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SOSYAL BİLİMLER ENSTİTÜSÜ

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TRADE OPENNESS AND ECONOMIC GROWTH: THE ZAMBIAN CASE

(YÜKSEK LİSANS TEZİ)

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ABSTRACT

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TRADE OPENNESS AND ECONOMIC GROWTH: THE ZAMBIAN CASE

Since independence, Zambia has pursued different trade policies aimed at enhancing benefits from international trade which in turn can promote economic growth and development. The aim of this study was to investigate the relationship between trade openness and economic growth for the Zambian Economy for the period 1980-2019. GDP growth, trade openness, FDI, industry value added, inflation, secondary school enrolment and terms of trade were the study variables. GDP growth, trade openness, FDI and terms of trade were I(0) whereas industry value added, inflation and secondary school enrolment were I(1). Thus, the ARDL approach was used as the method of estimation. Using a bounds testing procedure, it was found that cointegration exists among the study variables. The study found that trade openness has a negative effect on economic growth in the long run. Specifically, a 10 percent change in trade openness leads to a -1.38 percent change in economic growth. It was also found that when trade openness depends on FDI, inflation, secondary school enrolment and terms of trade, the effect on economic growth is positive. Thus, trade openness, FDI, inflation, secondary school enrolment and terms of trade complement each other to positively influence economic growth. Furthermore, FDI and secondary school enrolment have positive effects on economic growth in the long run. Terms of trade positively affects economic growth both in the long and short run whereas inflation has a positive effect on economic growth in the short run. On the other hand, industry value added has a negative effect on economic growth in the long run. The study also found a unidirectional causal relationship running from trade openness to economic growth. The study recommends a cautious consideration of complementary variables to trade openness before promoting more openness to trade for the Zambian Economy.

Keywords: Trade openness, Economic growth, FDI, terms of trade, secondary school enrolment, ARDL approach, Zambia.

ÖZET

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DIŞA AÇIKLIK VE EKONOMİK BÜYÜME: ZAMBİYA'NIN ÖRNEĞİ

Zambiya, bağımsızlıktan bu yana, uluslararası ticaretten elde edilen faydaları artırmayı amaçlayan farklı ticaret politikaları izlemiş ve bu politikalar ekonomik büyümeyi ve kalkınmayı teşvik edebilmektedir. Bu çalışmanın amacı, 1980-2019 dönemi Zambiya Ekonomisi için dışa açıklık ve ekonomik büyüme arasındaki ilişkiyi incelemektir. GSYİH büyümesi, dışa açıklık, DYY, sanayi katma değeri, enflasyon, lise kaydı ve ticaret hadleri çalışmanın değişkenleridir. GSYİH büyümesi, dışa açıklık, DYY ve ticaret hadleri I(0) iken sanayi katma değeri, enflasyon ve lise kaydı I(1)'dir. Bu nedenle, tahmin yöntemi olarak ARDL yaklaşımı kullanılmıştır. Sınır testi prosedürü kullanılarak, dahil edilen değişkenler arasında eşbütünleşmenin var olduğu tespit edilmiştir. Bu Çalışmada, dışa açıklık uzun vadede ekonomik büyüme üzerinde olumsuz bir etkiye sahip olduğu tespit edilmiştir. Spesifik olarak, dışa açıklıktaki yüzde 10'luk bir değişiklik, ekonomik büyümede yüzde -1,38'lik bir değişikliğe yol açmaktadır. Dışa açıklığın DYY'ye, enflasyona, lise kaydına ve ticaret hadlerine bağlı olduğu durumlarda, ekonomik büyüme üzerindeki etkinin olumlu olduğu da tespit edılmiştir. Bu nedenle dışa açıklık, DYY, enflasyon, lise kaydı ve ticaret hadleri, ekonomik büyümeyi olumlu yönde etkileyen tamamlayıcı değişkenlerdir. Dahası, DYY ve lise kaydının uzun vadede ekonomik büyüme üzerinde olumlu etkileri olduğu tespit edilmiştır. Dış ticaret hadleri ekonomik büyümeyi hem uzun hem de kısa vadede olumlu etkilerken, enflasyon kısa vadede ekonomik büyümeyi olumlu etkilemektedir. Öte yandan, sanayi katma değeri, uzun vadede ekonomik büyümeyi olumsuz etkilemektedir. Ayrıca, bu çalışmada, dışa açıklıktan ekonomik büyümeye uzanan tek yönlü bir nedensel ilişki bulunmuştur. Çalışma da, Zambiya Ekonomisin büyümesi için ticarete daha fazla açıklığı teşvik etmeden önce dışa açıklık için tamamlayıcı değişkenlerin dikkatli bir şekilde değerlendirilmesini önerilmektedir.

Anahtar Sözcükler: Dışa açıklık, ekonomik büyüme, DYY, ticaret hadleri, lise kaydı, ARDL yaklaşımı, Zambiya**.**

PREFACE

The early 1990s came with a strong wind of globalisation and adoption of market economy policies in most economies around the world. This led to most economies undertaking policies that led to higher levels of economic openness. Owing to this, the world has become a global village in which economies are more integrated and connected with each other. Through such occurences, economies have opened up their trade with other economies leading to higher levels of trade openness around the world.

The Zambian Economy openned up more to the outside world after 1991. This included the embracing of policies aimed at liberalising its international trade. Since then, trade policies aimed at promoting trade and enhancing benefits from more openness to trade has been undertaken. This includes, Zambia becoming a member to a number of trade-focused international institutions. The motivation of this study came from the desire to contibute to Zambian literature related to international trade, particularly, on the matter of examining the link between trade openness and economic growth for the Zambian Economy. Thus, it is my hope and trust that the findings of this study may prove of great importance to the Zambian Economy as well as to other economies.

The undertaking of this study received great input from different people. First and foremost, I would like to thank my supervisor, Prof. Dr. Mehmet Arslanoğlu for his invaluable support, guidance and comments made during the course of writing this thesis. I would also like to thank the Professors in the department of economics at Bursa Uludağ University for the in-depth economics lectures. This helped me become more prepared for this undertaking. Finally, I would like to thank my family, especially my wife for the enduring support in the course of writing this thesis.

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ABBREVIATIONS/ACRONYMS

AEs	Advanced Economies
AfCFTA	African Continental Free Trade Area
ARDL	Autoregressive Distributed Lag
BOZ	Bank of Zambia
COMESA	Common Market for Eastern and Southern Africa
ELG	Export-Led Growth
EMDEs	Emerging Markets and Developing Economies
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GFC	Global Financial Crisis
GRZ	Governemt of Zambia
ISS	Import Substitution Stragy
LDCs	Least Developed Countries
NTBs	Non-Tariff Barriers
NTEs	Non-Traditional Exports
R&D	Research and Development
SACU	Southern Africa Customs Union
SADC	Southern Africa Development Community
SAPs	Structural Adjustment Programmes
UNCTAD	United Nations Conference on Trade and Development
WTO	World Trade Organisation

INTRODUCTION

More openness to international trade is of great importance and desirable for economies today than in olden days. The world today is more integrated than ever. This is seen in the higher increase in the volume of global trade relative to the world output/income. Besides, the increase in trade in components, also referred to as Global Value Chains (GVCs) indicates more global integration and the importance of trade and the need for countries to be more open to international trade. The benefits that arise from trade has led to more countries opening up their economies, promoting outward-oriented strategies for growth. However, the way the benefits from international trade have accrued to countries engaging in trade vary from country to country. Some countries have experienced positive effects of trade openness on economic growth whereas other countries have experienced negative effects of trade openness on economic growth. This heterogeneity in experiences from trade openness has led to different views from both academicians and policy makers on the subject of trade openness and growth.

A significant number of studies have been undertaken aimed at examining the link between trade openness and economic growth. From these studies, a mixture of results have been found. The proponents for more openness to trade have argued based on the benefits that come with increased interaction among nations through exports and imports of goods and services. These include; easy transfer of technology, economies of scale to firms, increased competition leading to efficiency and lower prices, structural transformation in trading economies. On the other hand, the proponents against more openness to trade have argued that more openness to trade hinders the progress of local industries due to increased competition they face from foreign firms which are usually larger and well-financed. This leads to downscaling even closure of local industries. Arguments against trade openness include the disadvantages faced by Emerging and Developing Economies (EMDEs) as they trade with Advanced Economies (AEs). These economies tend to export goods and services with less or no value addition (unprocessed products). This is due to the lack of industries and facilities for processing raw products. This prevents the exporting of value added goods and services. In this way, these economies experience deterioration in their terms of trade. In other words, they pay more for imports than they receive for exports. Hence, the benefits from trade may not lead to economic growth as well as improvement in social welfare.

Zambia is a developing country considered as a lower middle-income country. Since its independence in 1964, different trade policies have been implemented. This includes the inward-oriented strategy of growth based on import substitution and the outward-oriented export strategy based on export promotion. In 1991, through the adoption of IMF backed Structural Adjustment Programs (SAPs), Zambia liberalised its trade and embraced more outward-oriented strategy for growth. Thus, there has been efforts made to diversify the economy from its dependence on the mining sector to other sectors where the economy has comparative advantage such as agriculture and tourism sectors. With the liberalisation of trade, Zambia became a member to a number of international bodies and signed agreements aimed at promoting more trade. This includes bodies such as SADC, COMESA, WTO and the recently ratified African Continental Free Trade Area (AfCFTA) agreement. This demonstrates Zambia's ambitions to increase the volume of international trade. In the light of such efforts, it is imperative to assess the benefits from increased trade openness for the Zambian Economy. Thus, this study seeks to investigate the relationship between trade openness and economic growth for the Zambian Economy for the years 1980-2019. This study is outlined as follows;

Chapter one discusses the concept of trade openness. This includes the definition of trade openness and some of the measures used to indicate the level of trade openness as well as the benefits from trade openness. The chapter also includes the discussion on the link between trade openness and economic growth as well as the conceptual framework. Besides, theories which address economic growth and trade openness are discussed. This includes the endogenous growth theory, neoclassical growth theory and the Export-Led growth strategy. In addition to this, empirical studies on trade openness and economic growth are discussed.

Chapter two discusses trade policy in Zambia. This includes trade policies implemented before and after the year 1990, that is, implemented trade policies in both the pre and post liberalisation period. The chapter also discusses selected macroeconomic indicators for the Zambian Economy. This includes the paths of Zambia's economic growth, trade openness, trade tariffs and taxes on international trade before and after 1990. Additionally, the main export destination, the main source of imports and the share of Zambia's trade according to international bodies on trade are discussed.

Chapter three involves the construction of an econometric model aimed at modelling the relationship between trade openness and economic growth for the period 1980-2019. This involves checking for stationarity in the variables, testing for cointegration and modelling both the long run and short run dynamics using the ARDL approach as the method of estimation. In addition to this, presentation and discussion of findings are included in the chapter. The chapter ends with conclusion and recommendations based on the study findings.

CHAPTER ONE

1.0 THEORETICAL APPROACHES ON TRADE OPENNESS AND ECONOMIC GROWTH

1.1 THE CONCEPT OF TRADE OPENNESS

Trade openness is a concept that has been generally accepted in the world of economics. Despite being a well-known concept in economics, particularly in international economics, definitions for trade openness are not so clear. In simple words, trade openness involves the lifting of or reduction in trade barriers to promote more trade. In other words, having no barriers to international trade as nations engage in trade amongst themselves. Edwards (1998:384) defines trade openness as the absence of any barriers to international trade among trading nations. Examples of barriers to trade include trade tariffs, import quotas, licences, exchange rate controls.

The concept of trade openness is strongly associated with trade facilitation[1] and trade liberalisation[2]. As trade facilitation improves the easiness of doing trade among nations, a nation's volume of trade (the sum of a nation's imports exports) tends to increase. The implementation of policies that facilitate international trade, lead to higher levels of trade openness in an economy. In other words, trade facilitation and liberalisation promotes both exports and imports leading to more openness to trade. Generally, the ratio of trade volume to GDP is used as a common measure of trade openness. Besides this, the ratio of exports to GDP and the ratio of imports to GDP and

[1] Trade facilitation: This is related to costs and easiness of doing trade among nations which in turn affect gains from trade. Improving trade facilitation is desirable in any economy. This is because when trade facilitation improves, all trade activities are carried out in an efficient, transparent and predicable way. Trade facilitation involves the integration of procedures and roles of border agencies, simplification of trading for small–scale traders, improvement in the legal and regulatory framework and the provision of systems, infrastructure and the development of trade corridors which are supportive to trade (Seventh National Development Plan [7NDP], 2017, 92).

[2] Trade liberalisation is the rendering free of international trade among nations from any sort of trade barriers. In other words, it is the existence of free trade with no intervention from government leading to significant increases in the volume of trade among trading nations. Trade liberalisation also involves the removal of restrictions on imports.

trade openness index are among other measures of trade openness[3]. From these measures, it can be deduced that the higher the ratio, the higher is the level of trade openness and the lower the ratio, the lower is the level of trade openness in an economy. Besides, the level of integration among natıons also helps in determining the level of trade openness for an economy (Kader, 2013:48). The levels of trade openness among nations are of varying degrees. Some economies have relatively higher degrees of trade openness than other economies. Below are some of the benefits that can accrue to a nation as it becomes more open to trade.

1.1.1 BENEFITS OF TRADE OPENNESS

Economies of scale: In the classical theory of trade with assumptions of constant returns to scale and perfect competition, international trade among nations occurs on the basis of comparative advantage. However, under new international trade theories with assumptıons of increasing returns to scale and imperfect markets, in addition to comparative advantage, international trade among nations occurs on the basis of economies of scale accruing to firms, technology levels and product differentiation (Karluk, 2003:91). The firms that operate with economies of scale tend to relatively have higher efficiency levels and lower costs of production. This gives such firms an advantage to increase output as well as sale their products at relatively lower prices. This leads to the driving out of inefficient firms from the market (that is, they are forced to shut down due to losses). Thus, as international markets expand through trade, efficient firms benefit from economies of scale and products are offered at lower prices. In this way, trade openness ensures an increase in consumer welfare and only a few and efficient firms remain in the market (Bayraktutan, 2003:182-183).

Change in economic structures: Trade openness enables trading nations to interact more with each other. Through this interaction, trading nations exchange information related to the production and consumption of goods and services. For instance, exported and imported goods and services (consumed goods and services) can be used to determine the needs and behaviours of consumers. This indirectly entails changes in the production of goods and services in order to meet consumer needs

[3] Other measures of trade openness include: tariff rates, non-tariff barriers, export taxes and subsidies, trade openness composite indexes, black market premium.

domestically and internationally. Thus, as international trade increases interaction among nations, firms change their production structures and the consumers change their behaviour and needs. In this way, trade leads to structural changes in an economy (Seyidoğlu, 2007:104). For instance, suppose two nations A and B are engaged in trade. Nation A produces and exports good X to nation B. Nation A discovers that it enjoys a large market for its product X in nation B. Due to this market share, nation A can start producing and exporting good Y (as a differentiated product) to nation B. Nation A can end up producing and exporting more goods to nation B (so can nation B produce and export to nation A). As this process continues, the economic structures in these two nations may go through changes which may improve social welfare.

Increased competition: As nations become more open to trade, the market size firms face increases. This is because trade increases the quantity of foreign products entering a country. This occurrence tends to lead to more competition for local firms as they have to compete for the domestic market with foreign firms (Mammadov, 2016:22). Increased competition can in turn stimulate trading firms to produce quality goods and services with efficiency in order to remain in the market. Thus, the firms participating in international trade are likely to improve the quality of their products as well as engage in innovative actions which may differentiate their products from those of their rivals. This is likely to improve consumer welfare in trading nations. Thus, as international competition increases, a nation's efficiency in production increases. In other words, through the productivity gains due to competition, a nation's total output increases. In this way, a nation can benefit from more openness to trade.

Technological advancement: Economic growth theories agree that technological advancement affects growth positively in the long run. Actually, the differences in factor productivity among nations is said to originate from differences in the levels of technology entering the production process (İbid: 22). International trade tends to increase technology transfer among trading nations. Nations that have low levels of technology for their production tend to benefit more from technologies present in foreign firms/nations as they interact more through trade. This is because of the increasing marginal returns of technology in nations with low levels of technology. In this way, developing nations are likely to benefit more from trade because of their low levels of technology. As a nation opens up more to the outside world, trade tends to act as source

of innovation. This is achieved through knowledge spill-overs among trading nations. Furthermore, more openness to trade leads to learning of new products and productive methods for producing goods and services. In other words, through integration with the outside world and supply chains, nations tend to easily adopt new technologies and new methods of production (Almeida and Fernandes, 2007:701-702). Thus, as the level of trade openness increases, technology can easily be transferred from one nation to another.

In addition, through trade, firms are able to import intermediate inputs and capital goods. This enables firms to develop their own technologies to incorporate in the production process. In a similar way, exporters interact with more informed and different consumers. In this way, exporting firms are able to get new information which they can use to develop new technologies for their production of goods and services. In short, as importing and exporting firms remain in competitive international markets, with time they are likely to develop new technologies thereby increasing production efficiency and produce high-quality products (Caselli and Coleman, 2001:2-13). Salvatore (2013:336) summarises the benefits of trade openness as follows;

- Increased trade openness enables EMDEs benefit from the technology/innovation from AEs.
- Increased trade openness tends to increase the benefits from Research and Development (R&D).
- Increase in the level of trade openness enables trading nations/firms to enjoy economies of scale in their production of goods and services
- As trade openness increases, price distortions are eliminated and production efficiency is enhanced.
- As trade openness promotes production efficiency, there is more specialisation in production among trading economies.
- Increased trade openness supports the development of new products.

1.2 TRADE OPENNESS AND ECONOMIC GROWTH

The association of trade openness and economic growth has been of great interest among academicians and policy makers for a long time. There is a general consensus that there exists a link between trade openness and economic growth. However, there are different views and findings on the nature of the relationship between trade openness and

economic growth. The studies on trade and growth, just like any cross-section study, have been faced with conceptual problems and the causal direction between the two variables is difficult to establish (Bliss, 2007:4).

Conventionally, trade openness together with rises in investments in both physical and human capital are an important factor of economic growth (Bergheim, 2005:3-20). The argument is that nations which are open to trade tend to experience increase in Foreign Direct Investments (FDI) and are able to attract technical know-how which is relevant for production of goods and services. In this way, a nation's capacity to increase its productivity, hence increase in total output becomes more probable. The supporters of more openness to trade contend that trade policies which promote trade allows for efficient reallocation of resources and indirectly enables economies to adopt export-led strategy of growth. This tends to support export promotion strategies in sectors where the economy enjoys comparative advantage (Jonsson and Subramaniam, 2001:198-199).

The investigation of the relationship between international trade and economic growth stretches as far as the studies of Adam Smith and David Ricardo. Smith (1776) and Ricardo (1821:85-86) explain that trade between two nations arises on the basis of trading nations specialising in the production of goods and services in which they have absolute and/or comparative advantage. In this way, nations can produce goods and services efficiently leading to increased output and social welfare. Through trade, a nation is able to consume more than it is able to produce from its available resources. At the same time, as more trade is promoted, a nation is able to produce more than is needed for its domestic demand. This increases the volume of goods and services that can be traded among nations. The gains from international trade are not only limited to the exchange of goods and services among trading nations. When evaluated from a macroeconomic perspective, international trade plays a role on the economic performance of trading nations. This is because trade tends to have positive effects on other macroeconomic indicators in an economy (Sağlam, 2016:2).

International trade can affect a nation's market structures, unemployment, inflation, poverty levels, income distribution and other economic indicators as it trades with other nations. This is because exports and imports are dependent on both domestic and foreign demand and supply dimensions. Thus, more openness to trade affects the

level of economic activity in an economy. As a nation uses its available resources efficiently, it increases its input productivity leading to more output and income. In this way, it can produce more than it requires domestically (exceeding domestic demand for goods and services). This makes an economy to export its produce to other nations. As exports increase, the level of competitiveness and productivity tends to increase leading to increased national output. As an economy exports, it also tends to import different products from abroad. Hence, as a nation becomes more open to trade, it creates the possibilities of importing capital goods needed for production and at the same time benefiting from foreign technologies and technical know-how (Husted and Melvin, 2013:220-222). This is achieved through the factor mobility which is enhanced as a nation becomes more open to trade. In short, through trade, input productivity improves.

Trading economies have been able to put forth different trade strategies aimed at maximising the benefits from trade. These include; the Export-Led Growth (ELG) strategy, the Import Substitution Strategy (ISS) and Foreign Direct Investment (FDI) based growth strategy (Mammadov, 2016:20). According to the ELG strategy, the increase in exports of manufactured goods and services creates positive externalities thereby causing a trickle-down effect to other sectors of the economy. This in turn boosts total output and economic growth. This is because more openness to trade allows for increases in FDI inflows, technology, flow of knowledge and technical know-how in an economy (Karam and Zaki, 2015:22). These contribute to increased production efficiency in trading nations. According to endogenous growth theory, openness to trade comes with benefits of technology transfer, increase in domestic and foreign competition and gains in input productivity which are desirable for the production of goods and services (Sakyi et al, 2015:863-864). The creation of a competitive environment increases social welfare in an economy. This is because competition limits the wastage of available resources in an economy. At the same time, higher levels of trade openness promotes specialization in the production of goods and services (Olaifa et al, 2013:44). Thus, trade policy that promotes higher levels of trade openness is seen as a rational and desirable policy for an economy.

There are many empirical studies which have been undertaken to investigate the association between trade openness and economic growth. These studies have recorded heterogeneous results explaining the link between the two variables. For instance, Romer

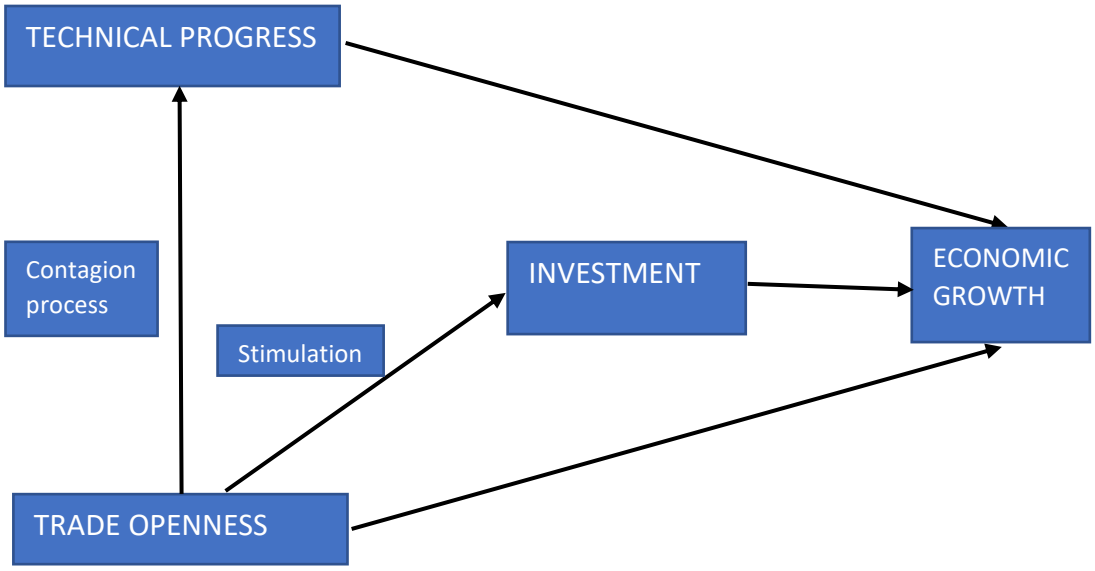
(1986) and Lucas (1998) found that trade openness positively affects growth through knowledge accumulation. Grossman and Helpman (1991:152), Romer (1990) and Sala-I-Martin and Barro (1995) found that as economies increase their levels of trade openness, technology levels increase in these economies leading to greater benefits from trade, hence, stimulating economic growth. Dolar (1992) in his study found that trade openness positively affects growth especially for economies that liberalised their trade. Rodriguez and Rodrik (1999) found an inverse relationship between trade restrictions and economic growth concluding that more of openness to trade is important. A study by Zahonogo on Sub-Saharan Africa countries found that trade openness is positive for economic growth (Zahanogo, 2016:50).

Besides the arguments of the existence of a positive relationship between trade openness and economic growth, other studies have shown that trade openness negatively affects the growth of an economy. It is argued that as a nation increases its level of trade openness, there is an increase in market competition which tends to reduces expected profits for domestic firms. As a result, this discourages firms from undertaking innovative practices which can improve their product standard (Sarkar, 2008:231). This is attributed to the fact that increased competition reduces profit margins and monopoly rents which accrue to innovators. Thus, due to increased level of trade openness, innovation is seen as a process of creative destruction (Hofmann, 2013:74). Furthermore, it is argued that higher levels of trade openness tends to reduce economic growth in the long run. This occurs when a nation decides to specialises in the production of goods and services in which it has comparative disadvantage or sectors in which technological innovations or the learning-by-doing are exhausted. Thus, other scholars have given support to protectionism if it encourages investment in sectors requiring R&D. This type of intervention tends to promote economic growth in the long run (Lucas, 1998; Yanıkkaya, 2003:77). Yanikkaya also finds that there exists a positive relation between restrictions to trade and economic growth for a set of developing countries (İbid, 77). In other words, more openness to trade inhibits economic growth in developing countries.

Studies on trade openness and economic growth goes beyond finding the nature of the relationship between the two variables. Despite the presence of a great number of studies investigating this relationship, there is apparently no consensus on the direction of the causal relationship between trade openness and economic growth. At the center of

the argument is whether economic growth influences trade openness (that is, unidirectional causal relationship), economic growth influencing trade openness or that both economic growth and trade openness influence each other (bi-directional causal relationship). In line with this, there is a mixture of empirical findings on causal relationship between trade openness and economic growth. Thus, this study sought to investigate the nature of the relationship as well as the direction of causality between trade openness and economic growth for the Zambian Economy. Below is the conceptual framework showing the link between trade openness and economic growth.

FIGURE 1: Interactions among trade openness, technical progress and investment



Source: Author's own illustration

Figure 1 above shows the conceptual framework of the study. It shows the relationship among trade openness, technical progress, investment and economic growth. The framework shows how the explanatory variables included in the study can influence economic growth. As it can be seen, technical progress, trade openness and investment can directly influence growth in an economy. Besides, it can be seen that trade openness through the contagion process (benefits from interactions with other nations) leads to technical progress which may enhance the effect of technical progress on the production of good and services. Hence, stimulate economic growth.

In addition to this, investment in an economy plays a role of catalysing the effects of trade openness on economic growth. In short, the conceptual framework shows the direct effects of investment, trade openness and technical progress on economic growth as well as the effect of the interaction between trade openness and technical progress as well as the interaction between trade openness and investment on economic growth. Thus, the framework aims at capturing the endogeneity and exogeneity of economic growth in the Zambian Economy. In this study, technical progress is measured using industry value added and secondary school enrolment (used as a proxy for human capital), investment is measured using FDI inflows.

1.3 THEORIES ON TRADE OPENNESS AND ECONOMIC GROWTH

There are a number of theories which attempt to explain the relationship between trade openness and economic growth. For instance, the traditional Heckscher-Ohlin trade theory tries to explain that trade openness leads to a one-time output growth and does not suggest the long run relationship between trade openness and growth. On the other hand, the neoclassical theory of growth suggest that long run economic growth is influenced positively by exogenous improvements in technology (increase in the use of technology in production). Different from the neoclassical view is the endogenous growth theory. This theory explains the impact of trade openness on economic growth in the long run by arguing that trade openness facilitates the transfer of technology as a nation interacts with foreign nations (Ulaşan, 2014:2). Besides, the endogenous growth theory differs from the neoclassical theory in the way technological progress is incorporated in the growth model.

1.3.1 NEOCLASSICAL GROWTH THEORY

The neoclassical growth theory was developed by Robert Solow in 1956 as a response to the growth model developed by Harrod Domar. The theory is also known as Solow growth theory. The distinctive feature of this theory is that individual factors of production are subject to diminishing returns[4] and that the production function exhibits

[4] The Law of diminishing returns gives a description of marginal products (marginal returns) of factors of production in the short run. In the short run, with other productive inputs being fixed, the marginal product of the varying productive input, beyond a certain point begins to diminish (decline). In other words, the resulting increment in total product begins to decrease and the average product decreases too (Ahuja, 2017, 397).

constant returns to scale in the production of goods and services. The theory states that output per worker is a function of capital per worker (Van Den Berg and Lewer, 2015:109). This measure of output gives the per capita output/income in an economy. The capital per worker is affected by a nation's level of investment which depends on the level of savings in an economy.

In the neoclassical model, population growth, investment and technological advancement are considered as exogenous variables. Owing to this, an increase in savings (thus, investments) leads to economic growth in the medium run (not permanent growth) as the economy transitions. On the other hand, an economy tends to experience permanent growth when labour-augmenting technical progress is incorporated in the production process. Thus, according to the neoclassical growth model, economic expansion in the medium-run and long-run are positively related to the level of investment and advancements in technology in an economy. In other words, since long-run and permanent growth is determined by technology, growth in the neoclassical model is said to be exogenously determined. The neoclassical growth model is shown below.

$$Y(t) = F[(K(t), A(t).L(t)] \quad (1)$$

The production function above shows output as a function of capital, labour and technology. Y, is output at time t, K is physical capital stock (machinery, factories/plants etc), L is labour stock and A[5] represents the level of technology which increases the productivity of labour in the production of goods and services. Thus, when the levels of technology (A) is high, per unit output of labour increases.

The production function above can be expressed in terms of per unit of labour[6]. That is,

[5] A, as a technology index is an exogenous production input which is labour-augmenting. Technology may include knowledge, abilities and skills necessary for production. Thus, technology improves the efficiency of labour in production. In this way, technology is also a labour-saving production input in the neoclassical growth model. Further, since technology enhances labour, the units of labour going into the production process are referred to as effective labour units (Savvides and Stengos, 2009:33).

[6] By dividing equation 1 by this term, $A(t).L(t)$, the production function is expressed in per units of effective labour.

$$y = F(k) \quad (2)$$

Where, y is output per unit of effective labour (worker), k is capital per unit of effective labour.

The neoclassical growth theory can be used to explain how trade affects economic growth. Thus, it is used to explain how international trade or trade openness increases a nation's welfare as it shifts from restricted trade policies to policies of free trade. Generally, as an economy undergoes more openness to trade, interacting more with other economies through imports and exports, there is an increase in efficiency in the production of goods and services. This leads to the transformation of available inputs into welfare-improving final products. This transformation is enhanced by the international flow of factors of production from locations with relative abundance of a factor to a location of relative scarcity (Hofmann, 2013:32). In line with the neoclassical model, Mazumdar (1996:1329) adds that if an economy is initially in its steady state, upon liberalising its trade, the economy tends to experience medium-run economic growth besides the usual increase in its income/output.

In light of the neoclassical model, the trade-growth relationship differs depending on the nature of the good being imported/exported (İbid, 1336). When a nations imports consumption goods and exports capital-intensive goods, trade does not lead to growth despite substantial increase in its income. On the other hand, for nations that import capital-intensive goods and export consumption goods, trade leads to growth owing to the reduction in the cost of capital goods which are incorporated into the production process. In other words, nations that export capital-intensive goods and import consumption goods may not increase its growth rate in the medium run whereas nations that import capital-intensive goods and export consumption goods tend to increase the growth rate in the medium run. Thus, it can be deduced that trade openness is likely to be a desirable benefit to developing economies than to developed economies. This is because developing economies tend to export less capital-intensive goods and services compared to developed economies which export capital-intensive goods and services.

In the light of the neoclassical model, trade openness tends to shift an economy's steady. This leads to medium-run economic growth as an economy experiences transition to a new steady state. However, the effect on economic growth is dependent on the

composition of trade (whether an economy's comparative advantage is in producing capital goods or consumption goods). Besides, since permanent economic growth under the neoclassical is possible as an economy experiences sustained technological growth, higher levels of trade openness can lead to permanent economic growth provided it transforms the speed of technical progress. In other words, trade liberalisation or increase in trade openness will positively influence economic growth if it positively affects the speed of technological advancement in an economy.

1.3.2 ENDOGENOUS GROWTH THEORY

The prominent feature in the neoclassical model is the case of diminishing returns exhibited in the factors of production. Due to this feature, there has been attempts by economists to make improvements on the neoclassical theory of growth. Specifically, attempts have been made to find ways in which economies can eliminate diminishing returns as well as coming up with new theories on growth which incorporates technical progress in the production of goods and services (Van Den Berg and Lewer, 2015:134). This has led to new understandings on how an economy can expand in the long run. Thus, the endogenous growth theory was developed to try and explain economic expansion in the long run.

The endogenous growth theory is an improvement on the neoclassical growth theory. Recent developments on the theory have been made by Paul Romer and Robert Lucas (Salvatore, 2013:336). The main difference is the treatment of technology[7] and marginal product of inputs in the production process. The neoclassical growth theory explains permanent economic growth through technical progress in the presence of diminishing returns in the inputs. On the other hand, the endogenous growth theory avoids diminishing returns and explains permanent economic growth through technical progress with a model which incorporates increasing returns to scale in the production of goods

[7] Technology in this model refers to new ideas, methods, organisational structures, knowledge, innovations and legal institutions. It also contains knowledge that determines how various factors and resources to produce new products can be used. Additionally, it includes quality institutions which aid economic activity. An economy with quality institutions which lead people to concentrate on being productive and innovative, transforms available resources into larger amounts of welfare-enhancing output (Van Den Berg and Lewer, 2015:139).

and services. In other words, a nation can accumulate factors of production without diminishing returns (in these factors) hence ensure permanent growth in the long run.

These two growth theories differ in the handling of technological advancement in the production process. In the endogenous growth theory, technological growth is taken as a positive externality[8] (or unintended by-product) of investments, production, exporting as well as importing. The model treats advancements in technology as an endogenous factor of production. Thus, economic growth is considered as an endogenous phenomenon (endogenously determined). According to this theory, for economies with the same capital per worker (same capital-labour ratio), the economy with the larger share of capital tends to enjoy higher steady state value than the economy with smaller share of capital. This is attributed to the absence of diminishing returns in the factors of production, particularly in capital (Van Den Berg and Lewer, 2015:136). This is because the productivity of all the inputs of production is assumed to increase through investments and technological growth. Thus, investments in explorations as well as R&D are critical for avoiding declining marginal returns in the factors of production. On the other hand, labour as a factor of production is part of human capital whose productivity is enhanced through trainings, education and work experiences. This in turn increases the marginal returns of labour.

The AK model

A simple model of the endogenous growth model is expressed as below. This model is referred to as the AK model.

$$Y = AK \tag{3}$$

Where, Y is the output, K is the capital and A represents a non-rival and non-excludable[9] level of technology included in the production process. The function shows

[8] Technology is taken as a positive externality because technology is considered a non-rival and non-excludable good for the production of goods and services. In this way, ideas or methods developed by different person can be used without diminishing the first person's capacity to use the idea or method. For instance, once a wheel is invented, there is no need to reinvent the same wheel.

[9] Technology sometimes can be excludable. For instance, through patents and copyrights, other firms have secrets and information advantage in relation to technology which other firms in the market may not have (Barro and Sala-i-Martin, 2004:62)

that output is a function of capital and that an increase in capital increases output. This also means that a decrease in capital reduces output. The level of capital in the production function has constant or increasing returns to scale and includes both physical and human capital. It is because of the presence of human capital that non-decreasing marginal returns become plausible. For instance, a more skilled worker is assumed to be more productive than an unskilled worker. In other words, higher human capital, implies more capital accumulation, leading to more productivity. In this way, economic growth in the long run is plausible. In line with the AK model, Romer (1986) proposed a different model based on capital accumulation. Romer also categorised Labour as human capital and states that as firms accumulate capital they create positive externalities to the other firms. In other words, capital accumulation by a firm benefits other firms (which have not accumulated capital) indirectly through knowledge externalities. This is because the accumulation of knowledge by a firm creates new knowledge to the whole economy related to production of goods and services. This is possible because the firm which accumulates knowledge on its own does not recognize the effect of the new knowledge to the economy. This is because the firm is a small entity in relation to the entire economy. The model by Romer is expressed below;

$$Y = AK^{\alpha}L^{1-\alpha} \tag{4}$$

By taking the A[10] in equation 4 as $A = \bar{A}K^{1-\alpha}$, equation 4 becomes similar to the AK model, as follows

$$Y = \bar{A}KL^{1-\alpha}, \bar{A} \text{ is a constant greater than zero} \tag{5}$$

The AK model is constructed on the assumption that when different firms accumulate capital, through the process of learning-by-doing, technical progress is generated leading to increasing marginal product. This is contrary to diminishing marginal returns which occur when technology remains the same. In a nutshell, the AK model depicts endogenous growth and this endogeneity comes from human capital and knowledge accumulation. This leads to increased productivity in the factors of production and non-decreasing returns to scale.

[10] This is based on the assumption that A is endogenously determined at an aggregate level and is taken as given by firms.

The endogenous growth model can be used to explain economic growth through the influence of trade openness. The non-rivalry and non-excludability of technology as a factor of production means that as nations interact with each other though trade, these nations can easily maximize the benefits from technology leading to an in increase in productivity of inputs. This is aided by the fact that higher levels of trade openness increases firm and industry competition which enhances innovation and availability of a variety of goods and services[11]. Besides, openness to trade increases the interaction of consumers and producers based in different countries. This increases the rate at which new ideas are shared across economic sectors and industries. This is aided by the fact that new technologies and ideas can be learned/copied as nations interact through trade[12]. For instance, a nation is able to import machinery/equipment that already contains technology and knowledge. In this way, a nation can use the machinery/equipment without learning the technology and/or applying the lessons to the creation of the same machine/equipment from the scratch.

Furthermore, the transfer of technology through trade, leads to an increase in the stock of knowledge available to innovators. This stimulates productivity as well as knowledge spill-overs to other firms and sectors of an economy. In short, trade openness fosters technological growth which improves production efficiency which in turn leads to higher output levels. Broadly, trade openness nurtures technical progress in firms, sectors and in economies as it enables the spill-over of knowledge and technical know-how from interactions among trading nations (Hofmann, 2013:25).

1.3.3 EXPORT-LED GROWTH STRATEGY

The export-led growth (ELG) strategy or the export promotion strategy gained substantial support upon the failure of the Import-Substitution Strategy (ISS) which started to gain importance in the post-World War II period. The transition to this growth strategy started with an increase in protectionist trade policies which most nations

[11] The production of goods and services embodies technologies that can be easily transferred or imitated as nations interact through trade.

[12] This is referred to as the concept of learning-by-doing. Trading nations experience this concept as a learning-by-exporting and/or learning-by-importing phenomena. Exports and imports contain knowledge, ideas, technologies that can be learnt by trading firms. This in turn expands trade and total output.

embraced after the great depression of 1929. These policies became more important for most nations as the world was experiencing the Second World War. This led to a significant decline in world exports as a percent of the world GDP by 1950 (Van Den Berg and Lewer, 2015:49). However, since 1950, there has been a significant rise in world trade than world output. For the period, 1950 to 1998, world GDP increased about six times whereas world exports increased approximately 20 times and by the year 2005, world exports accounted for 25 percent of world GDP (İbid, 49). This is attributed to the implementation of outward-oriented trade policies which tend to promote more exports. Most nations after 1970 embraced pro-trade policies. This led to further increase in levels of trade openness globally.

The ELG strategy is a strategy designed to help economies industrialise with regard to sectors in which a nation enjoys comparative advantage in the production of goods and services (Seyidoğlu, 2007:595). This strategy is implemented by identifying, promoting and supporting manufacturing in sectors that have the potential to grow and become competitive internationally. The supporting of firms may include the provision of export subsidies, grants by government for R&D, credit facilitation for exporting firms or those with potential to produce and export, devaluation of the local currency to make a country's exports relatively cheaper (competitive) and other deliberate government strategies aimed at helping domestic firms increase international market shares. As this strategy aims at reaching out to foreign markets through increased exports, domestic firms are made to face larger market size in addition to the domestic market. Thus, the production capacity of a nation increases thereby increasing the possibilities of economies of scale in the production of goods and services. A nation produces and exports goods and services in which it enjoys comparative advantage and imports goods and services in which it has comparative disadvantage. This in turn promotes higher levels of trade openness and industrialisation (production of manufactured goods and services). Thus, through this strategy, an economy is able to grow through trade. This trickles down to the expansion of other sectors and improvement in other macroeconomic indicators.

Since under the ELG strategy, instead of protectionism international competition is embraced, the behaviour of firms and the production structures in an economy undergo significant transformations. This includes elimination of or reduction in monopolistic behaviours, firms are constantly engaged in innovations and product differentiation due

to increased competition and market prices of goods and services tend to decline. This ensures important gains and dynamism (structural changes) in the economy. Furthermore, with increased competition, the spread of new ideas, knowledge and technology is enhanced under this strategy. Furthermore, a nation stands to benefit from free trade and trade agreements with other nations in a relatively easier manner than under protectionism. In this way, domestic resources in an economy are more likely to be used efficiently leading to higher output levels.

The basic function of trade policy under this strategy is different from the policy implemented under import substitution strategy or industrialisation. Under the industrialisation strategy based on export promotion, the basic function of trade policy is to support domestic industries to be ready for competition from foreign competitors. This is in spite of the tendency of economies to protect infant industries from foreign competition. Such economies later own implement liberal trade policies that promote more openness to trade and integration (İbid, 595). Export promotion strategy directly affects a nation's export earnings and trade volume. As export volume increases, the foreign exchange earnings increase as well.

However, there is a downside to the adoption of ELG strategy. As a nation implements this strategy, imports are liberalised leading to a rise in the ratio of trade volume to GDP. This may negatıvely affect a nation's balance of payment (İbid, 595). Additionally, with this strategy, developing nations may face challenges of building export industries due to the competition they face from large, established and efficient foreign industries. Thus, these nations are made worse from implementing export promotion strategy.

1.4 EMPIRICAL LITERATURE

There has been a great number of studies undertaken to investigate the relationship between trade openness and economic growth. This set of studies includes studies on both developed and developing economies. These studies include the computation of correlations, regression parameters and cointegration tests with an aim of proving or disproving the existence of any relationship between trade openness and growth (Van Den Berg and Lewer, 2015:54). Owing to a set of heterogeneous findings in this area of

research, there is neither an agreement on the nature of relationship nor on the causal relation between the two variables.

Generally, studies on this topic has faced criticisms for shortcomings seen in the results. These are related to the data used and/or statistical methods applied in the investigation of the relationship between trade openness and economic growth. One of the shortcomings has been in finding and measuring variables to be included in the empirical models particularly for developing economies where data capturing is still inadequate (İbid, 54). Van Den Berg also highlights the following as the major shortcomings in attempts to investigate the relationship between trade and growth; Inaccuracy of economic data, simplified assumptions when applying statistical methods, the nature and distribution of available data, omission of variables which measure the level of trade openness, simultaneity problem, insufficient samples leading to spurious results and measurement errors in the economic variables (İbid, 54). As a result of such shortcomings, there exists significant differences in empirical findings for studies on this topic. These section presents some of the empirical studies that have been conducted on this topic.

Fetahi-Vehapi et al (2015) finds a positive effect of trade openness on growth for South East European (SEE) countries. They find that the relationship is conditional on the level of income per capita and more beneficial to countries with higher levels of FDI and gross fixed capital formation. Billmeier and Nannicini (2009) for selected regions for the period after 1970; Shahbaz (2012) for Pakistan for the period 1971-2011; Tahir and Azid (2015) for developing countries for the period 1990-2009; Keho (2017) for Cote d'Ivoire for the period 1965-2014; Yücel (2009) for Turkey using monthly data for the period 1989-2007, find that a positive and statistically significant relationship exist between trade openness and economic growth. Edwards (1998) and Eriş and Ulaşan (2013) find that economies with higher levels of trade openness tend to experience quicker rise in productivity growth than other economies. Thus, leading to economic growth. Besides, the type of a measure indicating the level of trade openness is critical for studies on openness and growth. Harrison (1996) in testing the association between openness and growth found that a positive correlation exists between different indicators of trade openness and economic growth for developing countries and the type of data used (that is, cross-section, time series or panel data) influences the results.

Wacziarg and Welch (2008) in a cross-sectional study for the period 1950-1998, finds that liberalisation of trade fosters economic growth. For the countries that liberalised trade, the annual growth rates were 1.5 percentage points higher than the pre-liberalisation period and there was a significant increase in trade volume by approximately 5 percentage points for these countries. Asiedu (2013) on the Ghanaian economy for the period 1986-2010 and Hye et al (2016) on the Chinese economy for the period 1975-2009, applied the Autoregressive Distributed Lag (ARDL) approach and it was found that trade liberalisation positively affected economic growth in the long run (in the short run as well for the Chinese economy).

Zahanogo (2016) investigates the relationship between trade openness and economic growth in developing countries focusing on 42 Sub-Saharan countries for the period 1980-2012. Using the Pooled Mean Group estimation technique, it was found that there exists a threshold below which higher levels of trade openness positively affects economic growth and above a certain threshold trade negatively affects economic growth. Manwa et al (2019) investigates the relationship between trade liberalisation and economic growth in Southern African Customs Union (SACU). They find an insignificant relation between liberalisation and growth over a period of 30 years for 5 countries in the customs union. Yanikkaya (2003) and Willard (2000) find that there exists an unclear relationship between trade openness and economic growth for a cross section of countries. Hassan et al (2006) for Sub-Saharan African Countries; Chang et al (2009) as a cross-country study for the period 1960-2000, find that trade openness has not helped in achieving economic growth and that institutional and other complementary reforms are needed to aid these countries benefit from more openness to trade.

Dowrick and Golley (2004) found that for economies which specialise in exporting of primary products, trade openness negatively affects economic growth and that the benefits of higher levels of trade openness accrue to advanced economies rather than least developed economies. Moyo et al (2017) using the ARDL model for the Nigerian economy for the period 1980-2016, finds that openness to trade has a negative effect on economic growth.

Din et al (2003) for the economy of Pakistan; Yücel (2009) for Turkey; Sakyi et al (2015) for the case of developing countries for the period 1970-2009, finds that there

exists a bidirectional causal link between trade openness and economic growth in the long run. Tekin (2012) using the new Granger causality testing approach for cross-sectional data, found a unidirectional causal relationship from trade openness to growth for Least Developed Countries (LDCs) for the period 1970-2010. Similarly, Olufemi (2004) using Nigerian economy data for the period 1970-2000, found a unidirectional causal relationship from trade openness to economic growth.

TABLE 1: Summary of some empirical studies on trade openness and economic growth.

Author(s)	Country/Region	Indicator for trade openness	Findings
Zahonogo Pam (2016) Period: 1980-2012.	42 Sub-Saharan Africa	Imports/GDP, Exports/GDP, Imports plus Exports/GDP	Trade openness has a positive effect on growth up to a certain threshold above which the effect is negative.
Manwa et al (2019) Period: 1980-2011	5 Southern African Customs Union (SACU) countries	Tariffs, Real Effective Exchange Rate, Trade ratios, adjusted trade ratios	No relationship between trade liberalisation and economic growth for 5 countries in SACU.
Fetahi-Vehapi et al (2015) Period: 1996-2012.	10 South East European (SEE) Countries	Imports plus exports/GDP	Positive and statistically significant effect of trade openness on economic growth.
Yanikkaya Halit (2003) Period: 1970-1997	100 developed and developing countries	Imports plus exports/GDP, Exports/GDP, Import penetration ratios, trade intensity ratios with OECD and non-OECD countries.	There exists a positive significant link between trade barriers and economic growth for developing economies
Din et al (2003) Period: 1960-2001	Pakistan	Imports plus exports/GDP	Lon run positive relationship between openness and growth as well as bidirectional causal relationship between the two variables

Edwards Sebastian (1998) Period: 1960-1990	93 advanced and developing countries	Sachs and Warner Openness Index, Outward Orientation Index, Learmer's Openness Index, Average import tariff on manufacturing, average coverage of Non-Tariff Barriers	Results are robust to the use of openness measure, estimation technique, time period and functional period and that more open economies record faster growth in productivity of factors
Eriş Mehmet N and Bülent Ulaşan (2013) Period: 1960-2000	66 developed and developing countries	Current Openness, real openness, fraction of open years, weighted averages of tariff rates, Non-Tariff barriers and Black Market Premium	Trade openness is strongly associated with long-run economic growth
Harrison Ann (1996) Period: 1960-1987	50 developing countries	Index of trade liberalisation, Black-Market Premium, Imports plus exports/GDP and Movements Toward International Prices (MTIP) index	Together with the inclusion of the interaction of trade openness and human, there is a positive correlation between high openness and high economic growth.
Shahbaz Muhammad (2012) Period: 1971-2011	Pakistan	Real exports per capita, real imports per capita, terms of trade and real trade per capita	In the long run, economic growth is influenced by trade openness and there exists a unidirectional causal relationship between trade openness to economic growth.
Chang et al (2009) Period: 1960-2000	82 developed and developing countries	Structure-adjusted trade volume/GDP	Together with the interaction of trade openness with human capital investment, financial depth, inflation and public infrastructure, trade openness leads to faster economic growth

CHAPTER TWO

2.0 ZAMBIA'S MACROECONOMIC PERFORMANCE AND TRADE POLICY

2.1 ZAMBIA'S MACROECONOMIC INDICATORS.

This section presents and examines some selected macroeconomic indicators before and after the year 1990. The years before 1990, represent pre-liberalisation period whereas the years after 1990 represents post-liberalisation period.

2.1.1 Gross Domestic Product

Figure 2 below shows Zambia's Gross Domestic Product (GDP) at current prices in US dollars and its trend from 1964 to 1990. Generally, during this period, GDP has been growing especially before the year 1982. This can be seen from the upward slopping trend-line on the figure. From the figure below, the following are the observations and comments;

i. In the period 1964-1969, Zambia's GDP grew rapidly from 0.84 to 1.97 billion US dollars. This growth was not sustained as the economy contracted until the year 1971.

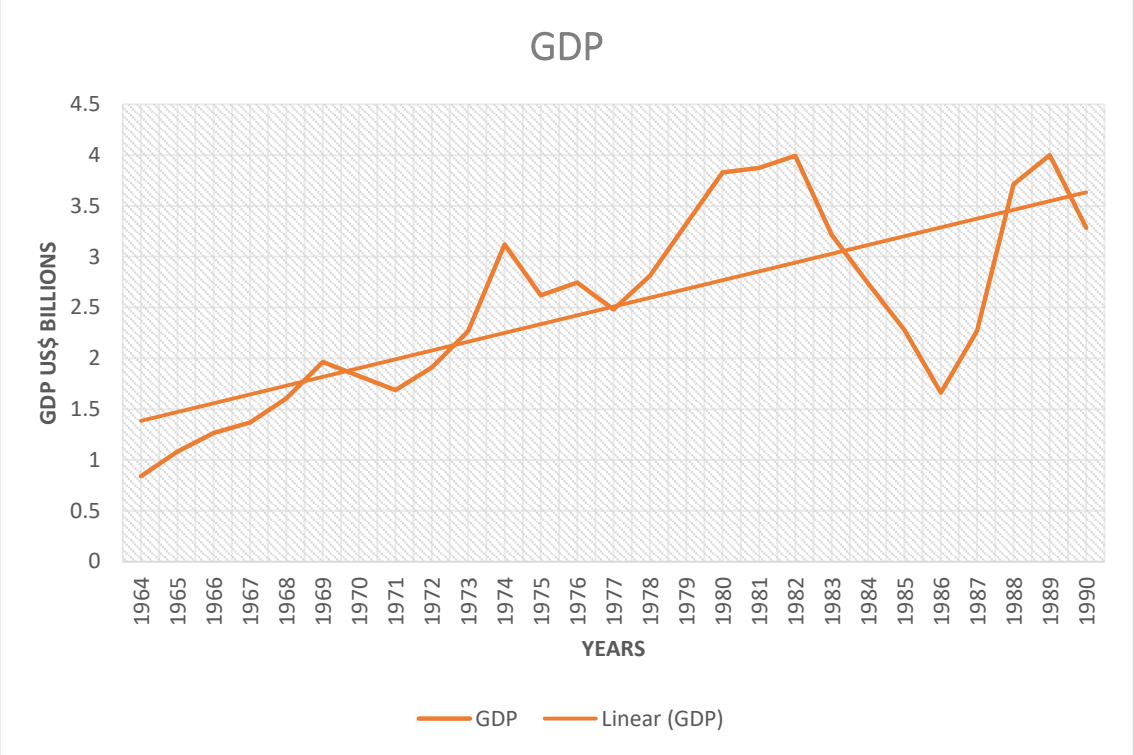
ii. After 1971, the economy began to recover although the recovery was slowed by external shocks to the economy. These were the oil crisis which started in 1973 and low copper prices which persisted on the international market.

iii. The GDP fell from 3.12 in 1974 to 2.48 billion US dollars in 1977. As a result of inward-looking and socialist policies put in place in 1975, the GDP recovered from the contraction growing to almost 4 billion US dollars in 1982.

iv. Between 1982 and 1986, the Zambian Economy recorded the largest contraction in GDP. In this period, the GDP fell from 3.99 in 1982 to 1.67 US dollars in 1986. This is attributed to rising public debt due to inward-looking policies making the government record budget deficits as well as low copper prices which prevailed in that period. In the same period, with an aim of overcoming the declining GDP, the government decided to adopt free market economy under IMF economic reforms. However, these reforms were abandoned in 1987 leading to adoption of inward-oriented policies.

v. After 1986, the GDP grew rapidly from 1.67 in 1986 to 4 billion US dollars in 1989.

FIGURE 2: Zambia's GDP at current prices in US dollars 1964-1990



Source: Author's illustration using World Bank's World Development Indicators Data.

Figure 3 below shows Zambia's GDP at current prices in US dollars and its trend from 1991 to 2020. This period recorded faster growth in GDP compared to the period before 1991. This can be seen from the upward slopping trend-line on the figure below. The growth in GDP has moved the Zambian Economy from the status of a low-income country to a lower middle-income country. From the figure below, the following are the observations and comments;

i. For the period 1991-2000, Zambia's GDP had been below 4 billion dollars. From 2001 to 2013, GDP increased rapidly reaching the peak of 28.05 billion dollars in 2013.

ii. This is attributed to the increased copper earnings in that period. This is because the growth of the Zambian Economy is largely dependent on copper exports. According to Maathai (2009:87), 50 percent of Zambia's GDP comes from copper export earnings. In the early 2000s, the copper prices

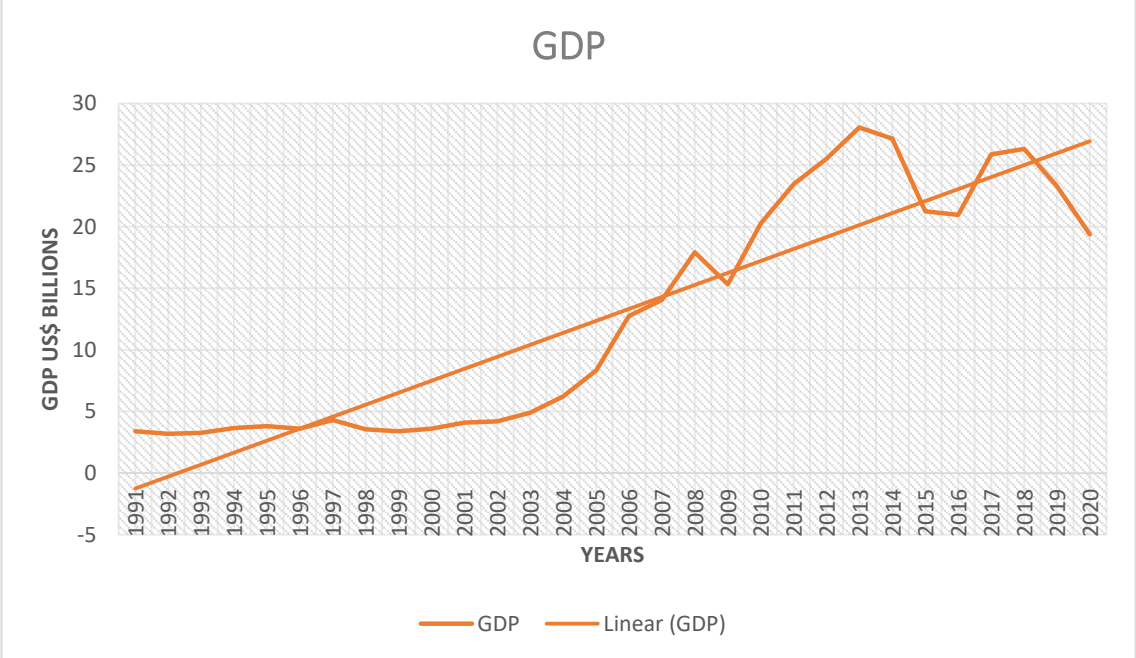
started rising on the international market. This led to a positive effect on the GDP. This increase in copper prices continued, thus, led to continued rise of the GDP (İbid: 98).

iii. The 2008 Global Financial Crisis (GFC) negatively affected the GDP. This is attributed to the fall in the global demand for commodities (such as copper). The GDP reduced from 17.91 in 2008 to 15.32 in 2009 billion dollars.

iv. Due to the quick recovery from the 2008 GFC of Zambia's major copper importer China, the GDP quickly recovered from the recession rising to 20.27 in 2010 from 15.32 billion dollars in 2009.

v. Since 2013, the GDP has been on a downward trend declining to 19.38 billion dollars in 2020 from its 2013 level.

FIGURE 3: Zambia's GDP at current prices in US dollars 1991-2020



Source: Author's illustration using World Bank's World Development Indicators Data.

2.1.2 Economic Growth

Figure 4 below shows economic growth in Zambia from 1964 to 1990. As it can be seen from the figure, Zambia's economic growth has been a mixture of booms and busts, that is, volatile growth for the period 1964-1991. In general, as it can be deduced from

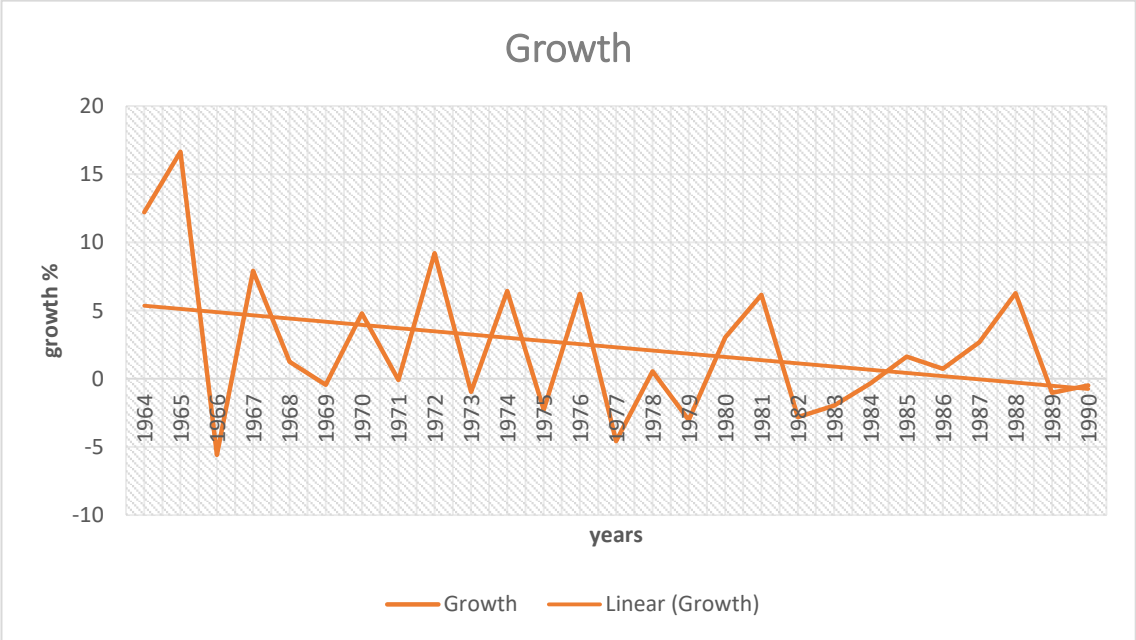
the trend-line, economic growth in Zambia shows a downward trend. From figure 4, the following are the observations and comments;

i. From 1964 to 1990, the highest and lowest growth rate for the Zambian Economy was in 1965 and in 1966 respectively. In 1965, the economy grew by 16.65 percent whereas in 1966, the economy declined by 5.57 percent.

ii. The 1973 oil crisis did not spare the Zambian Economy from its negative effects. This is because Zambia imports all its petroleum products. As a result, the economy contracted by 0.96 percent in 1973 from 9.21 percent the previous year. This was compounded by the falling copper prices which persisted in the 1970s.

iii. From 1982 to 1988, there was an upward trend for growth. The economy moved from a growth of -2.81 percent in 1982 to a growth of 6.28 percent in 1988. However, there was a sharp decline from 6.28 percent in 1988 to -1.02 percent in 1989.

FIGURE 4: Zambia's economic growth 1964-1990



Source: Author's illustration using World Bank's World Development Indicators Data.

Figure 5 below shows economic growth in Zambia from 1991 to 2020. Contrary to the downward trend in economic growth before 1991, there is an upward trend in economic growth for the period 1991-2010. This can be deduced from the trend-line

which shows an upward trend. From figure 5, the following are the observations and comments;

i. From 1991 to 2020, the highest and lowest growth rate for the Zambian Economy was in 2010 and 1994 respectively. In 2010, the economy grew by 10.3 percent whereas in 1994, the economy declined by 8.63 percent.

ii. In 1994, economic growth fell to 8.6 from 6.8 percent in 1993. This is attributed to a number of factors. Among them are; the falling copper prices, low energy production and inflation[13], the negative effects of the SAPs and rising debt (Chilala, 2018:91).

iii. The period 1999-2010 recorded an upward trend in economic growth. In 1999, economic growth was 4.65 percent rising to 10.3 percent in 2010. This put the Zambian Economy on the list of fastest growing economies. This growth is attributed to the favourable prices of commodities on the international market.

iv. Due to the 2008 GFC, economic growth reduced from 8.35 percent in 2007 to 7.77 percent in 2008. However, the recession did not last, there was a recovery from the 2008 level to 9.22 percent in 2009.

v. The period after the year 2010 has seen declining economic growth. This is attributed to the change in government in 2011, rising public debt, sharp depreciation of the exchange rate, droughts causing low energy production and low agriculture produce.

vi. For the period 2018 to 2020, economic growth has been on a downward trend. The contraction in growth is mainly attributed to high debt levels[14], rising levels of debt service due to depreciation of the currency (Zambian Kwacha),

[13] Both low energy production particularly hydroelectric power production and high inflation (due to rising food prices) are attributed to 1991-92 rainfall droughts. The rainfall pattern in Zambia showed a downward trend since 1980. This situation worsened in the 1991-92 rainfall season leading to droughts in the country. The droughts mainly affected maize production (Zambia's staple food). The result was a serious shortage of maize crop triggering sharp rises in mealie meal. Thus, there was a sharp rise in food inflation (Tiffen and Mulele, 1994).

[14] The levels of public debt as a percentage of GDP have been rising since 2018. Public debt as a percentage of GDP was 37.59 percent, 48.17 percent and 65.72 percent in 2018, 2019 and 2020, respectively. FDI as a percentage of GDP was 1.74 percent in 2018 (falling from 4.72 percent in 2017). 2019 and 2020 recorded FDI inflows of 2.35 percent and -0.46 percent, respectively (BOZ, 2021).

reduced levels of FDI inflows and COVID-19 pandemic[15] (Bank of Zambia [BOZ], 2021).

FIGURE 5: Zambia's economic growth 1991-2020

Source: Author's illustration using World Bank's World Development Indicators Data.

2.1.3 Inflation

Figure 6 below shows Zambia's inflation rate computed from Consumer Price index (CPI) from 1986 to 2019. From the trend-line, it can be seen that the inflation rate has been on a downward trend. The following are the observations and comments on figure 6;

i. The inflation rate between 1986 and 2005 was changing between double digit and triple digit inflation. The highest inflation rate was recorded in 1993 at 183.31 percent. This is as a result of poor rains in the early 1990s which led to sharp increments in food prices. After a good season of rains, the inflation rate reduced to 50.6 percent in 1994 from 183.31 percent.

[15] The COVID-19 pandemic caused by coronavirus (which attacks the human respiratory tract) started in January 2020. Due to its quick spreading, the pandemic affected all countries in the world. As governments tried to control the virus, economic activity was brought to a halt. This resulted into both supply (breakdown in supply chains) and demand (instant decline in demand for almost all goods and services) distortions globally.

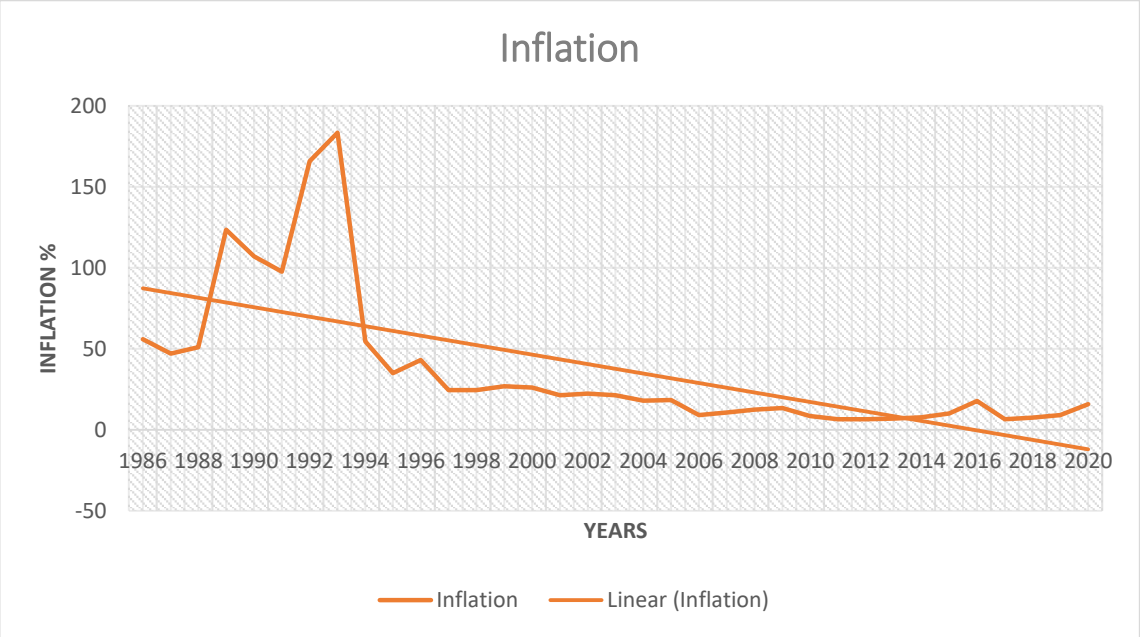
ii. In 2006, the Zambian Economy recorded its first ever single digit inflation at 9.02 percent. Since then, inflation rate has been changing between single and double digits. Zambia's lowest rate was recorded in 2011 at 6.43 percent.

iii. During the 2008 GFC, the inflation rate increased from 9.02 percent in 2006 to 13.4 percent in 2009.

iv. From 2010 to 2014, Zambia recorded single digit inflation rates. This trend was broken by double digit inflation rates recorded in 2015 and 2016. As a result, the government with a target of single digit inflation, using contractionary fiscal and monetary policies, the inflation rate returned to single digit in 2017 up to 2019.

v. The months of 2020 recorded double digit inflation averaging 15.7 percent on a yearly basis. This is mainly attributed to the pass-through effect from the exchange rate[16] to inflation. This is because Zambia imports almost all of its consumer goods and imports most of intermediate inputs of production.

FIGURE 6: Zambia's Inflation 1986-2020



Source: Author's illustration using World Bank's World Development Indicators Data.

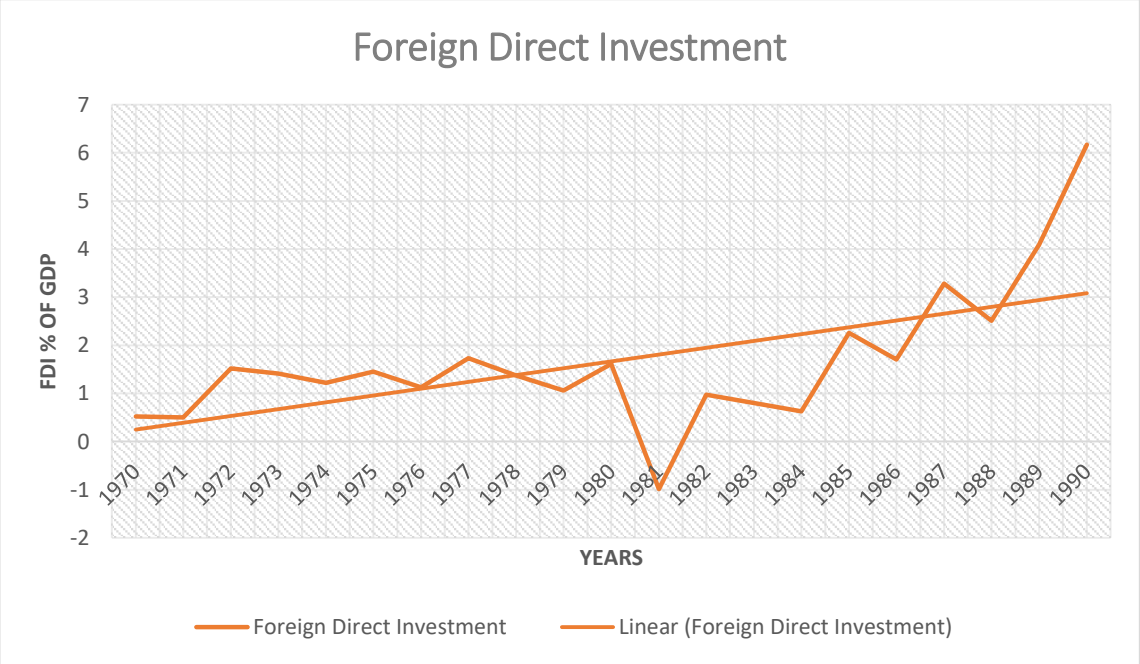
[16] The Zambian Kwacha continued to depreciate against major currencies (US dollar, Euro and pound sterling) in 2020. The exchange rate was K12.9/$ in 2019 and K18.3/$ in 2020. This represents 41.9 percent depreciation in one calendar year.

2.1.4 Foreign Direct Investment

Figure 7 below shows Zambia's Foreign Direct Investments (FDI) as a percentage of GDP for the period 1970 to 1990. In general, as it can be seen from the trend-line, FDI shows an upward trend. The following are the observations and comments on figure 7;

i. In general, FDI inflows shows constant (flat) trend for the period 1970-1980 especially from 1972.
ii. In 1980, the FDI began to decline until 1981. The FDI inflows reduced from 1.61 percent in 1980 to -0.99 percent in 1981.
iii. The period from 1981 to 1990 shows a strong upward trend. The FDI inflows increased from -0.99 percent in 1981 to 6.17 percent in 1990. This can be attributed to adoption of IMF backed reforms in the early 1980s although the reforms were abandoned after 1987.

FIGURE 7: Zambia's FDI as a percentage of GDP 1970-1990



Source: Author's illustration using World Bank's World Development Indicators Data.

Figure 8 below shows Zambia's FDI as a percentage of GDP for the period 1991 to 2020. In general, as it can be seen from the trend-line, FDI inflows for this period shows a constant (flat) trend. The following are the observations and comments on figure 8;

i. In 1991, the Zambian Government embraced liberalisation policies. This led to the privatisation of State-Owned Enterprises (SOEs). This resulted into a

sharp rise in the net inflow of FDI. In 1991, FDI net inflows were 1.02 percent whereas in 1992 and 1993, the net inflows increased to 1.41 and 9.61 percent respectively.

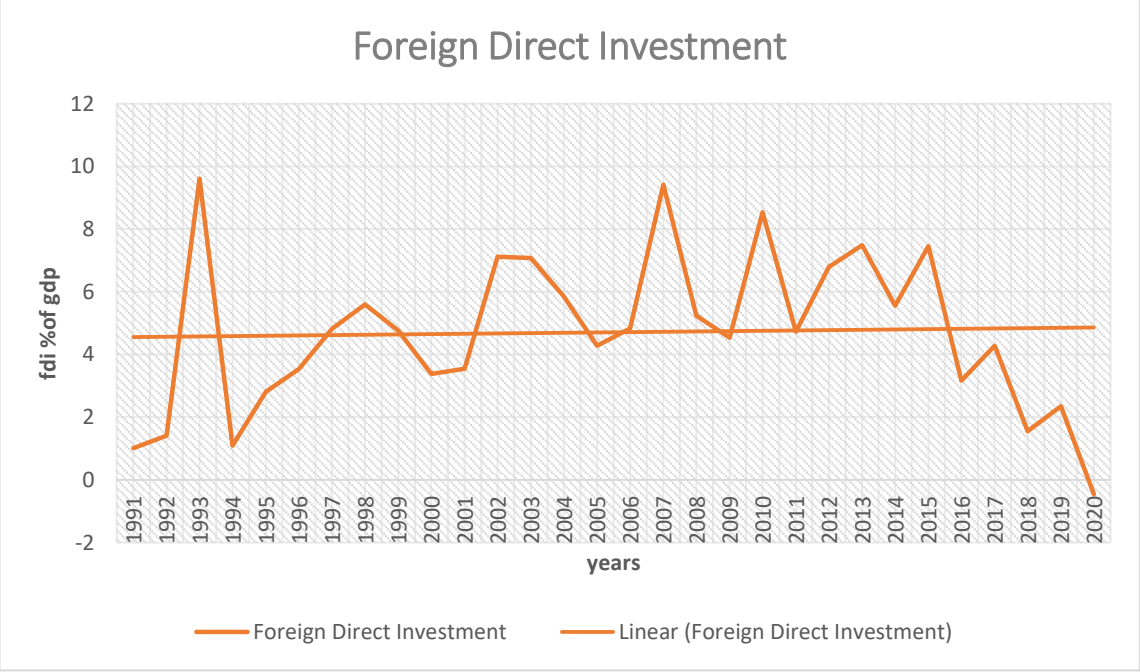
ii. In 1994, the Zambian Economy recorded 1.09 percent FDI inflows. This occured after a decline from the 1993 level of 9.61 percent.

iii. The period 1994-2015 shows an upward trend in FDI net inflows in general. This is attributed to Zambia's peaceful and stable political climate (Zambia Development Agency [ZDA], 2016:30). Besides, most of the FDI net inflows are in the mining sector which ensures a relatively higher return for investors (Chilala, 2018:90).

iv. The 2008 GFC negatively affected FDI flows into the Zambian Economy. FDI net flows reduced from 9.42 percent in 2007 to 5.24 percent and 4.53 percent in 2008 and 2009 respectively.

v. From 2015, FDI inflows have been on a downward trend. The inflows decline from 7.45 percent in 2015 to -0.46 percent in 2020. This is attributed to worsening economic performance of the economy in the same period (such economic performance sends negative sentiments to foreign investors).

FIGURE 8: Zambia's FDI as a percentage of GDP 1991-2020



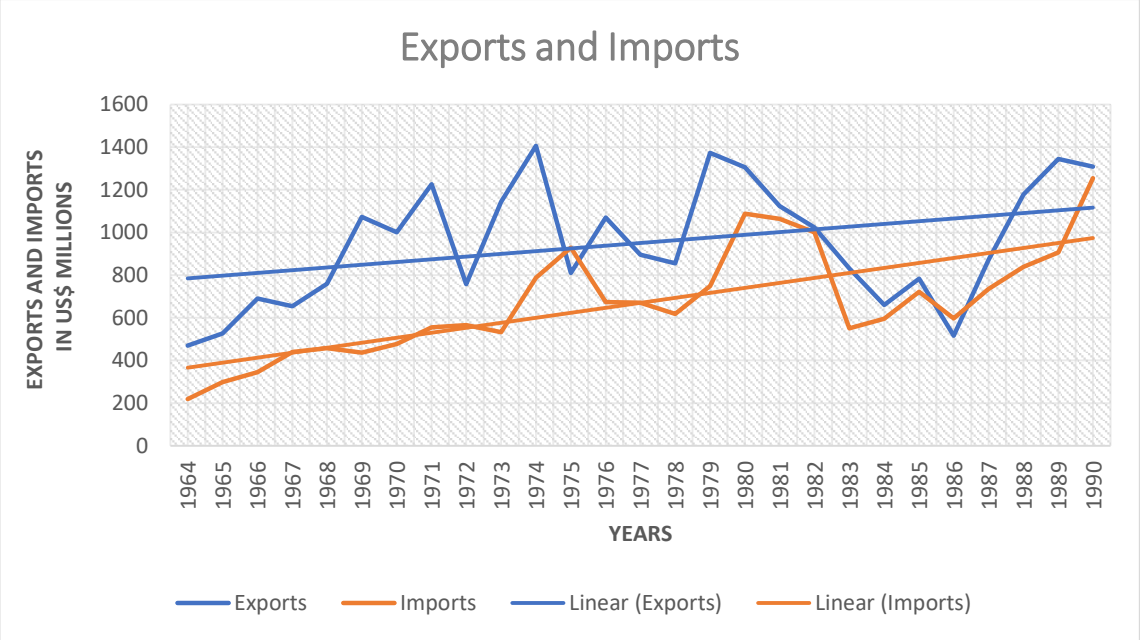
Source: Author's illustration using World Bank's World Development Indicators Data.

2.1.5 Exports and Imports

Figure 9 below shows Zambia's exports and imports in million US dollars for the period 1964-1990. Generally, as it can be seen from the trend-line, the levels of both exports and imports exhibit an upward trend for the time period considered. Zambia's exports are mainly driven by commodity exports from the mining sector. On the other hand, imports are mainly driven by consumer needs for goods and service. Thus, with rising national income, national imports increase. The following are the observations and comments on figure 9;

i. For the period before 1991, the exports were relatively higher than imports except for 1975 and 1986.
ii. Due to the oil crisis in 1973, the cost of imports started to increase surpassing exports earnings in 1975. In 1974, due to falling demand for copper, thus, falling copper prices, the exports earnings reduced and started to rise again in 1976.
iii. The adoption of inward-looking policies in 1975 led to restrictions on the importing of goods and services. As a result, the imports reduced after 1975 increasing the gap between exports and imports.

FIGURE 9: Zambia's Exports and Imports in US dollars 1964-1990



Source: Author's illustration using World Bank's World Development Indicators Data.

Figure 10 below shows Zambia's exports and imports in million US dollars for the period 1991-2020. As it can be seen from the trend-line, in general the level of exports and imports exhibit a stronger upward trend than for the years before 1991. The following are the observations and comments on figure 10;

i. Since 1991, Zambia's exports and imports exhibit a strong positive correlation, that is, they follow similar trends over time. Besides, the levels of both exports and imports rise faster than the years before 1991.

ii. The pattern of exports and imports exhibit a constant (flat) trend for the period 1991-2002. However, since 2002, the level of exports and imports exhibit a sharp rise. This is attributed to rising copper prices which started to rise in the early 2000s leading to increased copper production. Thus, increased exports.

iii. The 2008 GFC had its own effect on Zambia's exports and imports. The level of both exports and imports reduced in 2008 with imports recording a deeper decline than exports. This is because of falling commodity prices as well as falling national income.

iv. The recovery from the crisis did not last long, with the economy's exports and imports recovering in 2010 reaching peak in 2013.

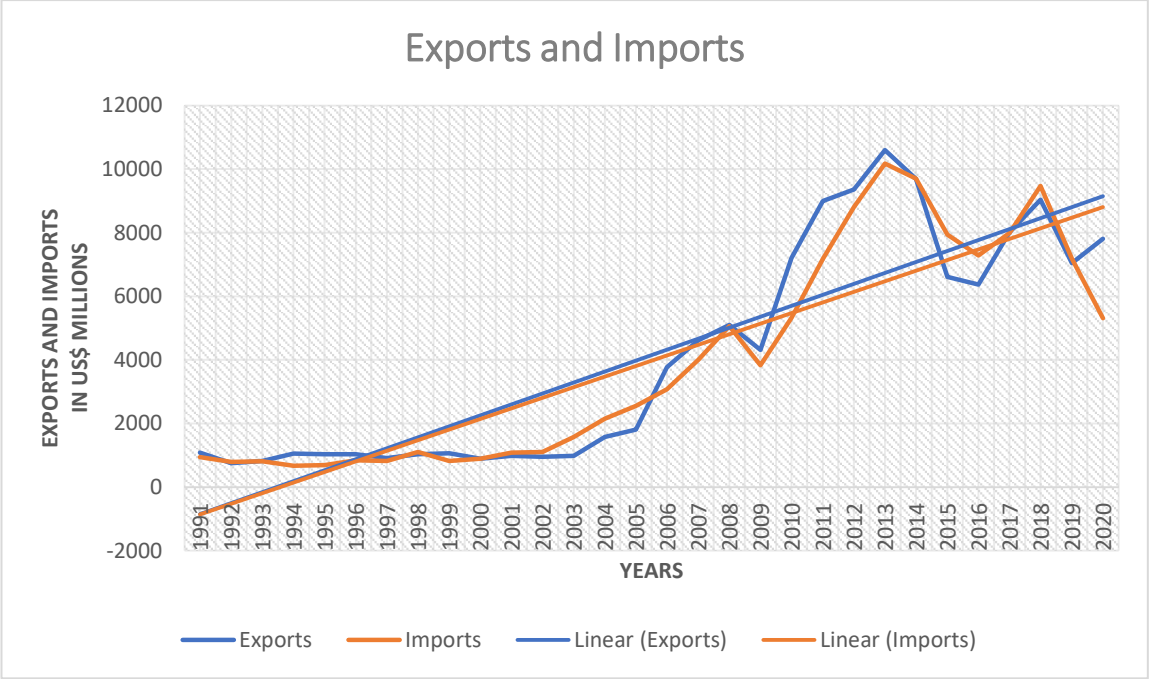
v. There is a sharp decline in both exports and imports from 2013 until 2016. This is as a result of falling copper prices because of a slowdown in copper demand from China to its lowest level (African Economic Outlook [AEO], 2015:326). The economic situation is worsened by droughts causing serious shortages of power supply[17] and low agriculture output.

vi. In 2020, the exports and imports show opposite trends with exports increasing and imports decreasing. This is attributed to the effects of the COVID-19 pandemic. The level of exports increased because of rising copper prices. The copper prices rose due to two factors. These are; the reduced supply of the

[17] Zambia is endowed with a lot of water bodies. Hence, the economy relies on hydroelectric power for its power supply needs (source of energy). This makes the economy susceptible to risks of energy shortages in times of droughts. Electricity supply shortages affects all sectors of the economy especially the mining sector as it relies on electricity supply for operations. Thus, droughts lead to power shortages leading to reduced energy supply to the mines leading to reduced mining output. According to AEO (2015:326), the electricity supply shortage which started in 2015 affected the industrial sector and other businesses.

commodity and the increased demand (after economies started opening up in the second quarter of 2020). The levels of imports reduced due to supply chains distortions[18].

FIGURE 10: Zambia's Exports and Imports in US dollars 1991-2020



Source: Author's illustration using World Bank's World Development Indicators Data.

2.1.6 Trade balance

Figure 11 below shows Zambia's trade balance[19] in million US dollars for the period 1964-1990. The following are the observations and comments on figure 11;

i. As it can be seen from the figure above, the Zambian Economy recorded more of trade surpluses than deficits in the trading of goods and services. The main driver of these trade surpluses was high export earnings and inward-oriented policies which restricted imports.

[18] Zambia's main source of imports is South Africa. During the course of the pandemic, the South African government made decisions to close its borders from time to time. This affected the amount of imports coming into the Zambian Economy.

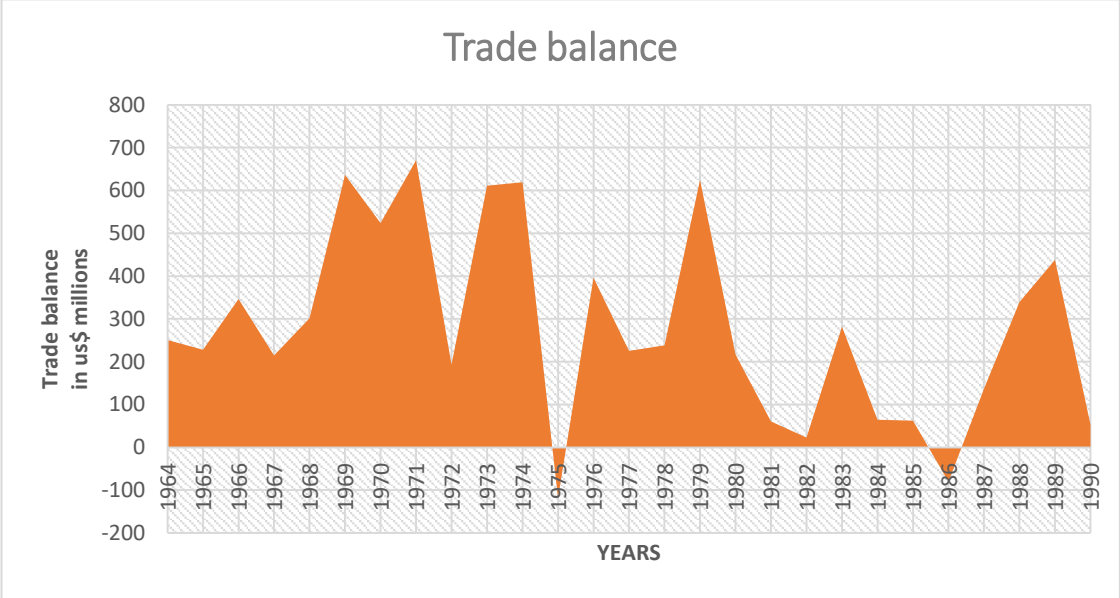
[19] Trade balance is calculated as the arithmetic difference between total exports and imports of goods and services. A positive difference represents a trade surplus in trade whereas a negative difference represents a trade deficit in trade of goods and services.

ii. The economy recorded trade deficits in 1975 and 1986. The deficit in 1975 is a result of falling exports earnings due to low commodity prices. The value of imports increased from 1973 after the oil crisis leading to a trade deficit in 1975.

iii. In both 1975 and 1986, the government had to change its trade policies. This involved import restrictions. As a result, the economy recovered from its trade deficits.

iv. The years before 1980 recorded high values of trade surplus compared to the years after 1980.

FIGURE 11: Zambia's Trade balance in US dollars 1964-1990



Source: Author's illustration using World Bank's World Development Indicators Data.

Figure 12 below shows Zambia's trade balance in million US dollars for the period 1991-2020. The following are the observations and comments on figure 12;

i. As it can be seen from the figure above, for the period 1991-2020, the Zambian economy recorded relatively smaller trade surpluses as well as relatively many years of trade deficits than the period before 1991.

ii. Between 1991 and 2000, exports and imports were strongly correlated. Thus, there are smaller levels of trade surplus and deficits.

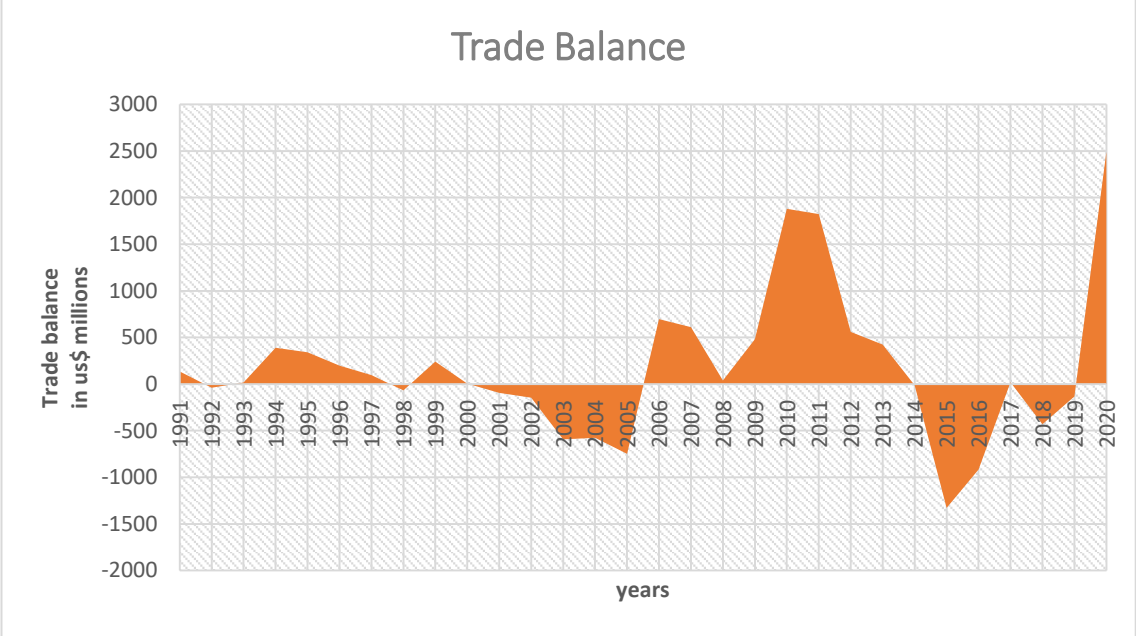
iii. Between the year 2000 and 2006, the rise in imports was more than the rise in exports. Thus, the Zambian Economy recorded trade deficits in the same period.

iv. During the 2008 GFC, the trade surplus narrowed as a result of a fall in both exports and imports (imports had a deeper fall).

v. From 2014 to 2019, trade deficits were recorded for the economy. This is attributed to larger declines in exports than imports. The exports fell because of reduced production in the mining sector. This is because of energy shortages which resulted in lower production in the mines. This situation was compounded by falling copper prices on the international market.

vi. In the year 2020, the economy recorded the highest trade surplus since 1991. This is attributed to higher amount of export earnings. The rise in export earning is from both increased production in the mines and rising prices of commodities[20]. Besides, there is a sharp decline in imports of goods and services due to supply distortions (distortions are due to the COVID-19 pandemic).

FIGURE 12: Zambia's Trade balance in US dollars 1991-2020



Source: Author's illustration using World Bank's World Development Indicators Data.

[20] The copper prices increased from US$ 6, 012 in 2019 to US$ 7, 741 per metric tonne in 2020(BOZ, 2020)

2.3.7 Degree of Trade openness

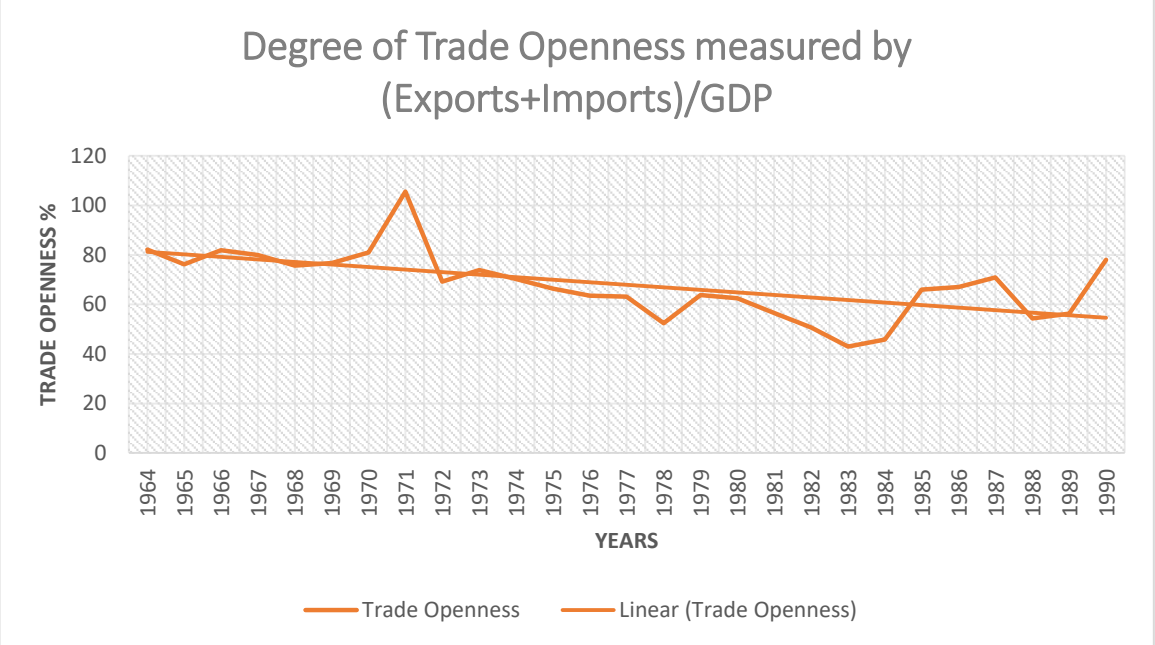
Figure 13 below shows Zambia's degree of trade openness as measured by the ratio of trade volume to GDP (at current prices in US dollars). As it can be seen from the trend-line, trade openness shows a downward trend for the period 1964-1990. The following are the observations and comments on figure 13;

i. In general, the period 1970-1983 exhibits declining levels of trade openness. For instance, in 1971, the degree of trade openness was 105.61 percent whereas in 1983, trade openness reduced to 43 percent. This is attributed to inward-oriented strategies which still received government support.

ii. In the 1980s, with worsen economic conditions, the government turned to IMF/World Bank backed SAPs. As a result, as it can be seen from figure 13, trade openness declined before 1983 and started to increase after 1983.

iii. However, due to unwanted economic outcomes from the SAPs, the government abandoned the programme embracing inward-oriented programme of growth from 1987. This led to trade openness falling from 70.86 percent in 1987 to 54.33 percent 1988. Trade openness started rising afterwards reaching 78.05 percent in 1990.

FIGURE 13: Zambia's Trade openness 1964-1990



Source: Author's illustration using World Bank's World Development Indicators Data.

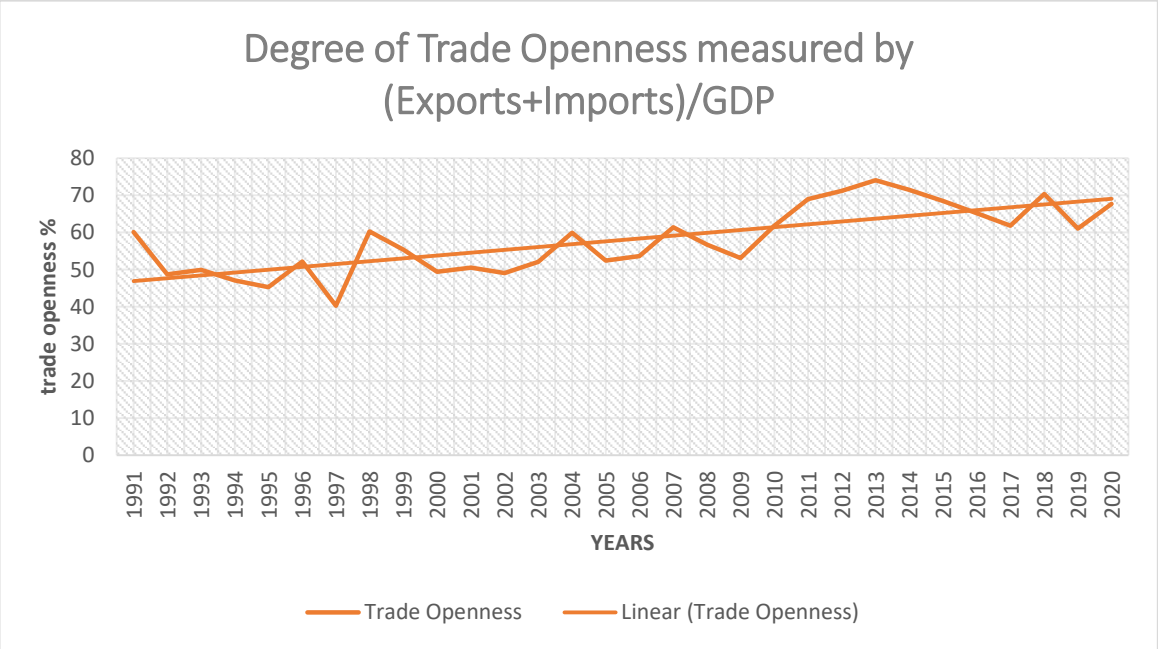
Figure 14 below shows Zambia's degree of trade openness for the period 1991-2020. The following are the observations and comments on figure 14;

i. As it can be seen from the trend-line, trade openness shows an upward trend for this period. This is contrary to the period 1964-1990 which shows a downward trend in the level of trade openness. Thus, the post-liberalisation period shows more openness to trade than the pre-liberalisation period.

ii. Since early 2000s, the degree of trade openness has been rising. This is attributed to the favourable commodity prices on the world market. This boosted copper production leading to more exports, more foreign exchange earnings and more imports.

iii. Between 2009 and 2013, the level of trade openness increased from 53.13 percent in 2009 to 74.08 percent in 2013. After 2013, there was a downward trend in the levels of trade openness.

FIGURE 14: Zambia's Trade openness 1991-2020



Source: Author's illustration using World Bank's World Development Indicators Data.

2.1.8 Taxes on International trade

Figure 15 below shows taxes on international trade[21] applied in the Zambian Economy for the period 1990-2018. As it can be seen from the trend-line, Zambia's taxes on international trade exhibits a downward trend. The following are the observations and comments on figure 15;

i. There was a sharp rise in taxes on trade for the period 1992-1995. In 1992, taxes were 12.9 percent increasing to 35.8 percent in 1995. This can be attributed to trade liberalisation which led to increase in trade volume. With this increase in trade volume, government decided to increase the taxes on trade to increase its tax revenues.
ii. From 1995 to 1996, the tax rate reduced from 35.8 percent to 11.7 percent. This can be attributed to new government policy embraced by the new government. The government then embraced ESAF IMF programme leading to more liberalisation in trade.
iii. During the 2008 GFC, the government increased taxes from 7.5 percent in 2007 to 9.9 percent in 2008.

[21] Taxes on international trade includes import duties, export duties, profits of export or import monopolies, exchange profits, and exchange taxes. Higher values of taxes on international trade act as Non-Tariff Barriers (NTBs) to international trade whereas lower values tend to facilitate international trade (World Bank, 2021)

FIGURE 15: Zambia's Taxes on International Trade 1990-2018

Source: Author's illustration using World Bank's World Development Indicators Data.

2.1.9 Tariff rates

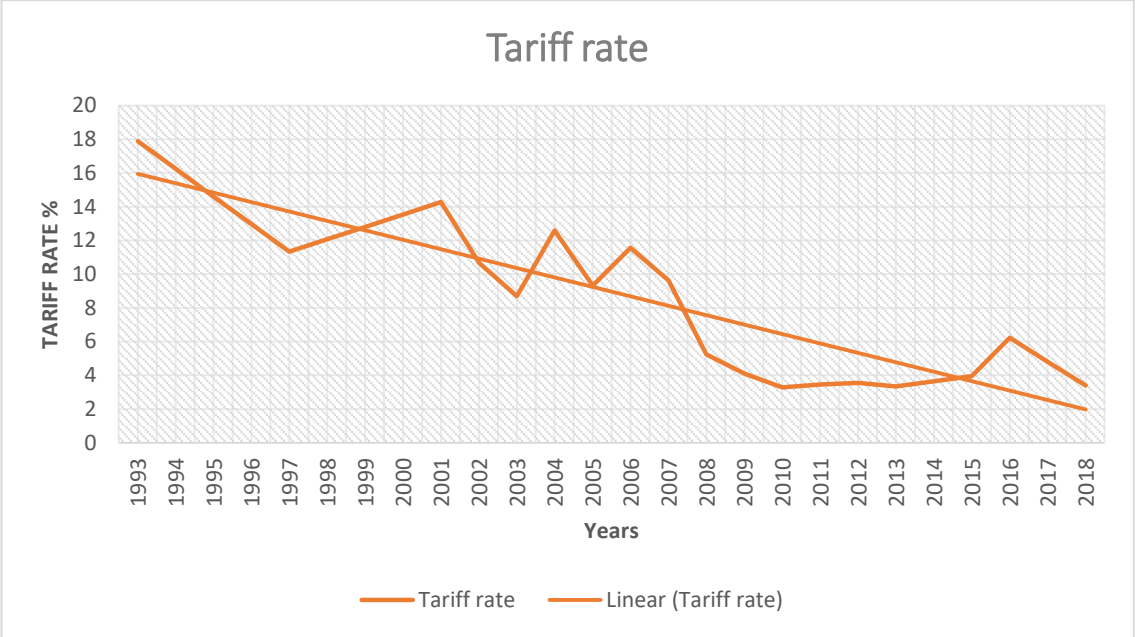
Figure 16 below shows the applied tariff rate[22] for all products for the period 1993-2018. The trend-line shows a strong downward trend for Zambia's tariff rates applied. From figure 16, the following are the observations and comments;

i. In general, the tariff rate applied on international trade has been falling since 1993. In 1993, the rate was 17.9 percent whereas in 2018, the rate reduced to 3.4 percent. This is attributed to trade liberalisation policies embraced in the early 1990s coupled with the wave of globalisation which gained momentum in the same period.

ii. During the years of the global financial crisis, the tariff rate reduced. For instance, in 2007, the rate was 9.6 percent. This reduced to 5.3 percent in 2008 and further reduced to 3.3 percent in 2010.

[22] Weighted mean applied tariff as defined by (World Bank, 2021) is the average of effectively applied rates weighted by the product import shares according to each partner country.

FIGURE 16: Zambia's Tariff rates 1993-2018

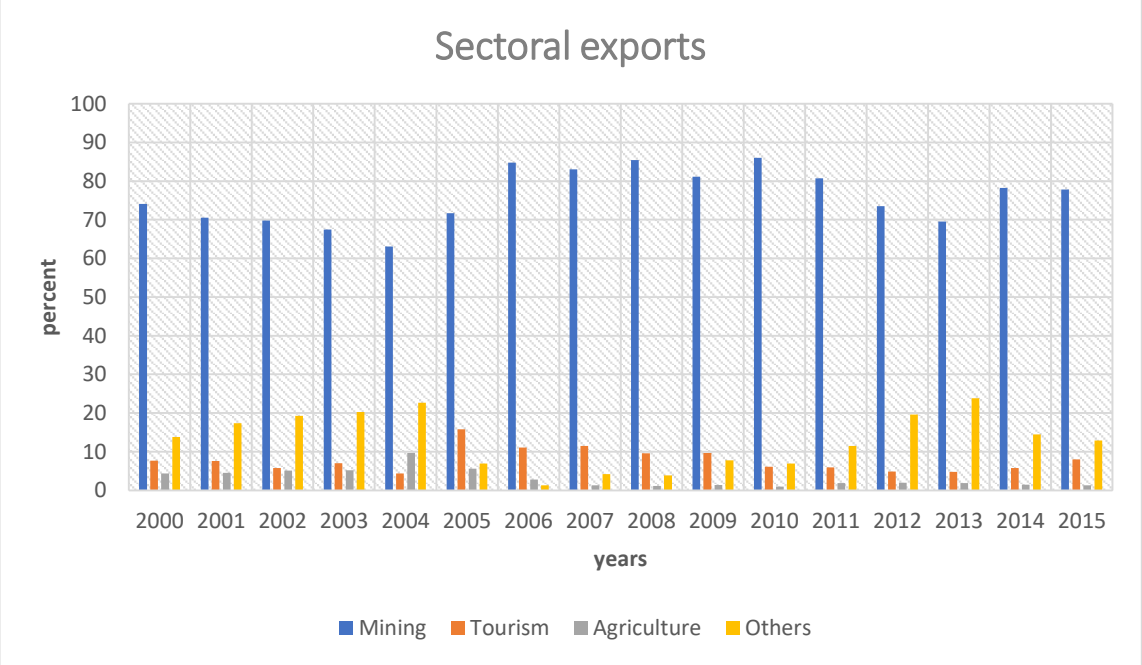


Source: Author's illustration using World Bank's World Development Indicators Data.

2.1.10 Contribution of sectoral exports to GDP

The main driver of the Zambian Economy is the mining sector. Since independence, the exports from the mining sector have been a major contributor to GDP. The mining sector is followed by the tourism sector when it comes to contribution of sector exports to GDP. Third in line is the agriculture sector. However, the contribution of agriculture sector exports to GDP is limited by two factors; the market for agriculture products being mainly domestic and insufficient value addition in the sector. Figure 17 below shows the contribution of exports from the mining, tourism and agriculture sectors to GDP. As it can be seen from figure 17, mining sector exports contributes relatively a higher proportion than the other sectors. For instance, in 2015, the mining sector's share was 77.8 percent whereas it was 8, 1.3 and 12.9 percent from tourism, agriculture and other sectors, respectively.

FIGURE 17: Contribution of sectoral exports to GDP



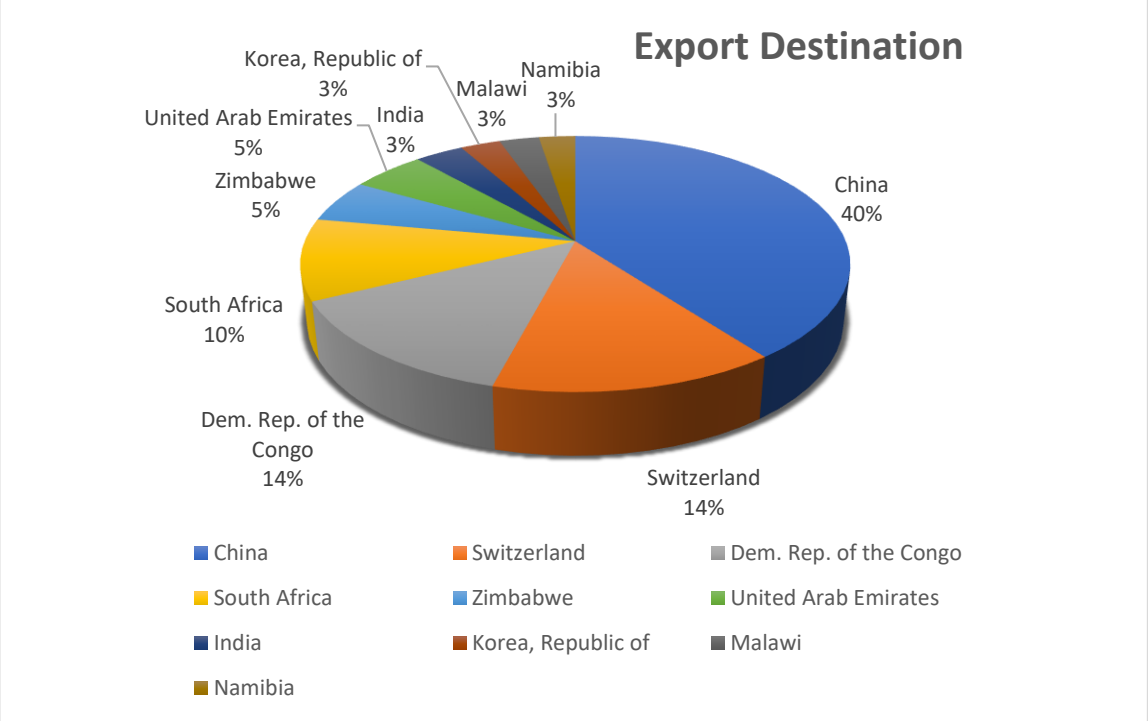
Source: Author's illustration using World Bank's World Development Indicators Data.

2.1.11 Destination of Zambia's Export

Figure 18 below shows Zambia's major destination for exports for the period 1995-2013. The main exported goods are; Copper, Cobalt, Tobacco, Non-alcoholic beverages. As it can be seen from figure 18, Zambia exports 40 percent of its exports to China followed by 14 percent to Switzerland[23] and Democratic Republic of Congo (DR Congo). South Africa follows DR Congo with 10 percent. Zimbabwe and United Arab Emirates (UAE) have a share of 5 percent. The smallest share of exports is 3 percent to India, Malawi, Namibia and South Korea.

[23] The share of exports going to Switzerland has been growing over the years. In December 2020, the share of exports to Switzerland was 51.4 percent whereas that of China was 15.3 percent (ZamStats, 2021:14)

FIGURE 18: Zambia's major export destinations



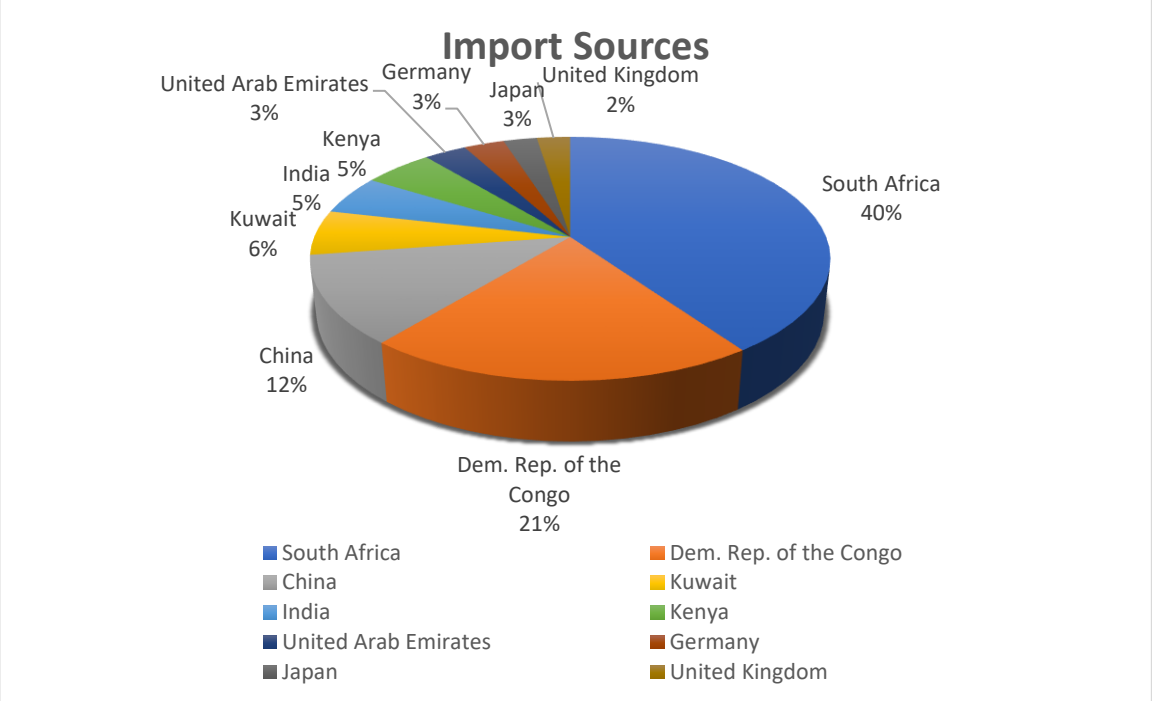
Source: Author's illustration using Zambia Statistics Agency (ZamStats) Data.

2.1.12 Source of Zambia's Imports

Figure 19 below shows Zambia's major source of imports for the period 1995-2013.The major imported products include; Vehicles, Machines/Tractors, Petroleum products and food products. As it can be seen from figure 19, 40 percent of Zambia's imports come from South Africa followed by DR Congo at 21 percent. 12 percent of the imports come from China[24]. Kuwait contributed 6 percent to Zambia's imports. This is followed by India and Kenya at 5 percent. UAE, Germany and Japan make up 3 percent of Zambia's import source. The United Kingdom has a share of 2 percent in Zambia imports.

[24] The Share of imports coming from China has been growing over the years. By the end of 2019, 16.1 percent of imports came from China. However, In December 2020, due to the COVID-19 pandemic, the share of imports coming from China reduced to 11.9 percent (ZamStats, 2021).

FIGURE 19: Zambia's major import sources



Source: Author's illustration using Zambia ZamStats Data.

2.1.13 Zambia's Membership to International Institutions for trade

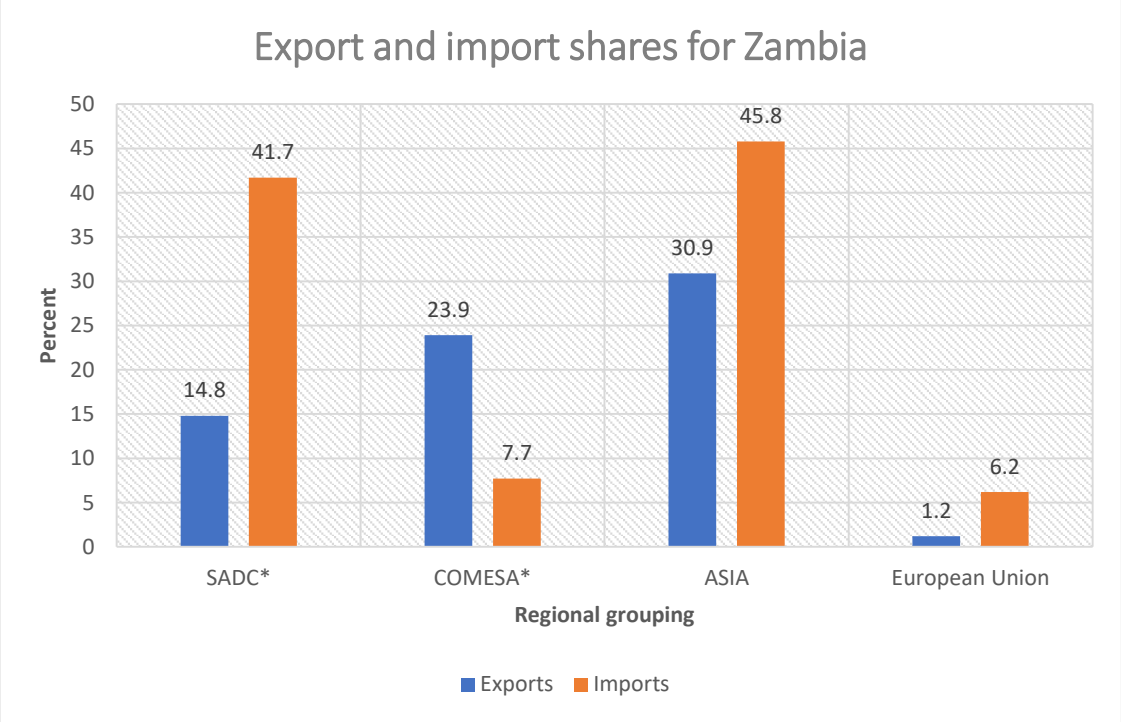
Zambia is a member to a number of international institutions focused on trade. This membership influences Zambia's level of trade openness and plays a big role in facilitating trade. These international institutions are; World Trade Organisation (WTO), Common Market for Eastern and Southern Africa (COMESA) and Southern Africa Development Community (SADC). In 2019, Zambia joined the newly established African Continental Free Trade Area[25] (AfCFTA). Zambia's membership to these institutions facilitates the flow of international trade. Hence, influences the level of trade openness.

[25] The African Continental Free Trade Area (AfCFTA) is Africa's vision for the continent aimed at sustainable growth and development. International trade under this agreement started on 1st January 2020. Through this agreement, economic integration, food security and industrialisation are expected to increase. Thus leading to structural and economic transformation in African countries. This is to be achieved through the creation of a common market. From this, intra-Africa trade is expected to rise (Zambia Institute for Policy Analysis and Research [ZIPAR], 2021:1-3). Besides, through the agreement, tariffs on 90 percent of goods are expected to be eliminated leading to increased trade volumes. The World Bank (2020) expects real incomes in Africa to increase by 7 percent by the year 2035 through the AfCFTA.

This comes from agreements which are made under these institutions such as removal of tariffs (through FTAs agreements) and removal of Non-Tariff Barriers (NTBs). For instance, owing to Zambia's membership to COMESA, the bloc is Zambia's largest market for its NTEs. In 1999, Zambia exported goods worth 267.778 billion Zambian Kwacha to COMESA members. These exports increased to more than 1 trillion Zambian Kwacha in 2004 (Central Statistical Office [CSO], 2004:4).

Figure 20 below shows Zambia's export and import shares by regional groupings for 2019 in the month of November. Zambia's exports mainly include metal commodities of copper and cobalt. Besides these, Zambia exports agriculture products (mainly corn and mealie meal) to these bodies. On the other hand, Zambia imports capital and industrial products, petroleum products, transport equipment and consumer foods and beverages from these regional bodies.

FIGURE 20: The share of Zambia's exports and imports by regional groupings



Note: (*) Some countries belong to both SADC and COMESA

Source: Author's illustration using ZamStats Data.

2.2 TRADE POLICY BEFORE 1991

Zambia located in Southern Africa was a British colony until 1964 when it gained its independence to become a republic. Since its independence, the country has undertaken its own trajectory towards economic transformation aimed at achieving economic growth and development. The economic structure of the Zambia is mainly based on mining owing to large deposits of different minerals (precious metals) in the country. Among the mined commodities is copper. Zambia is one of the big five producers of copper in the world. Thus, the mining of copper makes up Zambia's history and economic structure (Adams et al (2014:201). Since independence, Zambia has adopted and implemented different trade policies. This includes both inward-oriented and outward-oriented trade policies. Between 1964 and 1975, Zambia embraced liberal trade policies. This is attributed to the adoption of free market policies by the government. The increased openness to trade led to a rise in copper exports leading to higher export and foreign exchange earnings. This is because copper was the major of source of foreign exchange reserves accounting for almost half of public revenues (Government of Zambia [GRZ], 1984). During this period, the Zambian Economy recorded rapid economic growth. This was attributed to the high commodity prices particularly copper on the international market (Gondwe and Pamu, 2014:13). However, this growth could not be sustained due to external shocks which hit the economy in the 1970s.

In the early 1970s, the economy contracted because of three shocks. These were the fall in copper prices, oil crisis (which were external shocks) and an internal shock resulting from droughts in the country. The oil crisis in 1973 did not spare the Zambian Economy from its negative effects. This is because Zambia imports all its petroleum products to meet its domestic demand. This crisis occurred when oil prices were increased by oil producing countries. The rise in oil products was assessed to be more than 300 percent. This was after the Oil Producing and Exporting Countries (OPECs) made an agreement to cut the production of petroleum products creating a supply shortage throughout the world. This occurrence was a negative shock to the Zambian Economy and led to a reduction in the foreign exchange reserves as the cost of oil imports rose sharply (Seshamani, 1992:116). Since the 1973 oil crisis affected the oil-importing countries, almost the whole globe was negatively affected. As a result, the global demand for copper was negatively affected as countries made adjustments aimed at minimising

the effects of the crisis on the economy. Thus, in 1975 the copper prices fell leading to reduced export earnings from the commodity. This worsened Zambia's Balance of Payment (BOP) position. In addition, a budget deficit was recorded (GRZ, 1984). These shocks exposed the economy's liability to and dependence on external economic activity and environment. Further, these shocks exposed the failure of policies aimed at diversifying the economy away from the extractive sector of the economy (Bwalya, 2001:74-93; Lungu, 1998:5-16).

The low copper prices made mining in Zambia unfavourable for the economy. This was because 90 percent of foreign exchange came through the exporting of copper and other minerals (Chilala, 2018:77). As a result, the falling copper prices led to declining national incomes causing a recession in the economy (Corden and Neary, 1982:841; Sachs and Warner, 1999:63-64). As a reaction to the worsening of economic conditions, the Zambian Government in 1975 decided to adopt Import-Substitution Strategy (ISS) aimed at promoting industrialisation. This new strategy involved the direct quantitative controls on international trade, import restrictions through high and prohibitive tariffs for products which had direct competition with the domestic industrial sector(s) (Musonda and Adams, 1999:471). This strategy also supported socio-economic policies through highly protective currency exchange rate and trade with other nations (Hausner, 2000:1). During that time, import tariffs ranged from 0 percent for intermediate products to 150 percent for final products. The essential products such as those for consumers and capital/heavy equipment[26] had low tariff rates whereas non-essential products (for example consumer durables) had tariffs varying between 50 and 100 percent (Mudenda, 2009). Besides such a tariff structure, import restrictions were employed with an aim of ensuring trade balance. Imports were largely restricted on commodities and through strict foreign exchange controls by the government. During this period, the available foreign exchange was allocated to economic agents on the basis of type of firm and/or product basis through the Ministry in charge of industrial activities. The Bank of Zambia (Zambia's central bank) through its foreign exchange allocation committee

[26] Capital and heavy equipment products were imported as inputs for the production process. This was specifically for the manufacturing sector. Thus, the low tariff rates for these products stimulated manufacturing and was aimed at promoting industrialisation.

assessed which firms needed to get foreign exchange for its operations. This was aimed at protecting the local industry as well as controlling the industry. Furthermore, exporting firms were required to acquire export licences for the purpose of exporting their products (İbid).

Since the early 1980s, government economic policy was mainly in line with efforts to diversify the economy away from its dependence on mining. This meant having trade policies aimed at promoting Non-Traditional Exports (NTEs[27]). This led to a reduction in the high dependence on copper as a major source of exporting earnings. These reforms started with cautiousness in 1985 and became more purposeful after the change of government in 1991 (United Nations Conference on Trade and Development [UNCTAD], 2016:2). As a result, Zambia's total exports contained a relatively smaller share of copper exports of about 30 percent in that decade (İbid: 2). This also led to an increase in the variety of NTEs even though these were mainly linked to activities related to copper mining and primary agricultural goods and services.

The implementation of trade policy in the pre-liberalisation period was met with a number of challenges (Zombe, 2014:15). Firstly, the issuance of export licences to exporting firms increased the cost of doing business, created business uncertainties thereby creating unhealthy business environment. This acted as a barrier to trade with other countries and as a result limited the gains that could have been realised from trade. Secondly, the same period was met with the challenges of market access both regionally and overseas. This was mainly because of domestic problems in Zimbabwe[28] and South Africa. Zimbabwe was experiencing a war whereas South Africa was under economic

[27] Non-Traditional Exports (NTEs) for the Zambian Economy are merchandize products exported excluding Copper and Cobalt. Zambia's NTEs include sugar, cotton lint, horticulture products, soya beans and other primary agriculture products, textiles, cement and fertilizer. Copper and Cobalt are considered as Traditional Exports (TEs) (Central Statistical Office [CSO], 2004:2)

[28] Zimbabwe is one of the countries that shares a border with Zambia in the southern region. Zambia has borders with Democratic Republic of Congo, Tanzania, Malawi, Mozambique, Zimbabwe, Botswana, Namibia and Angola. Due to Zambia being a landlocked country, its access to international markets or coastal ports is made possible only through other countries. Zimbabwe is one of the important channels for Zambia when it comes to accessing South Africa and its coastal ports. Thus, the war acted as a trade barrier for both Zambia and South Africa especially for Zambia.

sanctions because of apartheid. This contributed to the fall in the trade volume between Zambia and South Africa as well as a reduction in the usage of coastal ports in South Africa (Mudenda, 2009). Thirdly, foreign exchange controls hampered the capacity of firms to import intermediate inputs and capital equipment/machinery. This created the problem of below-capacity production by local firms (Seshamani, 1988:60-61). Besides, the implementation of inward-oriented trade policies forced local firms to first meet domestic demand before exporting their products. This was in spite of the fact that local firms heavily relied on imported machinery and raw materials as intermediate inputs for their production. These trade restrictions worsened the levels of trade openness for the Zambian Economy as seen on figure 13 (Zombe, 2014:15).

2.3 TRADE POLICY AND LIBERALISATION AFTER 1991

Due to the worsening economic conditions[29] in the 1980s, the government decided to adopted the International Monetary Fund (IMF) and World Bank backed Structural Adjustments Programs (SAPs[30]). The ultimate purpose of these reforms was to ensure that the Zambian Economy became a liberalised economy. In line with these reforms, the availability of import licenses was increased and only tariffs were used for the purpose of protecting local industries from foreign competition. In other words, the quantity restrictions which existed before the adoption of the proposed reforms were no longer applied by the government (Ndulo and Mudenda, 2010:280). In other words, there were significant changes in the design and implementation of trade policy.

Nevertheless, the adopted reforms were abandoned between 1987 and 1989. The government decided to again adopt inward-looking policies with an agenda of "growth from own resources" (Seshamani, 1992:122). This was because the new reforms failed to

[29] This included the rising public debt and dwindling foreign reserves. This was compounded by low copper prices which led to reduced copper production.

[30] Structural Adjustments Programmes (SAPs) were a set of reforms prescribed by the IMF and World Bank to help the countries that were struggling economically. They were oriented towards the adoption of free market economy. The SAPs prescribed to Zambia included: The removal of foreign exchange controls, reduction of import duties, the elimination of licence requirements for importing and exporting firms, abolishment of export restrictions and introduction of export incentives, removal of subsidies and price controls (Mudenda, 2009). These policies liberalised international trade for the Zambian Economy from 1991.

yield expected economic outcomes that would lead to economic growth. Besides, social demonstrations broke out around the country expressing the discontent with the reforms. (Bwalya, 2001:131-134). This destabilised the economy and forced the government to abandon the new reforms.

After the abandonment of the SAPs in the late 1980s, the government had to adopt the IMF/World bank programmes in 1991 again. This was mainly because of the change in government in 1991. The new government had to embrace the reforms because of the following reasons (Seshamani, 1992:123);

- The falling copper prices, thus falling copper production,
- The rising of public debt,
- The lack of multilateral and bilateral aid

The new government fully embraced SAPs. Thus, the process of liberalising was put into effect. In line with the new stance, the government abandoned inward-oriented trade policies and embraced outward-oriented trade policies. This led to improvement in policies aimed at diversifying the economy from Traditional Exports (TEs) to Non-Traditional Exports (NTEs). Among the implemented reforms were the reduction of the tariff rates from 100 to 25 percent, the privatisation of around 200 State-Owned Enterprises (SOEs) and the liberalisation of foreign exchange rate markets (Center for Trade Policy and Development [CTPD], 2017:2).

The process of reforming the economy under the SAPs continued until 1995. In 1995, Zambia moved to the Enhanced Structural Adjustment Facility (ESAF) (Hausner, 2000:6). This program was the basis for further reduction in barriers to international trade (as seen on figure 15, there was a significant reduction in taxes on international trade from 1995). Hausner adds that after 1995, Zambia's tariff rate reduced significantly and the structure of tariffs was in a simplified form (İbid, 26). Besides, there was elimination of import sales taxes and import declaration fees. Since 1991, after the liberalisation of trade, trade policy in Zambia has been that of outward-looking and substantially has been unchanged[31]. The aim of the country was to follow the path of outward-oriented policies particularly export-promotion trade strategy that is based on free market economy and

[31] For major trade reforms undertaken after 1991, see UNCTAD (2016:40-41) on Zambia.

international competitiveness. This target is emphasised in Zambia's Fifth National Development Plan (FNDP) (GRZ, 2006). Below is the outline of Zambia's trade goals in the FNDP (Cali et al, 2014:312);

i. Transformation of the economy into a diversified and competitive economy thereby making the Zambian Economy a favourable and an internationally connected trading environment.
ii. Promotion of value addition on primary products so as to increase foreign exchange earnings and national income.
iii. Promotion of investment flows into export-oriented areas of production, that is, the areas in which Zambia has comparative and competitive advantages.
iv. Support and encouragement to the local firms in ways that promote increased efficiency in the production of goods and services.

CHAPTER THREE

3.0 AN ECONOMETRIC ANALYSIS OF THE RELATIONSHIP BETWEEN TRADE OPENNESS AND ECONOMIC GROWTH IN ZAMBIA

3.1 AIM OF THE STUDY

The Zambian Economy has undergone transformations since independence in the area of international trade. Different trade policies have been implemented from inward-oriented to outward-oriented policies. In 1991, international trade was liberalised leading to elimination or minimisation of barriers to trade. As a result, since then, Zambia has embarked on outward-oriented trade policies aimed at increasing exports and promoting export diversification from copper. In the light of trade liberalisation, thus, more openness to trade, the trajectory of Zambia's economic growth has been a mixture of upward and downward trends. Thus, this study aimed at investigating the relationship between trade openness and economic growth for the Zambian Economy for the period 1980-2019. This general objective was achieved under three specific objectives as follows;

- **Objective One:** To investigate the nature of the relationship between trade openness and economic growth.
- **Objective two:** Assess the dependence of trade openness on FDI, industry value added, inflation, secondary school enrolment and terms of trade in influencing economic growth.
- **Objective three:** Investigate the causal relationship between trade openness and economic growth.

3.2 METHODOLOGY

3.2.1 Research Method

In order to conduct the study, the quantitative research approach was used. This approach relies on the measurability of the study variables. In other words, this approach involves the compilation of data in a quantitative form. The compiled data is then subjected to quantitative analysis followed by statistical inferences (Kothari, 2004:5). Since the study variables in the study are measurable quantitatively, the use of a quantitative research approach is desirable and justified.

3.2.2 Data and sources

This study was an analytical type of research study. In other words, the collected data was used for analysis in order to make a critical evaluation and produce inferences with regard to the subject matter (Ibid: 5). The study made use of secondary data[32] for analysis. The study considered annual data spanning from 1980 to 2019 for the Zambian Economy. In other words, the study is a time series analysis for the stated period. The data was retrieved from the websites of World Bank, UNCTAD and the Zambian Ministry of education[33].

3.2.3 Data analysis

The analysis of the data in this study was done using a statistical software, E-views version 10. E-views is appropriate for conducting time series econometric analyses. The software has the ability to carry out statistical command techniques which provide outputs necessary for analysis and making statistical inferences. Upon importing data into E-views from Microsoft excel, descriptive statistics[34] covering measures of central tendency, measures of dispersion, measures of asymmetry (skewness) were obtained. Besides, the correlation matrix for the study variables and regression outputs were obtained. This involved the conducting of a causal and inferential analysis. In other words, parameters in the models were estimated and inferences were drawn based on the results.

3.2.3.1 Unit root tests

As any regression analysis is being undertaken, it is imperative that before any further data analysis, the study variables in the study are checked for the property of stationarity. This involves checking for the presence of unit root in a series. When a series is stationary (indicating absence of unit root in the series), the mean, variance and covariance are time invariant. In other words, the mean, variance and covariance of a

[32] Secondary data are data collected already and available for use in undertaking a research study. In this way, the use of this form of data does not contain problems encountered when collecting primary data (Kothari, 2004:111).

[33] See table 3 for further details on data sources

[34] This includes measures of central tendency, measures of dispersion and measures of asymmetry (skewness)

series are constant over time. On the other hand, a non-stationary series has its mean, variance and covariance varying with time (Gujarati and Porter, 2009:740). In this study to check for stationarity in the study variables, the Augmented Dickey- Fuller (ADF) test and the Phillips-Peron (PP) test were applied. For the ADF test, the general model is shown below:

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \sum_{j=1}^{m} \alpha \Delta Y_{t-j} + \varepsilon_\tau \qquad (1)$$

Where, Y_t is the series being tested for stationarity, Δ is the first difference operator, ε_τ is a pure white noise error term, t is the time trend whereas m is the number of lags. The number of lags (m) was chosen on the basis of Schwarz Information Criterion (SIC). This was based on the ability of the SIC in picking a model that is parsimonious than the Akaike Information Criterion (AIC). In other words, a model with fewer parameters to estimate. The ADF test takes into consideration the possibility of serial correlation in the error terms. This is achieved by adding lagged values of the series. The test was used to test the null hypothesis of $\delta = 0$ (that is, there is unit root and the series is non-stationary) against the alternative hypothesis of $\delta < 0$ (that is, there is no unit root and the series is stationary).

On the other hand, the PP test was applied because of its different qualities from the ADF test. The PP test uses nonparametric statistical methods in order to account for serial correlation in the error terms without adding lagged differenced terms. To make up for the shortcomings of the ADF test, the PP test is applied which allows for the error disturbances to be weakly dependent and heterogeneously distributed. The general model of the PP test is:

$$\Delta Y_t = \alpha Y_{t-1} + \beta X_t + \varepsilon_\tau \qquad (2)$$

Where, Y_t is the series being tested for unit root, X_t is an explanatory variable that can either be trended or non-trended. α and β are the parameters to be estimated and ε_τ is a pure white noise error term. The PP tests the null hypothesis of presence of unit root against the alternative hypothesis of no unit root in the series.

3.2.3.2 MODEL: The AK Model

The AK production function was used as a basis for the construction of the econometric models to explain the relationship between economic growth and the explanatory variables used in this study. The AK model explains the endogeneity of growth without the presence of diminishing returns in production inputs. This concept becomes plausible when capital as a production input comprises both physical and human capital (Barro and Sala-i-Martin, 2004:63). The AK model is given as follows:

$$Y = AK$$

Where A is a constant representing the level of technology (A > 0), Y is output and K is the level of capital. Thus, from the AK model it can be deduced that economic growth is a function of technology level and other factors that influence capital productivity in an economy.

In line with the AK model, economic growth is a function of trade openness, Foreign Direct Investment (FDI), industry value added, inflation, secondary school enrolment and terms of trade as well as the interaction among the stated variables in this study. That is;

Economic growth = f (trade openness, FDI, industry value added, inflation, secondary school enrolment, terms of trade and the interaction of trade openness with the other explanatory variables). To capture the stated function, two models were used. That is, Model 1 and Model 2 as shown below.

3.2.3.3 MODEL 1

$$GDP = f(TO, FDI, ING, INF, SECENROL, TOT)$$

Where GDP represents economic growth, TO is trade openness, FDIG represents the level of investment, ING is industry value added, INF is inflation, SECENROL is secondary school enrolment (This variable is used as a proxy for the level of human capital) and TOT is terms of trade. Table 2 below shows the variables included in the study and their respective definitions.

TABLE 2: Definition of variables for Model 1

Variable	Definition	Expected sign of coefficient	Source
TO	Ratio of trade volume to GDP. That is, $(Exports + Imports)/GDP$ expressed as a percentage.	Positive	World Bank (World Development Indicators)
FDIG	The net inflow of investment in an economy as a percent of GDP.	Positive	World Bank
ING	Value added in mining, manufacturing and construction as a percent of GDP.	Positive	World Bank
INF	The rate of general price increase in an economy.	Negative	World Bank
SECENROL	Total enrolment into secondary schools in relation to the age group corresponding to the level of education. This supports the provision of basic education and is a foundation for lifelong learning and human development.	Positive	World Bank; Ministry of Education Zambia (Educational statistical yearly bulletin-2004 to 2016)
TOT	The ratio of a nation's export value unit to the import value unit expressed as a percentage.	Positive	UNCTAD (UNCTAD stats)

3.2.3.4 MODEL 2

The aim of running model two was based on two reasons. Firstly, to investigate the complementarity among the explanatory variables as the dependent variable is regressed on these variables. Secondly, to avoid high collinearity problem between the explanatory variables included in model one and the explanatory variables included in model two if a single model was to be used. In order to investigate complementarity among the explanatory variables, trade openness was interacted with the other explanatory variables. The interaction terms aid in knowing the joint effects of explanatory variables on the dependent variable. Model 2 is shown below;

$$GDP = f(TOFDIG, TOING, TOINF, TOSE, TOTOT)$$

Where, TOFDIG is the interaction between trade openness and FDI, TOING is the interaction between trade openness and industry value added, TOINF is the interaction between trade openness and inflation, TOSE is the interaction between trade openness and secondary school enrolment and TOTOT is the interaction between trade openness and terms of trade.

TABLE 3: Variables for model 2

Variable	Expected sign of coefficient
TOFDIG	Positive
TOING	Positive
TOINF	Positive
TOSE	Positive
TOTOT	Positive

3.2.3.5 ARDL model

The Autoregressive Distributed Lag (ARDL) method of estimation was used in this study to investigate the relationship between trade openness and economic growth. The application of this method of estimation was based on the order of integration of the variables included in the study[35]. The ARDL model is used to model relationships among time series economic variables to show both the short run and long run dynamics in the model. The existence of a long run (co-integrating) relationship can be proven through the Error Correction (EC) process. One of the advantages of the ARDL model is its ability to estimate regression parameters based on times series that are integrated of different orders. That is, variables integrated of order zero or one, I(0) or I(1) respectively (Pesaran et al, 2001:290-291). The ARDL model incorporates the Error Correction Model (ECM). Owing to the specification of the ECM, the model is able to provide for both short run and long run multipliers. The Error Correction Term (ECT) also known as the speed of adjustment coefficient gives a measure of how strong the dependent variable is able to react to deviations from an equilibrium position. In other words, it measures the rate at which short run equilibrium distortions are corrected. Besides, the ECT is used to prove the existence of a long run relationship among the variables.

[35] See table 5 for the order of integration of variables.

The Bounds test

The bounds test[36] incorporated in the ARDL method of estimation makes use of the F-statistic to test for the existence of a long run relationship among the variables. The null hypothesis of no cointegrating relationship is tested against the alternative hypothesis of the presence of cointegrating relationship among the variables. The test decisions are;

- Reject the null hypothesis, when the F-statistic is above the upper bound of the critical values.
- Do not reject the null hypothesis, when the F-statistic is lower than the lower bound of the critical values.
- The test is inconclusive, when the F-statistic lies between the lower and upper bound of the critical values.

The general ARDL model by Pesaran and Shin (1995:1-2) is shown below as ARDL (p, q);

$$y_t = c_0 + c_1 t + \sum_{i=1}^{p} \emptyset y_{t-1} + \sum_{i=0}^{q} \beta^{*\prime} \Delta x_{t-1} + \beta' x_t + u_t$$

Where p, q represents the maximum number of lags, Δ is the difference operator, x_t is the k-dimensional I(0) or I(1) explanatory variables and y_t is the dependent variable. $\emptyset$ and β^* represent short run coefficients whereas β represents long run coefficients. u_t represents uncorrelated error terms. $c_1 t$ represents the trend component.

[36] The validity of the bounds test when used to test for the existence of a long run relationship is dependent on the presence of normally distributed errors (residuals) which are homoscedastic (equal variance), errors which are not serially correlated and stable regression parameters. The ARDL method of estimation provides for the checking of whether such residuals are present in a model.

3.2.3.6 ARDL representation of model 1

Long run form

$$GDP = \alpha_0 + \alpha_1 GDP_{t-i} + \alpha_2 TO_{t-i} + \alpha_3 FDIG_{t-i} + \alpha_4 ING_{t-i} + \alpha_5 INF_{t-i} + \alpha_6 SECENROL_{t-i} + \alpha_7 TOT_{t-i} + u_t$$

Where $\alpha_0 \ldots \ldots \alpha_7$ are long run coefficients and u_t is the error term.

Short run form

$$\Delta GDP = \beta_0 + \sum_{i=0}^{q} \beta_1 \Delta GDP_{t-i} + \sum_{i=0}^{q} \beta_2 \Delta TO_{t-i} + \sum_{i=0}^{q} \beta_3 \Delta FDIG_{t-i} + \sum_{i=0}^{q} \beta_4 \Delta ING_{t-i} + \sum_{i=0}^{q} \beta_5 \Delta INF_{t-i} + \sum_{i=0}^{q} \beta_6 \Delta SECENROL_{t-i} + \sum_{i=0}^{q} \beta_7 \Delta TOT_{t-i} + \omega ECT_{t-1} + u_t$$

Where $\beta_0 \ldots \ldots \beta_7$ are the short run coefficients, u_t is the error term, ECT_{t-1} is the error correction term and ω is the speed-of-adjustment.

3.2.3.7 ARDL representation of model 2

Long run form

$$GDP = \alpha_0 + \alpha_1 GDP_{t-i} + \alpha_2 TOFDIG_{t-i} + \alpha_3 TOING_{t-i} + \alpha_4 TOINF_{t-i} + \alpha_5 TOSE_{t-i} + \alpha_6 TOTOT_{t-i} + u_t$$

Where $\alpha_0 \ldots \ldots \alpha_6$ are long run coefficients and u_t is the error term.

Short run form

$$\Delta GDP = \beta_0 + \sum_{i=0}^{q} \beta_1 \Delta GDP_{t-i} + \sum_{i=0}^{q} \beta_2 \Delta TOFDIG_{t-i} + \sum_{i=0}^{q} \beta_3 \Delta TOING_{t-i} + \sum_{i=0}^{q} \beta_4 \Delta TOINF_{t-i} + \sum_{i=0}^{q} \beta_5 \Delta TOSE_{t-i} + \sum_{i=0}^{q} \beta_6 \Delta TOTOT_{t-i} + \omega ECT_{t-1} + u_t$$

Where $\beta_0 \ldots \ldots \beta_6$ are the short run coefficients, u_t is the error term, ECT_{t-1} is the error correction term and ω is the speed-of-adjustment.

3.2.3.8 Granger causality test

The granger causality test is used to investigate the direction of causality between the dependent and independent variables. Causal relations between variables can be unidirectional, that is, running from one direction of the variable to the other or bidirectional, that is, the causal relationship between the variables runs from both sides. In other words, under bidirectional causality, there exists feedbacks between the dependent and independent variables. The granger causality involves the estimation of the following equations (Gujarati and Porter, 2009:655);

$$Y_t = \sum_{i=1}^{n} \alpha_0 X_{t-i} + \sum_{j=1}^{n} \alpha_1 Y_{t-i} + u_{1t} \quad (1)$$

$$X_t = \sum_{i=1}^{n} \beta_0 X_{t-i} + \sum_{j=1}^{n} \beta_1 Y_{t-i} + u_{2t} \quad (2)$$

Where the error terms u_{1t} and u_{2t} are uncorrelated. Equation (1) tests for causality between Y and X running from X to Y. In other words, the equation (1) shows that current Y is related to past values of X. On the other hand, equation (2) test for causality between Y and X running from Y to X. The equation postulates that the past values of Y influence the current values of X. To test for causality, the null hypothesis is that the variable under consideration (For instance Y in equation (2)) does not granger causes the other variable (for instance X in equation (2)) whereas the alternative hypothesis is that the variable under consideration does granger cause the other variable. Using the F-statistic, the null hypothesis is rejected if the F-value is greater than the F-critical value or Prob (F-value) is greater than a particular level of significance.

3.3 PRESENTATION OF FINDINGS

3.3.1 MODEL 1: Presentation of findings

3.3.1.1 Correlation matrix

TABLE 4: Correlation among the variables

Variables	GDP	TO	FDIG	ING	INF	SECENROL	TOT
GDP	1						
TO	0.129656	1					
FDIG	0.591996	0.183833	1				
ING	-0.50395	0.250894	-0.44759	1			
INF	-0.42176	-0.15638	-0.08662	0.52215	1		
SECENROL	0.257843	0.352105	0.219083	-0.01369	-0.3121	1	
TOT	0.060693	0.46555	-0.13696	0.614701	0.008787	0.132346	1

Table 4 above shows the correlations among study variables in this study. The pairwise correlations help in detecting the problem of collinearity among the regressors.

The correlation coefficients neither exceed 0.8 nor are they below -0.8[37]. This shows that the use of these variables does not lead to the problem of high collinearity in the model.

3.3.1.2 Unit root test results

TABLE 5: Stationarity test results using ADF test

Variable	**At level**		**At first difference**		**Order of integration**
	Constant	Constant& Trend	Constant	Constant& Trend	
GDP	-2.0709	-6.8783***	-7.0783***	-6.9887***	I(0)
TO	-3.7715***	-3.7012**	-7.6443***	-7.7081***	I(0)
FDIG	-1.7009	-5.8489***	-10.1135***	-10.2094***	I(0)
ING	-2.3356	-1.5496	-6.6381***	-6.7537***	I(1)
INF	-2.1674	-2.2026	-6.2841***	-6.2821***	I(1)
SECENROL	0.5587	-1.2491	-8.1501***	-8.4763***	I(1)
TOT	-2.9365*	-2.8513	-7.1898***	-7.0762***	I(0)

Note: *, **, * ** significant at 10%, 5 % and 1% level of significance respectively.

Table 5 above shows Augmented Dickey-Fuller (ADF) test results for stationarity in the variables. As it can be seen from the table, GDP, TO, FDIG are stationary at level at 1 percent level of significance whereas TOT is stationary at level at 10 percent level of significance. Thus, these variables are integrated of order 0. On the other hand, ING, INF and SECENROL are stationary at first difference at 1 percent level of significance. Thus, these variables are integrated of order 1. The mixture in the orders of integration of the variables justifies the use of the ARDL method of estimation in regressing GDP on TO, FDIG, ING, INF SECENROL and TOT.

[37] The pairwise or zero-order correlations are considered high if they exceed 0.8 in absolute terms. This signals a serious problem of collinearity among the variables (Guajarati and Porter, 2009:338).

TABLE 6: Stationarity test results using PP test

Variable	At level		At first difference		Order of integration
	Constant	Constant& Trend	Constant	Constant& Trend	
GDP	-6.2174***	-6.9714***	-46.7864***	-47.0707***	I(0)
TO	-3.5894***	-3.5157**	-10.5317***	-11.9482***	I(0)
FDIG	-4.4062***	-5.9791***	-16.9515***	-18.8206***	I(0)
ING	-2.3584	-1.5496	-6.6381***	-6.7535***	I(1)
INF	-2.2313	-2.2441	-6.2897***	-6.2878***	I(1)
SECENROL	0.9195	-1.2211	-8.0666***	-8.4363***	I(1)
TOT	-3.0409**	-2.9628	-7.2518***	-7.1299***	I(0)

Note: *, **, * ** significant at 10%, 5 % and 1% level of significance respectively.

Table 6 above shows Phillips-Peron (PP) test results for stationarity in the variables. As it can be seen from the table, GDP, TO, FDIG are stationary at level at 1 percent level of significance whereas TOT is stationary at level at 5 percent level of significance. Thus, these variables are integrated of order 0. On the other hand, ING, INF and SECENROL are stationary at first difference at 1 percent level of significance. Thus, these variables are integrated of order 1. These results confirm the unit root tests under ADF. The mixture in the orders of integration of the variables justifies the use of the ARDL method of estimation in regressing GDP on TO, FDIG, ING, INF SECENROL and TOT.

3.3.1.3 Cointegration Test: THE BOUNDS TEST

TABLE 7: Bounds test results

F-statistic			16.71512
Test critical values		I(0)	I(1)
	10%	2.12	3.23
	5%	2.45	3.61
	2.5%	2.75	3.99
	1%	3.15	4.43

Table 7 above shows the test results of cointegration (the existence of a long run relationship) among the variables using the bounds test. I(0) and I(1) are the lower and upper bounds respectively. As it can be seen from the table, The F-statistic (16.71512)

exceeds all the upper bounds at 10 percent, 5 percent, 2.5 percent and 1 percent levels of significance. Thus, the null hypothesis of no long run relationship (no cointegration) is rejected. This means that there exists a long run relationship between the dependent variable (GDP) and the regressors (TO, FDIG, ING, INF, SECENROL and TOT).

3.3.1.4 Long run form

TABLE 8: Long run multipliers (coefficients)

Variable	Coefficient	Std. Error	t-statistic	Prob
TO	-0.138453	0.051657	-2.680237	0.0126
FDIG	0.509297	0.174891	2.912073	0.0073
ING	-0.451276	0.113248	-3.984859	0.0005
INF	-0.008298	0.013079	-0.634456	0.5313
SECENROL	0.120920	0.044677	2.706560	0.0118
TOT	0.115619	0.031157	3.710832	0.0010

The table above shows the long run regression results of regressing GDP on TO, FDIG, ING, INF, SECENROL and TOT. As it can be seen from the table, using the probability values[38] in the last column and considering a 5 percent level of significance, TO and ING have a negative significant effect on economic growth in the long run. INF has a negative insignificant effect on growth in the long run. On the other hand, FDIG, SECENROL and TOT have positive significant effects on economic growth in the long run.

[38] When the probability values (Prob) are less than a particular level of significance, the coefficients under consideration is statistically significant. On the other hand, when probability values are greater than a particular level of significance, the coefficients under consideration is statistically insignificant.

3.3.1.5 Short run form

TABLE 9: Short run multipliers (coefficients)

Variable	Coefficient	Std. Error	t-statistic	Prob
C	14.84086	1.281021	11.5818	0.0000
D(INF)	0.059066	0.015906	3.713525	0.0010
D(INF(-1))	0.056184	0.014958	3.756203	0.0009
D(TOT)	0.111336	0.018586	5.990157	0.0000
D(TOT(-1))	0.046163	0.017713	2.606184	0.0150
ECT (-1)	-1.175151	0.097927	-12.00030	0.0000

Table 9 above shows the short run regression results of regressing GDP on TO, FDIG, ING, INF, SECENROL and TOT. As it can be seen from the table, using the probability values in the last column and considering a 5 percent level of significance, INF and TOT have positive significant effects on economic growth in the short run. This is also valid for the previous period (year in this case) INF and TOT. On the other hand, the Error Correction Term (ECT) is negative and statistically significant. Its value of -1.175151[39] means that short run distortions (disequilibrium) are corrected after a year (since annual data was applied) and the path of convergence is oscillatory as opposed to a monotonic path to the long run equilibrium. That is, there is oscillation around the long equilibrium value in a diminishing manner before quickly converging to this value (Narayan and Smyth, 2006:339). This confirms the existence of a long run relationship between the dependent variable and the regressors in the model.

TABLE 10: Model 1 summary statistics

R-squared	0.840560
Adjusted R-squared	0.815648
F-statistic	33.74055
Prob (F-statistic)	0.000000

[39] When the value of the ECT lies between 0 and -1, the adjustment to a long run equilibrium is monotonic; when the value lies between -1 and -2, the adjustment to a long run equilibrium is oscillatory; when the value is less than -2, there exists an oscillatory divergence from a long run equilibrium (Alper, 2017:67; Alam et al, 2003:97; Loayza et al, 2005:11; Johansen, 1995:46; Narayan and Smyth, 2006:339).

Table 10 above shows the summary statistics of the overall model of regressing GDP on TO, FDIG, ING, INF, SECENROL and TOT. As it can be seen from the table, the value of R-squared is 0.840560. This means that under this model, 84.1 percent of the fluctuations in the dependent variable (GDP) are explained by the included regressors. This also means that, only 15.9 percent of the fluctuations in GDP are explained by other factors (variables) not included in the model. On the other hand, the value of the adjusted R-squared is 0.815648. This means that 81.6 percent of the fluctuation in GDP are explained by the included regressors and that only 18.4 percent of the fluctuations in GDP are explained by factors not included in the model. Besides, the Prob (F-statistic) value is less than the 5 percent level of significance (that is, less than 0. 05). This means that the overall model is statistically significant. In short, these results show that the model of regressing GDP on TO, FDIG, ING, INF, SECENROL and TOT is a statistically acceptable model.

3.3.1.6 Diagnostic tests

TABLE 11: Results of diagnostic tests

Diagnostic	Test	Prob
Normality of residuals	Jarque-Bera	0.824646
Serial correlation in residuals	Breusch-Godfrey Serial Correlation LM test	0.3053
Heteroscedasticity in residuals	Breusch-Pagan-Godfrey test	0.5616
Model Specification	Ramsey RESET test	0.5228

Table 11 above shows the probability values (Prob) of diagnostic tests undertaken in the study to check for the reliability (wellness) of the model for the purpose of estimation/forecasting. Using the Probability values in the table above and considering a 5 percent level of significance, decisions were made on the diagnostics under consideration.

In checking for normal distribution in the residuals (errors), normality test using the Jarque-Bera was undertaken testing the null hypothesis of normally distributed residuals against the alternative hypothesis of non-normally distributed residuals. From the results, the null hypothesis was not rejected. Thus, the model does not suffer from the problem of non-normal residuals.

In checking for the presence of serially correlated residuals, the Breusch-Godfrey Serial Correlation LM test was undertaken testing the null hypothesis of no serial correlation in the residuals against the alternative hypothesis of serial correlation in the residuals. From the results, the null hypothesis was not rejected. Thus, the model does not have serially correlated residuals.

In checking for heteroscedasticity in the residuals, the Breusch-Pagan-Godfrey test was undertaken. The null hypothesis of homoscedastic residuals (equal variance) was tested against the alternative hypothesis of heteroscedastic residuals (unequal variance). As it can be seen from the table, the probability is greater than 5 percent level of significance. Thus, the null hypothesis was not rejected and the residuals in the model are homoscedastic.

In checking for model specification bias, Ramsey RESET test was undertaken testing the null hypothesis of no model specification bias (no specification error) against the alternative hypothesis of model specification bias (specification error). From the results, the null hypothesis was not rejected and there was no specification bias in setting up this model.

3.3.1.7 Stability tests

Stability tests were undertaken to check for the stability of the regression parameters over the sample period. The CUSUM and CUSUM of squares stability tests were carried out.

CUSUM test

FIGURE 21: Parameter stability test

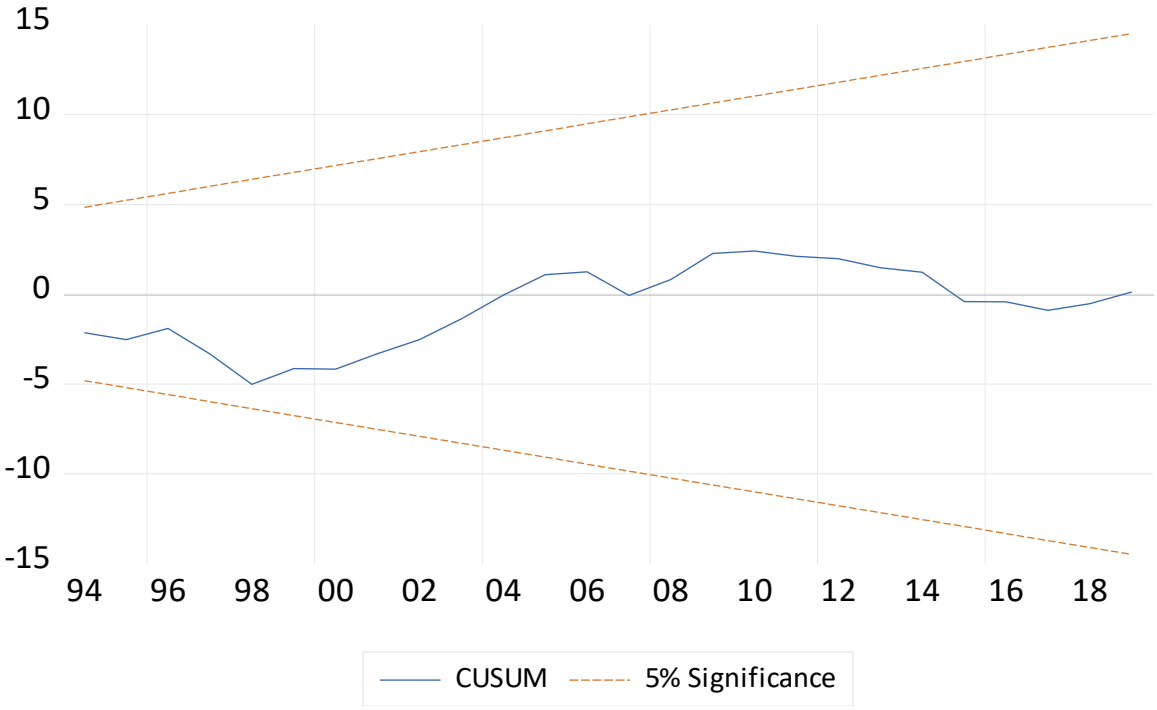


Figure 21 above shows the CUSUM test on parameter stability. As it can be seen from the figure, the blue line does not cross the 5 percent significance bounds[40]. This means that the regression parameters obtained in the study are stable (do not change) over the considered sample period.

[40] If the blue line crosses the 5 percent significance bounds, the regression parameters are considered unstable. That is, rather than being constant, they change over the sample period.

CUSUM of Squares test

FIGURE 22: Parameter stability test

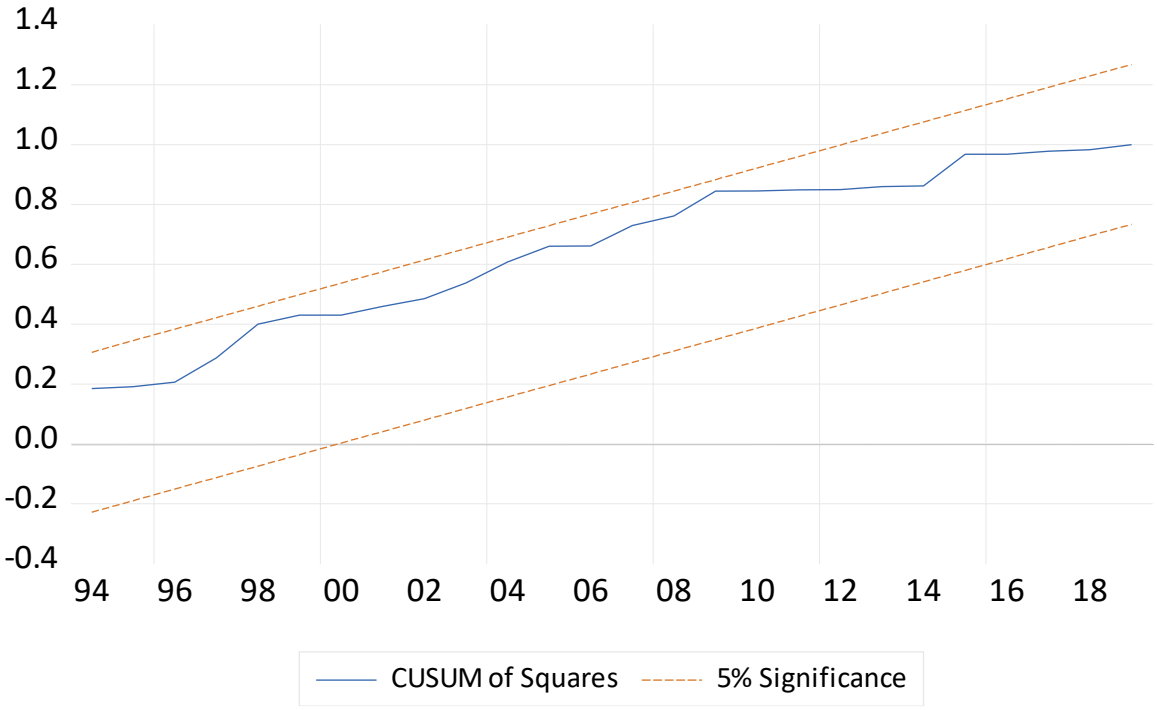


Figure 22 above shows the CUSUM of Squares test on parameter stability. As it can be seen from the figure, the blue line does not cross the 5 percent significance bounds. This means that the regression parameters obtained in the study are stable (do not change) over the considered sample period.

3.3.1.8 Causality test

The results of the granger causality test are shown in appendix 8. As it can be seen from the table, the probability values are above the 10 percent level of significance except for two. Thus, these null hypotheses are not rejected. However, the null hypothesis of TO does not granger cause GDP is rejected at 10 percent level of significance. This means that there is a unidirectional causal relationship running from TO to GDP. In other words, trade openness granger causes economic growth for the Zambian Economy. Besides, the null hypothesis of TOT does not granger causes GDP is also rejected at 10 percent level of significance. Thus, there is a unidirectional causal relationship running from terms of trade to economic growth.

3.3.2 MODEL 2: Presentation of findings

3.3.2.1 Unit root test results

TABLE 12: Stationarity test results using ADF test

Variable	At level		At first difference		Order of integration
	Constant	Constant& Trend	Constant	Constant& Trend	
TOFDIG	-1.5986	-5.7975***	-10.2761***	-10.2013***	I(0)
TOING	-2.9451**	-2.5164	-8.2569***	-8.7929***	I(0)
TOINF	-2.5193	-2.5572	-6.9465***	-6.9783***	I(1)
TOSE	1.2981	-2.0269	-9.6186***	-7.5524***	I(1)
TOTOT	-2.2731	-2.2420	-7.1447***	-7.0184***	I(1)

Note: *, **, * ** significant at 10%, 5 % and 1% level of significance respectively.

Table 12 above shows Augmented Dickey-Fuller (ADF) test results for stationarity in the variables. As it can be seen from the table, TOFDIG, TOING are stationary at level at 1 percent and 5 percent level of significance respectively. Thus, these variables are integrated of order 0. On the other hand, TOINF, TOSE and TOTOT are stationary at first difference at 1 percent level of significance. Thus, these variables are integrated of order 1. The mixture in the orders of integration of the variables justifies the use of the ARDL model in regressing GDP on TOFDIG, TOING, TOINF, TOSE and TOTOT.

TABLE 13: Stationarity test results using PP test

Variable	At level		At first difference		Order of integration
	Constant	Constant& Trend	Constant	Constant& Trend	
TOFDIG	-4.3702***	-5.8961***	-14.3639***	-14.4578**	I(0)
TOING	-2.9071*	-2.2695	-8.3323***	-9.0077***	I(0)
TOINF	-2.4876	-2.4946	-7.2983***	-7.3008***	I(1)
TOSE	0.0952	-1.7079	-9.6795***	-10.4202***	I(1)
TOTOT	-3.0467**	-3.0006	-7.1447***	-7.0184***	I(0)

Note: *, **, * ** significant at 10%, 5 % and 1% level of significance respectively.

Table 13 above shows Phillips-Peron (PP) test results for stationarity in the variables. As it can be seen from the table, TOFDIG, TOING and TOTOT are stationary

at level at 1 percent, 10 percent and 5 percent level of significance respectively. Thus, these variables are integrated of order 0. On the other hand, TOINF and TOSE are stationary at first difference at 1 percent level of significance. Thus, these variables are integrated of order 1. These results are a confirmation of the results under the ADF test.

3.3.2.2 Cointegration Test: BOUNDS TEST

TABLE 14: Bounds test results

F-statistic			16.31489
Test critical values		I(0)	I(1)
	10%	2.26	3.35
	5%	2.62	3.79
	2.5%	2.96	4.18
	1%	3.41	4.68

Table 14 above shows the test results of cointegration (the existence of a long run relationship) among the variables using the bounds test. I(0) and I(1) are the lower and upper bounds respectively. AS it can be seen from the table, The F-statistic (16.31489) exceeds all the upper bounds at 10 percent, 5 percent, 2.5 percent and 1 percent levels of significance. Thus, the null hypothesis of no long run relationship (no cointegration) is rejected. This means that there exists a long run relationship between the dependent variable (GDP) and the regressors (TOFDIG, TOING, TOINF, TOSE and TOTOT).

3.3.2.3 Long run form

TABLE 15: Long run multipliers (coefficients)

Variable	Coefficient	Std. Error	t-statistic	Prob
TOFDIG	0.005927	0.002689	2.204267	0.0362
TOING	-0.009809	0.001958	-5.008626	0.0000
TOINF	0.000160	0.000248	0.643807	0.5251
TOSE	0.001887	0.000798	2.365233	0.0255
TOTOT	0.002026	0.000516	3.924483	0.0005

The table above shows the long run regression results of regressing GDP on TOFDIG, TOING, TOINF, TOSECE and TOTOT. As it can be seen from the table, using the probability values in the last column and considering a 5 percent level of significance, TOFDIG, TOSE and TOTOT have a positive significant effect on economic growth in

the long run. TOINF has a positive insignificant effect on growth in the long run. On the other hand, TOING has a negative significant effects on economic growth in the long run.

3.3.2.4 Short run form

TABLE 16: Short run multipliers (coefficients)

Variable	Coefficient	Std. Error	t-statistic	Prob
C	10.20002	1.012378	10.07531	0.0000
D(TOINF)	0.001592	0.000307	5.182295	0.0000
D(TOINF(-1))	0.000650	0.000255	2.545624	0.0169
D(TOTOT)	0.001608	0.000262	6.140561	0.0000
D(TOTOT(-1))	0.000738	0.000275	2.687849	0.0122
ECT(-1)	-1.163999	0.108067	-10.77112	0.0000

Table 16 above shows the short run regression results of regressing GDP on TOFDIG, TOING, TOINF, TOSE and TOTOT. As it can be seen from the table, using the probability values in the last column and considering a 5 percent level of significance, TOINF and TOTOT have positive significant effects on economic growth in the short run. This is also valid for the previous period (year in this case) TOINF and TOTOT. On the other hand, the Error Correction Term (ECT) is negative and statistically significant. Its value of -1.163999 means that short run distortions (disequilibrium) are corrected after a year (since annual data was applied) and the path of convergence is oscillatory as opposed to a monotonic path to the long run equilibrium. That is, there is oscillation around the long equilibrium value in a diminishing manner before quickly converging to this value. This confirms the existence of a long run relationship between the dependent variable and the regressors in the model.

TABLE 17: Model 2 Summary Statistics

R-squared	0.808012
Adjusted R-squared	0.778014
F-statistic	26.93540
Prob (F-statistic)	0.000000

Table 17 above shows the summary statistics of the overall model of regressing GDP on TOFDIG, TOING, TOINF, TOSE and TOTOT. As it can be seen from the table, the value of R-squared is 0.808012. This means that under this model, 80.8 percent of the

fluctuations in the dependent variable (GDP) are explained by the included regressors. This also means that, only 19.2 percent of the fluctuations in GDP are explained by other factors not included in the model. On the other hand, the value of the adjusted R-squared is 0.778014. This means that 77.8 percent of the fluctuation in GDP are explained by the included regressors and that only 22.2 percent of the fluctuations in GDP are explained by factors not included in the model. Besides, the Prob (F-statistic) value is less than the 5 percent level of significance (that is, less than 0. 05). This means that the overall model is statistically significant. In short, these results show that the model of regressing GDP on TOFDIG, TOING, TOINF, TOSE and TOTOT is a statistically acceptable model.

3.3.2.5 Diagnostic tests

TABLE 18: Results of selected diagnostic tests

Diagnostic	Test	Prob
Normality of residuals	Jarque-Bera	0.758000
Serial correlation in residuals	Breusch-Godfrey Serial Correlation LM test	0.2849
Heteroscedasticity in residuals	Breusch-Pagan-Godfrey test	0.2287
Model Specification	Ramsey RESET test	0.2072

Table 18 above shows the probability values (Prob) of diagnostic tests undertaken in the study to check for the reliability (wellness) of the model for the purpose of estimation/forecasting. Using the Probability values the table above and considering a 5 percent level of significance, decisions were made on the diagnostics under consideration.

In checking for normal distribution in the residuals (errors), normality test using the Jarque-Bera was undertaken testing the null hypothesis of normally distributed residuals against the alternative hypothesis of non-normally distributed residuals. From the results, the null hypothesis was not rejected. Thus, the model does not suffer from the problem of non-normal residuals.

In checking for the presence of serially correlated residuals, the Breusch-Godfrey Serial Correlation LM test was undertaken testing the null hypothesis of no serial correlation in the residuals against the alternative hypothesis of serial correlation in the residuals. From the results, the null hypothesis was not rejected. Thus, the model does not have serially correlated residuals.

In checking for the presence of heteroscedasticity in the residuals, the Breusch-Pagan-Godfrey test was undertaken. The null hypothesis of homoscedastic residuals (equal variance) was tested against the alternative hypothesis of heteroscedastic residuals (unequal variance). As it can be seen from the table, the probability is greater than 5 percent level of significance. Thus, the null hypothesis was not rejected and the residuals in the model are homoscedastic.

In checking for model specification bias, Ramsey RESET test was undertaken testing the null hypothesis of no model specification bias (no specification error) against the alternative hypothesis of model specification bias (specification error). From the results, the null hypothesis was not rejected and there was no specification bias in setting up this model.

3.3.2.6 Stability tests

Stability tests were undertaken to check for the stability of the regression parameters over the sample period. The CUSUM and CUSUM of squares stability tests were carried out.

CUSUM test

FIGURE 23: Parameter stability test

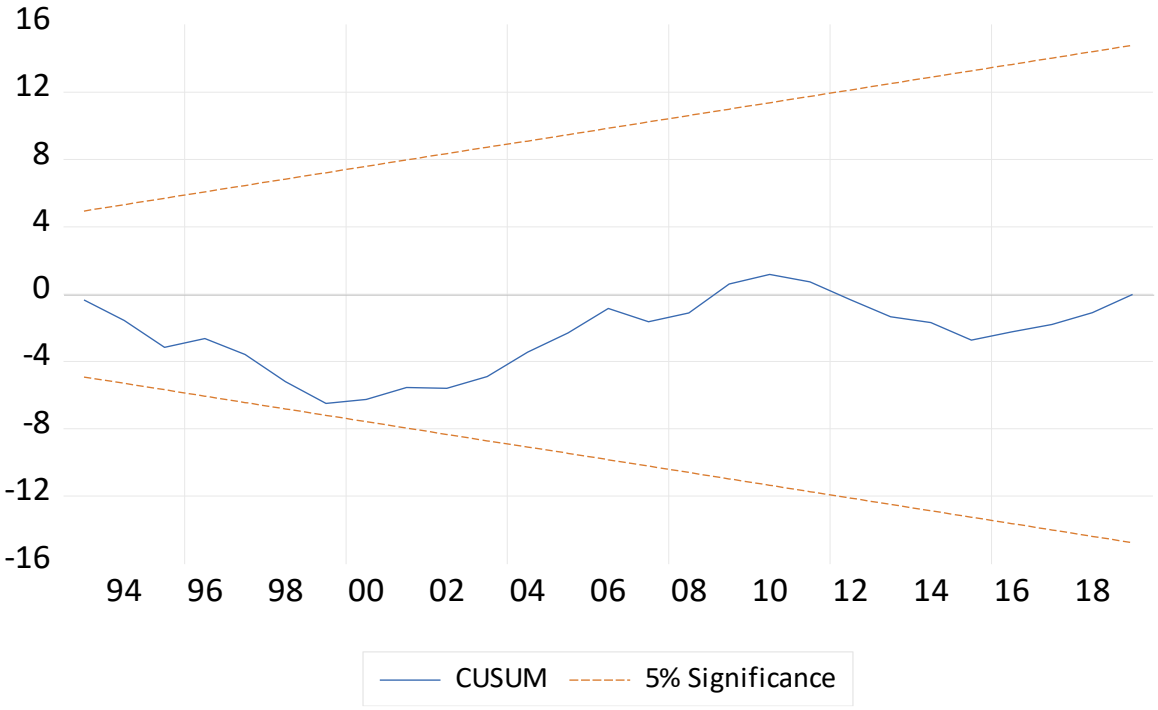


Figure 23 above shows the CUSUM test on parameter stability. As it can be seen from the figure, the blue line does not cross the 5 percent significance bounds. This means that the regression parameters obtained in the study are stable (do not change) over the considered sample period.

CUSUM of Squares test

FIGURE 24: Parameter stability test

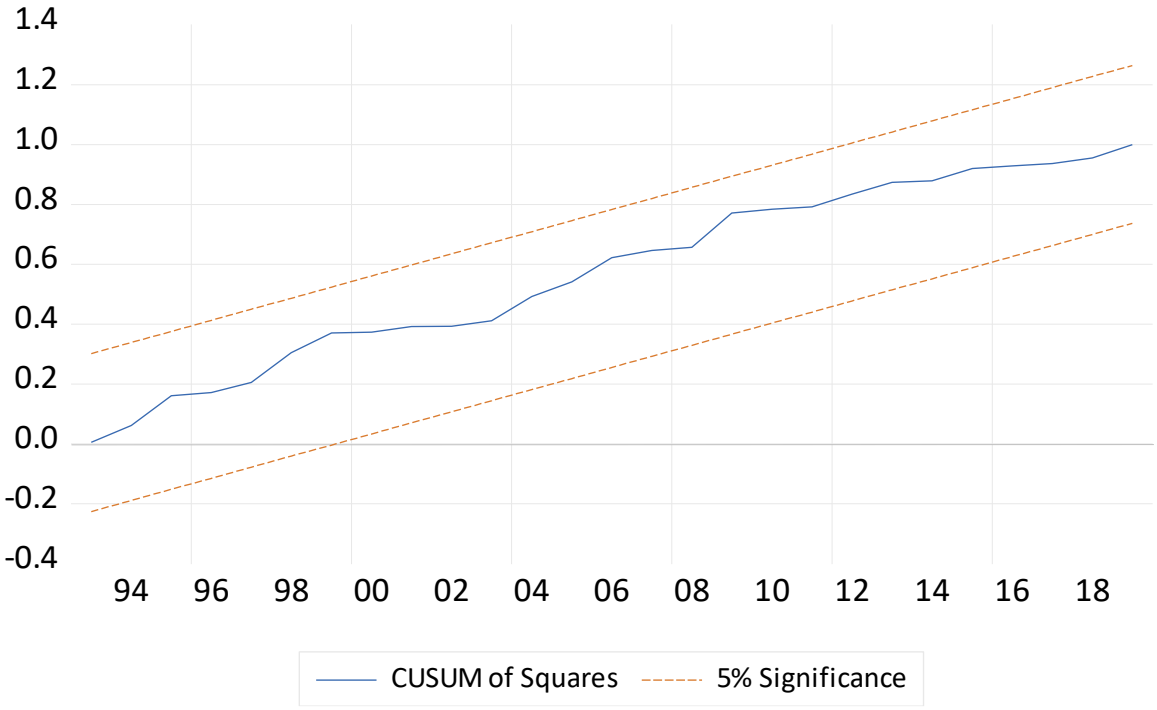


Figure 24 above shows the CUSUM of Squares test on parameter stability. As it can be seen from the figure, the blue line does not cross the 5 percent significance bounds. This means that the regression parameters obtained in the study are stable (do not change) over the considered sample period.

3.4 DISCUSSION OF FINDINGS

3.4.1 MODEL 1: Discussion of findings

As it can be seen from the results presented in section 3.3 above, in the long run, there is a negative relationship between trade openness and economic growth for the Zambian Economy. This inverse relationship between the two variables means that, an increase in the level of trade openness leads to a decrease in economic growth and a decrease in the level of trade openness leads to an increase in economic growth. Precisely, a 1 percent increase in the level of trade openness leads to 13.8 basis points (0.138 percent) decrease in economic growth. This also means that a 1 percent decrease in the level of trade openness leads to 13.8 basis points increase in economic growth for the

Zambian Economy. In other words, a 10 percent change in the level of trade openness, leads to a -1.38 percent change in economic growth in the long run. Thus, despite Zambia pursuing outward-oriented policies and liberalising trade in 1991, trade openness has had a negative effect on economic growth. This can be attributed to the low levels of manufacturing industries in the economy. This has led to Zambian exports being mostly in unprocessed form (that is, less or no value addition to these products). The lack of industries, hence, lack of value addition in products has led to Zambia importing processed, value-added products which are relatively expensive than products with less or no value addition.

The study finds a positive relationship between FDI and economic growth in the long run. This means that, an increase in FDI leads to an increase in economic growth and that a decrease in FDI leads to a decrease in economic growth for the Zambian Economy. Precisely, a 1 percent increase in FDI inflows into the Zambian Economy leads to 50.9 basis points (0.509 percent) increase in economic growth. This also means that a 1 percent decrease in FDI inflows into the Zambian Economy leads to 50.9 basis points decrease in the economic growth. In other words, a 10 percent change in the FDI inflows, leads to a 5.09 percent change in economic growth in the long run. Thus, for the period, 1980 to 2019, FDI inflows have led to increase in economic growth. The inflow of FDI in the economy leads to increased investments in different sectors (though mainly in the mining sector). Hence, leading to an increase in economic activity. For instance, the inflow of FDI in Zambia's mining sector has led to increased copper production, increased employment, increased foreign exchange earnings, increased tax revenue for the government as well as increased Corporate Social Responsibilities[41] (CSRs). These in turn lead to increased economic activity.

The relationship between industry value added and economic growth is negative in the long run. In other words, there is an inverse relationship between industry value

[41] Corporate Social Responsibilities (CSRs) are activities undertaken by corporate firms on a self-regulating basis. This involves a number of activities for the benefit of society ranging from economic, social and environment aspects. Examples of CSRs in Zambia include, Orphanage donations, sponsorship of sports (particularly sponsorship of football clubs), and sponsorship of education and health provision (HIV/AIDS programmes, construction of health posts) as well as donations to religious organisations.

added and economic growth for the Zambian Economy. This means that, an increase in industry value added leads to a decrease in economic growth and that a decrease in industry value added leads to an increase in economic growth in the long run. Precisely, a 1 percent increase in industry value added leads to 45.1 basis points (0.451 percent) decrease in economic growth. This also means that a 1 percent decrease in industry value added leads to 45.1 basis points increase in economic growth. In other words, a 10 percent change in industry value added, leads to a -4.51 percent change in economic growth in the long run. This is different from expectations that industry value added positively affects economic growth. This paradox can be attributed to the following factors; import dependency for intermediate inputs, low levels of manufacturing (low industrialisation) in the economy, FDI inflows mainly in the extractive sector (mining sector) whose value-addition is limited and the low levels of value addition in Zambia's exports. Feng et al (2016) finds that importation of intermediate inputs is helpful in the expansion of production and exports for firms which operate in high research and development (R&D) intensity industries. Contrary to this, Zambian industries are mainly related to economic activities in the mining sector (extractive sector).

There is a negative statistically insignificant relationship between inflation and economic growth in the long run for the Zambian Economy. However, there is a positive relationship between inflation and economic growth in the short run. The relationship is positive for both the current and previous period (one period lag) inflation rates. The positive relationship between the two variables, means that, an increase in inflation leads to an increase in economic growth and a decrease in inflation leads to a decrease in economic growth. Precisely, a 1 percent increase in the current inflation leads to 5.9 basis points (0.059 percent) increase in economic growth. This also means that a 1 percent decrease in current inflation leads to 5.9 basis points decrease in economic growth in the short run. On the other hand, a 1 percent increase in the previous year inflation leads to 5.6 basis points (0.056 percent) increase in economic growth and a 1 percent decrease in previous year inflation leads to 5.6 basis points decrease in economic growth. In other words, a 10 percent change in current inflation, leads to a 0.59 percent change in economic growth in the short run. The positive relationship between inflation and

economic is attributed to the presence of single-digit to moderate inflation[42] for most years in the Zambian Economy. For instance, between 1995 and 2019, Zambia's inflation averages around 15 percent. Besides, due to the levels of inflation, the Zambian currency is of low value relative to the major convertible currencies (US Dollar, Euro and Pound Sterling). This makes Zambian exports relatively cheaper and has led to Zambia recording trade surpluses for most years from 1970 to 2019.

Among the study findings is the relationship between secondary school enrolment (used as a proxy for human capital) and economic growth. It was found that in the long run, secondary school enrolment positively affects economic growth. This means that an increase in secondary school enrolment leads to an increase in economic growth and that a decrease in secondary school enrolment leads to a decrease in economic growth in the Zambian Economy. Precisely, a 1 percent increase in secondary school enrolment leads to 12.1 basis points (0.121 percent) increase in economic growth. This also implies that a 1 percent decrease in secondary school enrolment leads to 12.1 basis points decrease in economic growth in the long run. In other words, a 10 percent change in secondary school enrolment, leads to a 1.21 percent change in economic growth in the long run. This is because the increase in secondary school enrolment leads to an increase in literacy levels among labour units going into the production process. With increase in literacy rates, the capacity for training and learning increases. Besides, there is a positive relationship between secondary school enrolment and tertiary education enrolment. Thus, an increase in secondary school enrolment increases the likelihood of higher numbers in tertiary education. This in turn increases the quality of human capital, leading to an increase in labour productivity. Hence, increase in national output. Thus, an increase in human capital increases the quality of labour entering the production process of goods and services in the Zambian Economy. When this occurs, the national output increases leading to economic growth.

There is a positive link between terms of trade and economic growth both in the long run and short run. This positive relationship means that an increase in Zambia's terms of trade leads to an increase in economic growth and that a decrease in Zambia's

[42] Dornbusch and Fischer (1993:12), define moderate inflation as the inflation rate which is in the range of 15 to 30 percent for at least three years.

terms of trade leads to a decrease in economic growth in the long run as well as in the short run. Precisely, in the long run, a 1 percent increase in the terms of trade leads to 11.6 basis points (0.116 percent) increase in economic growth. This also means that a 1 percent decrease in terms of trade leads to 11.6 basis points decrease in economic growth. On the other hand, in the short run, a 1 percent increase in the current year terms of trade leads to 11.1 basis points (0.111 percent) increase in economic growth and a 1 percent decrease in the current year terms of trade leads to 11.1 basis points decrease in economic growth. Additionally, a 1 percent increase in the previous year terms of trade leads to 4.6 basis points (0.046 percent) increase in economic growth and a 1 percent decrease in the previous year terms of trade leads to 4.6 basis points decrease in economic growth for the Zambian Economy. In other words, a 10 percent change in the current terms of trade, leads to a 1.16 percent change in economic growth in the long run and 1.11 percent change in the short run. This is because, an increase in terms of trade implies an economy is receiving more from its exports than it is paying for its imports. This means that, an increase in terms of trade increases the welfare of the economy as well as increasing an economy's foreign exchange earnings.

3.4.2 MODEL 2: Discussion of findings

Model two shows the results of the interaction of trade openness with FDI, industry value added, inflation, secondary school enrolment and terms of trade. The results show that when trade openness is interacted with other variables, there is a change in effects on economic growth compared to the effects of these variables in model 1. Specifically, the effect of these variables on economic growth decreases (except for industry value added which shows an increase in effect) in the long run as well as the short run. This is attributed to the negative partial effect of trade openness on economic growth in the long run as observed in model 1.

The study finds that there is a positive relationship between economic growth and the interaction of trade openness and FDI in the long run. In other words, there is a significant joint positive effect of trade openness and FDI on economic growth in the long run. This means that when trade openness depends on FDI (or when FDI depends on trade openness), there is a positive effect on economic growth. However, the partial effect of FDI (the partial coefficient of FDI in model 1) on growth is larger compared to when FDI

depends on trade openness (Interaction term of trade openness and FDI in model 2). The presence of a significant joint effect of trade openness and FDI on economic growth means that, trade openness and FDI complement each other. Thus, they jointly affect economic growth positively in the long run for the Zambian Economy.

The coefficient of the interaction of trade openness and industry value added is negative and statistically significant. In other words, there is a significant joint negative effect of trade openness and industry value added on economic growth in the long run. This means that when trade openness depends on industry value added (or when industry value added depends on trade openness), economic growth is negatively affected in the long run for the Zambian Economy. However, the partial effect of industry (the partial coefficient of industry value added in model 1) on growth is smaller compared to when industry value added depends on trade openness (-0.9 basis points effect in model 2 compared to -45.1 basis points effect in model 1). This means that trade openness improves the effect of industry value added on economic growth when these variables are interacted. In other words, trade openness and industry value added complement each other.

The study finds a positive relationship between economic growth and the interaction of trade openness and secondary school enrolment in the long run. In other words, there exists a significant joint positive effect of trade openness and secondary school enrolment on economic growth in the long run. This means that when trade openness depends on secondary school enrolment (or when secondary school enrolment depends on trade openness), economic growth is positively affected in the long run for the Zambian Economy. However, the partial effect of secondary school enrolment (the partial coefficient of secondary school enrolment in model 1) on growth is larger compared to when secondary school enrolment depends on trade openness (0.1 basis points effect in model 2 compared 12.1 basis points effect in model one). From these findings, it can be seen that trade openness and secondary school enrolment complement each other and together positively affect economic growth.

When inflation is interacted with trade openness, the combined effect on economic growth is positive but statistically insignificant in the long run. However, the interaction term is positive and statistically significant in the short run. This means there

is joint positive effect of trade openness and inflation on economic growth in the short run. This positive relationship is valid for both the current year (coefficient) as well as previous year (one period lag coefficient). This means that when trade openness depends on inflation (or when inflation depends on trade openness), economic growth is positively affected in the short run for the Zambian Economy. Thus, from the study findings, trade openness and inflation complement each other and positively affect economic growth in the short run.

The interaction between trade openness and terms of trade has a positive influence on economic growth in both the long and short run. In other words, there exists a significant joint positive effect of trade openness and terms of trade on economic growth in both the long run and short run. This means that when trade openness depends on terms of trade (or when terms of trade depends on trade openness), economic growth is positively affected in the long run and short run for the Zambian Economy. However, the partial effect of terms of trade (the partial coefficients of terms of trade in model 1) on growth is larger compared to when terms of trade depends on trade openness both in the long and short run. Thus, it can be stated that trade openness and terms of trade complement each other and positively affect economic growth in both the long and short run.

CONCLUSION AND RECOMMENDATIONS

The main objective of the study was to investigate the link between trade openness and economic growth for the Zambian Economy for the period 1980-2019. This objective was achieved with the help of three specific objectives which were to investigate the nature of the relationship between trade openness and economic growth; assess the dependence of trade openness on FDI, industry value added, inflation, secondary school enrolment and terms of trade; and to examine the direction of causality between trade openness and economic growth. The study finds that there is an inverse (negative) relationship between trade openness and economic growth in the long run. This means that changes in trade openness lead to negative changes in economic growth. Specifically, a 1 percent change in trade openness leads to -13.8 basis points (-0.138 percent) change in economic growth. This means that a 10 percent change in trade openness is associated with a -1.38 percent change in economic growth in the long run.

The study also finds that trade openness depends on FDI, secondary school enrolment and the terms of trade in order to have a positive effect on economic growth in the long run. In the short run, trade openness depends on inflation and terms of trade to positively affect economic growth. When trade openness is interacted with industry value added (that is, when these variables depend on each other), the negative effect of industry value added on economic growth reduces. These results indicate that trade openness FDI, industry value added, inflation, secondary school enrolment, and terms of trade complement each other as they influence economic growth. This is because of their positive joint effect on economic growth as seen in model 2.

Furthermore, the study also finds that, a unidirectional causal relationship exists between trade openness and economic growth running from trade openness to economic growth. This means that past values trade openness influence the current values of economic growth for the Zambian Economy. In other words, past values of trade openness causes changes in the current values of economic growth. Thus, a causal link from trade openness to economic growth.

Besides, FDI and secondary school enrolment positively affects economic growth in the long run. Terms of trade has positive effect on economic growth in both the long run and short run. These findings means that higher levels of FDI, secondary school

enrolment and Terms of trade are desirable and are supposed to be encouraged for the Zambian Economy. It was also found that, inflation positively affects economic growth in the short run. On the other hand, industry value added negatively affects economic growth in the long run for the Zambian Economy.

The findings of the study indicate that economic growth is determined both exogenously and endogenously. In other words, growth is determined by both exogenous factors as well as endogenous factors. Growth is exogenously determined as seen from the partial (direct) effects of trade openness, FDI, industry value added, inflation, terms of trade and secondary school enrolment on economic growth in model 1. On the other hand, the interaction of trade openness with the other explanatory variables in model 2 indicate the determination of economic growth endogenously for the Zambian Economy. This is taken from the statistically significant joint effects of the explanatory variables included in model 2. The joint effects imply that in the presence of two or more variables, the changes in one variable influences the other variable (s) and together they influence the dependent variable. This represents the interaction effects among the variables and indicates that Economic growth is endogenously determined. These findings support the endogenous growth theory.

The findings of this study are similar to the findings of a number of empirical studies on trade openness and economic growth. These include the findings of Ann (1996) who found a positive influence on economic growth after interacting trade openness with human capital. Shahbaz (2012), Olufemi (2004) and Tekin (2012) found that a unidirectional causal relationship running from trade openness to economic growth exists. Additionally, Dowrick and Golley (2004) found that for primary product exporting nations, openness negatively impacts growth. In the same line, Moyo et al (2017) finds an inverse relation between openness and growth for the Nigerian economy. Chang et al (2009) finds that more openness to trade has to be done with caution by making sure that complementary reforms are put in place for developing countries to benefit from higher levels of trade openness. These findings also support the findings of Yanikkaya (2003) who found that trade barriers positively affect economic growth for developing economies like the Zambian Economy.

In the light of these findings, trade openness on its own is not desirable and should not be supported for the Zambian economy. It is evident that trade openness positively affects economic growth when coupled with its complementary factors which are FDI, secondary school enrolment, terms of trade, inflation and industry value added. Thus, from this, there is need to improve these complementary variables for trade openness to be beneficial for the Zambian economy. In line with this, a number of recommendations are given; First, Zambia needs to increase the level and quality of FDI flowing into the economy. This involves attracting FDI inflows in sectors away from the mining sector which currently receives the highest FDI inflows. This approach would increase the manufacturing and value addition capacity in the Zambian economy.

Second, there is need to increase the levels of secondary school enrolment as well as the quality of general education. This involves construction of more secondary schools in strategic locations. There is also the need to improve the quality of education in a way that it ensures improvement in the quality of human capital (this includes skills, knowledge, literacy, innovation). This would improve the quality of labour available for production of goods and services in the economy.

Third, a deliberate policy by the Zambian Government to industrialise and promote industrialisation is of great importance. This is in consideration of the fact that the Zambian economy is an open economy. This industrialisation should be sectors in which Zambia has comparative advantage (this includes the agriculture and tourism sectors) and away from the mining sector. This is because the mining sector is an extractive sector with limited value addition and R&D and/or learning is limited. Thus, there should be industries (with value addition capacity) related to the mining sector. Besides, industrialisation should involve construction of industries which can increase the quantities and quality of manufactured goods and services ready for consumption. Fourth, there is need for accommodative monetary policy which supports low to moderate inflation. In this way, inflation would have a positive effect on economic growth in the short run.

Lastly, Zambia is an economy that has linkages with foreign nations and institutions. This enhances Zambia's integration with the outside world. Thus, the Zambian Economy is open to international trade. In the light of this, this study

recommends further studies aimed at investigating the link between infrastructure development (this includes, transport, telecommunication and energy infrastructure) and trade openness as well as how these can influence economic growth. This is in consideration of the fact that Zambia is a landlocked country which depends on its neighbours to access coastal lines.

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APPENDIX

APPENDIX 1: SUMMARY STATISTICS

	GDP	TO	FDIG	ING	INF	SECENROL	TOT
Mean	3.620466	58.66107	4.177873	34.69401	33.32478	24.87000	84.51649
Median	3.966067	56.53199	4.187649	34.37890	17.76580	22.30000	85.05877
Maximum	10.29822	76.98121	9.605168	47.28350	165.5340	45.70000	163.5192
Minimum	-8.625442	40.29483	0.627865	22.81984	3.498589	13.60000	45.61917
Std. Dev.	3.859644	9.319598	2.476882	6.849983	38.64474	8.270280	23.54818
Skewness	-0.811287	0.184237	0.426042	-0.026535	1.948615	0.951011	0.809064
Kurtosis	3.861283	2.244768	2.321451	2.179615	6.104547	3.156313	4.801433
Jarque-Bera	5.624254	1.176914	1.977458	1.126414	41.37770	6.070203	9.772492
Probability	0.060077	0.555183	0.372049	0.569380	0.000000	0.048070	0.007550
Sum	144.8186	2346.443	167.1149	1387.761	1332.991	994.8000	3380.659
Sum Sq. Dev.	580.9771	3387.341	239.2628	1829.968	58243.23	2667.504	21626.15
Observations	40	40	40	40	40	40	40

APPENDIX 2: CROSS CORRELATIONS

Covariance Analysis: Ordinary
Date: 03/21/21 Time: 18:54
Sample: 1980 2019
Included observations: 40
Balanced sample (listwise missing value deletion)

Covariance Correlation	GDP	TO	FDIG	ING	INF	SECENROL	TOT
GDP	14.52443						
	1.000000						
TO	4.547177	84.68353					
	0.129656	1.000000					
FDIG	5.517922	4.137420	5.981570				
	0.591996	0.183833	1.000000				
ING	-12.99055	15.61640	-7.404229	45.74921			
	-0.503949	0.250894	-0.447590	1.000000			
INF	-61.33411	-54.91378	-8.084031	134.7658	1456.081		
	-0.421755	-0.156383	-0.086622	0.522150	1.000000		
SECENROL	8.024678	26.46026	4.375615	-0.756334	-97.25409	66.68760	
	0.257843	0.352105	0.219083	-0.013693	-0.312099	1.000000	
TOT	5.378302	99.61526	-7.788678	96.67533	7.796548	25.13001	540.6538

	0.060693	0.465550	-0.136961	0.614701	0.008787	0.132346	1.000000

APPENDIX 3: UNIT ROOT TESTS

UNIT ROOT TEST RESULTS TABLE (ADF)

Null Hypothesis: the variable has a unit root

At Level

		GDP	TO	FDIG	ING	INF	SECENROL	TOT
With Constant	t-Statistic	-2.0709	-3.7715	-1.7009	-2.3356	-2.1674	0.5587	-2.9365
	Prob.	***0.2570***	***0.0058***	***0.4243***	***0.1653***	***0.2204***	***0.9871***	***0.0503***
		n0	***	n0	n0	n0	n0	*
With Constant & Trend	t-Statistic	-6.8783	-3.7012	-5.8489	-1.5496	-2.2026	-1.2491	-2.8513
	Prob.	***0.0000***	***0.0316***	***0.0001***	***0.7982***	***0.4776***	***0.8886***	***0.1888***
		***	**	***	n0	n0	n0	n0
Without Constant & Trend	t-Statistic	-1.5113	-0.7852	-0.5734	-0.9902	-1.6306	2.0188	-0.9813
	Prob.	***0.1211***	***0.3706***	***0.4636***	***0.2844***	***0.0966***	***0.9886***	***0.2867***
		n0	n0	n0	n0	*	n0	n0

At First Difference

		d(GDP)	d(TO)	d(FDIG)	d(ING)	d(INF)	d(SECENROL)	d(TOT)
With Constant	t-Statistic	-7.0783	-7.6443	-10.1135	-6.6381	-6.2841	-8.1501	-7.1898
	Prob.	***0.0000***	***0.0000***	***0.0000***	***0.0000***	***0.0000***	***0.0000***	***0.0000***
		***	***	***	***	***	***	***
With Constant & Trend	t-Statistic	-6.9887	-7.7081	-10.2094	-6.7537	-6.2821	-8.4763	-7.0762
	Prob.	***0.0000***	***0.0000***	***0.0000***	***0.0000***	***0.0000***	***0.0000***	***0.0000***
		***	***	***	***	***	***	***
Without Constant & Trend	t-Statistic	-7.1621	-7.7110	-10.2175	-6.7397	-6.3518	-7.5511	-7.2929
	Prob.	***0.0000***	***0.0000***	***0.0000***	***0.0000***	***0.0000***	***0.0000***	***0.0000***
		***	***	***	***	***	***	***

UNIT ROOT TEST RESULTS TABLE (PP)

Null Hypothesis: the variable has a unit root

At Level

		GDP	TO	FDIG	ING	INF	SECENROL	TOT
With Constant	t-Statistic	-6.2174	-3.5894	-4.4062	-2.3584	-2.2313	0.9195	-3.0409
	Prob.	***0.0000***	***0.0095***	***0.0009***	***0.1586***	***0.1982***	***0.9950***	***0.0398***
		***	***	***	n0	n0	n0	**
With Constant & Trend	t-Statistic	-6.9714	-3.5157	-5.9791	-1.5860	-2.2441	-1.2211	-2.9628
	Prob.	***0.0000***	***0.0487***	***0.0000***	***0.7842***	***0.4554***	***0.8949***	***0.1553***
		***	**	***	n0	n0	n0	n0
Without Constant & Trend	t-Statistic	-4.1271	-0.8478	-1.6172	-1.0079	-1.6558	2.4189	-0.9556
	Prob.	***0.0001***	***0.3436***	***0.0991***	***0.2774***	***0.0919***	***0.9957***	***0.2971***
		***	n0	*	n0	*	n0	n0

At First Difference

		d(GDP)	d(TO)	d(FDIG)	d(ING)	d(INF)	d(SECENROL)	d(TOT)
With Constant	t-Statistic	-46.7864	-10.5317	-16.9515	-6.6381	-6.2897	-8.0666	-7.2518
	Prob.	***0.0001***	***0.0000***	***0.0000***	***0.0000***	***0.0000***	***0.0000***	***0.0000***
		***	***	***	***	***	***	***
With Constant & Trend	t-Statistic	-47.0707	-11.9482	-18.8206	-6.7535	-6.2878	-8.4363	-7.1299
	Prob.	***0.0000***	***0.0000***	***0.0000***	***0.0000***	***0.0000***	***0.0000***	***0.0000***
		***	***	***	***	***	***	***
Without Constant & Trend	t-Statistic	-45.5370	-10.5588	-16.9724	-6.7397	-6.3568	-7.5437	-7.3601
	Prob.	***0.0000***	***0.0000***	***0.0000***	***0.0000***	***0.0000***	***0.0000***	***0.0000***
		***	***	***	***	***	***	***

APPENDIX 4: BOUNDS TEST

F-Bounds Test			Null Hypothesis: No levels relationship	
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	16.71512	10%	2.12	3.23
k	6	5%	2.45	3.61
		2.5%	2.75	3.99
		1%	3.15	4.43
Actual Sample Size	38		Finite Sample: n=40	
		10%	2.353	3.599
		5%	2.797	4.211
		1%	3.8	5.643
			Finite Sample: n=35	
		10%	2.387	3.671
		5%	2.864	4.324
		1%	4.016	5.797

APPENDIX 5: LONG RUN COEFFICIENTS

Levels Equation

Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TO	-0.138453	0.051657	-2.680237	0.0126
FDIG	0.509297	0.174891	2.912073	0.0073
ING	-0.451276	0.113248	-3.984859	0.0005
INF	-0.008298	0.013079	-0.634456	0.5313
SECENROL	0.120920	0.044677	2.706560	0.0118
TOT	0.115619	0.031157	3.710832	0.0010

EC = GDP - (-0.1385*TO + 0.5093*FDIG -0.4513*ING -0.0083*INF + 0.1209*SECENROL + 0.1156*TOT)

APPENDIX 6: SHORT RUN COEFFICIENTS

ARDL Error Correction Regression
Dependent Variable: D(GDP)
Selected Model: ARDL(1, 0, 0, 0, 2, 0, 2)
Case 3: Unrestricted Constant and No Trend
Date: 03/21/21 Time: 17:18
Sample: 1980 2019
Included observations: 38

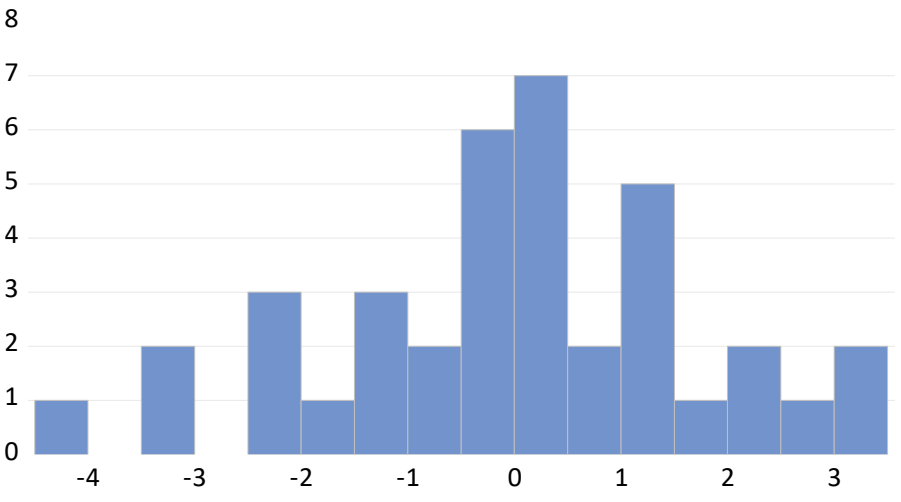
ECM Regression
Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	14.84086	1.281021	11.58518	0.0000
D(INF)	0.059066	0.015906	3.713525	0.0010
D(INF(-1))	0.056184	0.014958	3.756203	0.0009
D(TOT)	0.111336	0.018586	5.990157	0.0000
D(TOT(-1))	0.046163	0.017713	2.606184	0.0150
CointEq(-1)*	-1.175151	0.097927	-12.00030	0.0000

R-squared	0.840560	Mean dependent var	-0.117425
Adjusted R-squared	0.815648	S.D. dependent var	4.414597
S.E. of regression	1.895463	Akaike info criterion	4.260742
Sum squared resid	114.9689	Schwarz criterion	4.519309
Log likelihood	-74.95411	Hannan-Quinn criter.	4.352738
F-statistic	33.74055	Durbin-Watson stat	1.790912
Prob(F-statistic)	0.000000		

APPENDIX 7: DIAGNOSTIC TESTS

Normality test



Series: Residuals	
Sample 1982 2019	
Observations 38	
Mean	-3.34e-15
Median	0.100437
Maximum	3.410720
Minimum	-4.333098
Std. Dev.	1.762745
Skewness	-0.241810
Kurtosis	2.901764
Jarque-Bera	0.385602
Probability	0.824646

Autocorrelation test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.799323	Prob. F(2,24)	0.4612
Obs*R-squared	2.373116	Prob. Chi-Square(2)	0.3053

Test Equation:
Dependent Variable: RESID
Method: ARDL
Date: 03/21/21 Time: 19:34
Sample: 1982 2019
Included observations: 38
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP(-1)	-0.103861	0.163682	-0.634526	0.5317
TO	0.019619	0.064834	0.302611	0.7648
FDIG	0.004275	0.218021	0.019610	0.9845
ING	-0.061856	0.158784	-0.389562	0.7003
INF	-0.009182	0.024132	-0.380514	0.7069
INF(-1)	0.013715	0.028532	0.480668	0.6351
INF(-2)	-0.005120	0.022252	-0.230115	0.8200
SECENROL	-0.005808	0.053536	-0.108491	0.9145
TOT	-0.000981	0.026544	-0.036959	0.9708
TOT(-1)	0.011639	0.032808	0.354763	0.7259
TOT(-2)	0.003144	0.023431	0.134170	0.8944
C	0.365108	4.014004	0.090959	0.9283
RESID(-1)	0.293597	0.322027	0.911715	0.3710
RESID(-2)	-0.226305	0.225056	-1.005547	0.3247

R-squared	0.062450	Mean dependent var	-3.34E-15

Adjusted R-squared	-0.445389	S.D. dependent var	1.762745
S.E. of regression	2.119248	Akaike info criterion	4.617309
Sum squared resid	107.7891	Schwarz criterion	5.220631
Log likelihood	-73.72888	Hannan-Quinn criter.	4.831966
F-statistic	0.122973	Durbin-Watson stat	1.929000
Prob(F-statistic)	0.999838		

Heteroscedascity test

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.805240	Prob. F(11,26)	0.6346
Obs*R-squared	9.656144	Prob. Chi-Square(11)	0.5616
Scaled explained SS	4.298430	Prob. Chi-Square(11)	0.9604

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 03/21/21 Time: 19:36

Sample: 1982 2019

Included observations: 38

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.394948	7.974233	0.049528	0.9609
GDP(-1)	0.216750	0.238575	0.908521	0.3719
TO	0.077073	0.126815	0.607761	0.5486
FDIG	0.065373	0.422434	0.154752	0.8782
ING	0.172204	0.287715	0.598522	0.5547
INF	-0.067553	0.046886	-1.440799	0.1616
INF(-1)	0.047339	0.053851	0.879068	0.3874
INF(-2)	0.031278	0.044936	0.696047	0.4926
SECENROL	-0.068800	0.109446	-0.628622	0.5351
TOT	-0.112623	0.053850	-2.091413	0.0464
TOT(-1)	0.050078	0.061163	0.818760	0.4204
TOT(-2)	-0.027343	0.047325	-0.577779	0.5684

R-squared	0.254109	Mean dependent var	3.025499
Adjusted R-squared	-0.061460	S.D. dependent var	4.228304
S.E. of regression	4.356303	Akaike info criterion	6.033214
Sum squared resid	493.4117	Schwarz criterion	6.550346
Log likelihood	-102.6311	Hannan-Quinn criter.	6.217206
F-statistic	0.805240	Durbin-Watson stat	2.345854

Prob(F-statistic)	0.634583

Ramsey test

Ramsey RESET Test
Equation: EQ02
Specification: GDP GDP(-1) TO FDIG ING INF INF(-1) INF(-2) SECENROL TOT TOT(-1) TOT(-2) C
Omitted Variables: Squares of fitted values

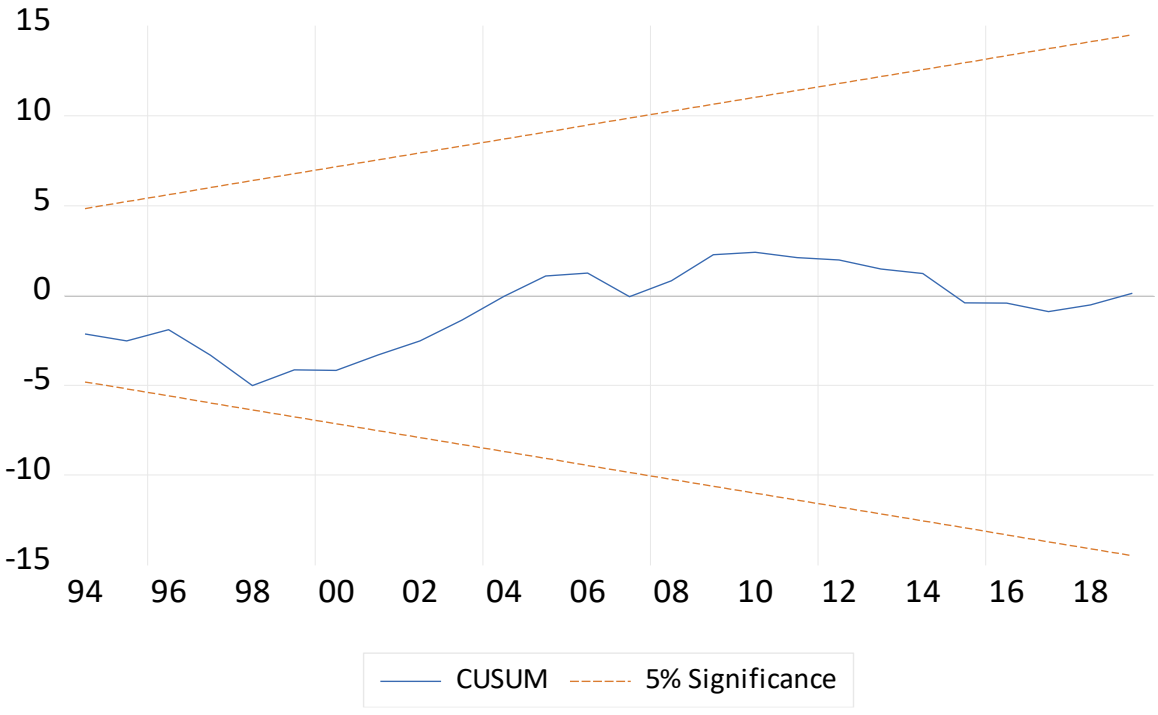
	Value	df	Probability
t-statistic	0.648205	25	0.5228
F-statistic	0.420170	(1, 25)	0.5228

F-test summary:

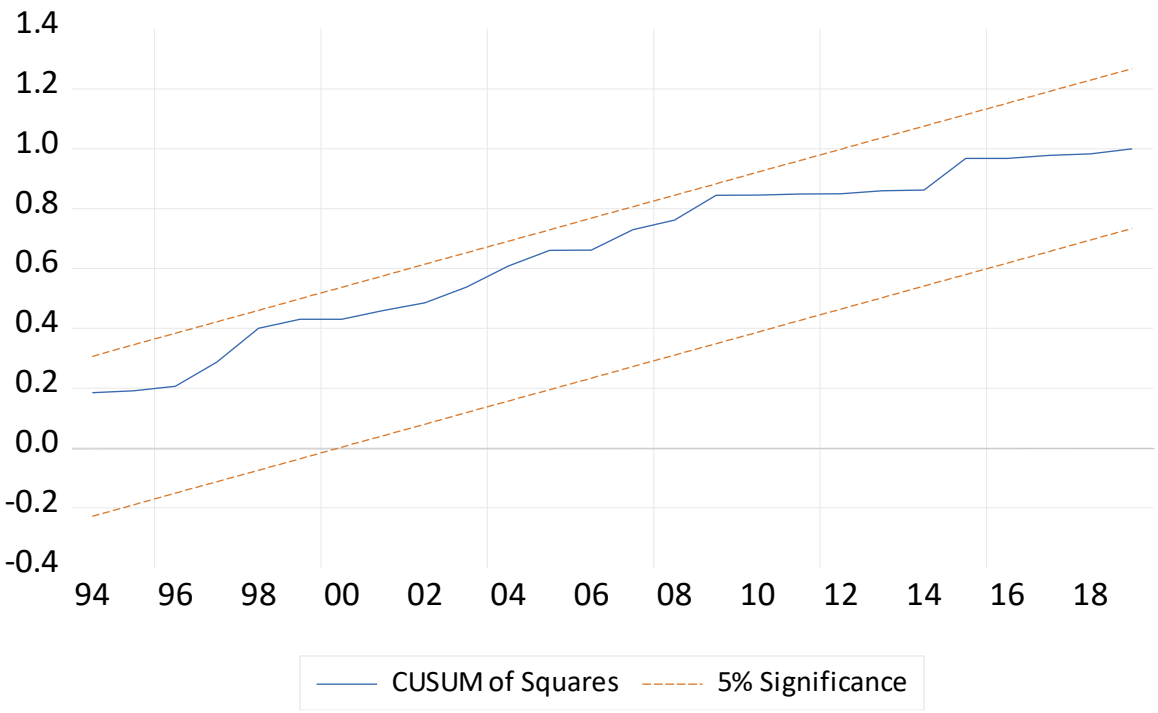
	Sum of Sq.	df	Mean Squares
Test SSR	1.900320	1	1.900320
Restricted SSR	114.9689	26	4.421882
Unrestricted SSR	113.0686	25	4.522745

Stability tests

CUSUM test



CUSUM of squares test



APPENDIX 8: CAUSALITY TEST

Pairwise Granger Causality Tests
Date: 03/21/21 Time: 19:42
Sample: 1980 2019
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
TO does not Granger Cause GDP	48	3.05650	0.0574
GDP does not Granger Cause TO		0.72670	0.4893
FDIG does not Granger Cause GDP	48	0.51473	0.6013
GDP does not Granger Cause FDIG		2.33695	0.1088
ING does not Granger Cause GDP	48	2.20862	0.1222
GDP does not Granger Cause ING		0.16009	0.8526
INF does not Granger Cause GDP	48	0.53066	0.5920
GDP does not Granger Cause INF		0.56127	0.5746
SECENROL does not Granger Cause GDP	48	0.47500	0.6251
GDP does not Granger Cause SECENROL		0.53453	0.5898

TOT does not Granger Cause GDP	38	2.75984	0.0779
GDP does not Granger Cause TOT		1.01580	0.3732
FDIG does not Granger Cause TO	48	0.17130	0.8431
TO does not Granger Cause FDIG		1.38125	0.2622
ING does not Granger Cause TO	48	5.24600	0.0091
TO does not Granger Cause ING		3.28166	0.0472
INF does not Granger Cause TO	48	6.38864	0.0037
TO does not Granger Cause INF		2.26199	0.1164
SECENROL does not Granger Cause TO	48	0.67201	0.5160
TO does not Granger Cause SECENROL		0.62312	0.5410
TOT does not Granger Cause TO	38	1.62886	0.2115
TO does not Granger Cause TOT		0.92749	0.4056
ING does not Granger Cause FDIG	48	2.21985	0.1209
FDIG does not Granger Cause ING		0.39573	0.6756
INF does not Granger Cause FDIG	48	2.19342	0.1239
FDIG does not Granger Cause INF		1.13756	0.3301
SECENROL does not Granger Cause FDIG	48	0.45723	0.6361
FDIG does not Granger Cause SECENROL		7.59974	0.0015
TOT does not Granger Cause FDIG	38	0.20758	0.8136
FDIG does not Granger Cause TOT		0.10436	0.9012
INF does not Granger Cause ING	48	0.94368	0.3971
ING does not Granger Cause INF		0.69837	0.5029
SECENROL does not Granger Cause ING	48	0.51164	0.6031
ING does not Granger Cause SECENROL		0.54782	0.5822
TOT does not Granger Cause ING	38	2.08494	0.1404
ING does not Granger Cause TOT		0.82992	0.4450
SECENROL does not Granger Cause INF	48	0.39894	0.6735
INF does not Granger Cause SECENROL		0.41180	0.6650
TOT does not Granger Cause INF	38	3.35371	0.0472
INF does not Granger Cause TOT		0.44448	0.6449

TOT does not Granger Cause SECENROL	38	0.24120	0.7871
SECENROL does not Granger Cause TOT		0.00631	0.9937

MODEL 2

APPENDIX 9: UNIT ROOTS TESTS

UNIT ROOT TEST RESULTS TABLE (ADF)

Null Hypothesis: the variable has a unit root

At Level

		GDP	TOFDIG	TOING	TOINF	TOSE	TOTOT
With Constant	t-Statistic	-2.0709	-1.5986	-2.9451	-2.5193	1.2981	-2.2731
	Prob.	***0.2570***	***0.4754***	***0.0475***	***0.1172***	***0.9983***	***0.1855***
		n0	n0	**	n0	n0	n0
With Constant & Trend	t-Statistic	-6.8783	-5.7975	-2.5164	-2.5572	-2.0269	-2.2420
	Prob.	***0.0000***	***0.0001***	***0.3193***	***0.3008***	***0.5724***	***0.4539***
		***	***	n0	n0	n0	n0
Without Constant & Trend	t-Statistic	-1.5113	-0.6102	-1.5080	-1.8798	2.1537	-0.7303
	Prob.	***0.1211***	***0.4477***	***0.1219***	***0.0579***	***0.9917***	***0.3935***
		n0	n0	n0	*	n0	n0

At First Difference

		d(GDP)	d(TOFDIG)	d(TOING)	d(TOINF)	d(TOSE)	d(TOTOT)
With Constant	t-Statistic	-7.0783	-10.2761	-8.2569	-6.9465	-9.6186	-7.1447
	Prob.	***0.0000***	***0.0000***	***0.0000***	***0.0000***	***0.0000***	***0.0000***
		***	***	***	***	***	***
With Constant & Trend	t-Statistic	-6.9887	-10.3013	-8.7929	-6.9783	-7.5524	-7.0184
	Prob.	***0.0000***	***0.0000***	***0.0000***	***0.0000***	***0.0000***	***0.0000***
		***	***	***	***	***	***
Without Constant & Trend	t-Statistic	-7.1621	-10.3844	-8.2338	-7.0263	-9.4778	-7.2472
	Prob.	***0.0000***	***0.0000***	***0.0000***	***0.0000***	***0.0000***	***0.0000***
		***	***	***	***	***	***

UNIT ROOT TEST RESULTS TABLE (PP)

Null Hypothesis: the variable has a unit root

At Level

		GDP	TOFDIG	TOING	TOINF	TOSE	TOTOT
With Constant	t-Statistic	-6.2174	-4.3702	-2.9071	-2.4876	0.0952	-3.0467
	Prob.	***0.0000***	***0.0010***	***0.0518***	***0.1246***	***0.9622***	***0.0393***
		***	***	*	n0	n0	**
With Constant & Trend	t-Statistic	-6.9714	-5.8961	-2.2695	-2.4946	-1.7079	-3.0006
	Prob.	***0.0000***	***0.0001***	***0.4420***	***0.3294***	***0.7327***	***0.1450***
		***	***	n0	n0	n0	n0
Without Constant & Trend	t-Statistic	-4.1271	-1.8833	-1.6110	-1.7851	1.4144	-1.1984
	Prob.	***0.0001***	***0.0575***	***0.1003***	***0.0707***	***0.9590***	***0.2072***
		***	*	n0	*	n0	n0

At First Difference

		d(GDP)	d(TOFDIG)	d(TOING)	d(TOINF)	d(TOSE)	d(TOTOT)
With Constant	t-Statistic	-46.7864	-14.3639	-8.3323	-7.2983	-9.6795	-7.1447
	Prob.	***0.0001***	***0.0000***	***0.0000***	***0.0000***	***0.0000***	***0.0000***
		***	***	***	***	***	***
With Constant & Trend	t-Statistic	-47.0707	-14.4578	-9.0077	-7.3008	-10.4202	-7.0184
	Prob.	***0.0000***	***0.0000***	***0.0000***	***0.0000***	***0.0000***	***0.0000***
		***	***	***	***	***	***
Without Constant & Trend	t-Statistic	-45.5370	-14.5328	-8.2992	-7.3754	-9.3981	-7.2472
	Prob.	***0.0000***	***0.0000***	***0.0000***	***0.0000***	***0.0000***	***0.0000***
		***	***	***	***	***	***

APPENDIX 10: BOUNDS TEST

F-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	16.31489	10%	2.26	3.35
K	5	5%	2.62	3.79
		2.5%	2.96	4.18
		1%	3.41	4.68
Actual Sample Size	38		Finite Sample: n=40	
		10%	2.483	3.708
		5%	2.962	4.338
		1%	4.045	5.898
			Finite Sample: n=35	
		10%	2.508	3.763
		5%	3.037	4.443
		1%	4.257	6.04

APPENDIX 11: LONG RUN COEFFICIENTS

Levels Equation

Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TOFDIG	0.005927	0.002689	2.204267	0.0362
TOING	-0.009809	0.001958	-5.008626	0.0000
TOINF	0.000160	0.000248	0.643807	0.5251
TOSE	0.001887	0.000798	2.365233	0.0255
TOTOT	0.002026	0.000516	3.924483	0.0005

EC = GDP - (0.0059*TOFDIG -0.0098*TOING + 0.0002*TOINF + 0.0019*TOSE + 0.0020*TOTOT)

APPENDIX 12: SHORT RUN COEFFICIENTS

ARDL Error Correction Regression
Dependent Variable: D(GDP)
Selected Model: ARDL(1, 0, 0, 2, 0, 2)
Case 3: Unrestricted Constant and No Trend
Date: 03/21/21 Time: 17:17
Sample: 1980 2019
Included observations: 38

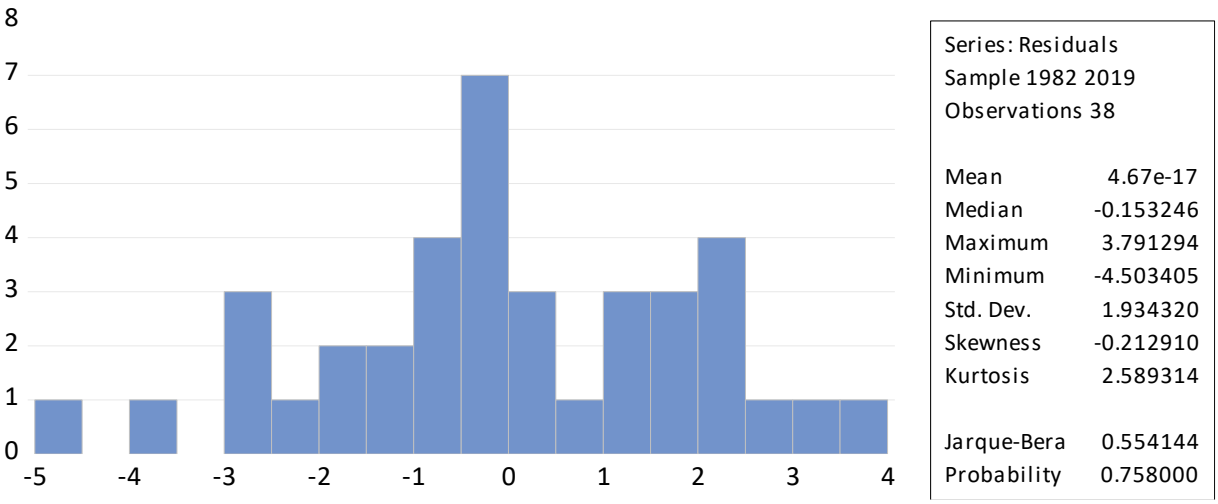
ECM Regression
Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.20002	1.012378	10.07531	0.0000
D(TOINF)	0.001592	0.000307	5.182295	0.0000
D(TOINF(-1))	0.000650	0.000255	2.545624	0.0169
D(TOTOT)	0.001608	0.000262	6.140561	0.0000
D(TOTOT(-1))	0.000738	0.000275	2.687849	0.0122
CointEq(-1)*	-1.163999	0.108067	-10.77112	0.0000

R-squared	0.808012	Mean dependent var	-0.117425
Adjusted R-squared	0.778014	S.D. dependent var	4.414597
S.E. of regression	2.079956	Akaike info criterion	4.446510
Sum squared resid	138.4389	Schwarz criterion	4.705076
Log likelihood	-78.48368	Hannan-Quinn criter.	4.538506
F-statistic	26.93540	Durbin-Watson stat	1.635230
Prob(F-statistic)	0.000000		

APPENDIX 13: DIAGNOSTIC TESTS

Normality test



Autocorrelation test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.884556	Prob. F(2,25)	0.4254
Obs*R-squared	2.511336	Prob. Chi-Square(2)	0.2849

Test Equation:
Dependent Variable: RESID
Method: ARDL
Date: 03/21/21 Time: 19:57
Sample: 1982 2019
Included observations: 38
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP(-1)	-0.189163	0.189866	-0.996296	0.3287
TOFDIG	0.000276	0.003276	0.084348	0.9335
TOING	-0.001539	0.002623	-0.586688	0.5627
TOINF	-2.33E-06	0.000491	-0.004739	0.9963
TOINF(-1)	6.66E-05	0.000428	0.155396	0.8778
TOINF(-2)	-0.000168	0.000363	-0.462520	0.6477
TOSE	0.000245	0.000951	0.257805	0.7987
TOTOT	0.000158	0.000496	0.317538	0.7535
TOTOT(-1)	0.000128	0.000456	0.281362	0.7807
TOTOT(-2)	0.000145	0.000376	0.387243	0.7019
C	1.450444	2.442176	0.593914	0.5579
RESID(-1)	0.409623	0.309417	1.323855	0.1975
RESID(-2)	-0.031670	0.223183	-0.141900	0.8883

R-squared	0.066088	Mean dependent var	4.67E-17
Adjusted R-squared	-0.382190	S.D. dependent var	1.934320
S.E. of regression	2.274114	Akaike info criterion	4.746558
Sum squared resid	129.2898	Schwarz criterion	5.306785
Log likelihood	-77.18460	Hannan-Quinn criter.	4.945882
F-statistic	0.147426	Durbin-Watson stat	1.884442
Prob(F-statistic)	0.999349		

Heteroscedascity test

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.389323	Prob. F(10,27)	0.2375
Obs*R-squared	12.91027	Prob. Chi-Square(10)	0.2287
Scaled explained SS	5.179355	Prob. Chi-Square(10)	0.8789

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 03/21/21 Time: 19:58
Sample: 1982 2019

Included observations: 38

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.428573	4.182920	0.580593	0.5663
GDP(-1)	0.426371	0.244494	1.743889	0.0926
TOFDIG	0.001698	0.006260	0.271227	0.7883
TOING	0.003325	0.004564	0.728529	0.4726
TOINF	-0.001236	0.000932	-1.326042	0.1959
TOINF(-1)	0.001508	0.000813	1.855392	0.0745
TOINF(-2)	0.000387	0.000662	0.584048	0.5640
TOSE	0.000223	0.001804	0.123471	0.9026
TOTOT	-0.000449	0.000924	-0.486312	0.6307
TOTOT(-1)	-0.001605	0.000843	-1.904173	0.0676
TOTOT(-2)	0.000205	0.000697	0.294174	0.7709

R-squared	0.339744	Mean dependent var	3.643130
Adjusted R-squared	0.095205	S.D. dependent var	4.654473
S.E. of regression	4.427368	Akaike info criterion	6.050686
Sum squared resid	529.2429	Schwarz criterion	6.524724
Log likelihood	-103.9630	Hannan-Quinn criter.	6.219345
F-statistic	1.389323	Durbin-Watson stat	1.591455
Prob(F-statistic)	0.237529		

Ramsey test

Ramsey RESET Test

Equation: EQ02

Specification: GDP GDP(-1) TOFDIG TOING TOINF TOINF(-1) TOINF(-2) TOSE TOTOT TOTOT(-1) TOTOT(-2) C

Omitted Variables: Squares of fitted values

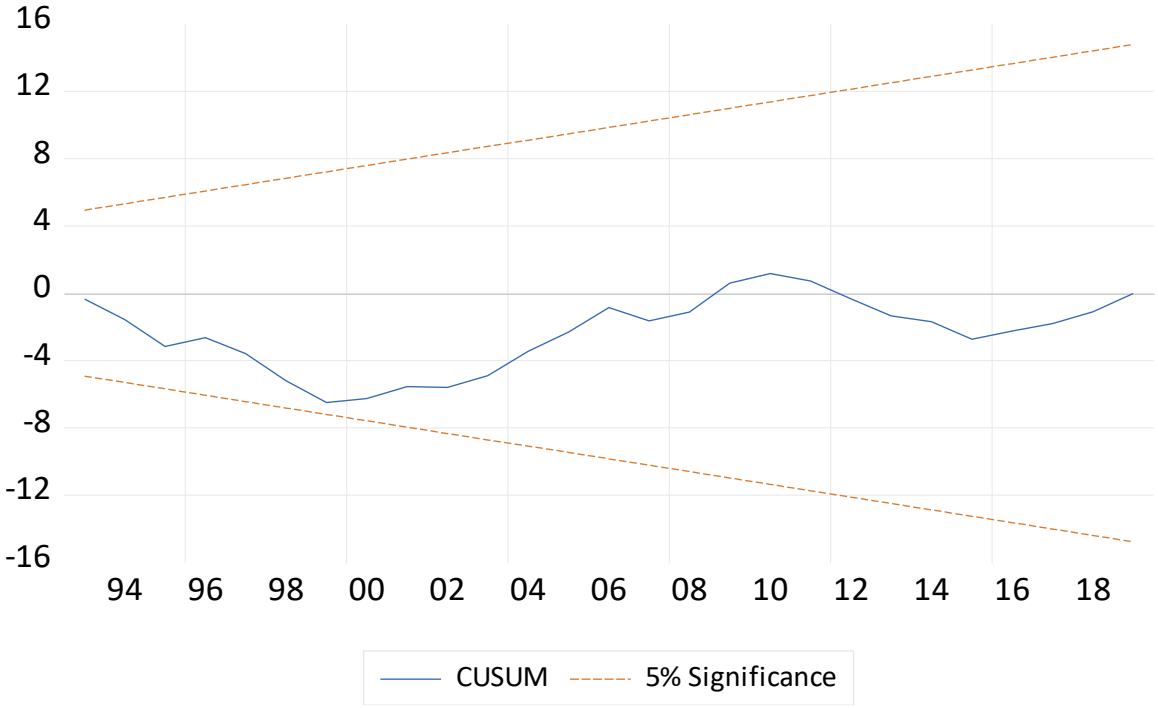
	Value	df	Probability
t-statistic	1.293427	26	0.2072
F-statistic	1.672954	(1, 26)	0.2072

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	8.369254	1	8.369254
Restricted SSR	138.4389	27	5.127368
Unrestricted SSR	130.0697	26	5.002680

Stability tests

CUSUM TEST



CUSUM of squares test