IMPACT OF FOREIGN AID ON ECONOMIC GROWTH IN SOMALIA: 1991-2020

BY

MOHAMED ABDIRAHMAN ALI

UNIVERSITY OF NAIROBI

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DECLARATION

This research project undertaking is truly mine and has not been submitted elsewhere for partial fulfilment of the award of any qualification in any other institution.

Signature…… Date 25th July 2022…….

Mohamed Abdirahman Ali

X51/10858/2018

This research project has been presented to me for scrutiny and perusal as the university supervisor.

Signature…… Date 15/09/2022…….

Dr. Samuel Nyandemo

School of Economics

University of Nairobi

DEDICATION

This project is dedicated to my family for encouraging me to pursue more knowledge and the unwavering support they have been offering while undertaking my postgraduate course.

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First and foremost, all praise goes to Allah for the inspiration, opportunity, and capacity to pursue and accomplish this course. To Dr. Samuel Nyandemo as the supervisor, special thanks for the advice, guidance, and support during proposal development. His immense knowledge and experience have encouraged me from the beginning. I appreciate the contribution of all my lecturers during my study at the University. I also acknowledge the University of Nairobi for creating a favorable study environment. Lastly, I express my gratitude to family members and friends for social and psychological support.

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LIST OF ACRONYMS AND ABBREVIATIONS

ADF	Augmented Dickey-Fuller test
ARDL	Autoregressive Distributed Lag
CLRM	Classical Linear Regression Model
DAC	Development Assistance Committee
DI	Domestic Investment
FDI	Foreign Direct Investment
FGLS	Feasible Generalized Least Squares
FGS	Federal Government of Somalia
GDP	Gross Domestic Product
MoPIED	Ministry of Planning, Investment, and Economic Development
NGOs	Non-Governmental Organisation
ODA	Official Development Assistance
OECD	Organization for Economic Co-operation and Development
OLS	Ordinary Least Squares
The U.K.	United Kingdom
UNDP	United Nations Development Programme
USA	United States of America
VAR	Vector Error Correction Model
W.B.	World Bank
WDI	Word Bank Development Index

ABSTRACT

The fundamental aim of aid is to create a platform for socio-economic growth. However, foreign aid has been criticized for only creating a cycle of economic dependency among recipient countries with no meaningful economic growth. There is no consensus among empirical studies on whether foreign aid stimulates or deters the country's economic growth. Since the fall of the Somali Republic in 1991, Somalia has consistently relied on foreign aid to build social amenities and boost the country's economic growth. However, the foreign aid donated to Somalia seems not to translate to positive economic growth. This study determined if foreign aid impacts economic growth in Somalia. The data adopted in the inquiry was acquired from the Word Bank Development Index, MoPIED, and UN Development Programme (UNDP) reports for the period spanning from 1991 to 2020. Data were analyzed using Eviews Software. The particular statistics included descriptive and inferential statistics. The descriptive statistics entail means, standard deviation, minimums, maximums, Skewness, and Kurtosis. Inferential statistics included the feasible generalized least squares to establish how economic growth is affected by foreign aid. Additionally, the study adopted the vector error correction model to find out the adjustment speed concerning long-run equilibrium. A significance level of p of <0.05 was used. Foreign aid negatively affects economic growth ($\beta=-0.070731$, $p=0.0777>0.05$). Capital formation substantially and positively inputs economic progress ($\beta=0.237644$, $p=0.0353<0.05$). Human Development Index has a positive but insignificant impact on economic advancement in Somalia ($\beta=0.013362$, $p=0.7955>0.05$). The effect of Labor Force Participation (LFP) on economic development is positive and noteworthy, as shown by ($\beta=0.119616$, $p=0.0255<0.05$). Physical capital positively and momentarily influences Somalia's economic growth ($\beta=0.464702$, $p=0.0023<0.05$). In contrast, technological growth positively affected economic growth, as shown by ($\beta=1.953641$, $p=0.0066<0.05$). The inquiry concludes that economic growth is insignificantly Influenced by foreign aid. Capital formation, physical capital, labor force participation, and technological growth have a weighty effect on Somalia's economic growth. In support of the international community, the Federal Government of Somalia (FGS) needs to refocus on other economic stimuli other than foreign aid. A favorable and peaceful environment is required for the growth of the Somali economy. Capital formation is intrinsically intertwined with the economic growth route of an emerging economy, including Somalia. It is recommended that the Somali

government raises the extent of capital formation to attain an elevated level of economic growth. There is a need for FGS to support the skilful training of its labor force. Economic growth requires physical capital, including equipment, machines, and other tools for efficient good and service production. The FGS may need to invest in efficient physical capital for efficient good and service production in the economy. The government of Somalia to invest more in research and development while partnering with global technology leaders to support technological growth that remains lagging in the country.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Somalia's economy has struggled since the fall of the Somali government in 1991. From then onwards, the country has witnessed continuous unending civil wars, including the ongoing war between the government and militant group, the Al Shabaab (Kenning, 2011). The unending conflict in Somalia has resulted in the disintegration of the once one Somalia into self-declared independent Somaliland and autonomous federal member states (Bradbury & Healy, 2010). As such, the economy has stagnated for a long period witnessing very small growth.

The economy of Somalia in nominal GDP was USD 4.049 billion in 2015, USD 4.2 billion in 2016, USD 4.509 billion in 2017, USD 4.72 billion (2018), USD 4.944 billion (2019), and USD 5.218 billion (2020). Compared to other countries in Africa sharing the same socio-economic backgrounds, Somalia's economy is far below, making the country among the poorest economies globally. Somalia's nominal economy GDP ranks 184/190 globally (World Bank, 2021). The social infrastructure in terms of roads, airlines, seaports, and social amenities like hospitals, educational services, government services, and other services remain poorly developed in Somalia. Regarding the business environment, Somalia ranks last globally (190/190 countries), implying that business enterprise development and growth in Somalia are worse (World Bank, 2021). The crumbling economy of over 30 years pushed the country to rely on foreign aid for sustenance.

Foreign aid refers to assistance consisting of either grants or loans offered by one state to another and can be multilateral, private, or bilateral help from Non-Governmental Organizations (NGOs) (Benham, 1962). According to World Bank (2015) and Official Development Assistance (ODA), foreign aid is funds or resources channeled from development agencies to developing countries through grants or loans. OECD (2015) defines foreign aid as official financial assistance to developing countries to support economic and social growth.

Grants are financial assistance extended to a country by states, federal governments, or local governments to finance certain projects. Grants include technical support but with no obligatory repayment (Sabra & Sartawi, 2015). Loans refer to financial assistance to a country by multilateral organizations and attract loan interest to be repaid by the recipient government together with the principal amount upon the expiry of the agreed repayment period (Juselius, Møller & Tarp, 2014). Foreign aid may target government, households, and the private sector to expand physical capital, healthcare system, education, and improved institution growth (Benham, 1962). Foreign aid aims to stimulate physical investment and enhance healthcare, education, and social services. Foreign aid is geared toward supporting the socio-economic welfare of countries and territories in need and entails multilateral aid from lending institutions like the World Bank, IFM, and bilateral aid from donor countries to recipient countries.

Foreign aid aims to spur the growth of the economy of the recipient countries by supporting capital growth, education, healthcare, and other social services. Physical capital investment can positively impact recipient countries' growth of the economy (Tüzemen & Barış-Tüzemen, 2015). When countries invest in health services, it is expected that this will result in a healthy nation that can work better and longer impact the economy's growth (Balcioglu, 2016). It is argued that investing in education results in a long-run improvement in human labor efficiency stimulating economic growth. Human capital investment through education results in the emergence of a skilled labor force required to drive the economy via the growth of business enterprises (Harris, 2021). Aid to the agriculture and food sector ensures that the population in the recipient is hunger-free and thus can participate in economic activities.

Foreign aid takes various forms; social, economic, and other (Bjørnskov, 2019). Economic aid act as physical capital to aid infrastructural growth and other forms of economic production; social aid connotes support aid to human capital, while other aids comprise aid support channeled to emergencies like food and health. White (1998) groups aid into program aid, including food aid, technical support, and project aid.

Project aid refers to help, both financial and non-financial channeled to support education, health, and rural development like transport, agricultural productivity, housing, electrification, water connections, and sanitation (Bjørnskov, 2019). Program aid refers to any financial help

but not connected to any particular activities and is in two main forms, budget and balance of payments support (Packenham, 2015). Balance of payment support aims to enhance a country's trade balance, while budget support entails aid to boost the recipient country's revenue growth and expenditure.

Technical support entails providing skills, know-how, knowledge, and technical advice (Rotarou & Ueta, 2009). Humanitarian aid is donor assistance to ease people's suffering from natural or artificial disasters to save lives (Kim, 2011). Humanitarian aid has been helpful in providing food and medicine to affected people, water, sanitation, and shelter intending to save lives/alleviate pain among people affected by human conflicts or natural disasters.

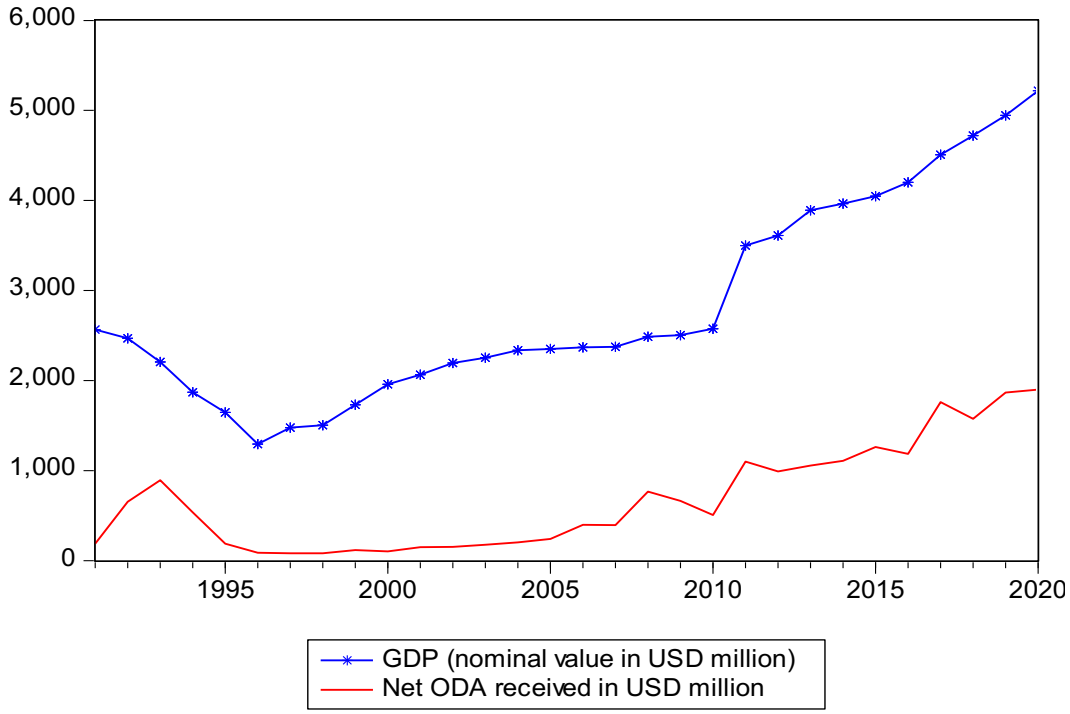
Foreign aid has remained a contentious subject among scholars resulting in diverse outcomes. It remains contentious if recipient countries are deriving economic benefits from aid or if they are becoming worse off by relying on aid (Bjørnskov, 2019). Despite massive aid to recipient countries for donor countries, the economic state of most recipient countries has consistently remained disintegrated, fragile, and stagnant, questioning the significant importance of foreign aid (Tarnoff, 2010). It is perceived that aid to recipient countries will stimulate economic growth, which is often the case. According to Akramov (2012), foreign aid channeled to these recipient countries becomes the source of conflict and a cycle of dependency, hindering any meaningful growth of the recipient country's economy.

1.1.1 Foreign Direct Aid and Economic Growth Somalia

Somalia remains a common recipient of foreign aid in the horn of Africa to a tune of over USD 55 billion from 1991 to 2020. Paradoxically, Somalia remains among the world's poorest countries with nominal GDP of less than USD 5.3 billion. Since the fall of the Somali government in 1991, Somalia has heavily relied on foreign aid for socio-economic support. Somalia received USD2 billion in foreign aid on a yearly basis in 2017 and 2018, equal to a 57% rise in the amount of foreign aid in comparison to the past five years from 2012 to 2016, when foreign aid averaged USD1.3 billion. Aid to Somalia is grouped into humanitarian aid and development aid. Humanitarian aid to Somalia was USD 1.331 billion in 2017, USD 1.138 billion in 2018, and USD 934 million in 2019. Development aid was USD 725 million in

2017, USD 874 million in 2018, and USD 924 million in 2019. Figure 1.1 shows Somalia's official development assistance in USD billion against nominal GDP in USD billion.

Figure 1.1: Net ODA Versus GDP nominal in Somalia (in USD billion) 1991-2020.



Source: WDI 2021: https://data.worldbank.org/country/SO

Figure 1.1 demonstrates that ODA to Somali has been rising over time. In 1991, ODA inflows to Somalia were USD186.4 million, and this rose to USD 892.1 million. The continuous fall of ODA in Somalia was recorded from 1994 to 1998. More ODA was channeled to Somalia from 1999 and subsequent years though there was a cut in 2010. By 2015, ODA inflow to Somalia was USD 1.260 billion. In 2016, ODA to Somalia was USD 1.3. The average ODA to GDP in 2016 was 21 percent, an implication that the Somali government heavily relies on foreign aid. In the same year, remittance flows were valued at USD 1.4 billion. In 2019, total aid to Somalia was USD1.9 billion, comprising USD 924 of development aid and USD 934 in humanitarian aid. Over 2011-2020, the percentage of ODA to nominal GDP averaged 38.1% (MoPIED, 2020). Percentage ODA to nominal GDP was highest at 47.6% in 2011 and lowest at 29.9% in 2013. In 2017, 2018, 2019 and 2020, the percentage ODA to nominal GDP was 45.7%, 46.0%, 37.6% and 36.4% respectively.

The European Union (E.U.), United Kingdom (U.K.), World Bank (W.B.), Germany, and the USA are the largest donors of foreign aid to Somalia. The greatest donors of development aid in 2019 were WB (9%), the U.K. (14%), E.U. (27%), and Germany (11%), all contributing greater than 50% of aggregate development aid (USD 500 million) in Somalia (MoPIED, 2020).

In 2018, the U.S. (38%), the U.K. (17), the E.U. (13%), and Germany (10) were the biggest provider of humanitarian aid in Somalia to a tune of 78% (USD 883 million) (MoPIED, 2020). Top 10 donors channeled 89% (USD 1.01 billion) of humanitarian aid to Somalia in 2018. In 2019, Humanitarian aid by country was 49% from the USA, E.U. (9%), Germany (9%), and the U.K. (9%). Table 1.1 indicates the spending of foreign aid in Somalia by subsectors of the economy.

Table 1.1: The spending of foreign aid in Somalia by sub-sectors

Sub-Sectors in USD million	2017	2018	2019	2020	Average*
Peace, security, and the rule of law	113.3	187	139	96.4	133.9
Institutions growth	173.5	186.1	155.2	120	158.7
Stimuli to the economy	68.5	87.4	58.8	39.9	63.7
Infrastructural facilities	75.8	97	82.9	98.8	88.6
Social and Human growth	177.3	179.4	200.8	94.8	163.1
Resilience	720.3	386.2	291.0	170.2	391.9
others (civil society, media, and cross-cutting)	18.4	12.7	14.0	19.2	16.1

(MoPIED, 2020)

Table 1.1 shows how foreign aid donated to Somalia was spent from 2017-2020. It is evident in table 1.1 that resilience (food security, migration, displacement, refugees and, durable solutions, and social protection & safety nets) has been getting the largest portion of foreign aid in Somalia over the observed period. Other greatest beneficiaries of the aid include social & human development, effective institutions, and peace and security & the rule of law, respectively (MoPIED, 2020). Allocation of foreign aid was lowest to others (civil society, media), economic stimuli, and infrastructure. It is evident in Table 1.1 that allocation of the

aid to economic stimuli is low, and this may attribute to the small margins of economic growth in Somalia.

1.2 Problem Statement

Somalia's foreign aid continues to rise as a foreign direct investment (FDI) declines (Ali, Dalmar, & Ali, 2018). FDI can stimulate the economic growth of a country by creating job opportunities, creating capital stock, and facilitating knowledge and technology transfers. Furthermore, foreign aid and FDI complement domestic investment (DI) that stimulate economic growth (Younsi et al., 2021).

The fundamental aim of aid is to create a platform for socio-economic growth (Sabra & Sartawi, 2015). However, foreign aid has been criticized that it only creating a cycle of economic dependency among recipient countries with no meaningful economic growth (Balcioglu, 2016). There is no consensus among empirical studies on whether foreign aid stimulates or deters the economic growth of a country (Ibrahim & Dahie, 2016). There are those scholars who argue that foreign aid stimulates economic growth of nations least endowed with resources and economic capabilities (Ibrahim & Dahie, 2016; Ali, Dalmar & Ali, 2018; Balcioglu, 2016). Advocators of foreign aid argue that aid can stimulate social capital growth and growth in household income, thus economic growth.

Currently, limited research elaborating the relationship between Somalia's economic development and external aid is limited. Since a country's economic development is considerably attributed to FDI and DI, it is crucial to examine how foreign aid affects Somalia's economic prosperity, which has been facing political instability for three decades. Therefore, this research aimed to address the knowledge gaps on how foreign aid impacts Somalia's economic growth. The research adopted a quantitative approach. Data from credible agencies would be gathered to determine how foreign aid impacts economic progression of the politically unstable country.

1.3 Research Objectives

The main objective was to determine the impact of foreign aid on economic growth in Somalia.

Specifically, this study sought to:

i. To determine the impact of official development assistance on economic growth in Somalia.
ii. To determine the impact of other factors of production on economic growth in Somalia.
iii. Draw policy recommendations regarding foreign aid and economic growth.

1.4 Research Questions

The research questions answered were:

i. What is the impact of official development assistance on economic growth in Somalia?
ii. What is the impact of factors of production on economic growth in Somalia?
iii. What policy recommendations can be drawn regarding foreign aid flow and economic growth?

1.5 Value of the Study

The results inform policy guidelines, and thus, the findings are of value to the government of Somalia through the MoPIED, donors, and scholars. The Somalia government, through the MoPIED, may review its guidelines on how to allocate foreign aid proportionately to be viable in the long run. The government of Somalia may also re-evaluate if dependence on foreign aid is sustainable for the growth of the economy or not and formulate other economic policies to bolster the evolution of the Somali economy.

The findings from the proposed study are also of significant importance to donor countries (Official Development Assistance). The study helps donors assess the allocation and subsequent usage of the donor funds and make critical decisions on whether to scale up the funding or down.

The results will inform future research regarding the subject. There have been no empirical studies on whether foreign aid stimulates or deters a nation's economic growth. Thus, the results from the study shall help ascertain the nature of the relationship and whether the findings agree or disagree with past literature studies. The study shall also act as a reference for other scholars and researchers.

1.6 Scope of the Study

The study determined the influence of foreign aid on Somalia's economic growth for the period 1991-2020 through a time-series analysis approach. The period of 1991-2020 has been chosen because of the relatively inaccessible macroeconomic time series data for Somalia, owing to the fact that the country has not been consistently reporting macroeconomic data since the fall of the federal government in 1990. Secondary data sources such as the World Bank Development Index (WDI) and Somalia's Ministry of Planning, Investment, and Economic Development reports were used in compiling this report. Economic growth and foreign aid data was collected for consideration and further analysis.

1.7 Organization of the Study

The outstanding sections of this study are structured in the following order: Chapter two presents the theoretical review underpinning the study and literature review. Chapter three outlines the theoretical model, analytical model, data sources, operationalization of variables, and diagnostic tests. Chapter four outlines the result and discussions, as chapter five outlines the summary and conclusions, as well as recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter outlines the theoretical review and empirical review regarding foreign aid and economic growth. The chapter closes with an overview literature review.

2.2 Theoretical Review

Foreign aid is provided to supplement domestic savings, creating an additional stock of foreign exchange, and facilitating the transfer of technologies. The use of foreign aid solely rely on how the recipient country utilizes the aid and may create synergy beyond the point applied. This inquiry was directed by the Neoclassical Growth Model, Harrod-Domar Model, and Gap Models. The presentation of the theory follows the pattern of who proposed the theory, what the theory says, and how the theory is relevant to the current study.

2.2.1 Neoclassical Growth Theory

The neoclassical growth concepts were modeled by Solow and Swan in 1956, who posited that economic growth is dependent on labor, capital, and technology. An economy may be limited in terms of labor and capital; however, for technology, the contribution is limitless (Solow & Swan, 1956). The total output of an economy, according to the neo-classical model, will be subject to the quality of the capital, and labor supply, as well as the average skills (Solow, 1999). Nonetheless, when the economy approaches the full equilibrium point, stock capital per worker will only grow with the increase in productivity either via improvement in the quality of labor or improved capital stock (Solow, 2001).

Solow's model has its own assumptions. The assumptions include shrinking marginal productivity of capital, technical growth exogenously determined, and level of substitution between labor and capital (Hahn, 2010). As per the Solow growth model, in the long run, positive technological growth, skilled labor force, high saving rate (investment rate), low capital depreciation rate, and lower degree of population growth are critical predictors of economic growth.

The economic growth can be modeled using mathematical expression:

$\Delta Yt = \frac{\delta Y \Delta Kt}{\Delta Kt} + \frac{\delta Y \Delta Lt}{\delta L} +$
$\frac{\delta Y \Delta At}{\delta A}$……………………………………………………………...2.1

Divide both sides of equation 2.1 by *Yt*; it becomes that: -

$$\frac{\Delta Yt}{\Delta Yt} = \frac{\delta Y \Delta Kt}{\Delta Kt \Delta Yt} + \frac{\delta Y \Delta Lt}{\delta L \Delta Yt} + \frac{\delta Y \Delta At}{\delta A \Delta Yt} \ldots\ldots\ldots\ldots\ldots 2.2$$

The equation shown above provides a decomposition of GDP growth into parts linked to growth in labor force, capital stock, and technological growth. Then

$\frac{\delta Y}{\delta K} * \frac{\Delta Kt}{\Delta Yt} = \frac{\delta Y}{\delta K} * \frac{Kt}{Yt} * \frac{\Delta K}{Kt} = \beta K \frac{\Delta K}{Kt} =$
$\beta K g K$……………………………………………….……….2.3

Employing the same approach for labor and technology, the simplified form of Equation 2.2 in growth form is as follows.

$$gy = \beta K g K + \beta L g L + \beta A g A \ldots\ldots\ldots\ldots\ldots 2.4$$

or

$\beta A g A = gy - (\beta K g K + \beta L g L)$…………………………………………………………..
2.5

Equation 2.5 shows the Solow residual in the long run. Because there is the constant return to scale assumption of constant return to s and a perfectly competitive market under the Solow growth model, the sum of labor and capital share is unity. That is, given that:

share of capital is βk,

share of labor is 1- βk = βL,

the equation shown above can be modified as

$$\beta A g A = gy - (\beta K g K + (1 - \beta k) g L) \ldots\ldots\ldots\ldots\ldots 2.6$$

Where *gy* is the GDP growth rate; *gk* is the rate of physical capital growth; *gL* is the human capital growth rate; *gA* is the rate of technology growth, and *βk*, βL, *and βA* are the marginal forces of capital, labor force, as well as technology, in that order. Thus, according to equation 2.6, growth in capital, labor, and technology stimulate economic growth.

Foreign aid is meant to stimulate the economy by supporting the many factions of the economy, including peace, security & the rule of law, supporting institutions, supporting the business through capital investment infrastructure, social & human development, resilience, and productive sectors like agriculture, among others (civil society, media, and cross-cutting). This study will therefore determine if foreign assistance shapes the progression of the Somali economy by considering the Solow growth postulations.

2.2.2 Harrod-Domar Model and Gap Models

Harrod (1939) and Domar (1946) separately created a model that postulates that investment rate and investment productivity are two factors affecting economic output. Investment is funded through savings that combine foreign and domestic savings Considering an open economy. Harrod-Domar's model predicts the growth of the economy based on the capital-output coefficient and saving ratio.

$$g= (I/Y)/\mu$$

$$I/Y=A/Y+S/Y$$

I is the desired level of investment, output is represented by Y; g represents the target GDP growth, A symbolizes aid, S is domestic savings while incremental capital-output ratio (ICOR) is represented by μ.

The ICOR indicates the number of extra capital units required to generate one additional unit of output. Therefore, the incremental capital-output ratio infers the proportion of investment to the growth rate (Easterly, 1999). Lower ICOR denotes quality investment (Sng, 2009). Using the idea of incremental capital-output ratio, the Harrod-Domar is useful in stimulating economic growth in less developed countries with small resource endowments (de Silver, 1984). It becomes easy to determine the level of capital investments and aid assistance to generate a certain level of economic output.

Nonetheless, in the short run, there is doubt that there exist a stable linear nexus between investment and growth rate. The endogenous growth model stresses the role of multiple inputs, including physical capital like human capital, social capital, technology, intermediate new goods, institutional design, and organizational capital (Van den Berg, 2013). Notwithstanding, savings, particularly domestic savings, provide a source of savings for investment that is required to boost economic growth (Boianovsky, 2018). For low-income countries, which highly rely on foreign aid, increasing the saving rate will stimulate economic output.

Adelman and Chenery (1966) expounded on the Harrod-Domar model to bring out the two-gap model. Shortage in labor force participation, under the two-gap framework. Developing countries often import goods and services critical for investment but end up importing more than exports creating a balance deficit (Hjertholm & White, 2000). Thus, investment is limited due to either a domestic savings shortage (saving gap) or a deficit in the balance of trade (trade gap) (Bugmann, 2001). Thus, inflows of foreign aid inflows aim to fill the two gaps and enable lowly resourced countries to enhance their economic productivity.

The third fiscal gap, which concentrates on government revenue and expenditures, was introduced as a result of the crippling debt problem of the 1980s (Griffin & Enos, 1970). The gaps include the fiscal, the trade, and the saving-investment gaps. The fiscal gap is defined as the difference between government revenues and aggregate expenditures though it may be a subcomponent of the saving gap (Hjertholm & White, 2000). Because of the fiscal gap, the government may find itself constrained because the resources for import and investment are little (Bugmann, 2001). The three-gap model help understands government budget constrain and not foreign exchange. Thus, the presence of foreign aid will supplement the government' own revenue, thus boosting economic productivity.

The Harrod-Domar Model is useful in understanding foreign aid and how it impacts the economic productivity of a country. Lack of savings is one of the major limitations to the growth of the economy. In addition, economic advancement counts on the degree of accumulated physical capital. Thus, savings and accumulated physical capital are crucial stimulants of economic productivity. Under Harrod-Domar Model, foreign aid is meant to enhance savings in a country. Foreign aid can complement savings and increase economic

productivity. The savings can later be used to stimulate economic growth by supporting economic sectors. Savings are essential in capital formation, which is necessary for stimulating economic growth.

2.3 Empirical Review

Over the period 1970 to 2024, Ali, Dalmar, and Ali (2018) investigated the extent to which external aid and debt influence Somalia's economic growth. Ordinary Least Squares (OLS) technique was employed. Foreign aid has a constructive and substantial influence on economic progression. Nevertheless, the inquiry by Ali, Dalmar, and Ali (2018) employed the basic OLS method, which OLS may not be very effective when the data under consideration is time-series in nature and may result in incorrect parameter estimates presenting methodological gaps.

Ibrahim and Dahie (2016) studied the influence of foreign assistance and domestic investment on the advancement of Somalia's economy. Ordinary least squares as the estimation technique was employed. Foreign aid positively impacts the growth of the Somali economy. OLS method may not produce accurate coefficient estimates based on the fact that the data under consideration are time series presenting a methodological gap.

In Palestine, Sabra and Sartawi (2015) investigated the consequences of foreign financial help on economic growth, Dutch disease presence, and domestic savings. The study employed OLS as the estimation method. Foreign aid impacts economic growth adversely. OLS method may not produce accurate coefficient estimates based on the fact that the data under consideration are time series presenting a methodological gap.

Using multivariate time-series data, Juselius *et al.* (2014) investigated how foreign aid affects macro-economies of 36 selected countries in Africa. The study time scope was 1960 to 2007. Results indicated a desirable long-run effect of ODA inflows on the economies. Little evidence was found that foreign aid is harmful to the economies studied. However, the study did not indicate the aggregate influence of financial assistance on individual nation's economic growth.

In Turkey, between 1967 to 2013, Tüzemen and Barış-Tüzemen (2015) determined how foreign aid impacts economic growth. The researchers adopted the ECM and Johansen Cointegration models in their study. It was found that economic growth is impacted by foreign

aid, and the relationship is nonlinear. However, the study did not indicate the characteristics of the association that existed between a country's economic growth and external aid.

Employing a panel model for chosen Turkic countries from 1992 to 2014, Balcioglu (2016) delved into a study that sought to uncover the nexus between foreign aid and economic growth. Data from Turkmenistan, Uzbekistan, Kyrgyzstan, Azerbaijan, Georgia, and Kazakhstan were collected; thus, panel model. Foreign aid significantly and positively impacts the growth of the economies across all the selected countries. Compared to Somalia, the Turkish government does not heavily rely on foreign aid to stimulate the economy's growth and so the effect of foreign aid on the economy may differ considerably.

In India, Mohapatra, Giri, and Sehrawat (2016) assessed the nexus between foreign aid and macroeconomic policies, as well as economic growth from 1970 to 2014. The paper employed the ARDL test and the VECM approach. Foreign aid had a desirable effect on the economy though the effect is insignificant on short term. VECM results indicated unidirectional causality from trade openness, government expenditure, and foreign aid to the growth of the economy in India. Impulse results showed a positive response in economic progress as a result of foreign aid. The allocation of foreign aid to diverse economic subsectors may differ significantly across countries, warranting further research in other countries that heavily rely on aid, like Somalia.

Siddique et al. (2017) determined if foreign aid impact the growth of the economy. The study was a panel approach of countries in South and East Asia from 1995 to 2013. Foreign aid was found to strongly and significantly promote economic growth across the countries selected. Foreign aid significantly and positively impacts gross domestic product in South and East Asian countries. This current study presents a methodological gap.

While focusing on Sub-Saharan Africa, Ahmed (2014) determined if foreign aid impacts economic growth. The study employed cross-sectional data over the years 2000 to 2012 and employed OLS. It was discovered that foreign aid lacks a weighty effect on an economy's growth path. OLS method may not produce accurate coefficient estimates based on the fact that the data under consideration are time series presenting a methodological gap.

While focusing on Ethiopia, Gebresilassie and Gebre (2019) determined the relationship existing between economic development and growth and foreign aid. The investigation employed time series data from 1974-2017, where ARDL and ECM were adopted to uncover the short and long-term linkage between foreign fiscal help and economic progression. The damaging and significant influence of foreign assistance on economic progression was evident in both short-term and long-term dependency on foreign aid. Short-term equilibrium was shifting to long-term at 84.6 percent. The allocation of foreign aid to various economic subsectors may differ significantly across countries, warranting further research in other countries that heavily rely on aid, like Somalia.

Kargbo (2012), over the period between 1970 and 2007, determined how foreign aid swayed economic growth for Sierra Leone. The study reveals that foreign assistance significantly influenced the growth of the country's economy. Foreign aid was found to be effective before the war compared to after the war. Though Somalia and Sierra Leone share similar political situations and overreliance on foreign aid, it is worth studying if foreign financial help impacts Somalia's economic growth to compare the scenario between the countries.

Alghamdi (2016) investigated if foreign aid promotes economic growth focusing on 54 African countries from 1980 to 2015. Pooled, GLS, and panel regression were employed to determine if foreign aid impact the growth of the economy. The scholars uncovered that aid from foreign countries positively influences the advancement of the African countries' economy, though the effect is small.

In Kenya, Gitaru (2015) determined if foreign aid impacted economic growth from 2006-2014. Time series data from WDI was employed. Foreign aid sways the economic advancement of the East African country positively and significantly. However, the OLS method and OLS method may not produce accurate coefficient estimates based on the fact that the data under consideration are time series presenting a methodological gap.

Anyieni (2014) further how foreign aid impacts economic growth in Kenya. The research proceeded through descriptive and quantitative analysis. The study utilized secondary data from WDI and IMF. The ordinary least square regression method was used. Foreign aid was identified to positively and significantly impact Kenya's economic growth. The study

employed the OLS method to recognize the nexus between foreign assistance on economic prosperity. OLS method may not produce accurate coefficient estimates based on the fact that the data under consideration are time series hence the methodological gap.

2.4 Overview of Literature

Past studies have presented conflicting conclusions and have constantly presented conflicting results (no consensus) on the impression of foreign assistance on economic progression or growth. Other scholars argue that foreign financial help has a substantial positive influence on economic progression (Ali, Dalmar & Ali, 2018; Ibrahim & Dahie, 2016; Balcioglu, 2016; Anyieni, 2014); others argue that the linkage is negative (Sabra, & Sartawi, 2015; Gebresilassie & Gebre, 2019) while others present insignificant connection between foreign assistance and economic development (Rmeileh, 2014; Mohapatra, Giri & Sehrawat, 2016; Ahmed, 2014).

However, in the study by Ali, Dalmar, and Ali (2018) and Ibrahim and Dahie (2016), OLS may not be very effective when dealing with time-series data and may result in incorrect parameter estimates, thus a methodological gap. It is against this that the present inquiry wishes to establish if foreign aid impacts the economic growth in Somalia.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter presents the study's theoretical and analytical model as well as the operationalization of variables, data sources, techniques for analyzing data, and model assumption tests.

3.1 Research Design

The times series research strategy is a study design that covers a longer period of time in months, quarters, biannual, and years and is the design used in this study and is appropriate in this case since it aims at collecting time series data for foreign aid, physical capital; labor force participation; technology, capital formation, and human development index from the year 1991 to 2020.

3.2 Theoretical Framework

Both the Harrod-Domar Model (Harrod, 1939; Domar, 1946) and the neoclassical growth theory proposed by Solow and Swan (1956) were adopted. The Solow model states that human effort, financial resources, and technological advancement are all necessary for a flourishing economy. Thus, the economic growth can be modeled as.

$$\Delta Yt = \frac{\delta Y \Delta Kt}{\Delta Kt} + \frac{\delta Y \Delta Lt}{\delta L} + \frac{\delta Y \Delta At}{\delta A} \quad \text{.....3.1}$$

$$\frac{\Delta Yt}{\Delta Yt} = \frac{\delta Y \Delta Kt}{\Delta Kt \Delta Yt} + \frac{\delta Y \Delta Lt}{\delta L \Delta Yt} + \frac{\delta Y \Delta At}{\delta A \Delta Yt} \quad \text{.....3.2}$$

The equation shown above categorizes GDP growth into parts connected to growth in the labor force, capital stock, and technological growth. Then

$$\frac{\delta Y}{\delta K} * \frac{\Delta Kt}{\Delta Yt} = \frac{\delta Y}{\delta K} * \frac{Kt}{Yt} * \frac{\Delta K}{Kt} = \beta K \frac{\Delta K}{Kt} = \beta K g K \quad \text{.....3.3}$$

Following the same approach, for labor and technology, the condensed form of Equation 2.2 in growth arrangement is as follows.

$$gy = \beta K g K + \beta L g L + \beta A g A \quad \text{.....3.4}$$

$$\beta A g A = gy - (\beta K g K + \beta L g L) \quad \text{.....3.5}$$

Because there is the constant return to scale assumption and a perfectly competitive market under the Solow growth model, the sum of labor and capital share is unity. That is, if the share of capital is βk, the share of labor will be 1- βk = βL, and the above equation can be rewritten as

$$\beta AgA = gy - (\beta KgK + (1 - \beta k)gL) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 3.6$$

Where *gy* is the GDP growth rate; *gk* is the speed of physical capital growth; *gL* is the rate at which the human capital grows; *gA* is the speed at which technology grows, and *βk*, βL, *and βA* are the marginal factors of capital, labor force, as well as technology in that arrangement Thus, according to equation 3.6, capital growth, labor and technology advancement stimulate economic growth. Therefore, the total factor productivity rate growth factor can be estimated using labor force, output growth rate and capital stock formulation.

Harrod-Domar postulates that economic output depends on the rate of investment and investment productivity. Investment is funded through savings that combine foreign and domestic savings. Considering an open economy, Harrod-Domar's model predicts the growth of the economy based on the capital-output coefficient and saving ratio.

g= (I/Y)/μ……3.7

I/Y=A/Y+S/Y……...…….3.8

I is the desired level of investments, the output is represented by Y; g represents the GDP growth target, A represents the foreign assistance, S stands for domestic savings and ICOR is represented by μ.

Thus, the postulation of the neoclassical growth theory and Harrod-Domar Model were combined to develop the analytical model of the study.

3.3 Analytical Model

The study sought to determine the impact of foreign aid on economic growth in Somalia. Basing on neoclassical growth theory, economic growth is a function of capital, technology and labor:

Economic growth= function (labor, capital, and technology) …….....…...…….3.9

$gy = f(gk, gL, gA)$……...……3.10

where

gy is the proportion of real GDP growth; *gk* embodies the physical capital growth rate; *gL* signifies the rate at which human capital grows; *gA* characterizes the speed of technology growth.

According to the Harrod-Domar model:

Economic growth= function (investment)…….……...…….…….3.11

Thus:

$gy = f(cf)$…….……..……3.12

Where

gy is the rate of real GDP growth, and cf is capital formation from the country's level of investment.

Equation 3.10 and equation 3.12 can be combined in the presence of foreign assistance and other control variables targeted by foreign help, the empirical equation to be determined in the proposed study are:

$gy = \beta_0 + \beta k + \beta L + \beta A + \beta Cf + HDI + FA$ ……..……..……. ……3.13

where

gy is economic growth rate; *the k* growth rate of physical capital; *L* is labor force participation; *A* represents a growth rate of technology; Cf is capital formation, F.A. is foreign aid, and HDI is human development index.

3.4 Description and Measurement of Variables

Economic growth (*gy*) embodies the dependent variable. On the other hand, the study's independent variable is foreign aid, while physical capital, labor force participation, the growth rate in technology, capital formation, and human development index are control variables. Table 3.1 shows variables of the study are defined and operationalized.

Table 3.1: Variable Definition, Measurement, and Expected Outcome

Variable	Measurement	Expected sign	Source
Economic growth	This is the monetary value of services offered and goods produced in Somalia over a determined time. Considering an open economy, annual GDP growth in % was used Considering an open economy.		WDI
Factors of production	Refers to production elements that stimulate economic growth. The factors identified in the literature include physical capital, labor force, and technology and capital formation.	±VE	WDI
Physical capital	Refers to the equipment employed in production and is measured using physical capital stock as % of GDP	±VE	WDI
Labour force participation (LFP)	The LFP rate is a total that is stated as a proportion of the total population aged 15 and above (LFP rate (% of total population ages 15+))	±VE	WDI
Technological growth	Refers to technological progress in output production. It was measured as the amount spend on research and development as % of GDP	±VE	WDI
Capital formation	Represents total value of inventories, gross fixed capital formation, and acquisitions deducting valuable disposals. Capital formation is gauged as a fraction of the gross capital formation to GDP	±VE	WDI
Human Development Index (HDI)	The HDI refers to the level of development of the human being based on three parameters. The parameters include education, health, and income,	±VE	UNDP reports

	where a composite index comprising the three parameters is a measure of HDI		
Foreign aid	Refers to net ODA channeled from donor countries to recipient countries for socio-economic growth. Aid is computed as Net ODA received per capita by the recipient country divided by initial GDP/capita. Aid as a percentage of GDP/capita	±VE	WDI

3.5 Data Source

Time series data between 1991 and 2020 was employed in this study. Sources of data were the WDI, MoPIED, Eurostat electronic database, and the UNDP reports.

3.6 Data analysis

Data were analyzed employing Eviews Software. The analysis involved both descriptive and inferential statistics. Descriptive statistics entailed means, standard deviation, minimums, maximums, Skewness, and Kurtosis. Inferential statistics included the feasible generalized least squares (FGLS) and Vector Error Correction framework. In this respect, the FGLS model was used to define the influence of foreign assistance on economic growth. The study also adopted the Vector Error Correction system to uncover the rate of adjustment towards long-term equilibrium. A significance level of p of <0.05 was used.

3.7 Pre Estimation Tests

3.7.1 Stationarity Test

As depicted by Gujarati and Porter (2011), the main importance of stationary time series is that if it is a non-stationary time series data modeled without checking for stationarity, incorrect parameter estimates are found. In addition, failure to account for stationarity may lead to spurious model estimates. The ADF test under the null hypothesis of non-stationarity was carried out on all the variables.

3.7.2 Cointegration Test

A cointegration test is important for determining the kind of model to be estimated. In this regard, the study tested for cointegration by employing the Johansen test for cointegration, subject to the no cointegration null hypothesis. The study found that all variables were integrated at level two and above; hence the vector error correction (VEC) model was employed.

3.8 Post estimation Tests

The post-estimation tests included the normality tests and serial correlation, as well as heteroscedasticity tests.

3.8.1 Normality Tests

Before running statistical models, the residuals should be normally distributed, which is not always the case (Zahediasl & Ghasemi, 2012). The normality assumption is very important in making precision about the data distribution. The Jarque-Bera test was employed to test for the normality of the data (Bera and Jarque, 1982). The study tested the H_0 that the data is not normal. If the calculated p-value>0.05, the H_0 is rejected. Data that is not normal calls for non-parametric tests generally deemed suitable.

3.8.2 Serial correlation

Serial correlation test checks if the error term of transfers from one period to the next. Errors can be correlated at first order (AR1) or second order (AR2). Breusch-Godfrey Serial Correlation L.M. Test was employed to check for serial correlation in the error terms. If the p-value>0.05, data does not suffer from serial correlation, and if the p-value<0.05, data suffers from serial correlation. In case a serial correlation is detected in data, the dependent variable is lagged.

3.8.3 Heteroscedasticity

The inquiry employed the Breusch-Pagan/Godfrey to check for heteroscedasticity. The H_0 symbolizes that the error variance is homoskedastic. In case the H_0 is overruled and concluded that heteroscedasticity is present in the data, the model was represented by running an FGLS model. At the point when the p-value<0.05, Heteroscedasticity is present; when the p-value>0.05, there is an absence of Heteroscedasticity.

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSIONS

4.0 Introduction

This chapter presents results of the study analysis as well as findings of the study in line with the study variables. It is divided into the following sections consisting of descriptive statistics, trend analysis, diagnostic tests, models and discussions.

4.1 Descriptive Statistics

The descriptive statistics included means, median, maximum and minimum values, standard deviation of the variables used in the study. These statistics are shown in Table 4.1.

Table 4.1: Descriptive Statistics

	GDP	HDI	LFP	K	A	FA	CF
Mean	1.621388	30.77333	33.23167	4.110437	0.280643	29.17521	20.00347
Median	2.60333	30.8	33.24	3.6375	0.3205	28.86575	21.92252
Maximum	3.9	41.4	38.92	10.056	0.519	47.64218	42.39582
Minimum	-12	20.7	27.49	1.029	0.013	10.19789	9.605534
Std. Dev.	3.124848	4.002407	2.192391	2.538202	0.143069	10.08339	9.092113
Skewness	-3.03273	-0.06395	-0.32843	-0.87180	-0.43196	-0.16586	-0.43803
Kurtosis	13.17998	4.395779	4.487334	2.755484	1.835193	2.494643	2.208528
Jarque-Bera	175.5273	2.455697	3.304543	3.874969	2.628898	0.456786	1.742384

Probability	0	0.292922	0.191614	0.144066	0.268622	0.795811	0.418452
Sum	48.64165	923.2	996.95	123.3131	8.4193	875.2562	600.1041
Sum Sq. Dev.	283.1756	464.5587	139.3908	186.8317	0.593516	2948.568	2397.329
Observations	30	30	30	30	30	30	30

GDP= annual GDP growth in %, HDI= composite index measuring average achievement in three basic dimensions of human development education, health and income, labour force participation (LFP)= % of the total population aged 15 and above, k= Physical Capital (% physical capital stock to GDP), A= Technology, amount spend on research and development as % of GDP, FA= Foreign aid, net ODA as % of GDP, CF= Capital formation, Gross capital formation (% of GDP).

The descriptive study findings for Economic Growth indicated that annualized GDP growth averaged 1.621388% from 1991 to 2021. Between 1991 and 2020, the GDP growth rates were a minimum of -12% and a maximum of 3.9%. The standard deviation of the GDP rate was 3.124848, indicating that GDP fluctuated over the testing period. Since the Jarque-Bera test yielded a probability of 175.5273, this is evident that the data is normally distributed and thus reject the 5% level of confidence normality null hypothesis. However, the GDP data were slightly atypical, with a skewness degree of -3.03273 and kurtosis of 13.17998, as determined by Kline (2011). Kline (2011) claims that differences between 3 and 10 are relatively common.

Throughout the years 1991-2020, the average HDI was 30.77333. Between 1991 and 2020, the HDI ranged from 20.7 to 414. The variation in HDI growth during the study period was indicated by a standard deviation of 4.002407. According to the results of the Jarque-Bera test, the data are normally distributed, rejecting the null hypothesis at the 5% level of significance.

From 1991 to 2020, the mean LFP was 33.23167. We found that the median LFP was 38.92, and the minimum was 27.49. Having a standard deviation of 2.192391 indicates that LFP changed over the course of the period under study. The value of 3.304543 for the Jarque-Bera test indicates that the data are normally distributed, rejecting the null hypothesis at the 5%

significance level. With a skewness of -0.32843 and kurtosis of 4.487334, these data are close to normal, per Kline's (2011) definition.

Throughout the years 1991-2020, the average LFP was 33.23167. We found that the median LFP was 38.92, and the minimum was 27.49. As the standard deviation for LFP during the time period under study was 2.192391, we can conclude that LFP was not constant. The value of 3.304543 for the Jarque-Bera test indicates that the null hypothesis of the data's normality was rejected at the 5% statistical significance, and the data were found to be normally distributed. According to Kline (2011), a skewness of -0.32843 and a kurtosis value of 4.487334 indicate a nearly normal distribution.

During the timeframe of this study, physical capital (k) averaged 4.110437. Results ranged from a low of 1.029 to a high of 10.056 for k. The standard deviation was 2.538202, suggesting that k was not stable throughout the time period under study. The value of 3.874969 for the Jarque-Bera test indicates that the null hypothesis was rejected with a 5% level of significance. This information is considered normal, etc. There was a skewness of 0.871807 and kurtosis of 2.755484.

Between 1991 and 2020, the average value of F.A. was 29.17521. Between 1991 and 2020, the minimum and maximum F.A. were 10.1978 and 47.64218, respectively. Growth in F.A. was also variable over the course of the study period, as indicated by the standard deviation of 10.08339. The results of the Jarque-Bera test indicate that the data are normally distributed; and null hypothesis rejected at 5% level of significance.

Last but not least, the average C.F. from 1991 to 2020 was 20.00347%. C.F. as a percentage has been as low as 9.605534% and as high as 42.39582%. C.F. had a wide range of values throughout the time period studied, as indicated by the standard deviation of 9.605534. The value of 1.742384 for the Jarque-Bera test indicates that the null hypothesis was rejected at the 5% level, and the data set is normally distributed. Within the proposed range of 3 and 10 by Kline, the skewness test results were 0.43803, and the kurtosis was 2.208528. (2011).

4.2 Trend Analysis

The inquiry applied a trend analysis focusing on economic growth, labor force, physical capital, technology, capital formation, foreign aid, and human development index. The trend

lines were presented in the form of line graphs. Figure 4.1 show the trend line for economic growth.

Figure 4.1: Economic Growth (GDP)

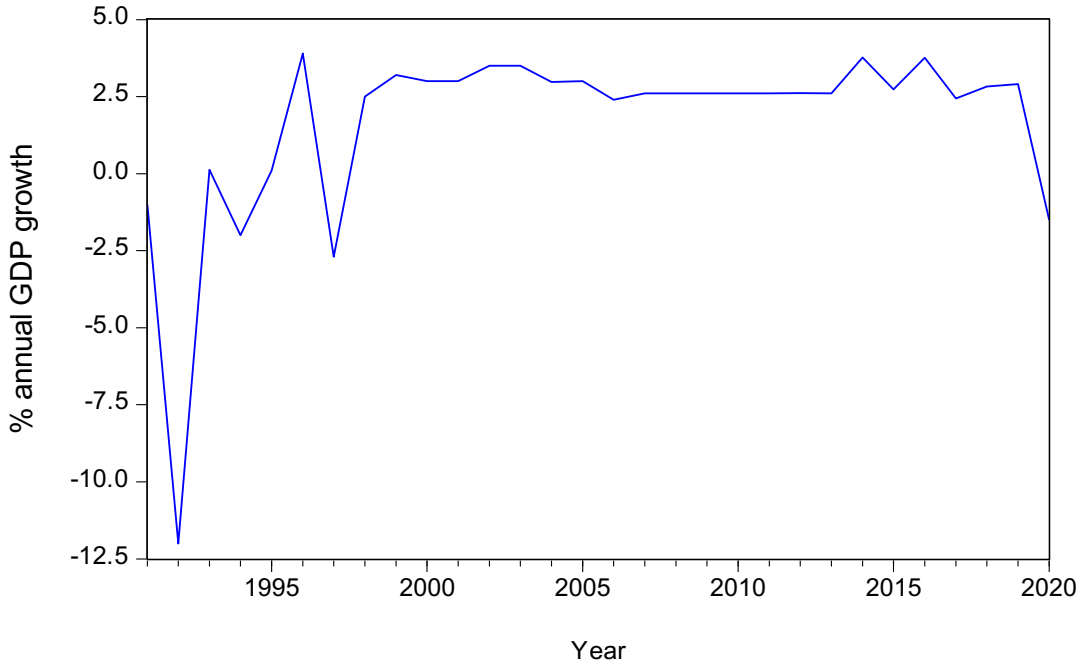


Figure 4.1 indicates that real GDP dropped drastically from 1990 to low levels in 1991. The GDP bounced back to a positive growth rate in the year after in 1992. Economic growth went down slightly between 1992 and 1994. After 1994, economic growth went high to reach its highest point up to around 1996 before another drop in the growth rate took the annual GDP growth rate below zero in 1997. The growth rate rose from around -2.5% to +2.5% between 1997 and 1999, from where Somalia maintained a relatively steady GDP growth rate of just over 2%. The GDP growth rate has only varied slightly over the last two decades and only dropped again to below zero in 2019 and 2020. Figure 4.2 show the Human development index graph.

Figure 4.2: Human Development Index

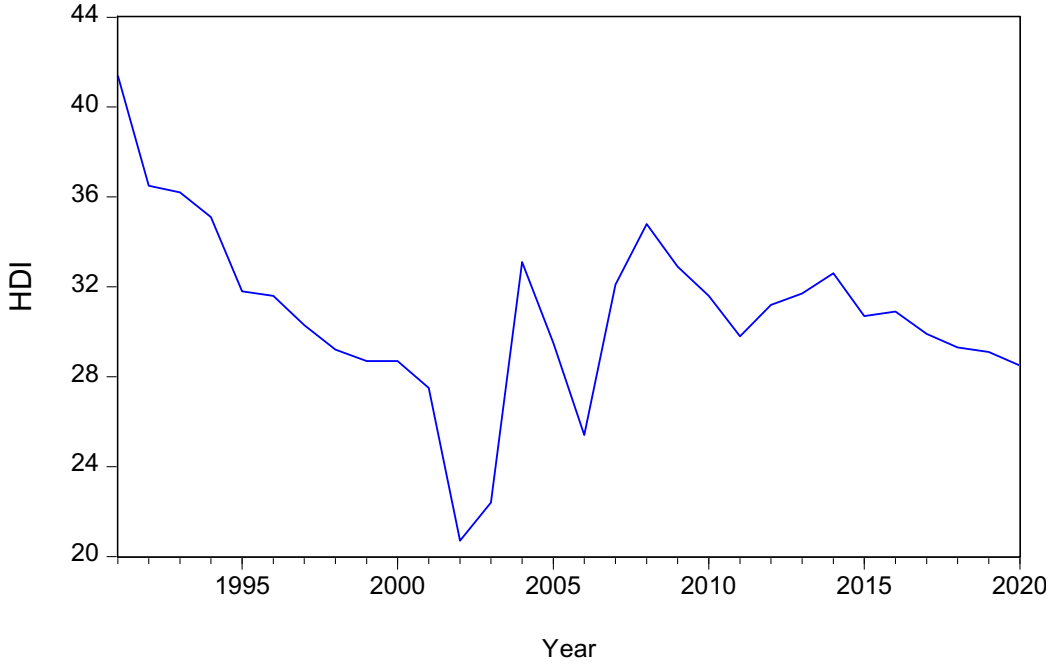


Figure 4.2 presents Somalia's Human Development Index between 1991 and 2020. The Human Development Index (HDI) is informed by basic dimensions in the development of education, health, and income levels. According to figure 4.2, Somalia's HDI was at its highest in 1991 and dropped sharply between 1991 and 1992 before it seemed to steady itself for a year before dropping again in 1993. This downward spiral continued for several years until it reached an all-time low of 21 in 2002. After 2002, the HDI began a sharp rise for two years until it reached 32 in 2004. However, this was followed by another decline between then and 2006. From 2006, the HDI began another rise from an HDI rating of 26 to one of about 35 between 2008 and 2009. This is the highest point in recent history since Somalia's HDI has not reached similar levels. The HDI declined to 30 in 2011, then rose to 32 around 2014, from where it slowly and steadily declined to 28 in 2020. Figure 4.3 shows the labor participation rate trend line.

Figure 4.3: Labour Participation Rate

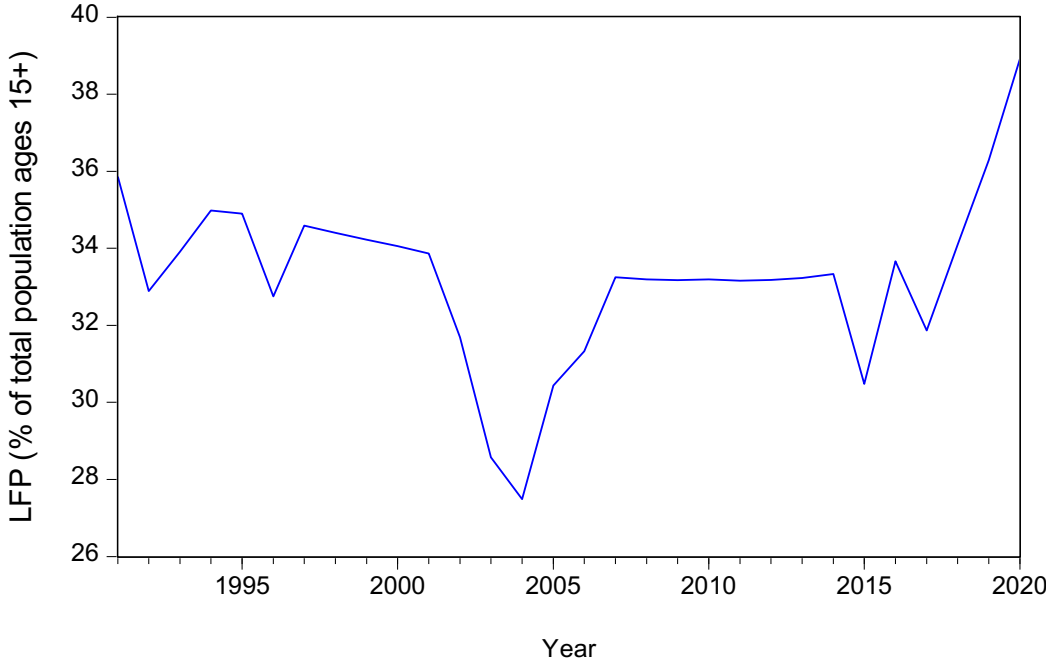


Figure 4.3 presents Somalia's Labour Force between 1991 and 2020. The labour force denotes the percentage of the total population aged above 15 years. In 1991, lightly above 35% of the total population was above 15 years old and therefore constituted the labor force. The labor force declined to 33% in the subsequent year then rose to 35% again by 1994 where it stayed up to 1996. After 1996, labor force participation declined slightly to 33%. This figure rose slightly above 34% in 1997 and maintained at that level until around 2002. In 2002, there was a sharp decline of the labor force in the proceeding couple of years, with the labor force hitting a record low of about 27% in 2004. From then the labor force grew steadily to the previous levels of 33% in 2007. The labor force stayed roughly the same until the mid-2010s, when it dropped slightly to 30% in 2015 before it started a sharp rise to 38% in 2020. A labor force of 38% represents the highest labor force in the duration of the study. Figure 4.4 shows the physical capital trend line.

Figure 4.4: Physical Capital

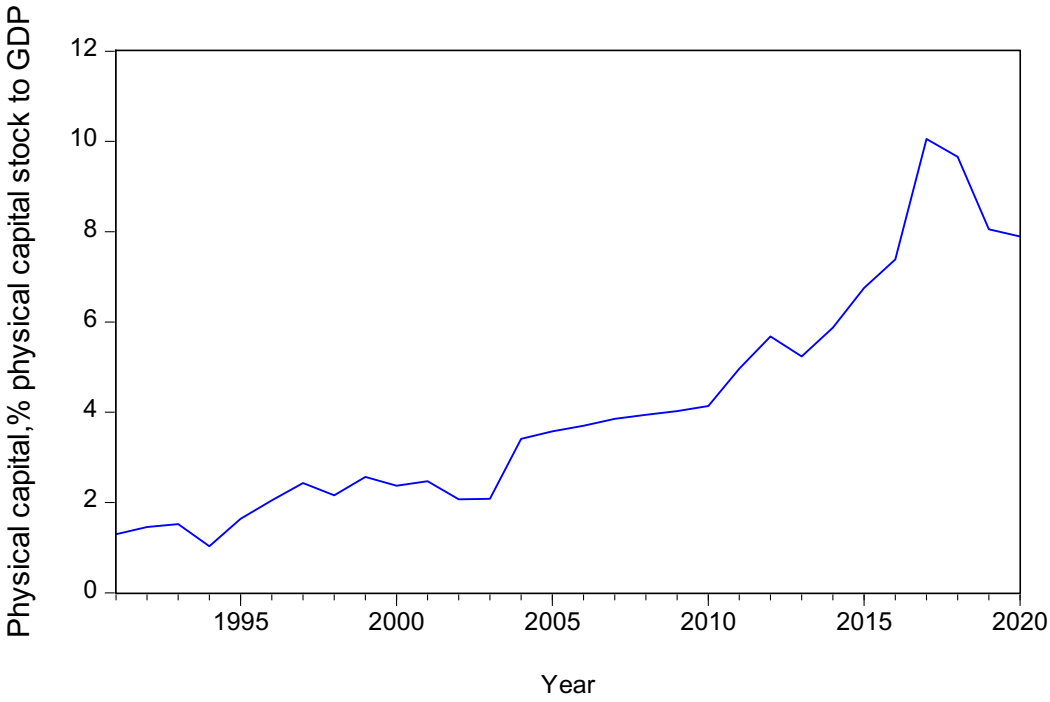


Figure 4.4 shows the physical capital of Somalia for the period between 1991 and 2020. Physical capital is the percentage of physical capital stock to GDP. In 1991 physical capital (k) was about 1.4%, and there wasn't much change until 1995, when a small rise took k to slightly above 2%. The physical capital levels were largely the same until around 2003, when there was a slight increase steadily to 4% in 2010 and 6% in 2012. From then, physical capital levels dropped slightly before a sharp rise to 7% in 2016 and a high of 10% in 2017. Physical capital levels dropped slightly to 8% in 2020. Figure 4.5 shows the technological growth trend graph.

Figure 4.5 Technology growth

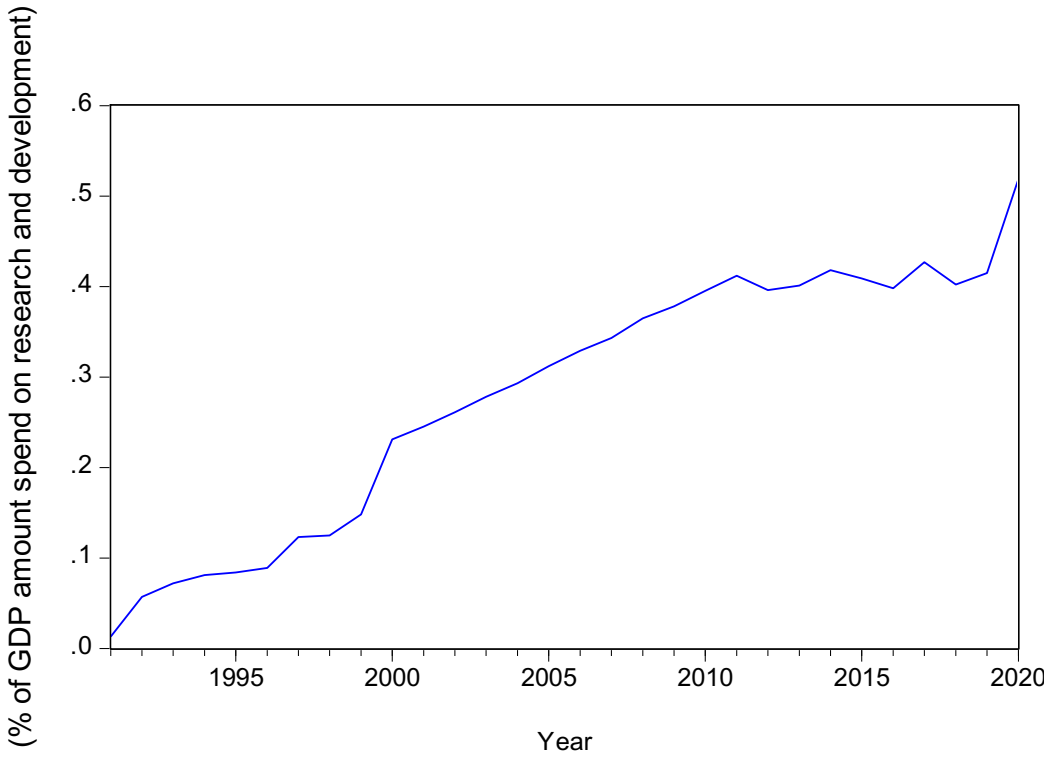


Figure 4.5 presents Technology. Technology is measured by the amount of money spent on research and development in Somalia as a percentage of GDP between 1991 and 2020. In 1991, there was very little spent on technology, with less than 0.5% of GDP spent on technology. This figure rose slightly to around 1% by 1995. It increased steadily to 2% by 2000, after which there was an almost linear growth between 2000 and 2010 to about 4% of GDP. The amount spent on technology relative to GDP stayed largely the same at 4% up to 2018, after which it rose again to 5% in 2020. Figure 4.6 shows a trend line graph for foreign aid.

Figure 4.6: Foreign Aid

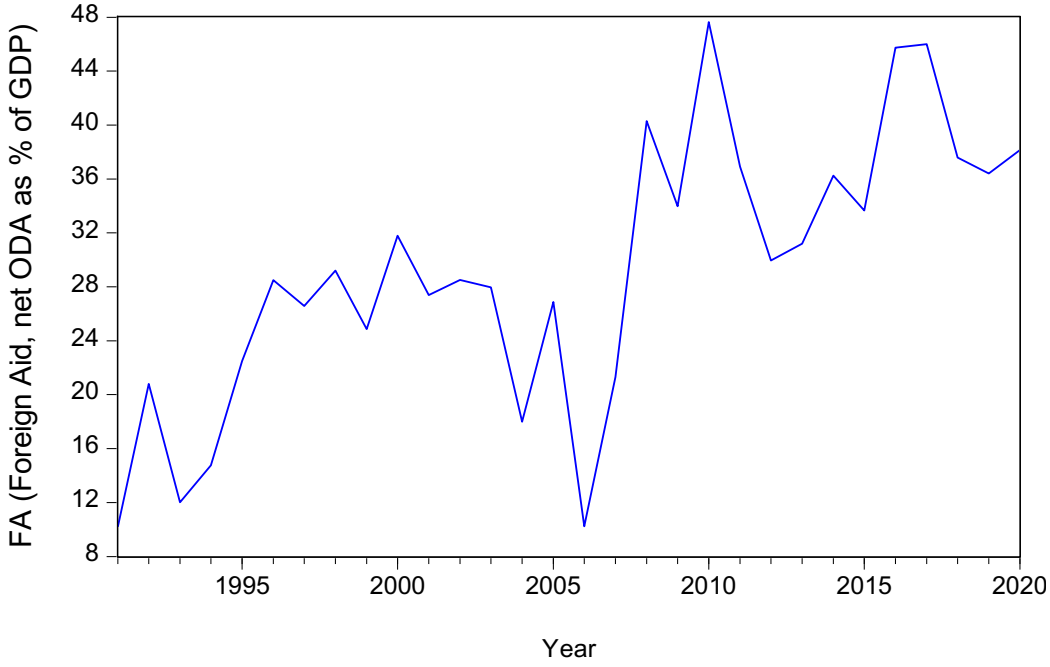


Figure 4.6 shows foreign aid in Somalia for the years between 1991 and 2020. The ODA measured foreign Aid as a percentage of GDP. In 1991, F.A. was at 12% and rose sharply to 20% in 1992 before dropping back to 12% the next year. From 1993, there was a steady rise reaching 28% in 1996. There was a period of light fluctuations from 1996 to 2003. After 2003, a sharp decline led to 10% Foreign Aid in 2006. After 2006, there was a sharp rise up to 40% in 2008. In 2009, Foreign Aid declined slightly to 36% before rising to a record high of 48% in 2010. There was a reduction of foreign aid to around 30% in 2012. The F.A. index rose slightly to 32% in 2015 before a sharp rise to 44% in 2016. Financial Aid remained high in 2017, then dropped to 36% in 2020. Figure 4.7 shows the capital formation line graph.

Figure 4.7 Capital Formation

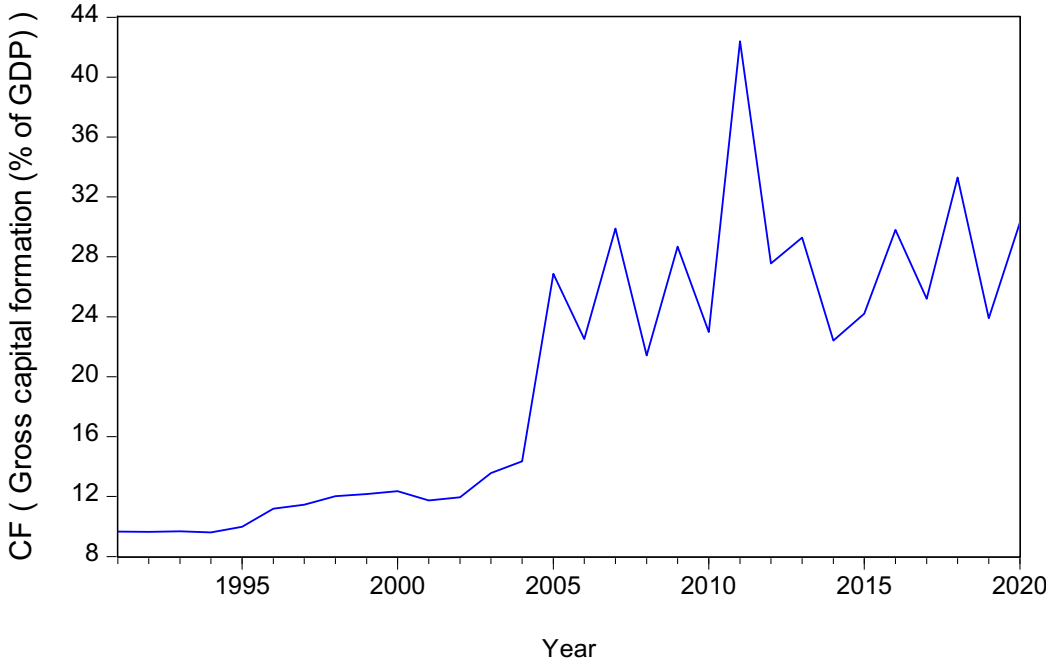


Figure 4.7 presents capital formation in Somalia for the period between 1991 and 2020. In 1991, the Capital formation was at an all-time low of about 10%, and this ratio only started to rise in 1995. Capital formation rose to 12% and saw minimal change until around 2003, when there was a sharp increase to 28% by 2005. Capital formation varied between 20-28% until 2010, when it began to increase sharply to 42% in 2011. It dropped again to 28% in 2012 and 24% in 2014. Between 2015 and 2020, capital formation rose and fell between 22% and 32% of GDP. In 2020, Capital formation in Somalia stood at 28%.

4.3 Diagnostic Tests

Prior to running a regression model diagnostic tests were conducted. The tests conducted in this case were the unit root tests test (stationarity test), multicollinearity test, normality test, heteroscedasticity test and autocorrelation test. This is usually performed to avoid spurious regression results from being obtained and to ensure that parameter estimates are precise and accurate.

4.3.1 Stationarity Test (Unit Root Test)

Most economic variables are usually non-stationary in nature and prior to running a regression analysis. Unit root tests were thus conducted using the Augmented Dickey-Fuller (ADF) test to establish whether the variables were stationary or non-stationary. The purpose of this is to avoid spurious regression results being obtained by using non-stationary series. The unit root results are presented in Table 4.2.

Table 4.2: Unit Root Tests at Level

Variable name	1% Level	5% Level	10% Level	ADF test	Sig.	Comment
GDP	-3.679322	-2.967767	-2.622989	-3.600771	0.0121**	Stationary
k	-3.679322	-2.967767	-2.622989	-0.853275	0.7884	non-stationary
d(k)	-3.689194	-2.971853	-2.625121	-5.020403	0.0004***	Stationary
Lfp	-3.679322	-2.967767	-2.622989	-4.132929	0.0033***	Stationary
A	-3.679322	-2.967767	-2.622989	-4.562469	0.0011**	Stationary
Cf	-3.679322	-2.967767	-2.622989	-5.067861	0.0003**	Stationary
HDI	-3.679322	-2.967767	-2.622989	-4.658980	0.0009**	Stationary

FA	-3.679322	-2.967767	-2.622989	-2.490096	0.1281	non-stationary
d(F.A.)	-3.689194	-2.971853	-2.625121	-7.516803	0.0000***	Stationary

*Sig at 10% **sig at 5% ***sig at 1%

DP=gross domestic product, k=physical capital, Lfp=labour force participation, A=technological growth, HDI

Results in Table 4.2 indicated that economic growth (GDP), labor force participation, technological growth, capital formation, and Human Development Index were stationary. Physical capital and foreign aid were nonstationary. Thus, Physical capital and foreign aid were subjected to first differencing to make them stationary. At the first level of differencing, Physical capital and foreign aid variables became stationary.

4.3.2 Normality Test

The normality test is performed for each investigation to guarantee that the variables utilized have a normal distribution (Jarque & Bera, 1987). The Jarque-Bera test assessed if the residuals followed a normal distribution because it gives conclusive tests. The null hypothesis for a normal distribution can be tested using the Jarque-Bera statistic, which has two degrees of freedom. The provided possibility also stands for the probability that a Jarque-Bera statistic is larger than the identified value (absolute value) when the null hypothesis is in play. The provided possibility shows that a Jarque-Bera statistic surpasses (in absolute value) the specified value under the null hypothesis. Therefore, because of a low statistical likelihood value the null hypothesis of normal distributed data is rejected. To conclude that the data follows a normal distribution, the probability must be larger than 0.05. Figure 4.8 presents the normality results.

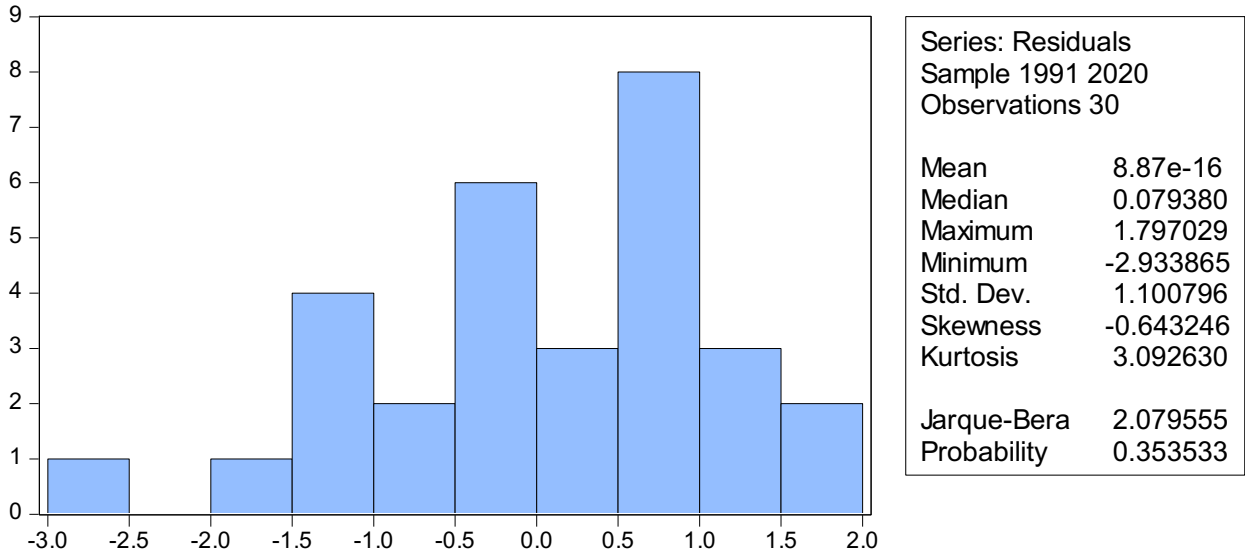


Figure 4.8: The Jarque-Bera Normality Test

According to the figure above, all the residuals arising from the model were normally distributed. The outcomes were reinforced by a Jarque-Bera statistic of 2.092630 and a p-value of 0.353533, which is greater than 0.05. While Skewness was -0.643246, the Kurtosis was 3.092630, suggesting that at a 5% importance level, the null hypothesis of normally distributed data is acknowledged, and the data is identified as normal. Kline (2011) submits that Skewness and Kurtosis values that exist within a series of ≤3 and ≤10, correspondingly, are identified to be relatively normal. Therefore, this data can be exposed to parametric statistical analysis tests that consist of time series regression systems.

4.3.3 Heteroscedasticity Test

Heteroskedasticity denotes the state of systematic alterations of the model's spread of residuals or the error terms. The degree to which the various sources of error in the time series model are interconnected was evaluated using a test for heteroscedasticity. When using a regression model, the error terms must have a fixed variance (homoskedastic). As a result, the Breusch-Pagan test for heteroscedasticity was used in the investigation to ensure that the residuals are up to standard; the test's null hypothesis is that the residuals are homoskedastic. A constant variance is present when the p-value is greater than 0.05. Table 4.3 presents the study's heteroscedasticity.

Table 4.3: Heteroskedasticity Test: Breusch-Pagan-Godfrey

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	5.034086	Prob. F (20,15)	0.0020
Obs*R-squared	17.03118	Prob. Chi-Square (20)	0.0092
Scaled explained SS	10.47418	Prob. Chi-Square (20)	0.1061

The null hypothesis was not rejected at a critical p value of 0.05 since the reported value is 0.0020<0.05. Thus the data suffered from heteroscedasticity. This was remedied by running the feasible generalized least squares (FGLS). The presence of residual variance in a model shows that the scattering of the model is dependent on at least one independent variable. This adds business to the model and hence creates a scenario of deviation of the model from effective and actual results. While heteroscedasticity does not cause bias in the coefficient estimates, it does make them less precise. Lower precision increases the likelihood that the coefficient estimates of the model may not be as precise as possible.

4.3.4 Autocorrelation Test/ Serial correlation tests

Serial correlation is used in statistics to describe the relationship between observations of the same variable over specific periods. Serial correlation tests were run in order to check for correlation of error terms across time periods. Serial/autocorrelation is tested using the Breusch-Godfrey test. The null hypothesis is that no first order Serial/Autocorrelation exists. These results are presented in Table 4.4.

H_0: There exist no serial correlation in the residual.

Table 4.4: Breusch-Godfrey Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.427655	Prob. F (2,21)	0.6576
Obs*R-squared	1.174054	Prob. Chi-Square (2)	0.5560

Serial correlation results show absence of correlation of error terms across time periods since 0.6576>0.05 indicating that that we do not reject the null hypothesis of no serial correlation and conclude that serial correlation does not exist in the model. Therefore there was no need to do lagging of the dependent variable. It often exists when the order of observations matters, the typical scenario of which is when the same variable is measured on the same participant repeatedly over time. Serial correlation occurs in time-series studies when the errors associated with a given period carry over into future periods. The purpose of time-series analysis is to model the serial correlation to understand the nature of time dependence in the data.

4.3.5 Test for cointegration

After ascertaining the stationarity properties of the series, cointegration analysis was done. The first step was to generate the residuals from the long run equation of the non-stationary variables. Then stationarity of the residual was tested using ADF. The results indicate that the lagged residual is stationary (i.e. has no unit roots). The Johansen Cointegration test was also conducted since it is more accurate and superior to Engle granger test of Cointegration. Johansen cointegration tests were conducted. The hypotheses were;

H_0: *There is no cointegration among test variables*

H_1: *There is cointegration among test variables*

Table 4.5: Test for cointegration

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of C.E. (s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.935341	201.4396	125.6154	0.0000
At most 1 *	0.865271	124.7582	95.75366	0.0001
At most 2	0.601520	68.63239	69.81889	0.0619
At most 3	0.560764	42.86962	47.85613	0.1358
At most 4	0.337748	19.83350	29.79707	0.4342
At most 5	0.227227	8.294427	15.49471	0.4345
At most 6	0.037729	1.076857	3.841466	0.2994

The trace test indicates 2 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

The null hypothesis cannot be rejected and cointegration exists between variables studied when the probability (p-value) is greater than 0.05. It is statistically significant to accept H1 (that the variables are cointegrated) if the p-value is lower than 0.05. Table 4.6 displays the results of the Johansen cointegration test, and the value of probability is 0.0000<0.05, so the results investigator rejects the null hypothesis that the variables are not cointegrated. We also conclude that at least one cointegrating equations exist because the trace statistic is larger than the Critical Value (201.4396> 125.6154).

4.4 Feasible generalized least squares

The study found that data suffered from heteroscedasticity. This was remedied by running the Feasible Generalized Least Squares (FGLS). Table 4.6 shows the FGLS model.

Table 4.6: Feasible generalized least squares

Dependent Variable: GDP

Method: Fgls

Weighting series: LFP^(-0.5)

Weight type: Inverse standard deviation (EViews default scaling)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FA	-0.070731	0.038303	-1.846646	0.0777
CF	0.237644	0.106252	2.236605	0.0353**
HDI	0.013362	0.050955	0.262226	0.7955
LFP	0.119616	0.050059	2.389491	0.0255**
K	0.464702	0.135917	3.419018	0.0023***
A	1.953641	0.654389	2.985441	0.0066***
C	-1.865604	2.016793	-0.925035	0.3646

Weighted Statistics

R-squared	0.817932	Mean dependent var	3.868611
Adjusted R-squared	0.770436	S.D. dependent var	2.219293
S.E. of regression	1.202428	Akaike info criterion	3.407527
Sum squared resid	33.25418	Schwarz criterion	3.734473
Log-likelihood	-44.11290	Hannan-Quinn criter.	3.512120
F-statistic	17.22103	Durbin-Watson stat	1.946591
Prob(F-statistic)	0.000000	Weighted mean dep.	3.670929

Unweighted Statistics

R-squared	0.776912	Mean dependent var	4.036194
Adjusted R-squared	0.718715	S.D. dependent var	2.334202
S.E. of regression	1.237974	Sum squared resid	35.24930
Durbin-Watson stat	1.988785		

Table 4.6 shows that although foreign aid has a negative impact on economic growth, the impact is insignificant (=-0.070731, p=0.0777>0.05). The calculated t-statistic of -1.846646 is smaller than the significance level of 1.96. These numbers show that increasing the amount of money given to other countries doesn't stimulate their economies. As shown above, capital formation significantly contributes to GDP growth (=0.237644, p=0.03530.05). The t-statistic of 2.236605 is larger than the minimum acceptable value of 1.96. A one-unit shift in capital formation boosts GDP growth by 0.237644 units. Table 4.6 also demonstrates that the Human Development Index (HDI) has a positive but insignificant effect on Somalia's economic growth (=0.013362, p=0.7955>0.05), as indicated by a T-statistic of 0.262226, which is smaller than the critical t-statistic of 1.96.

According to (=0.119616, p=0.02550.05), which can be found in table 4.6, LFP has a significant and positive effect on GDP growth. The t-statistic of 2.389491 is more than double the minimum acceptable value of 1.96, lending further credence to the hypothesis. The result indicates that a one-unit increase in the labor force leads to a 0.119616-unit increase in GDP growth.

Additionally, the findings in table 4.6 reveal that physical capital has a positive and significant effect on Somalia's economic growth (β=0.464702, p=0.0023<0.05). This is affirmed by the calculated t-statistic of 3.419018 that is greater than 1.96, the critical t-statistic value. Finally, the findings established that technological growth (A) has a positive and significant effect on economic growth as shown by (β=1.953641, p=0.0066<0.05). This was confirmed by the calculated t-statistic of 2.985441> critical t-statistic of 1.96.

4.5 Vector Error Correction Model

The study found the existence of cointegrating equations between the study variables. The VECM model was thus established to Vector error correction model was also employed to determine the adjustment speed towards long-term equilibrium. Table 4.7 shows the VECM model.

Table 4.7: Vector Error Correction Model

Error Correction:	D(GDP)	D(K)	D(F.A.)	D(C.F.)	D(HDI)	D(LFP)
CointEq1	-0.848836	0.014351	-0.299262	-0.210549	1.065244	-1.800946
	(0.23146)	(0.09397)	(1.27670)	(0.33555)	(0.46728)	(0.48768)
	[-3.66730]	[0.15272]	[-0.23440]	[-0.62747]	[2.27967]	[-3.69291]
R-squared	0.709683	0.490223	0.272115	0.474006	0.742295	0.724306
Adj. R-squared	0.419366	-0.019554	-0.455770	-0.051987	0.484590	0.448611
Sum sq. resids	43.64460	7.193946	1327.858	91.72740	177.8801	193.7488
S.E. equation	1.832287	0.743895	10.10658	2.656305	3.699065	3.860539
F-statistic	2.444510	0.961641	0.373844	0.901164	2.880404	2.627205
Log-likelihood	-44.79462	-20.45628	-90.90039	-54.82163	-63.76252	-64.91614
Akaike AIC	4.355157	2.552317	7.770399	5.097898	5.760187	5.845640
Schwarz SC	5.027072	3.224232	8.442315	5.769814	6.432102	6.517555
Mean dependent	0.113601	0.254111	0.865531	-0.008100	0.088889	0.145926
S.D. dependent	2.404597	0.736727	8.376407	2.589838	5.152470	5.198990

Determinant resid covariance (dof adj.)	16248.63
Determinant resid covariance	202.4391
Log-likelihood	-301.5590
Akaike information criterion	29.00437
Schwarz criterion	33.32382

The system will reach long-term equilibrium at 84.8836%, as indicated by the error correction term (ECT) of -0.848836. The coefficient of -0.848836 indicates that the imbalances in GDP growth accomplished in one era are adjusted in the following period. The R - squared value for the shorter-term results was 70.9683%, indicating that changes in GDP can be attributed to

shifts in international aid, wealth creation, capital investments, workforce participation, technology improvement, and HDI.

4.6 Discussion of Results

The research evidenced that although foreign aid has a negative impact on Somalia's economic growth, the impact is insignificant. The results thus imply that foreign assistance has no meaningful effect on economic advancement. Foreign aid makes the economy overdependence on assistance at the expense of producing for itself to grow the economy. Thus, foreign aid is bad for the economy because of higher aid dependency coupled with bad economic management of the recipient countries and ineffective allocation of aid funds, among other things. Somalia has been relying much on foreign aid since 1991 as means of supporting the socio-economic indicators, including livelihood, social services, and administrative services. Foreign aid has remained a contentious subject among scholars resulting in diverse outcomes. It remains contentious if recipient countries are deriving economic benefits from aid or are becoming worse off by relying on aid. The results concur with Ahmed (2014), whose research focused on Sub-Saharan Africa. According to the research findings, foreign financial aid did not have any significant effect on the economy's growth. However, the finding are contrary to a research study conducted by Ali, Dalmar, and Ali (2018), on the impact of external aid and debt on Somalia's economy between 1970 and 2014. According to the research findings, foreign financial aid and debt contributed positively to the growth of the country's economy. The conflicting findings among scholars may imply that external aid is not effective in stimulating economic growth. In the context of Somalia, financial assistance from foreign countries, though has no significant benefit to the growth of the economy. Capital formation has a weighty impact on economic growth. The results imply that heightened capital formation has a substantial positive influence on economic growth in Somalia. This implies that capital formation in a country is vital in stimulating the economy's growth.

No country has attained continual financial development without considerable investment in capital formation. In a quote to acquire financial development all over the globe, great attention has been concentrated on raising the formation of capital. Capital stock describes the percentage of existing income conserved and invested for purposes of bolstering future outcomes and also earnings. Capital stock establishes the nationwide ability to generate, which

subsequently influences economic development. Shortage of funding development has been cited as the most major restraint to lasting financial growth. The results concur with an investigation by Gebresilassie and Gebre (2019), who examined the extent to which external aid impacted economic advancement in Ethiopia in the years 1974-2017 and uncovered that capital formation has a significant positive effect on economic progression. The effects of capital formation on economic growth in India established that capital formation positively affects economic growth.

The model results indicated that the rate of labor force participation significantly weighs on economic growth. The results suggest that a higher labor force participation rate significantly benefits Somalia's economic growth. Productivity indicators can be traced back to labor. To measure productivity, labor productivity must be calculated. This is the ratio of output to input acquired from the workforce. Another way to put it is that productivity increases per hour spent working. The results corroborate those of Shahid's (2014) study on LFP's impact on Pakistan's economic expansion, which found that the rate of LFP has a major bearing on GDP growth.

Nonetheless, Kargi (2014) research into the correlation between Turkey's participation into labor force and economic development found that this correlation has a paradoxical effect, with skilled workers having a positive effect on development and unskilled workers having a negative effect. This agrees with the findings of Wijaya, Kasuma, Tasenţe, and Darma (2021), who found that size of the labor force and GDP expansion had a linear relationship. A larger labor force means more people to work, more potential buyers for homegrown goods, and more hands to crank out more goods.

The research also showed that physical capital significantly impacts GDP growth. It appears that an increase in physical capital has a significant positive effect on Somalia's economic growth. Investments in fixed assets are seen as crucial to the expansion of a country's economy. Equipment used in the creation of goods and services is considered physical capital. There can be no economic expansion without sufficient and well-functioning physical capital. The findings corroborate those of Li, Wang, Westlund, and Liu (2015), who investigated the impact of physical Capital on China's economic development and discovered a positive and sizable effect. In addition, Bunyamin (2021) found that physical capital contributed positively to economic growth in Indonesia.

The findings show that technological advancements have a positive impact on Somalia's economic development. It has been argued that technological advancements have sparked a production revolution, resulting in greater production efficiency and hence a boost to economic growth. The findings align with those of Sultanuzzaman et al. (2019). They found that technological growth positively affected economic growth in some Asian economies by analyzing the relationship between exports and technology.

The advancement in technology significantly improves the productivity through the optimization of exporting of goods and services. It also signifies the export potential of an economy and enlightens the competitiveness of the global world as a whole. Technology growth facilitates the acquisition of efficient physical capital that drives rapid economic growth[3]. Advanced technology can produce goods with less input and less complexity. In addition to this, with better execution and trade, it can be transferred from one country to the other without too much cost, effort and difficulty.

CHAPTER FIVE

SUMMARY, CONCLUSIONS, AND POLICY IMPLICATIONS

5.1 Summary of the Study

The purpose of the inquiry was to uncover foreign aid's influence on Somalia's economic growth. Foreign aid target economic indicators like physical capital, labor force participation, technological growth, capital formation, and human development index and which were also investigated in the study. Time series research design was utilized in the years 1991 to 2020. Data analysis incorporated descriptive statistics as well as inferential statistics. The descriptive statistics entailed means, standard deviation, minimums, and maximums. Inferential statistics included the feasible generalized least squares and Vector error correction model. The FGLS model was used to determine foreign aid's influence on an economy's growth. The vector error correction tool was also employed to measure the adjustment speed towards long-term equilibrium.

The short-run mode results revealed that foreign aid, capital formation, physical capital, labor force participation, technological growth, and HDI explain 70.9683% of economic growth in Somalia, while the long-term model results revealed an ECT of -0.848836, an indication that the model adjusts towards long term equilibrium at the speed of 84.8836%. A negative and insignificant influence of foreign assistance on economic growth in Somalia was discovered, implying that foreign assistance is not helpful to the Somali economy. Capital formation has a positive and significant effect on economic growth, implying that a one-unit surge in capital formation results in an increase in economic growth by 0.238 units. It was also found that the labor force participation rate has a weighty impact on economic growth, implying that a one-unit increase in labor force participation rate results in positive increase in economic growth by 0.119 units. A productive labour force has the tendency to stimulate economic development. In addition, it is evident that physical capital has a significant positive impact on economic development, and thus, a one unit change in physical capital results in 0.465 unit increases in the Somali economy. Technological growth greatly contributed to Somalia's economic development, implying significant growth in technology will result to positive impact on economic growth by1.953641 units.

5.2 Conclusions

The research found that international aid did not significantly affect economic expansion. Grants, development assistance, and technical assistance provided by foreign governments are unlikely to stimulate economic growth. This indicates that the study findings point to other factors besides foreign aid as possible drivers of economic growth.

This research concludes that increased capital formation is critical for economic expansion. Increased growth in a country's output is a direct result of the increased capital mobilization of the country's production resources. A healthy economy is the result of productive manufacturing and distribution of goods and services. Similarly, a high gross investment rate encourages FDI, which in turn boosts the economy.

The study finds that the outcome of the LFP rate has a significant and positive effect on Somalia's economic growth. Plus, a skilled labor force is good for economic expansion. A significant impact on economic expansion is made by physical capital. It follows that physical capital must play a crucial role in fostering economic expansion. Increased economic output necessitates the availability of physical capital in the form of machinery, tools, and other such assets.

The study found that the development of technology had the greatest noticeable effect on Somalia's economic growth. There is evidence to suggest that technological advancements play a significant role in boosting economic output by encouraging the effective production of goods and services. Appropriate technologies help inject efficiency into key elements of economic growth like labor productivity, physical capital, and innovation.

5.3 Policy recommendation

Foreign aid lacked any substantial influence on economic growth. This is an implication that economic growth may be stimulated by other factors identified in the study findings and not by aid, including capital formation, technological growth, capital stock, and labor force productivity. The Somali government, in support of the international community, needs to refocus on other economic stimuli other than foreign aid. A favourable and peaceful

environment is required for the growth of the Somali economy. The donor aid may also review the channeling of the aid to more economically productive sectors like supporting capital formation and growth of technology to support efficient good and service production. Capital formation is significant in stimulating economic growth.

The rate of LFP is a crucial predictor of economic growth. There is a need for structured human development programs anchored on competencies, skill, and efficiency. The human development programs should be geared toward developing skilful labor that is responsive to the needs of the economy.

Physical capital plays a vital part in shaping economic growth. Economic growth requires the presence of physical capital, including equipment, machines, and other tools for efficient good and service production. The Somali government may need to invest in efficient physical capital for efficient good and service production in the economy.

Growth in technological growth results in significant positive influence on economic growth in Somalia. Growth in technology revolutionizes production, enhancing production efficiency, and thus stimulating higher economic growth. The government of Somalia to invest more in research and development while partnering with global leaders in technology to support technological growth that remains lagging in the country.

5.4 Areas for Further Research

Economic growth in Somalia remains unstable and fragile. The country has witnessed socio-political instability for over three decades. Future research needs to focus on the implication of socio-economic conflicts on economic growth in Somalia.

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APPENDICES

Appendix I: Data Collection Sheet

Year	Economic growth, % annual GDP growth	Physical capital, % physical capital stock to GDP	Labour Force, (% of total population ages 15+	Technology, amount spend on research and development as % of GDP	Capital formation, Gross capital formation (% of GDP)	Composite index of education, health, and income.	Foreign aid, net ODA as % of GDP
1991	-1.004	1.294	35.86	0.013	9.6664	41.4	10.1978
1992	-12	1.453	32.89	0.057	9.6348	36.5	20.8011
1993	0.124	1.523	33.91	0.072	9.6781	36.2	12.0084
1994	-2	1.029	34.98	0.081	9.6055	35.1	14.7671
1995	0.101	1.637	34.9	0.084	9.9786	31.8	22.4982
1996	3.9	2.0435	32.75	0.089	11.1896	31.6	28.4879
1997	-2.7	2.4317	34.59	0.123	11.4502	30.3	26.571
1998	2.5	2.1581	34.4	0.125	12.0229	29.2	29.2135
1999	3.2	2.564	34.22	0.148	12.1729	28.7	24.863
2000	3	2.3691	34.06	0.231	12.3525	28.7	31.785
2001	3	2.4713	33.86	0.245	11.7350	27.5	27.384
2002	3.5	2.0728	31.69	0.261	11.9476	20.7	28.518
2003	3.5	2.0827	28.57	0.278	13.5725	22.4	27.9615
2004	2.972	3.4121	27.49	0.293	14.3490	33.1	17.9907
2005	3	3.578	30.44	0.312	26.8737	29.5	26.8707
2006	2.4	3.697	31.33	0.329	22.5261	25.4	10.2436
2007	2.6	3.8541	33.25	0.343	29.8910	32.1	21.3168
2008	2.6	3.941	33.19	0.365	21.4244	34.8	40.2946
2009	2.6	4.022	33.17	0.378	28.6884	32.9	33.9826
2010	2.6	4.138	33.19	0.395	22.9829	31.6	47.64218
2011	2.6064	4.9620	33.16	0.412	42.3958	29.8	36.91498
2012	2.6109	5.6780	33.18	0.396	27.5646	31.2	29.95889
2013	2.6003	5.2345	33.23	0.401	29.2802	31.7	31.20585
2014	3.7713	5.8712	33.33	0.418	22.4206	32.6	36.25587
2015	2.7308	6.7541	30.48	0.409	24.2001	30.7	33.66667
2016	3.7630	7.3849	33.66	0.398	29.8004	30.9	45.73076
2017	2.4403	10.0560	31.87	0.427	25.1996	29.9	45.99576
2018	2.8246	9.6570	34.09	0.4023	33.3010	29.3	37.58091
2019	2.9096	8.0540	36.29	0.415	23.8998	29.1	36.41242
2020	-1.5085	7.8900	38.92	0.519	30.2999	28.5	38.13643