembered that the economy has opened itself up from the great disruptions of insufficient economic policies put in place by governments.

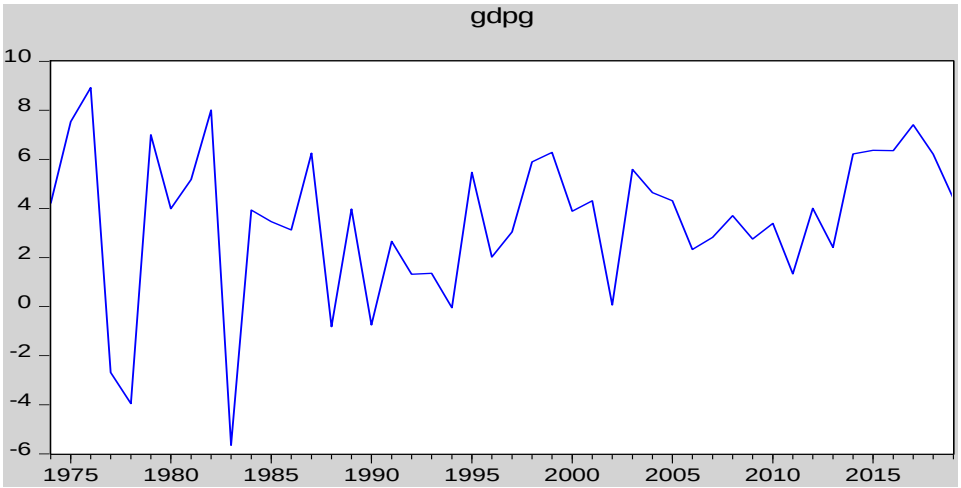

Figure 4.1. Evolution of Economic Gowth (1974 – 2019)

Source : Data From World Bank

Inflation has had negative impacts on the economy of the country by reducing the purchasing power of the consumer and increasing the cost of investment. In 1994 the Senegalese economy had reached its highest level of inflation ever, which was 34% in

the year. However in 1987 and 2009 the economy recorded a deflaction of -1.7% due to the economic policy that was put in place. After the devaluation of the CFA franc in 1994, Senegal's economy resumed with growth, real GDP having grown by 2.9% in 1994 and this decision had the immediate consequence on the economy, a price surge of 32, 1% in 1994. And in 1995 we witness a decrease of inflation in Senegal until 2000. The evolution of annual inflation is given in the following Figure 4.2.

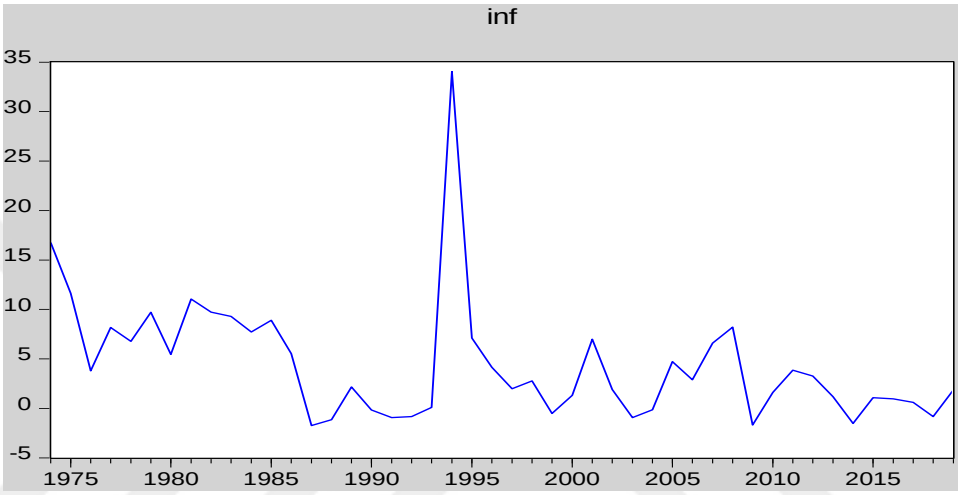

Figure 4.2. Evolution of Inflation (1974 – 2019)

Source : Data From World Bank

The external debt is a main source of financing the economy of the country by filling the budget deficit. External debt comes from technical and financial partners like the World Bank or the International Monetary Fund or a friendly country or a foreign company to finance the deficit gap in the country's budget. The country's external debt ratio evolved considerably during the years 1975 to 1985 and restarted evolving from 2008 to 2019. Also, from 1994 to 2006 the external debt kept falling. The evolution of the ratio of the external debt is given in the following Figure 4.3.

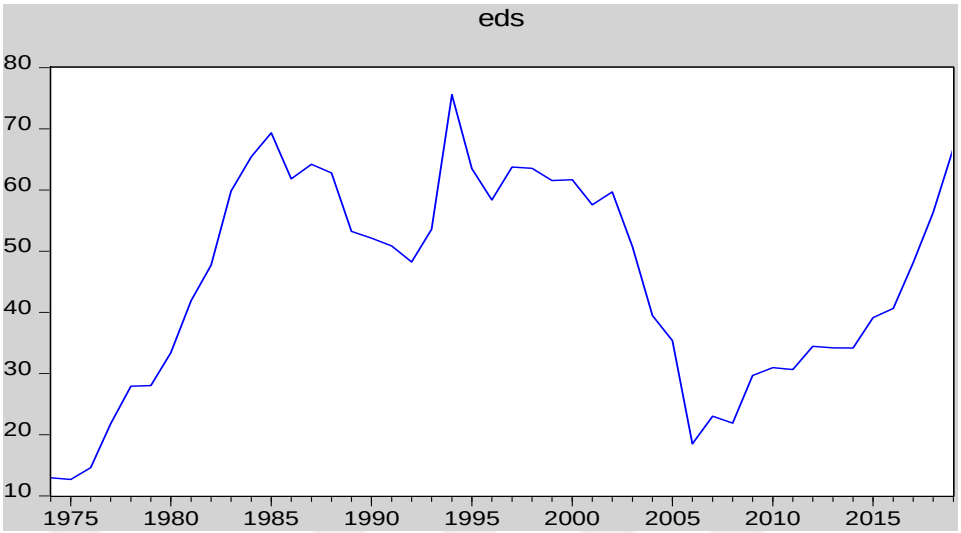

Figure 4.3. Evolution of External Debt (1974 – 2019)

Source : Data From World Bank

Foreign direct investment, which represents the investment of persons of foreign citizenships in a country, constitutes a lever for economic growth. In a nation economy, the higher the level of human capital, the more impact foreign direct investment will have on the rate of growth of the economy. In Senegal, the foreign direct investment values are very low so they can't really affect the economic growth. The lowest value of the foreign direct investment during the period of the study is (-1,0) in 1983 and the FDI begins to increase gradually from 2012 to 2019.

The graphical representation curve is more decreasing than increasing and it is given in the following Figure 4.4.

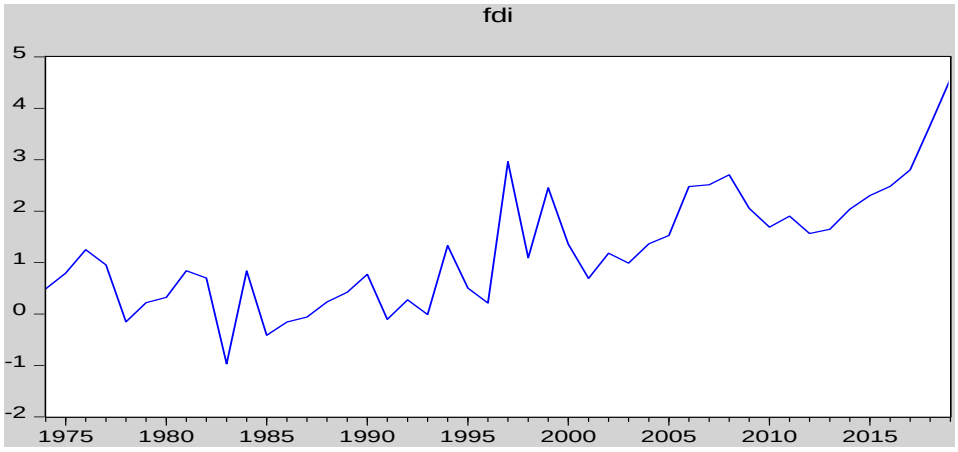

Figure 4.4. Evolution of Foreign Direct Investment (1974 – 2019)

Source : Data From World Bank

Official development assistance (ODA) contracted by developing countries are grants or debts from developed countries in order to promote economic development. Grants are cash disbursements for which no repayment is made. These public development aid is granted according to certain financial conditions such that part of the amount is a non-refundable donation. Foreign aid in general constitutes a great source of financing for weak economies in order to fill the budget deficits in these countries for a favorable development.

Looking at the curve of the official development assistance, we see that during the period used, in 1994 senegal obtained more aid compared to other years and less aid in 2016 in Figure 4.5.

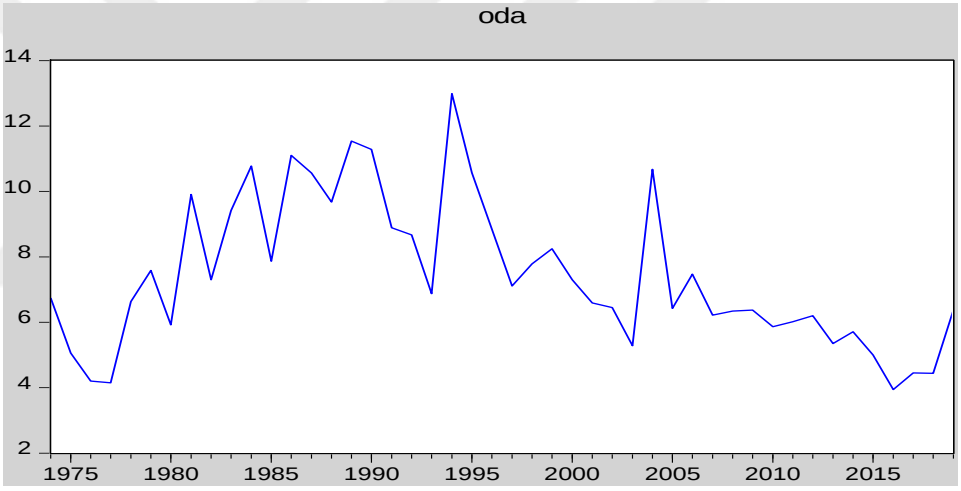

Figure 4.5. Evolution of Net Official Development Assistance (1974 – 2019)

Source : Data From World Bank

4.2. Unit Root Tests Results

That is mandatory to check the time series properties of each variable series before using the data to estimate the model ARDL. It is known time series are trending and non-stationary in most cases. So to avoid a spurious regression problem, it is primodial to correct the non-stationarity of the macroeconomic variables. In addition, when a series contains a unit root, it is normal to make the series stationary by transforming the variables by differentiation.

Finding out the degree of integration, we examine unit root test using the standard Augmented Dickey Fuller (ADF), Phillips Perron (PP), Kwiatkowski-Phillips-Schmidt-

Shin (KPSS), and Ng-Perron tests with a value 5% critical. The Tables 4.1 and Table 4.2 show the results.

Table 4.1. The Results of ADF, PP and KPSS Unit Root Tests

Variables	ADF	PP	KPSS	Decision
GDPG	**-4.885074(1)c***	**-6.501018(2)c***	**0.255304(2)c***	I(0)
	-3.588509(1%)	-3.584743(1%)	0.739000(1%)	
	-2.929734(5%)	-2.928142(5%)	0.463000(5%)	
	-2.603064(10%)	-2.602225(10%)	0.347000(10%)	
INF	**-5.826658(0)b***	**-5.789328(4)b***	**0.051759(3)b***	I(0)
	-4.175640(1%)	-4.175640(1%)	0.216000(1%)	
	-3.513075(5%)	-3.513075(5%)	0.146000(5%)	
	-3.186854	-3.186854	0.119000	
EDS	**-1.767832(0)c**	**-2.025927(4)c**	**0.143116(5)c***	I(0)
	-3.584743(1%)	-3.584743(1%)	0.739000(1%)	
	-2.928142(5%)	-2.928142(5%)	0.463000(5%)	
	-2.602225(10%)	-2.602225(10%)	0.347000(10%)	
ΔEDS	**-5.171620(0)a***	**-5.283055(3)a***		I(1)
	-2.618579(1%)	-2.618579(1%)		
	-1.948495(5%)	-1.948495(5%)		
	-1.612135(10%)	-1.612135(10%)		
FDI	**0.712372(1)a**	**0.216641(2)a**	**0.142915(3)b****	I(0)
	-2.618579(1%)	-2.617364(1%)	0.216000(1%)	
	-1.948495(5%)	-1.948313(5%)	0.146000(5%)	
	-1.612135(10%)	-1.612229(10%)	0.119000(10%)	
ΔFDI	**-11.10780(0)a***	**-11.28635(1)a***		I(1)
	-2.618579(1%)	-2.618579(1%)		
	-1.948495(5%)	-1.948495(5%)		
	-1.612135(10%)	-1.612135(10%)		
ODA	**-0.488771(1)a**	**-3.195443(3)c****	**0.176234(5)b***	I(0)
	-2.618579(1%)	-3.584743(1%)	0.216000(1%)	
	-1.948495(5%)	-2.928142(5%)	0.146000(5%)	
	-1.612135(10%)	-2.602225(10%)	0.119000(10%)	
ΔODA	**-5.697189(3)b***			I(1)
	-4.198503(1%)			
	-3.523623(5%)			
	-3.192902(10%)			

Notes: The numbers in parentheses "(.)" are the lag lengths that are determined by Schwarz Criterion in ADF test. Bartlett Kernell estimation method is used in PP and KPSS. a:indicates that regression does not involve constant term or trend; b: indicates regression involves both constant term and trend; c: indicates regression involves constant term. *, **,***; indicates 1%, 5% and 10% significance level.

Table 4.2. The Result of Ng-Perron Unit Root Test

Variables	NG-Perron				Decision
	MZa	**MZt**	**MSB**	**MPT**	
GDPG	**-25.8824(1)b***	**-3.59720(1)b***	**0.13898(1)b***	**3.52182(1)b***	I(0)
	-23.8000(1%)	-3.42000(1%)	0.14300(1%)	4.03000(1%)	
	-17.3000(5%)	-2.91000(5%)	0.16800(5%)	5.48000(5%)	
	-14.2000(10%)	-2.62000(10%)	0.18500(10%)	6.67000(10%)	
INF	**-21.1744(0)b****	**-3.24442(0)b****	**0.15322(0)b****	**4.36042(0)b****	I(0)
	-23.8000(1%)	-3.42000(1%)	0.14300(1%)	4.03000(1%)	
	-17.3000(5%)	-2.91000(5%)	0.16800(5%)	5.48000(5%)	
	-14.2000(10%)	-2.62000(10%)	0.18500(10%)	6.67000(10%)	

EDS	**-1.23439(0)c** -13.8000(1%) -8.10000(5%) -5.70000(10%)	**-0.54287(0)c** -2.58000(1%) -1.98000(5%) -1.62000(10%)	0.43979(0)c 0.17400(1%) 0.23300(5%) 0.27500(10%)	**13.0553(0)c** 1.78000(1%) 3.17000(5%) 4.45000(10%)	I(0)
ΔEDS	**-21.2222(0)c*** -13.8000(1%) -8.10000(5%) -5.70000	**-3.18800(0)c*** -2.58000(1%) -1.98000(5%) -1.62000	**0.15022(0)c*** 0.17400(1%) 0.23300(5%) 0.27500	**1.39454(0)c*** 1.78000(1%) 3.17000(5%) 4.45000	I(1)
FDI	**0.22848(1)c** -13.8000(1%) -8.10000(5%) -5.70000(10%)	**0.06960(1)c** -2.58000(1%) -1.98000(5%) -1.62000(10%)	**0.30462(1)c** 0.17400(1%) 0.23300(5%) 0.27500(10%)	**11.6851(1)c** 1.78000(1%) 3.17000(5%) 4.45000(10%)	I(0)
ΔFDI	**-17.3826(0)c*** -13.8000(1%) -8.10000(5%) -5.70000(10%)	**-2.92218(0)c*** -2.58000(1%) -1.98000(5%) -1.62000(10%)	**0.16811(0)c*** 0.17400(1%) 0.23300(5%) 0.27500(10%)	**1.50462(0)c*** 1.78000(1%) 3.17000(5%) 4.45000(10%)	I(1)
ODA	**-6.69696(1)c** -13.8000(1%) -8.10000(5%) -5.70000(10%)	**-1.82342(1)c** -2.58000(1%) -1.98000(5%) -1.62000(10%)	**0.27228(1)c** 0.17400(1%) 0.23300(5%) 0.27500(10%)	**3.68087(1)c** 1.78000(1%) 3.17000(5%) 4.45000(10%)	I(0)
ΔODA	**-18.3314(0)b**** -23.8000(1%) -17.3000(5%) -14.2000(10%)	**-3.00861(0)b**** -3.42000(1%) -2.91000(5%) -2.62000(10%)	**0.16412(0)b**** 0.14300(1%) 0.16800(5%) 0.18500(10%)	**5.08548(0)b**** 4.03000(1%) 5.48000(5%) 6.67000(10%)	I(1)

Notes: The numbers in parentheses "(.)" are the lag lengths that are determined by Schwarz Criterion in ADF test. Bartlett Kernell estimation method is used in Ng-Perron tests. a:indicates that regression does not involve constant term or trend; b: indicates regression involves both constant term and trend; c: indicates regression involves constant term. *, **,***; indicates 1%, 5% and 10% significance level.

The resultats indicate that the economic growth (GDPG) and inflation (INF) are integrated at level I(0). In KPSS test, the external debt stocks (EDS) and the foreign direct investment are integrated at level while in ADF, PP and NG-Perron are integrated in order (1). In KPSS and PP, the net official development (ODA) are integrated at level while in ADF and NG-Perron are integrated in order (1).

The results indicate that some variables are stationary at level and other variables are stationary in first difference and none of the variables is integrated in order 2. Then, as indicated by Pesaran et al. (2001) the ARDL model cointegration is the most suitable method to estimate or verify the long and short term relationship between variables.

4.3. Post Estimation Tests Results

It is required to perform relevant post estimation or standard property of the model to verify the validity of the regression models. This study used some diagnostic and stability tests, which include normality test (Jaque- Bera test), serial correlation test t (Brush & Godfrey LM test), heteroscedasticity test, linearity test (Ramsey RESET Test)

and the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ) test. These diagnostics are required to verify the trustworthy of the estimated coefficients; and there may be need for model restructuring depending on the results of the diagnostics. These tests are advised by Pesaran et al. (2001). A decision is made after comparing the probability value associated with the test statistic and the critical value (5%). The null hypothesis is accepted when the p-value is bigger than the critical value (5%) and the null hypothesis is not accepted if the p-value is less than the critical value (5%). According to test results presented in Table 4.3, there is no heteroscedasticity and serial correlation problem. And the results confirm the normality and linearity conditions.

Table 4.3. Diagnosis and Stability Tests

	TEST	Ho	Obs*R-squared	Prob. Chi^2
Serial correlation	LM Test	No autocorrelation	3.885560	0.1433
Normality	Jarque-bera Test	Residuals normality distributed	4.395804	0.111036
Heteroscedasticity	ARCH Test	Homoscedastic	0.175469	0.6753
Linearity	Ramsey Reset Test	Linear relationship	0.541707	0.5935
Stability	CUSUM	Stable		
	CUSUMQ	Stable		

Source: Author's Computation Using Eviews

In addition, the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of square of recursive residuals (CUSUMQ) tests are used to verify the stability of the model for long run and short run relationship. The test found parameter stability because the cumulative sign did not go outside the frame between the two critical lines as given in Figure 4.6 and Figure 4.7.

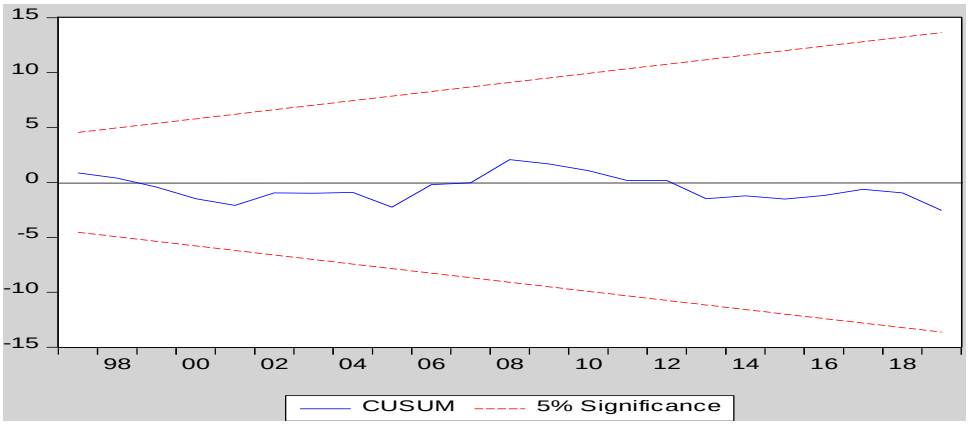

Figure 4.6. Plot of Cumulative Sum of Recursive Residual

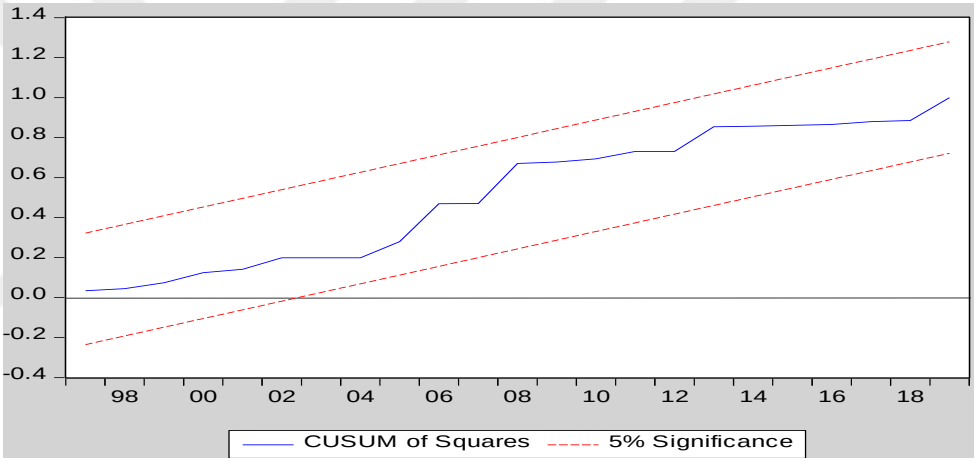

Figure 4.7. Plot of Cumulative Sum of Squares of Recursive Residual

4.4. Result of Bound Test

For getting the optimal lag length for cointegration analysis, it has estimated one by one from lag (1) to lag (4) because of the study uses annual data. The optimal lag length is lag (2) using minimum Akaike information criterion(AIC) values, and its Chi-Square probability value has no auto correlation problem as given in Table 4.4.

Table 4.4. Optimal Lag Selection for Bound Test

M	AIC	SIC	X^2 BREUSCH- GODFREY (2)
1	5.133481	5.741728	4.073176 (0.1305)
2*	5.040022	5.859185	1.839611 (0.3986)
3	4.586175	5.620503	9.115003 (0.0105)
4	3.944566	5.198399	9.891067 (0.0071)

Source: Computation Using Eviews

Notes: X^2 Breusch- Godfrey is autocorrelation test statistics. The numbers in parentheses are probability values.

* indicates the selected lag length.

The Unrestricted Error Correction Model is estimated with 2 lag Wald Test is utilized to one lagged dependent and independent variables.

The calculated F-Statistic from Wald Test is 4.629047 as given in Table 4.5 and it is compared with critical values from Pesaran et al. (2001:300-301).

Table 4.5. Result from ARDL Bound Test

K	F statistic	Critical values	
		%5 significance level	
		Lower Bound	Upper Bound
4	4.629047	2.86	4.01

Source: Computation Using Eviews

Notes: K indicates the number of independent variables in the model. Critical values came from Table C1(III) in Pesaran et al. (2001:300).

Since the F-Statistic is greater than upper bound, the null hypothesis of no cointegration relationship between variables is rejected as given in Table 4.5. Hence, there is cointegration relationship between GDP growth and their determinants.

4.5. Long Run Impact from ARDL Model

After verifying the cointegration relationship between variables, we begin estimating the long-term model. The results show the existence of long-term relationship between economic growth and the following variables, inflation, external debt, foreign direct investment and net official development assistance. The estimated long run coefficient utilizing the ARDL model and selected Akaike Information Criterion result is presented in the Table 4.6.

Table 4.6. Estimated Long Run Coefficients from ARDL (4, 1, 4, 1, 4) Model

Dependent Variable: GDPG				
Variables	**Coeffient**	**Standard. Error**	**t statistic**	**Probability**
EDS	0.053096*	0.011088	4.788635	0.0001
FDI	-0.007069	0.288438	-0.024506	0.9807
INF	-0.049968	0.033055	-1.511668	0.1442

ODA	-0.757270*	0.153032	-4.948456	0.0001
c	6.784837	1.261518	5.378311	0.0000

Source: Computation using E-views.

Notes: *, **, *** means respectively 1% significance level, 5% significance level and 10% significance level.

The result in the Table 6.6 indicates the external debt stocks (EDS) has positive and significant effect on GDP growth at 5% significance level. EDS's coefficient is 0.053096 shows any percentage change in EDS, keeping all other things fixed in long term, bring 0.053096 percent change in GDP growth during the study period in Senegal.

The result shows foreign aid (ODA) has negative and significant impact on GDP growth at 5% significance level and official development aid coefficient is -0.757270, an increase in ODA will decrease economic growth keeping all things fixed during the study period in Senegal.

However, inflation (INF) and foreign direct investment (FDI) have negative impact but insignificant at 5% significant level on GDP growth in Senegal.

4.6. Short Run Error Correction Model (ECM)

The short-term ECM model is estimated after accepting the long-term coefficients of the growth equation. As discussed above, the term error adjustment (ECM) refers to the degree of adjustment made to bring a dynamic model back into balance. It is a residual of a lagged period that comes from the estimated long-term dynamic model. The error correction term coefficient shows how fastly the variables reach equilibrium. Also, it has to have negative sign and be significant at the standard significant level. (i.e. the p-value has to be smaller than 5%).

Table 4.7. Results of Error Correction for selected ARDL (4, 1, 4, 1, 4) Model

Dependent Variable= GDPG				
Variables	**Coeffient**	**Standard. Error**	**t statistic**	**Probability**
D(GDPG(-1))	1.236558*	0.245424	5.038456	**0.0000**
D(GDPG(-2))	0.729743*	0.167604	4.353975	**0.0002**
D(GDPG(-3))	0.427841*	0.107609	3.975870	**0.0006**
D(EDS)	-0.068798	0.049435	-1.391674	**0.1773**
D(FDI)	0.510414	0.428805	1.190318	**0.2461**
D(FDI(-1))	1.694260*	0.505740	3.350064	**0.0028**

D(FDI(-2))	2.134582*	0.604647	3.530296	**0.0018**
D(FDI(-3))	0.832179	0.510533	1.630020	**0.1167**
D(INF)	0.011122	0.052247	0.212880	**0.8333**
D(ODA)	-0.636987*	0.196727	-3.237918	**0.0036**
D(ODA(-1))	1.452119*	0.233446	6.220360	**0.0000**
D(ODA(-2))	0.672017**	0.247886	2.710995	**0.0125**
D(ODA(-3))	0.651996*	0.207774	3.138006	**0.0046**
CointEq(-1)*	-2.639798*	0.335868	-7.859619	**0.0000**

R-squared	0.869692	Mean dependent var	0.168698
Adjusted R-squared	0.809192	S.D. dependent var	4.089526
S.E. of regression	1.786367	Akaike info criterion	4.259447
Sum squared resid	89.35102	Schwarz criterion	4.838670
Log likelihood	-75.44838	Hannan-Quinn criter.	4.471755
Durbin-Watson stat	1.870336		

Source: Computation Using Eviews

Notes: *, **, *** means respectively 1% significance level, 5% significance level and 10% significance level.

The CointEq(-1) have negative sign and significant with a coefficient estimate of -2.639798, so it supports the cointegration in Bound Test as given in Table 4.7. Thus, the existence a long-run causality running from the explanatory variables to GDP growth. The CointEq(-1)= -2.639798 implicates that the deviation from the long-term in the previous year on economic growth is revised by 263.97% in the next year. Therefore, this implies the fast correction towards long run equilibrium is 263.97% within one period of time.

The result shows external debt stocks (EDS) has negative impact but insignificant at 5% significant level on GDP growth in short run. The foreign direct investment (FDI) has positive and significant effect at 5% significant level on economic growth in short run. Inflation has positive effect but insignificant at 5% significant level on GDP growth in short run. The net official development assistance (ODA) has positive and negative coefficients so we cannot make a decide but his probability is significant at 5% significant level.

4.7. Result of Toda Yamamoto Causality Analysis Test

This test presents the result on the causal relationship between the variables by indicating whether the relationship is unidirectional or bidirectional by using 5%

significance level of test statistics. There is a relationship when the probability of the test statistic is less than 5% significant level.

Table 4.8. Results of Toda Yamamoto Causality Tests

Nul hypothesis	Chi-square	Probability	Direction
GDPG is no a causer of INF	11.65894	0.0201	From GDPG to INF
INF is no a causer of GDPG	11.07489	0.0257	From INF to GDPG
GDPG is no a causer of EDS	22.38076	0.0002	From GDPG to EDS
EDS is no a causer of GDPG	34.31644	0.0000	From EDS to GDPG
GDPG is no a causer of FDI	5.207601	0.2667	From GDPG to FDI
FDI is no a causer of GDPG	34.11312	0.0000	From FDI to GDPG
GDPG is no a causer of ODA	37.03083	0.0000	From GDPG to ODA
ODA is no a causer of GDPG	52.14696	0.0000	From ODA to GDPG
INF is no a causer of EDS	7.232006	0.1241	From INF to EDS
EDS is no a causer of INF	9.879936	0.0425	From EDS to INF
INF is no a causer of FDI	10.33295	0.0352	From INF to FDI
FDI is no a causer of INF	17.02679	0.0019	From FDI to INF
INF is no a causer of ODA	15.71040	0.0034	From INF to ODA
ODA is no a causer of INF	3.781488	0.4364	From ODA to INF
EDS is no a causer of FDI	4.190961	0.3808	From EDS to FDI
FDI is no a causer of EDS	11.77006	0.0191	From FDI to EDS
EDS is no a causer of ODA	21.14542	0.0003	From EDS to ODA
ODA is no a causer of EDS	47.05327	0.0000	From ODA to EDS
FDI is no a causer of ODA	90.10855	0.0000	From FDI to ODA
ODA is no a causer of FDI	8.211328	0.0841	From ODA to FDI

Source: Computation Using Eviews

According to the results found in the Table 4.8 the interpretations of the causal relationship between variables are given below.

Causality between GDPG and INF: It is a bidirectional causality between GDP growth and inflation; that means in long term GDP growth leads to inflation and inflation leads to GDP growth.

Causality between EDS and GDPG: It is a bidirectional causality between GDPG and EDS; that means in long term each of them leads to another.

Causality between FDI and GDPG: It is an unidirectional causality running from FDI to GDPG; it means in long term FDI leads to GDPG but GDPG does not lead to FDI.

Causality between GDPG and ODA: It is a bidirectional causality between GDPG and ODA; that means in long term each of them leads to another.

Causality between INF and EDS: It is an unidirectional causality running from EDS to INF; it means in long term EDS leads to INF but INF does not lead to EDS.

Causality between INF and FDI: It is a bidirectional causality between INF and FDI; that means in long term INF leads to FDI and FDI leads to INF.

Causality between INF and ODA: It is an unidirectional causality running from INF to ODA; it means in long term INF leads to ODA but ODA does not lead to INF.

Causality between FDI and EDS: It is an unidirectional causality running from FDI to EDS; it means in long term FDI leads to EDS but EDS does not lead to FDI.

Causality between EDS and ODA: It is a bidirectional causality between EDS and ODA; it means in long term EDS leads to ODA and ODA leads to EDS.

Causality between FDI and ODA: It is an unidirectional causality running from FDI to ODA; it means in long term FDI leads to ODA but ODA does not lead to FDI.

These variables (GDPG and INF), (EDS and GDPG), (GDPG and ODA), (FDI and INF), (EDS and ODA) have bidirectional causality between them. While the variables (INF and ODA), (FDI and ODA), (FDI and GDPG), (INF and EDS), (FDI and EDS) have unidirectional between them. Thus, the results above show all independents variables, inflation, official development assistance, external debt and foreign direct investment lead to GDP growth.

CHAPTER 5

5. CONCLUSION AND POLICY RECOMMENDATION

5.1. Conclusion

In this research we examine the determinants of economic growth in Senegal over the period from 1974 to 2019 to determine the relationship between long-term and short-term variables, we ustilised the Autoregressive model Distributed Lag (ARDL). Before employing the ARDL model, all variables are examined for their time series properties (stationarity properties) by utilizing ADF, PP, KPSS and NG-Perron tests. The results reveal that the GDP growth (GDPG) and inflation (INF) are integrated at level I(0). In KPSS test, the external debt stocks (EDS) and the foreign direct investment (FDI) are integrated at level while in ADF, PP and NG-Perron they are integrated in order 1. In KPSS and PP, the net official development (ODA) are integrated at level while in ADF and NG-Perron they are integrated in order 1.

The stability of the model was examined by the diagonal tests techniques. The result attest non-existence of serial correlation evidence, the residual has a normal distribution, non-existence of hetroscedasticity problem and there is linear relationship. Forthermore, the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of square of recursive residuals (CUSUMQ) display that the model is stable.

Since the study used an ARDL model methodological approach, also known as the Bound test method. The result revealed the bound test value or F-statistic is bigger than the upper bound critical value given by Pesaran et al.(2001), so there is cointegration relationship between economic growth and its determinants (Inflation, Foreign direct investment, External debt, Net official development assistance) in Senegal over the period of study.

In long run impact, it found the external debt (EDS) has positive impact and significant on GDP growth in Senegal while foreign aid (ODA) has negative and significant impact on GDP growth in Senegal during the study period. However, foreign direct investment (FDI) and inflation (INF) have negative impact but insignificant at 5% significant level on GDP growth in Senegal.

In short run impact, it found out that external debt stocks (EDS) has negative impact but insignificant on GDP growth. Also, the foreign direct investment (FDI) has positive and significant effect on GDP growth. The inflation has positive impact but insignificant at 5% significant level on economic growth. The net official development assistance (ODA) has positive and negative coefficients so we cannot make a decision but his probability is significant at 5% significant level.

Going from a comparative study of the results found in this study and those of some results mentioned in the empirical literature we note a similarity on the one hand and on the other the absence of similarity. In this study, it was found in short run that foreign direct investment has positive and significant effect on GDP growth which is similar to Hammam (2010) study using OLS. Also, Havi et al. (2013) found foreign aid foreign direct investment have positive and significant effect in Ghana. However, in this study, external debt has positive and significant effect and official development assistance has negative and significant impact on GDP growth in long run. But Mekonnen (2017) using ARDL model found external debt and foreign aid have negative effect while inflation, physical capital, human capital have positive effect on real GDP in Ethiopia. Also, Gebru (2015) found out external debt has negative effect on economic growth in both short and long run while foreign aid and inflation have insignificant effect on economic growth.

Although inflation generally does not affect Senegal's economic growth significantly, the government of The Senegal should reduce its rate if possible, and keep the inflation rate below double digits through strict fiscal and monetary policies.

In the Toda Yamamoto analysis result, the causality between GDPG and these variables INF, EDS and ODA took one by one shows there is a bidirectional causality. So that means GDPG leads to these variables and each of these variables lead to GDPG. While the causality between GDPG and FDI is an unidirectional causality; only FDI leads to GDPG in long term. Thus, all independent variables lead to GDP growth in Senegal during the study period.

Comparison of causality analysis studies, in this study only FDI does not lead to economic growth. However, Havi et al. (2013) found that none of independent variables

used in his analysis leads to economic growth but there is unidirectional causality between physical capital and FDI, foreign aid and physical capital, labour force and FDI, FDI and foreign aid in Ghana.

5.2. Policy Recommendation

The result of the study shows external debts stocks is an important determinant on GDP growth in Senegal. So the government should implement policies that will fit the growth in order to increase economic growth for the well-being of the population. And the government should continue to manage foreign aid well so that the economy continues to prosper in Senegal. Furthermore, policymakers should allocate the external debt to sectors that foster economic growth such as the agricultural sector for food self-sufficiency and the industrialization of basic products. So, these investments will result in a drop in unemployment.

Nevertheless, it is very important that government pay attention to debt because if the debt is too high it may have the risk of unsustainability. In addition, to ensure the repayment of the debt, it is preferable to use it in the most profitable growth sectors, because it makes it possible to increase the economic potential of the country and avoid the risk of non-repayment on time. Therefore, the debt constitutes an substantial element into account in the development of the budgetary policy of a nation, it must be used with caution and further, it is preferable to fill the budgetary deficit through a domestic indebtedness such as by issuing treasury bonds before resorting to external debt, which may be accompanied by conditions that are not compatible with Senegal's development program.

Regarding ODA, which has negative effect on growth in Senegal in the long term, governments must redirect the use of ODA in growth-promoting sectors and improve the conditions for managing funds and any other aid for development objectives.

Inflation which is in both cases in the short and long term insignificant in Senegal and has always been below 4% in recent years. So, it is important that leaders keep inflation low for as long as possible, because it is good for economic growth.

Foreign direct investment being a determinant of short-term growth, government should take care to maintain political stability, respect and enforce national and

international law, improve the security of residents and implement a policy of attracting foreigner investors and promote the return and investment of Senegalese abroad in the country to increase the rate of investment and maintain an evolutionary growth in order to enhance the the living conditions of the population.

BIBLIOGRAPHY

ABESSOLO, Y. (1998). "Les Déterminants de la Croissance Economique en Afrique Subsaharienne", Une Analyse Empirique (No. 29). Groupe d'Economie du Développement de **l'Université Montesquieu Bordeaux IV**.

ACEMOGLU, D.; JOHNSON, S.; ROBINSON, J.; THAICHAROEN, Y. (2003). "Institutional Causes, Macroeconomic Symptoms: Volatility, Crises and Growth", **Journal of monetary economics**, 50(1), 49-123.

ACEMOGLU, D. (2008). "Introduction to Modern Economic Growth. Princeton: **Princeton University Press.**

ADU, G. (2013). "Determinants of Economic Growth in Ghana: Parametric and Nonparametric Investigations", **The Journal of Developing Areas**, *47*(2), 277-301.

AHMADOU, L. G.; DIATTA, J. C. (2018). "Analyse des Determinants de la Croissance Economique des Pays de l'UEMOA et des BRICS: Etude comparative", **Revue d'Économie & de Gestion,** *2*(1), 137-156.

AJAYİ, L. B.; Oke, M. O. (2012). "Effect of External Debt on Economic Growth and Development of Nigeria", **International journal of business and social science,** *3*(12), 297-304.

ALFARO, L. (2003). "Foreign Direct Investment and Growth: Does the Sector Matter? Unpublished Article", **Harvard Business School**, 2003, 1-31.

ALI, A.M.; CRAIN, W. M. (2002). "Institutional Distortions, Economics Freedom, and Growth", **Cato Journal**, 21(3) 415-426.

ALI, A. (1997). "Economic Freedom, Democracy and Growth", **Journal of Private Enterprise**, 13(1): 1-20.

ALTASEB A. B.; SINGH K. (2018). "Economic growth determinants in Ethiopia: a literature survey", **Article in International Journal of Research,.** *5*(4):326-336

AMABLE, B.; GUELLEC, D. (1992). "Les théories de la croissance endogène '' Theories of endogenous growth'', **Revue d'économie politique**, (3), 314-377.

ANDERSEN, L.; BABULA, R. (2009). "The Link between Openness and Long-Run Economic Growth", **Journal of International Commerce and Economics**, *2*(4101), 31-51.

ANDERSSON, B. (1998). "Scandinavian Evidence on Growth and Age Structure", **Paper presented at ESPE conference**, Uppsala, Sweden.

ANOTA M. (2012). "Les théories de la croissance économique «Theories of economic growth »", **Annotations**. Consulted the 01-12-2021.

ANTOINE, D. F. (2015). "Analyse comparative des déterminants de la croissance des pays de l'UEMOA et des pays à forte croissance", **Revue d'Analyse des politiques économiques et financières,** *1*(1), 41-68.

ARVANITIDIS, P.; PAVLEAS, S.; PETRAKOS, G. (2009). "Determinants Of Economic Growth: the View of the Experts", **University of Thessaly, Department of Planning and Regional Development,** 15(1), 1-22.

MULUSEW, A. (2012). "Relationship between Inflation and Economic Growth in Ethiopia", **Msc thesis in Economic, University of Gonder**, June 2012.

AYADI, F. S.; AYADI, F. O. (2008). "The İmpact of External Debt on Economic Growth: A Comparative Study of Nigeria and South Africa", **Journal of sustainable development in Africa**, *10*(3), 234-264.

BALASUBRAMANYAM, V.N.; SALISU, M.; SAPSFORD, D. (1996). "Foreign Direct Investment and Growth in EP and IS countries", **The Economic Journal**, 106 (92-105).

BALCHA, T.D. (2011). "Sources of Economic Growth in Ethiopia: A Time Series Empirical Analysis 1981-2009", Unpublished **Master's Thesis, University of Oslo**, Sweden.

BARRIOS, S.; BERTINELLI, L.; STROBL, E. (2010). "Trends in Rainfall and Economic Growth in Africa: A Neglected Cause of the African Growth Tragedy", **The Review of Economics and Statistics**, 92(2), 350-366.

BARRO, R.J. (1989). "Economic Growth in a Cross Section of Countries", **NBER Working Paper** No. 3120.

BARRO, R. J. (1999). "Determinants of economic growth: Implications of the global evidence for Chile", **Cuadernos de economía** (Economic notebooks), 443-478.

BARRO, R. J. (1996). "Democracy and growth", **Journal of economic growth**, *1*(1), 1-27.

BARRO, R. J. (2003). "Determinants of economic growth in a panel of countries", **Annals of economics and finance**, *4*, 231-274.

BARRO, R. J. (2013),"Inflation and Economic growth", **Annuals of Economics and Finance** 14(1), 85–109. Department of Economics Littauer Center 120 Harvard University Cambridge, MA.

BAWA, S.; ABDULLAHİ, I. S. (2012). "Threshold effect of inflation on economic growth in Nigeria", **CBN Journal of Applied Statistics**, *3*(1), 43-63.

BEGG, D.; VERNASCA, G.; FISCHER, S.; DORNBUSCH, R. (2014). "Economics", EBOOK, **McGraw Hill**.

BENHABIB, J.; SPIEGEL, M.M. (1994). "The Role of Human Capital in Economic Development: Evidence from Aggregate Cross-Country Data", **Journal of Monetary Economics**, 34, 143-173.

BISWAS, S.; SAHA, A. K. (2014). "Macroeconomic Determinants of economic growth in India: A Time series analysis", *SOP* **Transactions On Economic Research,** *1*(2), 54-73.

BLOOM, D. E.; SACHS, J. D.; COLLIER, P.; UDRY, C. (1998). "Geography, demography, and economic growth in Africa", **Brookings papers on economic activity**, *1998*(2), 207-295.

BLOMSTROM, M.; LIPSEY, R.E.; ZEJAN, M. (1993). "Is Fixed Investment the Key to Economic Growth?", **NBER Working Paper** No. 4436.

BORENSZTEIN, E.; DE GREGORIO, J.; LEE J. W. (1998). "How does foreign direct investment affect economic growth?", **Journal of international Economics,** 45(1), 115-135.

BRENNER, T.; LEE, D. (2014). "Weather Conditions and Economic Growth- Is Productivity Hampered by Climate Change?", Working Papers on Innovation and Space No. 06.14, **Philipps-Universität**, Marburg.

BRUNO, M.; EASTERLY, W. (1998). "Inflation Crises and Long-run Growth", **Journal of Monetary Economics**, 41(1), 3-26.

BRUNO, M.; EASTERLY, W. (1996). "Inflation and Growth: in Search of A Stable Relationship", **Federal reserve Bank of st. louis Review**, *78*(May/June 1996).

CALDERON, C.A.; CHONG, A.; LOAYZA, N.V. (2002). "Determinants of Currents Account Deficits in Developing Countries", Contributions to Macroeconomics,**The B.E. Journal of Economics**, 2 (1), 1-31.

CHIRWA, T. G.; ODHIAMBO, N. M. (2016). "Macroeconomic Determinants of Economic Growth: A Review of International Literature", **The South East European Journal of Economics and Business**, *11*(2), 33-47.

CHIZONDE, B. (2016). "The Macroeconomic Determinants of Economic Growth in Zambia: Do Copper Prices Matter?", **MasterThesis,University of Dar es Salaam**, Tanzania. https://mpra.ub.uni-muenchen.de/87854/

CINYABUGUMA, M.; ENGLISH, P. (2014). "Senegal Economic Update: Learning from the Past for A Better Future. **The World Bank** (No. 94258, pp. 1-46).

CLEMENTS, B.J.; BHATTACHARYA, R.; NGUYEN, T.Q. (2003). "External Debt, Public Investment, and Growth in Low-Income Countries", **IMF Working Paper** No. 03/249.

CRENSHAW, E.M.; AMEEN, A.Z.; CHRISTENSON, M. (1997). "Population Dynamics and Economic Development: Age-Specific Population Growth Rates and Economic Growth in Developing Countries 1965 to 1990", **American Sociological Review**, 62(6), 974-984.

DAMOENSE-AZEVEDO, M. Y. (2013). "Modeling long-run determinants of economic growth for the Mauritian economy", **The Journal of Developing Areas**, *47*(1), 1-21.

DAO, M.Q. (2012). "Population and Economic Growth in Developing Countries", **International Journal of Academic Research in Business and Social Sciences**, 2(1), 6-17.

DAS, A.; SETHI, N. (2019). "Effect of foreign direct investment, remittances, and foreign aid on economic growth: Evidence from two emerging South Asian economies", **Journal of Public Affairs**, *20*(3), e2043.

DE LONG, J.B.; SUMMERS, L.H. (1990). "Equipment Investment and Economic Growth", **NBER Working Paper** No. 3515.

DELL, M.; JONES, B.F.; OLKEN, B.A. (2011). "Temperature Shocks and Economic Growth: Evidence from the Last Half Century", **American Economic Journal**: Macroeconomics, 4(3), 66-95.

DEWAN, E.; HUSSEIN, S. (2001). "Determinants of economic growth (Panel data approach)", Suva: Economics Department, **Reserve Bank of Fiji**.

DOMAR, E. D. (1946). "Capital expansion, rate of growth, and employment", Econometrica, **Journal of the Econometric Society,** 14(2) 137-147.

DOMAR, E. D. (1947). "Expansion and employment", **The American Economic Review**, 37(1) 34-55.

DOS SANTOS, M.D.; VINAY, F.P. (2000, March and June). "Migration as a Source of Growth: The Perspective of a Developing Country", **Paper presented at the 4th. T2M conference**, Paris, France and the 2000 SED meeting, San Jose, Costa Rica.

DPEE. (2021). "Situation Economique et financière en 2021 et perspective 2022 Economic and financial situation in 2021 and perspective 2022",. **DPMSP**, Senegal, November 2021.

EASTERLIN, R.A. (1967). "Effects of Population Growth on the Economic Development of Developing Countries", **The Annals of the American Academy of Political and Social Science,** 369(1), 98-108.

EDWARDS, S. (2004). “Thirty Years of Current Account Imbalances, Current Account Reversals and Sudden Stops”, **NBER Working Paper Series**. Working Paper No. 10276.

ERKİNHARJU, S. (2021). “The İmpact of Official Development Assistance on Economic Growth”, **Master's thesis, University of Turku**.

FISCHER, S. (1991). “Growth, Macroeconomics, and Development”, **NBER** Macroeconomics Annual 1991, Volume 6, 329 – 379.

FISCHER, S. (1993). “The Role of Macroeconomic Factors in Growth”, **Journal of Monetary Economics** 32.3 (1993): 485-512.

GALLUP, J. L.: SACHS, J. D.; MELLINGER, A. D. (1999). “Geography and Economic Development”, **International Regional Science Review**, 22(2), 179-232.

GASSAMA, K.; SYLLA, F. (2018). “Sénégal_Afrique Perspectives économiques 2018 (Senegal_Africa Economic Outlook 2018)”, **African Development Bank**.

GEBRU, T. (2015). “The Determinants of Economic Growth in Ethiopia: A time series analysis”, **MasterThesis, Addis Ababa University**, Addis Ababa, Ethiopia.

GLAESER, E.L; SCHEINKMAND, J.A.; SHLEIFERA, A. (1995). “Economic Growth in a Cross-section of Cities”, **Journal of Monetary Economics**, 36(1), 117-143.

GRIER, K.B.; TULLOCK,G. (1989). “An Empirical Analysis of Cross-National Economic Growth”, 1951-80. **Journal of Monetary Economics**, 24, 259-276.

HARRIS, D. J. (2007). “The Classical Theory of Economic Growth”, **The new Palgrave dictionary of economics,** 1-10.

HARROD, R. F. (1939). “An Essay in Dynamic Theory”, **Economic Journal**, 49, 14-33.

HARROD, R. F. (1948). “Towards a Dynamic Economics: Some Recent Developments of Economic Theory and Their Application to Policy”, **MacMillan** and Company, London.

HAMMAM, R. M. (2010). “Determinants of Egypt’s Economic growth”, **The American University in Cairo**, A Thesis Submitted to Economics Department, Cairo.

HASSEN A. S. (2017). “Determinants of Economic Growth in Ethiopia: A Time Series Analysis”, 1980-2014. **Gazi University, MA Thesis**, Turkey.

HAVI, E. D. K.; ENU, P.; OSEI-GYIMAH, F.; ATTAH-OBENG, P.; OPOKU, C. D. K. (2013). “Macroeconomic determinants of economic growth in Ghana: Cointegration approach”, **European Scientific Journal**, *9*(19) 156-175.

ISMAILA, M.; IMOUGHELE, L. E. (2015). “Macroeconomic Determinants of Economic Growth in Nigeria: A Co-Integration Approach”, **International**

Journal of Academic Research in Economics and Management Sciences, *4*(1), 34-46.

KALAITZIDAKIS, P.; MAMUNEAS, T.P.; SAVVIDES, A.; STENGOS, T. (2001). "Measures of Human Capital and Nonlinearities in Economic Growth", **Journal of Economic Growth**, 6, 229-254.

KEYNES, J.M (1936), "The General Theory of Employment, Interest and Money", Khaled R.M. **MacMillan Cambridge University Press**.

KHAN, M. S.; SENHADJİ, A. S. (2000). "Threshold effects in the relationship between inflation and growth", **Available at SSRN 879840**. vol. 48, issue 1, 1.

KIDA, D. (2009). "The Determinants of Economic Growth: The Case of UEMOA", **African Institute for Development and Planning**, United Nations.

KOGID, M.; MULOK, D.; BEATRICE, L.F.Y.; MANSUR, K. (2010). "Determinant Factors of Economic Growth in Malaysia: Multivariate Cointegration and Causality Analysis", **European Journal of Economics, Finance and Administrative Sciences** Issue- 24, 123-137.

KRUEGER, A.B.; LINDAHL, M. (2001). "Education for Growth: Why and for Whom? ", **Journal of Economic Literature**, 39(4), 1101-1136.

MANKIW, N.G.; ROMER, D.; WEIL, D.N. (1992). "A Contribution to the Empirics of Economic Growth", **The Quarterly Journal of Economics**, 107(2), 407-437.

MCEACHERN, W. A. (2016). "Economics: A contemporary introduction", **Cengage Learning**.

MEKONNEN, A. (2017). "Determinants Of Economic Growth In Ethiopia: A Time Series Analysis", **Doctoral dissertation, St. Mary's University**.

MELLO, L.R. (1999). "Foreign Direct Investment-Led Growth: Evidence from Time Series And Panel Data", **Oxford Economic Papers**, 51(1), 133-151.

MEPC. (2020). "Situation Economique et financière en 2020 et perspective 2021 Economic and financial situation in 2020 and perspective 2021", **DPMSP**, Senegal, November 2020.

MEFP. (2018). "Rapport D'activité Annuel Edition 2018 (Annual Activity Report 2018 edition) ", **MEFP**, Senegal.

MO, P. H. (2001). "Corruption and Economic Growth", **Journal of Comparative Economics**, 29(1), 66-79.

MORAL-BENITO, E. (2012). "Determinants of Economic Growth: a Bayesian Panel Data Approach", **Review of Economics and Statistics**, *94*(2), 566-579.

NOULA, A. G. (1994). "Analyse de la Croissance Economique au Sénégal", **Center for Economic Research on Africa,** Department of Economics and Finance, School of Business, Montclair State.

OKETCH, M.O. (2006). "Determinants of Human Capital Formation and Economic Growth Of African Countries", **Economics of Education Review,** 25(5), 554-564.

OKOMBI, I. F. (2019). "Les Déterminants de la Croissance Economique dans les Pays de la CEMAC: cas du Congo", **Annale des Sciences Economiques et de Gestion**, *18*(2): 252-268.

ONYIMADU, C. O. (2015). "An overview of endogenous growth models: Theory and critique", **International Journal of Physical and Social Sciences**, *5*(3): 2249-5894.

OZGEN, C.; NIJKAMP, P.; POOT, J. (2010). "The effect of migration on income growth and convergence: Meta-analytic evidence", **Papers in Regional Science**, *89*(3), 537-561.

PATTİLLO, C. A.; POİRSON, H.; RİCCİ, L. A. (2002). "External debt and growth", Available at SSRN 879569. **IMF working paper**, 2(69): 48.

PAUL, S. (2002, May). "Demography and Finance-Finance and Growth", **Paper presented at seminar at Institute for Futures Studies**, Stockholm, Sweden.

PESARAN, M. H.; SHIN, Y.; SMITH, R. J. (2001). "Bounds Testing Approaches to The Analysis of Level Relationships", **Journal of applied econometrics**, *16*(3), 289-326.

PETRAKOS, G.; ARVANITIDIS, P.; PAVLEAS, S. (2007). "Determinants of Economic Growth: The Experts' View", Dynamic Regions in a Knowledge-Driven Global Economy: **Lessons and Policy Implications for the European Union** (DYNREG) Research Project.

PRASAD, E.S.; RAJAN, R.G.; SUBRAMANIAN, A. (2007). "Foreign Capital and Economic Growth", **NBER Working Paper Series**. The Brookings Institution, vol. 38(1), 153-230.

PRITCHETT, L. (2001). "Where has all the Education Gone?", **The World Bank Economic Review**, 15 (3), 367–391.

REFAEİ, R.; SAMETİ, M. (2015). "Official Development Assistance And Economic Growth in Iran", **International Journal of Management, Accounting and Economics**, *2*(2), 125-135.

SACHS, J. D.; WARNER, A.; ÅSLUND, A.; FISCHER, S. (1995). "Economic Reform and the Process of Global Integration", **Brookings Papers On Economic Activity**, *1995*(1), 1-118.

SANDRINE, M. S.; ROBILLIARD, A. S. (2010). "Study on Shared Growth in Senegal 2001-2005", **Paris School of Economy/ Paris Dauphine University**, France. https://halshs.archives-ouvertes.fr/halshs-00966347

SANYANG, M. L. (2019) "The. Determinants of Economic Growth. in the Gambia: A Time Series", Analysis. **Gaziantep University**, Turkey.

SCHCLAREK, A.; RAMON-BALLESTER, F. (2005). "External Debt And Economic Growth in Latin America", **Paper not yet published**. *Download at http://www. cbaeconomia. com/Debt-latin. pdf.*

SİDRAUSKI, M. (1967). "Inflation and economic growth", **Journal of political economy,** *75*(6), 796-810.

SIRAJ, T. (2012). Official Development Assistance (ODA), "Public Spending and Economic Growth in Ethiopia", **Journal of Economics and International Finance**, *4*(8), 173-191.

SOLOW, R. M. (1956). "A Contribution to the Theory of Economic Growth", **The quarterly journal of economic**s, *70*(1), 65-94.

SONG, C. (2006). "Global Challenges And Strategies For Control, Conversion and Utilization of CO2 for Sustainable Development Involving Energy, Catalysis, Adsorption and Chemical Processing", **Catalysis today**, *115*(1-4), 2-32.

SMITH A. (1776). "An Inquiry to the Nature and Causes of the Wealth of Nations", The Glasgow Edition of the Works and Correspondence of Adam Smith, Oxford: **Oxford University Press.**

SNOWDON, B.; VANE, H. R. (2005). "Modern Macroeconomics: Its Origins, Development and Current State", **Edward Elgar Publishing, Cheltenham**.

SWAN, T. W. (1956). "Economic Growth and Capital Accumulation", **Economic record,** *32*(2), 334-361.

TAVARES, J.; WACZIARG, R. (2001). "How Democracy Affects Growth?", **European Economic Review**, 45, 1341-1378.

TEMPLE, J. (1999). "A Positive Effect of Human Capital on Growth", Economics Letters, 65(1), 131-134.

TENOU, K. (1999). "Les Déterminants de la Croissance a Long Terme dans les Pays de l'UEMOA", **Notes d'Information et Statistiques, Etudes et Recherches**, *493*.

TOBİN, J. (1965). "Money and Economic Growth", *Econometrica:* **Journal of the Econometric Society**, *33*(4), 671-684.

TODA, H. Y.; YAMAMOTO, T. (1995). "Statistical Inference in Vector Autoregressions with Possibly Integrated Processes", **Journal of econometrics**, *66*(1-2), 225-250.

ULKU, H. (2004). "R&D, Innovation, and Economic Growth: An Empirical Analysis" **International Monetary Fund.** WP/04/185. Retrieved from https://www.imf.org/external/pubs/ft/wp/2004/wp0 4185. pdf.

VEIGA, J. L.; ALEXANDRA F.; TIAGO S. (2014). "Public Debt, Economic Growth, and Ination in African Economies" **Munich Personal RePEc Archive**, working Paper No. 57377, posted 17. July 2014.

VELEDİNAH, J. M. (2014). "Impact of Official Development Assistance On Economic Growth in Kenya", Doctoral dissertation, **University of Nairobi**.

VIJAYARAGHAVAN, M.; WARD, W.A. (2001). "Institutions and Economic Growth: Empirical Evidence for a Cross-National Analysis", Working Paper, **Center for International Trade, Clemson University**.

YANIKKAYA, H. (2003). "Trade Openness and Economic Growth: A Cross-Country Empirical Investigation", **Journal of Development Economics**, *72*(1), 57– 89.

YELOU, C. (2000). "Analyse des Déterminants de la Croissance Economique dans un Pays en Développement: Cas Du Sénégal" Analysis of the Determinants of Economic Growth in a Developing Country: Case of Senegal'', **African Institute For Economic Development And Planning,** Economic Commission for Africa, United Nations.

WB (2019). World Bank, **World Bank Data** base last updated: 01/04/2019.

ZARDOUB, A.; SBOUI, F. (2021). "Impact of foreign direct investment, remittances and official development assistance on economic growth": panel data approach. **PSU Research Review.**