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IMPACT OF NONTRADITIONAL AGRICULTURAL EXPORTS ON

GHANA'S ECONOMIC GROWTH.

ADAM UMAR

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GHANA'S ECONOMIC GROWTH

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DECLARATION

STUDENT

I Adam Umar hereby declare that this thesis is the result of my own original work and that no part of it has been presented for another degree in this University or elsewhere:

Candidate's Signature…………………………Date …………………………….

Adam Umar

SUPERVISOR

I hereby declare that the preparation and presentation of the thesis was supervised in accordance with the guidelines on supervision of thesis laid down by the University for Development Studies.

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ABSTRACT

The study examined the impact of nontraditional agricultural exports on Ghana's economic growth using secondary data obtained from World Development Indicators and FAOSTATS from 1961 to 2019. The empirical investigation was based on the estimation of linear and nonlinear ARDL models. The trend analysis revealed a declining trend in growth of NTAE. The ARDL/NARDL bounds test revealed presence of cointegration between real GDP, NTAE, gross capital formation, exchange rate, inflation and FDI. The results also revealed that NTAE, exchange rate and gross capital formation have significant positive impact on the economic growth of Ghana whiles the other variables such as inflation and FDI exhibit significant negative relationship with economic growth. The study further identified real GDP, exchange rate and inflation as significant factors that affect the growth of Ghana's NTAE in long run. IRF results indicate that innovations (shocks) to the selected macroeconomic variables exhibit both positive and negative (asymmetric) impact on the growth of Ghana's NTAE. The study recommended that Ghana Export Promotion Authority takes immediate steps such as exhibitions, incentives, trade fairs and other available means to reverse the decelerating trend in the growth of NTAE in Ghana. The government flagship programme 1D1F should be focusing on establishing agricultural processing factories that will add value to the products of NTAEs for export market, Ministry of Food and Agriculture should increase the agricultural sector investment to propel economic growth. To Bank of Ghana, the study recommended that the bank work towards achieving a stability of the cedi as depreciation causes huge negative impact on the country's economic growth. The study further recommended to GIPC to appraise all the sectors of the economy and identify the critical areas that need foreign investment and make it attractive for foreigners to invest in order to revert the negative impact of FDI on Ghana's economy.

ACKNOWLEDGMENT

DEDICATIONS

The work is dedicated in loving memory of my late father Sheik Adam Salifu may Allah mercy be on you.

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LIST OF ACRONYMS

ACP- African, Caribbean and Pacific

ADF- Augmented Dickey Fuller

AfCFTA- African Continental Free Trade Area

AGOA- African Growth and Opportunity Act

ARDL- Autoregressive Distributive Lag

ANOVA- Analysis of Variance

AU- African Union

CAADEP -Comprehensive African Agricultural Development Programme

CET- Common External Tariff

CUSUM- Cumulative Sum

CUSUM SQUARE - Cumulative Sum of Square

DOSL- Dynamic Ordinary Least Squares

ECM -Error Correction Model

ECO -Economic Cooperation Organization

ECOWAS- Economic Community of West African States

EDI- Extractive Dependence Index

ELGH- Export Led Growth Hypothesis

EPA- Economic Partnership Agreement

ERP- Economic Recovery Programme

ETLS- ECOWAS Trade Liberalization Scheme

EU- European Union

FAOSTATS- Food and Agricultural Organization Statistics

FDI- Foreign Direct Investment

FINSAP- Financial Sector Adjustment Programme

FMOLS - Fully Modified Ordinary Least Squares

FTA - Free Trade Area

GATT -General Agreement on Tariffs and Trade

GCF- Gross Capital Formation

GDP- Gross Domestic Product

GEPA- Ghana Export Promotion Authority

GEPC- Ghana Export Promotion Council

GIPC -Ghana Investment promotion Centre

GIT- Ghana's International Trade

GLS-DF- Generalized Dickey Fuller

ILO- International Labour Organization

IMF- International Monetary Fund

KPSS- Kwiatkowski-Phillips-Schmidt-Shin

LDC- Least Developed Countries

LM- Langrage Multiplier

MOFA- Ministry of Food and Agriculture

MPC- Monetary Policy Committee

MOTI- Ministry of Trade and Industries

NARDL- Nonlinear Autoregressive Distributive Lag

NLCD- National Liberation Council Decree

NTAE- Nontraditional Agricultural Export

NTBs - Non-Tariff Barriers

NTEs -Non-Traditional Exports

OECD- Organization of Economic Corporation for Development

OLS- Ordinary Least Square

PERD- Planting for Export and Rural Development

PSDS- Private Sector Development Strategies

RBI - Reserve Bank of India

RCA -Revealed Comparative Advantage

RECs- Regional Economic Communities

RGDP- Real Gross Domestic Product

SACU – Southern Africa Custom Union

SAP- Structural Adjustment Programme

SDT- Special and Differentiated Treatments

SSA -Sub-Saharan Africa

UK- United Kingdom

UNCTAD- United Nations Conference on Trade and Development

UNDP- United Nations Development Program

UNIDO- United Nations Industrial Development Organization

USA- United States of America

USAID- United States Agency for International Development

USTR -United States Trade Representative

VAR- Vector Autoregressive

VECM- Vector Error Correction Model

WAEMU- West African Economic and Monetary Union

WAMZ - West African Monetary Zone

WDI- World Development Indicators

WTO - World Trade Organization

1D1F- One District One Factory

CHAPTER ONE

INTRODUCTION

1.1 Background

The export led growth hypothesis (ELGH) postulates exports as one of the key components of Gross Domestic Product (GDP). Exports generate revenue, create employment, provide income to manufacturers and influence the amount of foreign exchange reserves to promote national development (Hinson & Sorensen, 2006). Exports also lead to increase in technology advancement, liberation of trade and capital markets worldwide (Ibid). Emerging market economies such as China and India, as well as the developed East Asian "Tigers", among several other examples, chalked remarkable success in economic growth due to optimum priority they attached to export diversification. They have widened their exports basket to cover different goods and services as well as different markets across the globe (UNCTAD, 2015)

Traditionally, most African economies have been struggling to remain relevant in international trade, because the continent has not diversified but rather concentrated on exporting raw or primary commodities which have low and volatile prices as well as low demand in the world market (Verter, 2017). They depend on these few export commodities which are mostly unprocessed or semi-processed for their foreign exchange. According to UNCTAD (2021) Africa trade in goods and services was around 3% of the global exports' value in 2019 and in monetary terms the continent recorded an exports value of US$ 462 billion out of US$19 trillion global exports' value. Similarly, merchandize exports in some selected individual countries according to UNCTAD (2015) were more than

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Africa in its entirety in terms of global share of exports. For instance, China had 13.7% of global export value, USA 9.1%, Germany 8%, Japan 3.8%, 3.4% for Netherlands, 2.8% for UK and 2.5 for Canada (Ibid). These were all more than Africa's 2.4% share of global export. According to Gupta and Yang (2006), whiles trade has increased three-fourth (75%) of the world rate, the continent's performance in the area of trade lags behind as compared to other developing economies like India and China with primary commodities such as agricultural products and fuel accounting for the largest share (over 65%) of the continent's exports. The poor performance of Africa in international trade has diminished Africa's importance in world trade as the entire continent contributes less than 3% to world trade and this has further deepened the poverty situation in the continent (Verter, 2017). This has renewed the call for Africa and other developing nations including Ghana to widen their export net and diversify export into new territory of Non-Traditional Exports (NTEs) and new markets. As a result, diversification into NTEs has often been advocated as a viable strategy for African countries to stabilize their balance of payments and stimulate the needed economic growth (Dijkstra, 2001).

Ghana since independence has pursued an export led growth policy (Baah-Nuakoh et al., 1996). This was intensified during the era of structural adjustment programme (SAP) and even more rigorous in post SAP. According to Baah-Nuakoh et al., (1996) structural adjustment programmes in developing nations were much particular on export-led growth. This was in recognition of the significant role exports play in economic growth and development. Ghana through her export diversification policy launched an export strategy which

aimed at building the potential of the non-traditional export (NTE) sector to widen the economic prospects of the country (MoTI, 2012a). Ghana's International Trade (GIT) policy emphasizes on improving exports, discouraging consumption of imports and encouraging consumption of made in Ghana products (MoTI, 2012b). In pursuant of the trade policy, and in agricultural sectoral trade in particular, Ghana in 2018 launched a joint programme dubbed 'Planting for Export and Rural Development (PERD)' and 'Rearing for Food and Exports (RFE)' to aid in the structural transformation of the economy to create jobs and as a measure to address issues of food insecurity in the country (MoFA, 2019).

Developing economies in their quest to develop emphasize much on sectoral exports in their economic development strategies (Thompson & Thompson, 2010). Ghana since independence has been concentrating on agricultural sectoral exports until the recent discovery oil. Ghana's varied fortunes in economic growth have been reflective in the performance and relative importance of the agricultural sector. The sector accounts for one-fifth (20%) of Ghana's GDP, employs nearly 50% of the workforce and source of livelihood for most of the country's poorest household (World Bank, 2018). The agribusiness sector has a higher multiplier effect on employment as it creates 750 jobs for every USD1 million value of marginal output (World Bank, 2018). Agriculture is an important sector of any nation's economy because of its contribution towards employment, food production and export earnings (Ibid). The expansion of agricultural exports plays a pivotal role in reducing poverty, increasing incomes and foreign exchange earning of developing economies especially at their early stages of development.

This is so because resources allocation of those countries may give them a competitive edge in the agricultural sector and also due to higher income elasticity of demand for food in developing nations compared to developed nations (Johnston & Mellor, 1961). The agricultural exports sector offers economic avenue for decreasing poverty, increasing government revenue and foreign exchange as well as reducing unemployment in Ghana and the African continent (Mwangi, 2021; WorldBank, 2018). Agricultural exports enhance movement of agricultural raw materials to industries across the globe as well as food distribution across other parts of the world hence it is an avenue through which food and nutritional security is achieved both locally and globally.

Statistics from GEPA (2020) show that agriculture sector contributes hugely to Ghana's exports earning for instance, cashew was the highest in terms of exports values among all NTAE commodities in 2018 and 2019. However, its market shares dipped by 37.1% over 2018 value and accounted for 55.29% of the total sub-sector's export revenue. Flowers were the lowest among the NTAEs in terms of revenue earning in the first ten products of the NTAE subsector, contributing about 0.80% to total subsector earnings and posed a growth of 40.64% over its 2018 earnings. Shea nuts recorded a huge increased (92.79%) in earnings. According to GEPA (2019) this was due to high demand for it in the period of 2019 following the hiked in cocoa price. Shea butter is a substitute for cocoa butter, and this should be expected (increase in demand for shea nuts) whenever the price of cocoa increases on the futures market demand tilts towards Shea butter, thus increasing demand for Shea nuts. The inverse is true for a fall in price of cocoa butter on the futures market. Shea butter was substituted for some of the

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cocoa butter requirements obtained from cocoa paste. Yam exports in 2019 recorded a growth of 58.8% in value relative to 2018 exports, according to GEPA this was due to market expansion into the Middle East and the Emirates. Cashew nuts, bananas, mangoes, pineapples, medicinal plants and parts, and fresh or chilled tunas recorded a decline in growth performance in 2019 relative to 2018. This is represented in fig 1.1 to 1.3 below
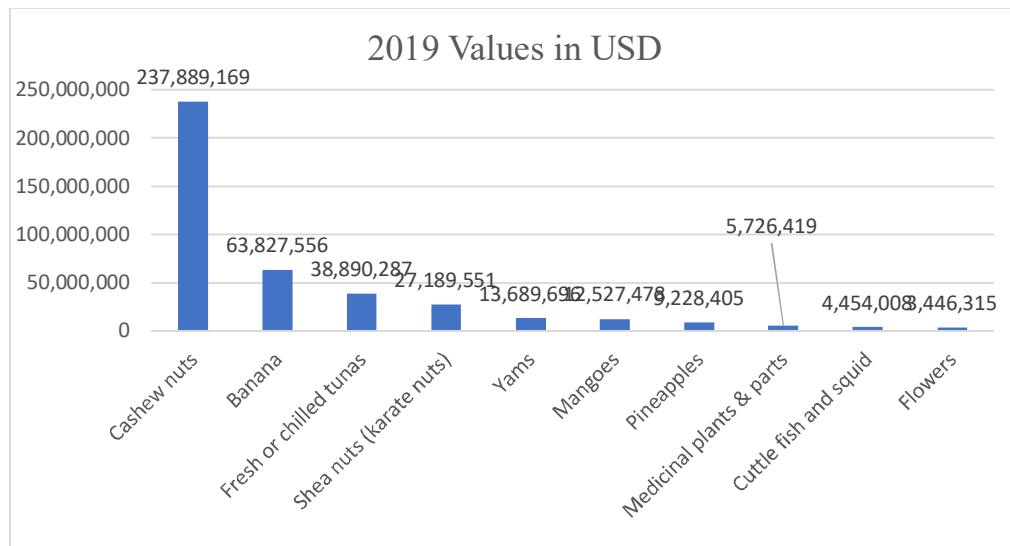
Figure 1.1: **Top Ten Nontraditional Agricultural Exports Products in 2019**

Source: Author's estimation from GEPA 2019 Statistics
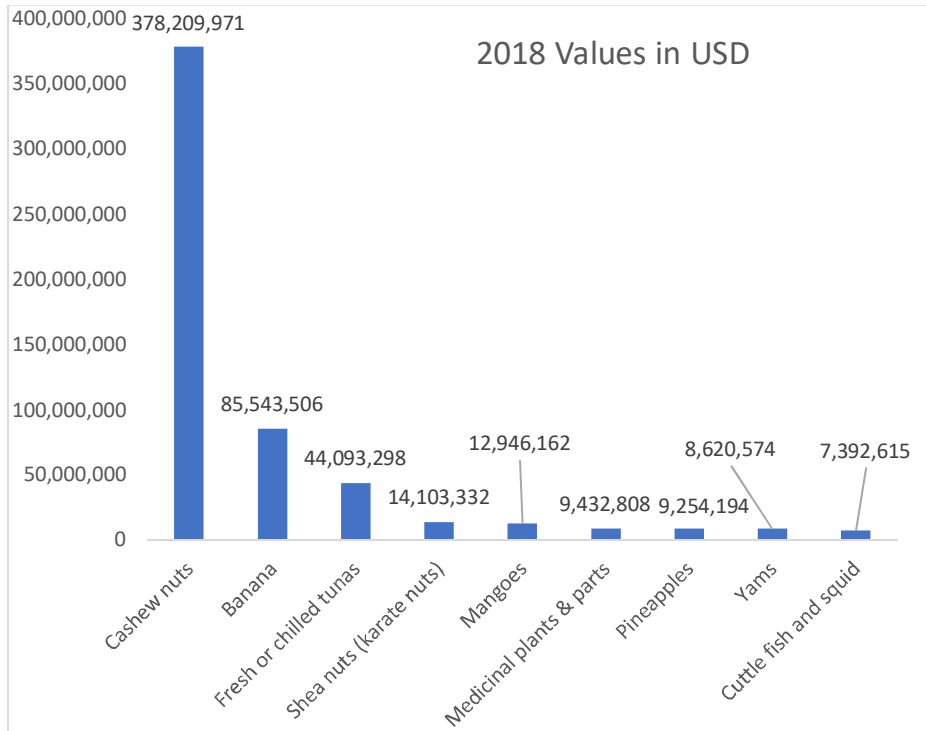
Figure 1.2: Top Ten Nontraditional Agricultural Exports Products in 2018

Source: Author's estimation from GEPA 2019 Statistics
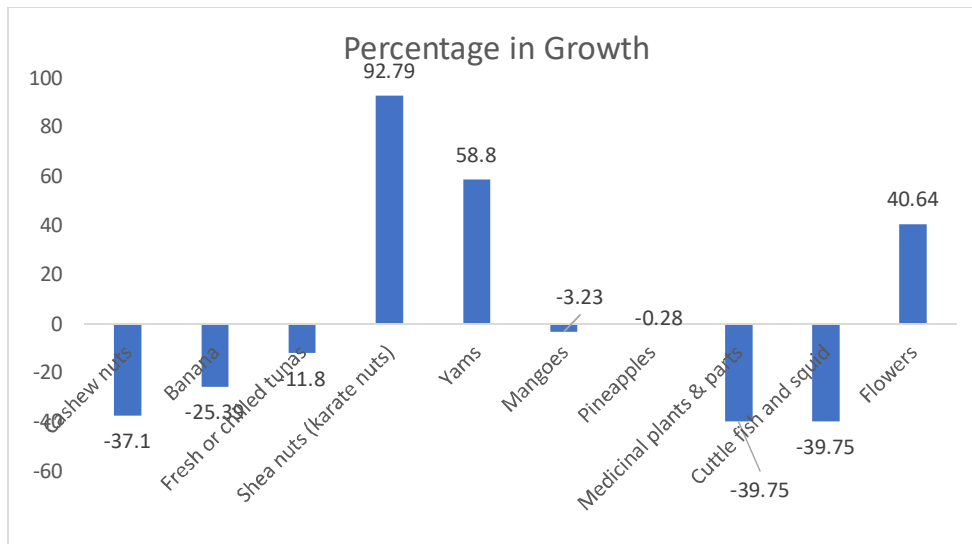
Figure1.3: Top Ten NTAE Products Growth in percentages from 2018 to 2019

Source: Author's estimation from GEPA 2019 Statistics

From the above statistics, it can be seen that the role of agricultural exports in economic buildup cannot be overlooked.

1.2 Problem Statement

Non-traditional agricultural exports (NTAEs) refer to exports of agricultural products except cocoa and lumber. The NTAEs have an integral role to play in stabilizing the macroeconomy and expanding the frontiers or drivers of Ghana's economic growth. The contribution of agricultural exports specific the non-traditional sector to the national merchandize exports is phenomenal. According to GEPA (2019), the total value of the top ten leading NTE products mostly dominated by agricultural products in 2019 was US$ 1,662,915,855 which was about 57.34% of the total value of NTEs. Cocoa butter, was the biggest earner, it contributed about 11.54% to the total NTEs. Cashew (in-shell) was the second product in the top ten products. Cocoa butter overtook cashew nuts as the highest earner among the top ten (10) leading products. The first and tenth earned US$334.5 million and US$78.28 million respectively. In aggregate terms, the processed cocoa sector experienced a growth of 5.99% in 2019 relative to 2018. The marginal growth in the processed cocoa sub sector was due to high demand coupled with high futures market price for cocoa butter and cake (GEPA, 2020). Growth in performance of palm oil and its fractions (olein) products according to GEPA (2020) were triggered by high demand for the products, adherence to the protocols of the ECOWAS Trade Liberalization Scheme (ETLS) by most member states, as well as relentless trade facilitation efforts by the GEPA in 2019. Cashew's poor performance during the year 2019 according to GEPA (2020) was

due to two major factors. Thus, the beginning of the season (January to March) experienced low demand, from major players specific Indian buyers, and low yields attributed to the lack of spraying. This is illustrated in figure 1.4
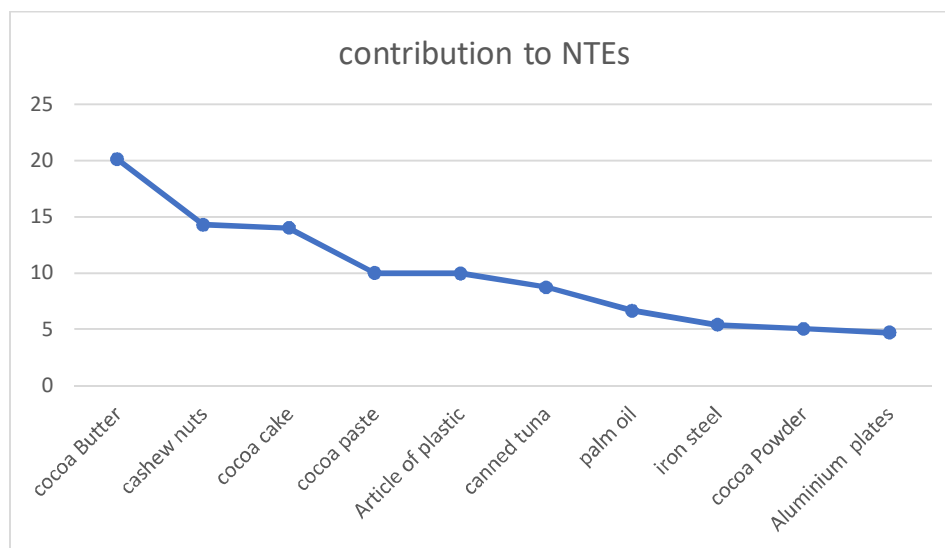
Figure1.4: Top Ten NTE products in 2019
Source: Author's estimation from GEPA, 2019 Statistics

Trade statistics from GEPA (2020) revealed that Ghana's total exports grew by 8.53% in 2019 with yearly average growth rate of 3.81% for the period of 2015-2019. Over this period (2015 to 2019), Ghana's Non-Traditional Exports (NTEs) grew at an annual average rate of 2.97% and contributed 18% to total national merchandise exports of Ghana in 2019. The NTE's percentage contribution to total national exports in 2015, 2016, 2017, 2018 and 2019 were 20%, 23%, 18%, 19% and 18% respectively (GEPA, 2020). NTE earnings for the year 2019 amounted to US$2.899 billion. This reflects an increment of 3.10% over 2018 earnings of US$ 2.813 billion. The appreciation in the 2019's NTEs value was associated with higher performance in the agricultural products (NTAE)

subsector (Ibid). Similarly, the entire NTE revenue in 2018 was US$ 2.813 billion, representing 10% increment over the 2017 figure of US$ 2.556 billion. The contribution of the NTE sector to the overall merchandise export of Ghana was 18.83%, a little above the 2017 figure of 18.37% (GEPA, 2019). The outstanding performance of NTEs in 2018 according to GEPA (2019) statistics was also primarily due to a 43.84% increase in NTAE specific cashew nuts from US$262.95 million in 2017 to US$378.21 million in 2018. Total NTE earnings from the NTAE sub-sector in 2019 was US$430.233 million as against US$591.036 million earned in 2018, reflecting a blipped of 27.21%. Despite this blipped, the NTAE sub-sector still contributed a whopping 14.84% to total NTE earnings in the year 2019.

Despite the importance of the nontraditional agricultural exports subsector to the economy as listed above, empirical studies related to this area are limited to; brand building (Ayambire, 2016), expectations and policy issues (Addo & Marshal, 2000), destination selection of NTE (Govina et al., 2014), NTAE and natural resource management (Ampadu-agyei, 1994), smallholders and nontraditional exports (Takane, 2004), financing of NTEs in Ghana (Buatsi, 2002). But as such the lengthy period of data points utilized for this current study, significant difference of this study from the above studies is the choice of the nonlinear version of autoregressive distributive lag model which measures impacts taking to account asymmetric and dynamic multiplier effect which the utilized method of the above-mentioned works could not account for. The other difference is that the above empirical studies did not examine the impact of NTAE on Ghana's economic growth.

The non-traditional agricultural exports, which are exports outside the major traditional agricultural export products, hold the key to Ghana's economic growth and export diversification drive hence it is imperative to assess its contribution to the economic growth of Ghana.

1.3 Research questions

1.3.1 Main Question

What is the role of non-traditional agricultural exports in Ghana's economic growth?

1.3.2 Specific Questions

The specific research questions are;

- What has been the trend in growth of NTAEs from 1961-2019 in Ghana?

- What kind of impact do NTAEs have on Ghana's economic growth?

- What are the factors that affect the growth of NTAEs in Ghana?

- What are the impacts of innovations (shocks) to the some selected macroeconomic variables on NTAEs' growth?

1.4 Objectives of the study

1.4.1 Main Objective

The main objective of the study is to investigate the role of NTAE in Ghana's economic growth.

1.4.2 Specific Objectives

The specific research objectives are;

- To examine the trend of NTAEs in Ghana from 1961-2019.

- To examine the impact of NTAEs on Ghana's economic growth.

- To determine significant factors that affect the growth of NTAEs in Ghana.

- To examine the impacts of innovations (shocks) to some selected macroeconomic variables on NTAEs' growth.

1.5 Significance of the Study

1.5.1 Contribution of the Study to Policy

The Non- traditional exports sector has been identified as the catalyst that will speed up the economic growth of the country. The study contributes to policy in the following ways; First, the implementation of the recommendations on inflation-exchange rate measures will reduce inflationary and exchange rate pressures in the economy to achieve a stabilized economy that promotes international trade. Again, the study advocated for special focus to be given to NTAE as part of government 1D1F policy this will create jobs to reduce unemployment rate in the country. Further, a stringent legislative regime and other measures recommended to guide the operations of foreign direct investors in the economy will lead to the identification of the strategic areas that need foreign investment. This will minimize if not completely eradicate the negative effects of foreign direct investment on the Ghanaian economy. Finally, the study advocated for government through Ministry of Finance and MOFA to increase investments in the NTAEs' sector and when implemented will increase government budgetary allocation to the agricultural sector to enhance investment and this will lead to economic growth in Ghana.

1.5.2   Contribution of the Study to Literature

The study will serve as a relevant source of literature for the academic world and Ghana as a whole. The study used both symmetric and asymmetric ARDL models to examine NTAE economic growth nexus. The study adds to the existing literature in the following ways. Firstly, the contribution of this thesis is the segregation of changes in NTAE into positive and negative changes to investigate whether these changes have asymmetric effects on Ghana's economic growth or otherwise. As oppose to the symmetric ARDL approach, asymmetric method allows the separate estimation of the impact of NTAE increases (positive changes) and NTAE decreases (negative changes) on the economic growth. This is very important because the linear ARDL model implicitly assumes that the impact of NTAE is symmetric, this is sometimes not real for macroeconomic variables as the case is for NTAE and the other variables (INFL, EXCR and GCF). However, the asymmetric ARDL takes this assumption into account since coefficients of NTAE positive and NTAE negative are assumed to be significantly different from each other, suggesting that the magnitude of impacts of NTAE increases and NTAE decreases are not the same as the linear model will assume but rather asymmetric. Secondly, the thesis took a specific component of NTE which is the agricultural component using specific products exports values to examine its impact on Ghana's economic growth whiles related studies only used the entire NTEs and have done little to the best of my knowledge to examine its impact on economic growth. For instance, (Addo & Marshal, 2000), (Ampadu-agyei, 1994), (Apalatoya, 2018), (Ayambire, 2016), (Buatsi, 2002) and (Govina et al., 2014) have all written about the topic with different methodologies and

have not examined NTE impact on economic growth let alone NTAE on economic growth nexus.

1.6 Organization of the Study

The study is organized into five chapters. Chapter one contains the background of the study, research problem, research questions, research objectives, significance of the study, and organization of the study.

Chapter two contains literature review. Chapter three consist of the research methodology for the study. Chapter four contains the analysis of the results/findings of the study. The chapter five, being the last chapter, contains the summary, conclusion and recommendations of the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The chapter reviews literature on economic growth models, trade policies of the country, trade associations the country has signed on to, international trade theories, and markets destinations of Ghana's nontraditional exports. The subsequent section reviews some empirical work on exports economic growth nexus and determinants of exports growth. The chapter concludes by examining the theoretical backbone behind the study.

2.2 Definition of Some Terms

2.2.1 Economic Growth

Ivic,(2015) defined economic growth as constantly proliferating the volume of output in an economy, or an upward adjustment in GDP as the main quantitative indicator of production for a period of one year". This involved constantly increasing volume of production in a country over a time or improvement in the inflation-adjusted market value of the goods and services produced by an economy over time. Statisticians conventionally measure such growth as the percent rate of increase in the real gross domestic product, or real GDP. Economic Growth is usually calculated in real terms – inflation-adjusted terms – to eliminate the distorting effect of inflation on the prices of goods produced. Measurement of economic growth uses national income accounting. This measures the trend in the average level of GDP over the period, and ignores any fluctuations in the GDP around this trend. The economic growth rate is calculated from data on GDP estimated by Ghana Statistical Service.

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2.2.2 Nontraditional Exports

Non-traditional exports is defined as exports of agricultural products, except cocoa beans, timber products (logs and lumber) and unprocessed gold, other minerals and electricity (Republic of Ghana Export and Import Act 1995 (Act 503), 1995). According to GEPA (2020) there are over 383 different NTE products grouped into agricultural, processed/semi-processed and handicrafts with recent addition of service exports (GEPA, 2020).

2.2.3 Nontraditional Agricultural Exports

Inferring from the Import and Export Act of Ghana NTAE can be defined as a subset of nontraditional exports. To be precise, this refers to export values of all agricultural products except cocoa beans and timber products. Any unprocessed agricultural export commodity which is outside this bracket is classified as nontraditional agricultural export. Cashew, shea nuts, yam, banana, vegetables, medicinal plants, pineapples are among the leading NTAE products (GEPA, 2019). For the purpose of this study, NTAE refers to the total exports from the sum of products such as pineapple and banana, vegetables and cashew.

2.3 Economic Growth and Development Models

Recent literature on economic growth and development theories hinges on four strands of economic growth models. These are the linear stages of growth model, pattern of structural change, international dependence revolution and neoclassical free market counter revolution model (Todaro & Smith, 2015).

2.3.1 Linear Stages of Growth Model

This school of thought view development as interrelated steps and stages a country will pass through to attain growth and development. It postulates that economic development will be attained given the right quantities and amalgamation of savings, investment and foreign assistance through aid. Prominent associate of this economic growth model is an American economic historian Rostow who in his 1959 article "the stages of economic growth" stated that "this article summarized a way of generalizing the methodology of contemporaneous economic history and this form of generalization is a set of interrelated steps of growth categorized as: the traditional society; the preconditions for take-off; the take-off; the drive to maturity; the age of high mass consumption" (Rostow, 1959, p. 2). This theory as intimated sees development process as a sequence of phases of economic growth that all countries must follow in order to attain economic development. To this model, development thus become a synonymous to rapid, aggregate economic growth.

2.3.2 Patterns of Structural Change Model

This model is rooted on mechanism by which less developed countries or developing nations follow to change their domestic economic architecture from a colloquial and subsistence agriculture to an advanced, highly modern and well-structured industrialized and service sector (Todaro & Smith, 2015). According to Sen (2010) this model employs contemporary economic models and statistical tools to reveal how the inward process of macrostructural and microstructural changes that must be followed if a developing country is poised to succeed in terms of economic growth as well as sustaining the trajectory and rapidness of

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this growth. This model concentrates on the means by which under-developed or less developed countries change their domestic economic architecture from a heavy reliance on traditionary agriculture to a more sophisticated, well urbanized, more manufacturing centered and a well-functioning service economy (Sen, 2010). It employs efficient econometric tools and models to show how this change process takes place. Lewis 'two-sector' model, and the 'patterns of development' model by Chenery are often discussed in literature as structural change models.

(i) Lewis Theory of Development: Lewis model is among the widely discussed models in the issue of structural change economic growth model. According to Todaro and Smith (2015) it is one of the most written and early known theories in economic development literature that has been centered on the structural transmogrification of a subsistence economy. This was formulated by Nobel-prize winner Sir W. Arthur Lewis in the mid-1950s (Riaz et al., 2020). According to Lewis (1954), the underdeveloped economy is made up of two sectors: A traditionary sector with very high population residing in the rural subsistence sector whose marginal productivity of labour is zero known as surplus labour in that when the services of the labour is withdrawn in the agricultural sector this will not affect the sector's performance. The model emphasis is basically on the transfer of labour that will not affect the output of the primary sector (agriculture) and the modern manufacturing or service sector (Hirota, 2002).

(ii) Patterns of Development is another model under structural change theory attributed to Hollis Chenery. In his 1960 paper entitled the patterns of industrial

growth, Chenery argued that there are orderly steps by which the economic and institutional architecture of LDCs is metamorphosized over time to allow new industries to replace traditionary agriculture as the main source of economic growth. According to Chenery (1960), is not only physical and human capital accumulation that spur development but a substantial transmogrification of the economic structures from a colloquial economic system to a sophisticated and a contemporary economic system is a paramount requirement for economic growth and development. These structural changes according to this model entail all economic actors, including the changing of production methods, changing consumer demand from foreign inclined to locally inclined, changing the pattern of global trade and resource usage as well as changes in the socio-economic lifestyle of the citizenry (Chenery, 1960).

2.3.3   International Dependence Revolution Model

This model was more dorsal and politically inclined (Todaro & Smith, 2015). This model attributes the underdevelopment of LDCs to both domestic and international power relationships that exist between the developed and the less developed or developing countries. According to this model there are institutional and political weakness as well as economic rigidities and these fuels a dual relationship in a form of the rich and the poor within and without the developing countries setup and that constrain LDCs from eradicating poverty and promoting economic growth and development.   Dependence economic growth models placed more emphasis on weak external and internal control mechanism such as political weakness as the cause of economic under development of LDCs (Sen, 2010). Theories under this model are discussed below.

(a) Neo-Colonial Dependence Model: It refers to the dasein and perdurance of least development in a highly skewed or imbalanced international capitalist or property ownership system. The international system as noted by this model is controlled or governed by disproportional power relationships between "rich countries" and the "poor countries". The poor nations try to develop and become self-reliant and independent to wean themselves from their oppressors but this system rigidity gags them and sometimes making it impossible for the attainment of self-sufficiency. According to this model, certain "mightful" groups in the developing nations who earn high incomes, social prestige, and political power who are minority group in terms of numbers allows their parochial interest to supersede that of the state and aligned themselves to the capitalist system of inequality to deprive the nations from development. Directly and indirectly, they serve and are renumerated by the international special-interest power groups including the Bretton Wood institutions (World Bank and IMF). Therefore, for development of LDCs to accentuate, a complete overhaul or reengineering of the world's capitalist system is required to unleash dependent developing countries from their oppressors both international and domestic. The poor and inefficient systems which are controlled or manipulated by the powerful nations, suit the interests of the manipulating class (the developed countries). And in the end, they retard the growth of economies of underdeveloped nations through conditionalities they placed before economies of the underdeveloped countries for loan acquisition and other assistances.

(b) False-Paradigm Model: This model as a dependence theory of development apportioned the lack of development of LDCs to a warp and inappropriate policy

advice given by the international development experts or economists from the developed nations and their surrogate institutions such as World Bank and IMF as well as the multinational corporate organizations. This expert advice according to this theory turn to be bias, faulty and does not resonate with the systems of the underdeveloped nations and for that matter will not lead to any economic growth or development. According to the proponent of this model as cited by Todaro and Smith (2015) these experts give ill-advice in a form adulterated concepts, misleading theoretical concepts, and incomprehensible econometric models of development that often result in to incorrect policies to tackle developmental challenges because of difference in social structure of the economies of LDCs and that of the developed nations.

(c) Dualistic Development Thesis: Dualism development model as often discussed in development economics literature is premised on the fact that there is a continue widening of the gap between the poor and the rich in all levels of life. The dualism is grounded on the assumption that there is a harmonious life between the poor and the affluent class in the society, highly educated class and greater number of illiterate class within the same country or vicinity. According to this model, as contained in Todaro and Smith (2015) there is an accord between the mightful and wealthy industrialized nations with weak, very poor peasant societies in the global society. This peaceful existence is ingrained and not merely transitional. It is not a temporary situation that would be solved giving the exigence of time, the gap between the rich (the superior) and poor (inferior) will continue to remain wider in favour of the rich.

2.3.4 Neoclassical Free Market Counter Revolution Model

This theory is known in economic literature as neo-liberal theory. According to Todaro and Smith (2015), this model came into existence in the 1980s and 1990s, and gained a dominance role in the economic literature. This theory attributes lack of growth in the underdeveloped economies to too much government interference in every sector of the market economy, inefficient public corporation and regulatory rigidities. The model advocates for free markets, trade liberalization and the privatization of redundant public sector businesses. This model came into being in the 1980s, where right wing governments in the United States and Europe sponsored writers to counter the claim of dependence theory's reasons for LDCs underdevelopment (Todaro & Smith, 2015). These writers are often economists with IMF and World Bank with the argument that privatization of government business are the very means that lift LDCs to a developed status as according to these writers there is inefficiency in public corporations which makes these businesses unprofitable and best solution to get these businesses work is to transfer ownership to the private sector. The neoliberal theory is grounded on the following strands of models:

(a)   Free-Market Analysis: This model asserts that markets are sufficiently efficient and does not need any government interference giving the following assumptions: Thus the commodity markets provide efficient information for investors in new business activities, Labour markets adjust to these new investments in an equal measure, Producers have a perfect idea that best suit the consumers for what kind of products that will be produced to meet the demand of consumers and how to produce it efficiently and timely, whiles Product and

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factor market prices represent a true reflection of limited values of goods/services and resources. Under this market model, rivalry between firms is deemed effective and efficient to set prices by the interaction of forces of demand and supply. Innovations and inventions are readily and always obtainable. Information is strongly efficient and almost near perfection.

(b) Public-Choice Theory: This model also called a 'new political economic growth model, this theory is of the view that government does not get things done right. There will always be shortfalls in all government intervention especially in doing business. This is because those politicians are interested in the next election and not the next generation. The bureaucrats, citizens and states act solely from parochial and political interest perspective, using their association with government to enrich them and to pursue their own selfish needs to the detriment of the state. Citizens use political affiliation to gain special favours or benefits from government interventions, for example, job opportunities, scholarships, contracts and the like. Politicians abuse incumbency by using state funds to sustain power and authority for longer duration of time. Bureaucrats use their offices to extort moneys and other goodies from citizens and foreigners seeking their services. And finally, state uses its mighty power to expropriate private property from individuals. According to this theory, the overall effect of these actions results in misallocation of resources and more of it all lead to unfreedoms and general reduction in individual welfares. The proposal tabled by this model is that, limited government involvement in an economy is a panacea to economic growth and development of LDCs.

(c) Market-Friendly Approach: This model believes that market do work but in as much as they work, market failures are bound to occur and for that matter government intervention in the market in a form of policy and infrastructure is sometimes desirous or necessary to ensure market efficiency. This market theory is the most recent model that deviates or disagree slightly with neoclassical counterrevolution model. To this model, deviations in the market will only be controlled by government through legislations however the model is of the view that government should not meddle with resource appropriation or allotment in an economy but should rather create an enabling environment for businesses to thrive.

2.3.5   Endogenous Growth Theory

The endogenous growth theory is an economic growth model which attributes the cause of economic growth to factors that are internal to the economy. The theory is modeled on the idea that improvements in innovation, knowledge, and human capital lead to increased productivity, which intend affect economic outlook positively. The endogenous growth theory was first created due to deficiencies and dissatisfaction with the idea that exogenous factors determined long-term economic growth. In particular, the model was designed to reject the neoclassical exogenous growth models, as it made predictions about economic growth without taking into account changes in technology. The endogenous growth model challenges the narrative by placing significant role to technology in economic growth. Since long-term economic growth is emanated from the growth rate of economic output per person (average productivity), economic growth would depend on productivity levels. In turn, productivity would depend on the progress

of technological change, which relies on innovation and human capital factors which are considered internal to an economy, not external. The assumption surrounding this model include; firstly, the need for the government to provide incentives and subsidies for businesses in the private sector to entice businesses to invest in research and development so they can continue to drive innovation. secondly, investing in human capital through education or training programmes. This will improve the quality of labour, which increases productivity. The other assumptions include that; (i) Government should enact policies that help entrepreneurs to create new businesses and new jobs. (ii) Investments should also be made to improve infrastructure and manufacturing processes in order to achieve innovation in production. (iii) Intellectual property rights, such as copyrights and patents, are incentives for businesses to expand their operations. The following models are discussed under endogenous growth model:

(a) Arrow Model**:** Also known as the AK model of economic growth, the arrow model is used to explain economic changes as a result of innovation and technology. The "learning by doing" model is used in the arrow model to explain how self-practice and innovation result in productivity and improved human capital. It is because learning by doing leads to a decrease in labour required to create a unit of output.

(b) Uzawa–Lucas Model**:** The Uzawa-Lucas model explains how economic growth in the long term is attributed to the accumulation of human capital. In order to produce human capital, education should be used. Therefore, the model assumes that human capital is the only input element in the education sector. It

also assumes that economic output is developed by using physical capital and human capital. As a result, the ratio of physical capital to human capital is the measurement used to determine the total capital in an economy.

(c) Romer Model**:** This model is attributed to Paul Romer on his technological change model where he considers changes to technology to be endogenous. Romer argued that technological advancements lead to economic improvements. The model further assumes that innovative ideas are a very important part of economic growth. Therefore, merging improvements in human capital and existing knowledge will create innovative ideas to improve production of goods and services in an economy.

2.4 Ghana's Trade Policies

Ghana's trade policy has metamorphosized from fairly liberal in 1950s to a maximum control regime in the 1970s and a current liberalized trade policy (Albert & Akuoni, 2012). Following Ghana's deteriorating balance of payment position and the overall declined in economic growth emanating from the failure of Kwame Nkrumah import substitution industries and other macroeconomic policies of the periods of 1960s and 1970s, Ghana adopted World Bank and IMF Economic Recovery Programme (ERP) in 1983 which aimed at reversing the prolonged periods of economic downturn emanated from the macroeconomic failure of the period of 1960s and 1970s (Aryeetey & Harrigan, 2000). The prescriptions from this programme were geared towards eliminating distortions in the Ghanaian economy and putting it back on a sound footing. Among the prescriptions included trade liberalization policy with emphasis on export led

growth. This resulted in Ghana placing much emphasis on export trade leading to the development of non-traditional exports (Whitfield, 2011). This section aimed at reviewing trade policies from independence to the fourth republic and is structured as trade policies after independence to the period of ERP, between ERP and 4th Republic and in the 4th Republic.

2.4.1   Trade Policies Between 1957 and 1983 (Between Independence and ERP period)

On attainment of independence Ghana's first president Kwame Nkrumah launched his industrialization drive policy which focused on import substitution industries to produce commodities that were previously imported by the country (Aryeetey & Harrigan, 2000). This was merged with exchange rate control policy where the country devalued or undervalued the exchange rate to make domestic product cheaper as against imports to discourage the consumption of the latter. Under this regime the country's trade policy was emphasizing on protectionism and against liberalization. This witnessed the implementation of exchange rate control, tariffs and quantitative control as measures of reducing imports demand (Albert & Akuoni, 2012). The import substitution policy under Nkrumah seven-year development plan could not be sustained after his overthrow.

Again, under this period certain gains in trade promotion were made among these include the establishment of Ghana Export Promotion Council (GEPC) by Act (NLCD 396) of 1969 as an agency under Ministry of Trade and Industries with a core mandate of export development and to diversify Ghana's export from the

traditional to non-traditional as well as run a promotional campaign to promote exports growth and development in Ghana (MoTI, 2012b).

Busia government lasted for two years and little can be said about the trade policy of that administration. The military regimes after Busia thus between the periods of 1970 and 83 have been described by economists as a period where little or no macroeconomic management was in place (Aryeetey & Harrigan, 2000).

2.4.2   Trade Policies Between 1983 and 1992

Ghana was not in a democratic regime between the period of 1983 to 1992. However, this period also saw several policies and development in the area of trade. The military regime as a measure of containing the economic woes of the country under this period sought the intervention of the Bretton Wood institutions- World Bank and IMF for technical support to embark on economic reignition programme (Aryeetey & Harrigan, 2000). This culminated into the introduction of economic recovery scheme known as Economic Recovery and Structural Adjustment programme (ERP and SAP). Key component of this programme was on trade liberalization scheme with the emphasis on export led growth (Whitfield, 2011). Trade policy under this regime includes tariff control and adjustment policy, trade liberalization, flexible foreign exchange rate regime, price deregulation exercise and institutional reforms (Albert & Akuoni, 2012). The reforms were to restore macroeconomic confidence, increase incentives for production of export products as well as provide readily available foreign exchange to boost the country international reserves or import cover. The pursuance of the economic recovery package under the period of 1983, saw

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Ghana trade policy moved towards market oriented and liberal trade. This led to a significant downward adjustment of tariff as well as reduction in other import restrictions. In 1986 there was a recategorization of import license categories following the launched of a new exchange rate regime as indicated above (Albert & Akuoni, 2012). In the year 1988, the import permit was considered obsolete and was then scrapped and substituted for special indirect tax on imports (Aryeetey & Harrigan, 2000). From 1987 to 1991 there were major transformations to the tariff architecture of the country. Those that were imposed on luxury goods was reduced in 1988 and was subsequently replaced with a super sales tax in 1990 which were between 50% to 500% (Albert & Akuoni, 2012). Imported fruits were subject to a tax of 500% while vegetables were subject to a tax of 100% the value of import this was done to discourage consumption of foreign produces (Whitfield, 2011). This was however, reduced to the range of 10 to 100% in 1991. Lastly, in the 1990s the GEPC now GEPA was transformed to be a promotional agency and tasked with the responsibility of developing the NTE sector. This led to the coming into being the product development unit of GEPA (MoTI, 2012). Exhibitions of Ghana's export potentials in selected ECOWAS countries were organized by GEPA to showcase Ghana's product as a means to promote exports into the West African sub-region (Ibid).

2.4.3   Trade Policies After 1992 (4th Republic)

Under the fourth democratic dispensation, the trade sector has witnessed remarkable policy interventions ranging from legislations to the establishment of institutions to boost trade flow in the country. In 1995 there was an enactment by the parliament of Ghana a legislation known as import and export Act 503

followed by the free zone Act (Act 504) which dedicate a full chapter (section 21 to section 24 of the Act 504) to the promotion of international trade with emphasis on export. In 2008, there was amendment of Act 503 to Act 585. And as such these, several legislations have been enacted in the fourth republic to boost trade in Ghana. Ghana produced a Trade Policy document in 2004 which outlines guidelines in the implementation of Government's trade agenda. The Trade Policy declared private sector as the engine of growth, and tasking Government to provide a trade enabling environment to allow private business to thrive to achieve the objectives of promoting a just and transparent international trade regime, facilitating trade, to build the capacity of domestic and export markets participants, consumer protection, protection of intellectual property rights and multilateral trade among several others (MoTI, 2012). This era has also witnessed the drawing of trade policies and strategies for the export sector to be specific. Key among these is the national export strategy of 2013-2017. This trade policy was drawn in 2012 and launched in, 2013 to contribute towards economic growth of Ghana with exports as major contributor to consolidate the gains Ghana has chalked in attaining the middle-income status, and to create formal decent and lucrative job opportunities for the youth (MoTI, 2012). The national export strategy was launched taking into account Ghana's Medium-Term Development Policy Framework as well as the Shared Growth and Development Agenda 2010-2013, which were the key actors in developing Ghana's NTE sector (MoTI, 2012b). The Medium-Term Private Sector Development Strategies (PSDS I and PSDS II) were implemented to ensure the competitivity of the private sector and creating the needed jobs to enhance livelihoods for all (MoTI, 2012b). The reasons for establishing the NES was to provide guidance or direction in financial

and material resources mobilization to support both the public and private sectors towards achieving the needed economic growth with exports contributing its shares towards this (MoTI, 2012b). As such the broad objectives, the trade strategy calved three key specific objectives which include; to widen the share of NTEs in total exports of the country and to promote export diversification of the economy in line with ELGH. The second objective is to build capacities and to provide the needed resource to export development institutions such GEPA, GIPC, EXIM bank among others. And the final objective which is anchored on ensuring that export value or attitude is implanted throughout the country, so that every administrative District is identified with an exportable agro-based product to contribute to Ghana's development story.

2.4.3.1 Establishment of institutions

The post 1992 era witnessed establishment of institutions to boost export development in the country. These include the establishment of Export Development, Agricultural Investment Fund (EDAIF). This fund was instituted by an Act of Parliament (Act 582) in the year of 2000 as an Export Development and Investment Fund (EDIF) with the responsibility of mobilizing resources for the development and promoting of international trade with particular emphasis on exports. The law mandates the fund to provide credit facility to exporters especially those in the field of non-traditional exports at a very minimal or concessionary rate to promote the development of NTEs in Ghana. The act was amended in the year 2011 to include the component of agriculture into the fund. The amended act that included the component of the agriculture to the fund added additional responsibility to the fund to extend credit facility to exporters in the

field of agricultural products and manufacturers who add value to agricultural products.

2.5 Trade Organizations that Ghana Belongs

Ghana is a signatory to several international bodies and treaties and belongs to several World bodies be it political, social, economic, cultural and the like. These bodies in the area of trade include the following;

2.5.1   World Trade Organization (WTO)

WTO in its current form was established in the year 1995. Previously, before the coming into force of WTO, General Agreement on Tariffs and Trade (GATT) was a trade agreement dating back to the era of post-World War II (year 1947). WTO was then formed to replace it. WTO however, started operation in 2005 and Ghana joined the organization in the very year it was established (1995) (MoTI, 2012b). The organization has a current membership of 164 states with its headquarters located in Geneva-Switzerland. The world body operates under the principles of non-discrimination, free or liberalized trade, promoting strong fair and healthy competition among member countries. This organization ensures fair market trading system to reduce protectionism and domestic government intervention in the area of advancing subsidies support to exporting firms to create undue advantage in the foreign competitive market (Hall & Lieberman, 2010). As such trade issues, WTO is also tasked with the duty of promoting other non-trade issues including protecting the environment and promoting food and nutrition security. The body also practice differential treatment to developing and emerging market economies. This is geared towards guaranteeing a level playing

ground for member states. As a body responsible for promoting trade on fair and non- discriminatory grounds, the body sanctions any member state that goes contrary to the rules of operations. These rules are only waived in situation where strictly implementation of the rule(s) will bring about health hazard, environmental destruction or other grounds determined to have merited waiver by WTO (Hall & Lieberman, 2010).

2.5.2 Economic Community of West African States Trade Liberalization Scheme (ETLS)

Economic Community of West African States was established in 1975 to enhance a multilateral cooperation between West African countries to achieve economic and trade integration among these West African States. ECOWAS was stablished by the 1975 treaty of Lagos. This REC is made up of 15 countries, eight of which are French-speaking group (WAEMU group) and six belonging to West African Monetary Zone (WAMZ) predominantly an English-speaking group. ECOWAS is the oldest economic community recognized by the AU (Asuako, 2021). As a key measure to widen the frontier of trade in the West African region, ECOWAS launched the ECOWAS TLS in 1990 that was drawn in 1979 to achieve free movement of goods and persons within ECOWAS region and to achieve tariff free in trade among Member States in the West African sub region. In pursuit of the objective of market integration among member states as part of provisions in the ECOWAS treaty, (Article 3) of the 1993 Revised Treaty provides for the abolishment of trade barriers both tariff and nontariff barriers to ensure the harmonization of trade policies that will culminate into establishing an FTA. The 1975 Treaty placed a fifteen-year timeline for the complete removal of trade

barriers among Member States. Within two years after the signing of the ECOWAS accord, members were by this accord, debur from levying new taxes on ECOWAS products. And were to use the remaining eight years to gradually phase out import duties to enhance smooth trade among Member States. After the eight years deadline, the treaty enjoined Member States to adopt a Common tariff regime for all member countries (ECOWAS, 1975). According to Elumelu (2014) to achieve common tariff and market integration as enjoined by the trade accord, a trade Liberalization Scheme was introduced to achieve this objective. The ETLS seeks to capitalized on the vast potentials of the ECOWAS huge market to promote trade in all aspect of their economies with special emphasis on manufacturing/industrialization, foreign investment (direct and portfolio), entrepreneurship and skills development. Initial products calved under ETLS were agricultural commodities, raw materials and craft work. These products are exempted from attracting custom duties and other non-justifiable NTB from Member States. Having realized the need to widen the product coverage the ETLS was then extended to include processed and industrialized products in 1990 (Elumelu, 2014); (Karaki & Verhaeghe, 2017). Following the addition of industrial products to the liberalization scheme, it became apparent for the body to establish what is made up "originating" products that qualify to gain access to ECOWAS market without tariffs imposed on them. The Rules of Origin were then instituted to guide the operations of the ETLS. The products under ETLS are however, not qualified for compensation or indemnity due to loss of revenue incurred during the importation of goods from member states (ECOWAS Commission & USAID, 2010). To qualify as an originating product, the good must have a quantum or composite value created or added to the product from the

resources of member countries to be greater than 60% and a value added to the original product should be equal to or above 30% using resources of member states. The Rules of Origin conditionalities were instituted to avert trade deflection and ensuring that products outside ECOWAS region do not benefit from duty-free treatment within the ECOWAS fraternity. Another rule governing the operations of ETLS is the ECOWAS Protocol on free movement of people and goods, this protocol seeks to address the challenges ensuing ECOWAS citizens with regard to their movement across the borders of member countries freely. This is to ensure easy movement of ECOWAS citizens, goods and transportation within the ECOWAS boundaries. These Protocol is endeavored not only to boost trade among-ECOWAS citizens and countries but also to encourage peaceful coexistence by different nationals in the ECOWAS setup as well as ensure regional value and unimpeded supply chains to reduce prices of regionally produced goods to ensure ECOWAS consumers' welfare (ECOWAS Commission, 1993). According to ECOWAS Commission and USAID (2010) in order to ensure a level playing field for Member States, the implementation period for the removal of restrictions on intra-ECOWAS trade was subject to the principle of differential and fair treatment with Member States categorized into three groups. Where each group were treated on case-by-case bases in terms of phasing out tariffs for instance Group I Member States, comprising of Ghana, Nigeria, Cote d'Ivoire, and Senegal were expected to phase out tariff on goods and services within six years, Group II countries which also made up of Liberia, Benin, Guinea, Sierra Leone and Togo were to achieve a complete tariff phase out within eight years. And the last group being Cape Verde, Guinea Bissau, Gambia, Burkina Faso, Mali, and Niger were to spread the implementation of

tariff phase out over a period of ten years. The overall purpose of the ETLS is to achieve an FTA. As at date, 2021 such free trade area situation is yet to be attained. To enjoy the duty-free treatment under the ETLS, a qualified product must come with a Certificate of Origin, issued by appropriate authority after a process of verification, that the product has satisfied the ECOWAS rules of origin (Karaki & Verhaeghe, 2017). Enterprises that wish to participate in the scheme must file their application at appropriate quarters of the scheme for further processing and approval. Completed forms are submitted to the ECOWAS National Unit for consideration by the ETLS Committee in the Member State of the applying enterprise. The list of enterprises and products approved for ETLS eligibility by the Committee are submitted with supporting documents to the ECOWAS Commission for further review and final approval. Upon approval, a certificate of "Pass" is issued and the list of eligible products approved by the Commission is communicated to all member states secretariats to treat the product as duty-free product from ELTS. This (Pass Certificate) together with other documents grant the exporter/importer of ETLS product(s) an access to ECOWAS market. By this, all Member states are duty-bound to treat the product with special or preferential treatment (Asante, 2018). At present, the certificate is issued by an established institution of the member country of the enterprise producing and the exporting product. The issuing authority varies among Member States. For example, in Ghana, the issuing authority is the Ministry of Trade whereas, in Nigeria the responsible institution is the Chambers of Commerce (Elumelu, 2014). The location of the ECOWAS National Unit also differs among Member States. Also marked by significant variations among Member States is the empaneled of the National Committee that considers and

approves applications of enterprises for eligibility of the ETLS. In some countries such as Ghana, Nigeria, Cote d Ivoire among others the composition is highly representative and includes representatives of the Ministries of Trade, Industry, Foreign Affairs, Customs Service, and the Private Sector whiles in other jurisdictions, such as Senegal, it is less representative and excludes representatives of the private sector (ECOWAS Commission & USAID, 2010). In addition to the Certificate of Pass/Origin, qualified exporters who want to enjoy from duty free provisions of the ETLS have to send their products along with other documents such as the Customs Excise and Preventive Service Declaration Form and a Bond Guarantee (Ibid). The vehicles deployed to transport the goods/products must be road worthy, insured against certain insurable risk determined by ETLS, and other requirements that may be specified by ECOWAS from time to time. Other accompanying documents such as safety and standard certificate that confirms that the product passed through safety and standards tests among others may be requested (Karaki & Verhaeghe, 2017).

2.5.3 African Growth and Opportunity Act (AGOA)

This is a US legislation passed on 18th May, 2000 by the 200th congress of the United States. This serves as a major trade legislation that grants Sub-Saharan Africa (SSA) access to US market upon meeting certain qualifying modalities or conditions including being a market oriented economy that protect and respect private property rights, open rules based trading with limited government participation or involvement in price control and other market interventions, eliminating of barriers to US trade and investment, systems in place to reduce corruption, political stability among several others (US Trade Policy for Sub-

Saharan, 2000). Qualified country has the chance to utilize up to 6,999 commodities in US market (Osabohien et al., 2021). Since the enactment of the Act, Ghana as a country from Sub-Saharan African has benefited tremendously from it. According to USTR (2018) overall SSA foreign direct investment in US as at 2016 was USD4.2 billion a marginal increment of 164% from 2014 figure of USD1.6 billion and two-way goods trade between US and SSA increased from USD36.9 billion in 2015 to USD39 billion in 2017 with Ghana being among the top US export market in the region with an amount of USD886 million. Ghana also exported agricultural and forestry product to a tune of USD29.20 million and USD2.70 million respectfully in the year 2017 alone curtesy AGOA (Osabohien et al., 2021).

2.5.4   Economic Partnership Agreement (EPA)

Economic partnership agreement as the name suggests is an economic agreement between organization of African Caribbean Pacific States on one part and the European Union on the other part. The post Cotonou negotiated agreement was concluded on 15th April, 2021. The broader objective as contained in Article 1 of the negotiated EPA is to institute a strong tide of political collaboration and partnership to generate mutual benefits on common and confluence interest. And with specific objectives of fostering social development to eradicate poverty, promoting and protecting rights, democratic principles, rule of law, good governance, gender equity and promotion of trade integration among members. Article 49 of the negotiated partnership agreement deals with trade. Under this both parties renewed their commitment to enhancing integration of sustainable development and environment protection in every aspect of their trade relation.

Furtherance to this, article 50 of the agreement commits both parties to recognize the importance of Cotonou agreement in context of their relation. To this, they undertook to promote the intensification and diversification of trade flows to their mutual gains and in compliance with WTO framework including special and differentiated treatments (SDT). The Agreement under trade specific agreement intends to create an FTA between the EU and the ACP Group of States. Ghana, together with other African and Caribbean countries on one side and the EU on the other side have been deliberating on this agreement to ensure unimpeded access to the participating members' market. This negotiated EPA provides free access that is unimpeded tariff barrier to the EU market for unlimited time for all imports originating in Ghana (EPA, 2021). This asymmetric and progressively opening of the Ghanaian market to EU products takes into account the different level of development between Ghana and the EU.

2.5.5   African Continental Free Trade Agreement (AfCFTA)

AfCFTA is a ground breaking project of the African Union's Agenda 2063 plan to attain an inclusive and sustainable development across the 54 States of the African continent over the next half decade (AU, 2018). Recently launched in Ghana the trade agreement is considered as the turning point in the path of African economic transformation and growth. This idea of instituting a free trade agreement was adopted by the AU in 2012 (AU, 2018). AfCFTA was to come into existence by the end of year 2017 (Ibid). This deadline was however, not met and was extended. The objective of the free trade agreement as enshrined in the Article 3 (a) of the agreement is to create a single market for goods, services, aided by movement of persons across the borders of each member state in order

to deepen trade and economic integration of the African continent. Specifically, the agreement covers areas such investment, intellectual property rights, competition policy among several others. Similar to the ECOWAS trade liberalization scheme this trade agreement also contained Rules of Origin and other rules including elimination of trade barriers, a digital settlement platform and the Trade Observatory to store the data of all trading activities and macroeconomic variables (Tralac, 2020). The Agreement that established the AfCFTA was signed in March 2018, in Kigali Rwanda after the finalization of the legal document that brings all the 53 states of African to form a free trade area (Tralac, 2020). Eritrea happened to be the only country that is not a signatory to the agreement. The FTA has a total population of more than 1.2 billion people and a GDP of more than US$3.4 trillion (Tralac, 2020). The AfCFTA Secretariat is located in Ghana and was commissioned into full force in Accra, Ghana on 17 August 2020.

2.6 Ghana Trading Partners in the Non-traditional Exports Market

Ghana's NTE market comprises of several multilateral and bilateral markets however, major trading partners are the; European Union, ECOWAS, India, US, Vietnam and China. According to GEPA (2020) in 2019 non-traditional export products were exported to 155 countries. These countries are categorized into five blocks as follows: European Union (EU), ECOWAS, Other Developed Countries, Other African Countries and Other Countries.

2.6.1 Merchandized NTEs

Export of Non-Traditional goods into ECOWAS in 2019 was US$ 836,511,513 a marginal appreciation of 12.79% from 2018 figures (GEPA, 2020). This implies that ECOWAS market destination accounted for 28.85% share of the total market. The EU market, being the leading destination of Ghana's NTEs, contributed about US$1.11 billion representing 38.18% of the total market value of Ghana's NTEs. The market value, however, shows a 3.43% dip in growth relative to 2018's performance. Other African Countries absorbed 4.998%, Other Developed Countries took 7.70%, and Other Countries imported 20.33% of NTEs. A comparison of performance of the markets in 2018 to 2019, is illustrated in the table 2.1 below;

Table 2.1: Comparative Share of NTE Earnings by Destination Category

Market Year	European Union US$	ECOWAS US$	Other Countries US$	Other Developed Countries US$	Other African Countries US$
2019	1,105,577,666	836,511,513	589,571,770	223,366,194	144,942,675
2018	1,144,835,448	741,661,288	722,580,620	160,927,730	42,893,735
% Of growth	-3.43%	12.79%	-18.41%	38.80%	237.91%

Source: Author's estimation from GEPA 2019 statistics

Table 2.2: Top Ten World Market destination for Ghana's NTEs in 2019

COUNTRY	NTE CONTRIBUTION IN US $
NETHERLANDS	381,133,482
BURKINA FASO	219,567,639
TOGO	199,593,126
FRANCE	165,405,975
INDIA	163,773,812
UK	157,074,731
USA	139,702,181
GERMANY	131,268,357
VIETNAM	88,289,972
SENEGAL	85,234,9815

Source: Author's construction from GEPA 2019 Statistics

The European Union serves as a major market for Ghana's NTEs, this market trades in agricultural products especially vegetable and horticultural products such as banana and pineapple. Among the European Union, Netherlands was the lead market destination for NTEs, absorbing about US$ 381,133,482 value of NTEs in 2019 followed by France, UK and Germany who respectively contributed about US$ 165,405,975, US$157,074,731 and US$131,268,357. Out of the top ten market destinations, in terms of destinations by categories, 4 were EU countries, 3 were ECOWAS countries, 1 was from other developed countries, and 2 were from other countries. The three ECOWAS countries in the list were, Burkina Faso, Togo and Senegal. These countries were second, third and tenth

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respectively, in the top ten market destinations for Ghana's NTE products market as shown above in the table 2.2.

Table 2.3: Top Ten Leading ECOWAS Markets for Ghana's NTEs.

Country	NTE Contribution in US$ 2019	NTE Contribution in US$ 2018	% Growth 2019/2018
Burkina Faso	217,569,639	238,163,226	-8.65%
Togo	199,593,126	163,315,506	22.21%
Senegal	85,234,815	17,965,524	374.44%
Cote Ivoire	74,663,226	63,507,495	17.57%
Mali	73,788,962	84,273,748	-12.44%
Nigeria	60,620,400	69,798,431	-13.15%
Niger	51,622,088	46,867,465	10.14%
Benin	42,369,476	40,791,682	3.87%
Mauritania	16,677,347	152,244	10854.35%
Guinea	6,460,895	6,433,278	0.43%

Source: Author's construct from GEPA 2019 Statistics

Burkina Faso came up as the lead importing country in ECOWAS and Africa for Ghana's NTEs. It maintained its position as the top importer in 2019 from 2016 through 2017 and 2018. Togo and Senegal were the second and third lead importing countries in ECOWAS and Africa. Burkina Faso contributed 26.26% of the total top ten value with Guinea (the tenth) contributing 0.78%. Average import value by the 10 top importing ECOWAS States in 2019 stood at US$82.86

million relative to US$73.57 million in 2018. This shows an increase of 12.79% in average import value of the top ten ECOWAS States (GEPA, 2020).

Table 2.4: Ten Leading European Markets for Ghana's NTEs

Country	NTE Contribution in US$ 2019	NTE Contribution in US$ 2018	% Growth 2019/2018
Netherlands	381,133,482	430,206,810	-11.41%
France	165,405,975	198,700,013	-16.76%
UK	157,074,731	164,253,366	-4.98%
Germany	131,268,357	126,602,347	3.69%
Belgium	81,397,100	76,609,733	6.25%
Italy	79,146,017	50,936,823	55.38%
Spain	69,371,804	53,949,539	28.59%
Denmark	34,468,433	26,813,461	21.09%
Portugal	4,684,923	12,557,902	-62.69%
Greece	43,047,190	2,970,985	2.56%

Source: Author's calculation from GEPA 2019 Statistics

From GEPA statistics, Netherlands emerged as the market leader in EU for Ghana's NTEs in 2019. It absorbed US$381.133million, a reduction of 11.41% over 2018 figure. France maintained the position as the second lead importing country in Europe for Ghana's NTEs with an import value of US$165.406 million in 2019, showing a reduction of 16.76% over 2018 imports. The United Kingdom, also maintained a third position in 2019. The country imported NTEs to a tune of

US$156.074 million, representing a decrease of 4.98% from 2018. Germany witnessed an appreciation of 3.69% from 2018 figures. Belgium, Italy, Spain and Denmark all recorded an appreciable increase in NTEs import from Ghana. Portugal however, recorded a massive decline of 62.69% in imports of Ghana's NTEs. Greece was the tenth in ranking of top ten EU importing countries for NTEs, importing US$3.047 million value of Ghana's NTE. This represents a rise of 2.56% in import value over 2018 figures. According to the statistics, average import value of the top ten (10) EU importing Countries in 2019 was US$110.399 million relative to US$190.28 million in 2018. The overall performance of the E.U unlike ECOWAS showed a negative growth of 3.43% in the import value in 2019 relative to 2018.

2.7 International Trade Theories

Trade theories attempt to examine the pattern of trade. This sector reviews international trade theories known to exist or have existed. These theories include;

2.7.1 Mercantilism

The term mercantilism is a theory and system of political economy that was practiced in Europe after the decline of feudalism (Berkum & Meijl, 2000). This system was based on national policies of amassing gold, colonization and a merchant marine to attain a favourable balance of trade position. Mercantilism emphasized policies that encouraged exports of domestic products and discouraged import (Berkum & Meijl, 2000). This theory views trade as a zero-sum game where one partner's loss is offset by the other partner's gain. The role

of Mercantilism was to widen the sovereign power of a nation through the control and ownership of vast precious mineral which by then measured by its holdings of treasure usually gold. Mercantilism was, based on the notion of widening trade surplus and reducing trade deficit to a minimum level through encouragement of exports and disdain for imports. This theory in the past led to several wars between countries as the markets were being safeguard by military to avoid invasions of imports into their country's market.

Absolute Cost Advantage

In the 18th century, mercantilism policies became obsolete and an impediment to economic progress which led to the emerging writers then to criticize its operation (Berkum & Meijl, 2000). For instance, Adam Smith wrote in his book "The Wealth of Nations" that the mercantilist policies were deleterious to economic growth and being one sided thus, only favoured production unit and disfavoured the interests of consumers. Smith begins his theory with a preamble that export is a lucrative venture that can propel economic growth and development if only the state imports goods that satisfy the needs of consumers better at a lower price than if it would have been produced. Smith asserts that instead of producing them in domestic market it will be prudent to rather import those goods (Smith, 1776). The essence of Smith theory is that it admonishes countries to export the good they can produce at a lower cost and import those they are disadvantaged in terms of cost of production. Smith determine the cost buildup of goods by quantifying and calculating the labour hours in monetary unit that is used in the production process. In order to demonstrate this, he analyzed the cost component by beginning with country one, using a one factor approach of production technique,

Smith evaluated the productivity of labour using the hours spent to produce a unit measure of products M and N. He used a single factor approach to model what constitute cost of production of an M product as well as an N product in a production unit of an economy. He used letters to demonstrate the cost of product for instance H- was for hours, L- for labour, and the unit needed of labour to produce M commodity is HLM and for N is HLN. He did this taking into assumption of opportunity cost and scarcity of resources (Smith, 1776).

2.7.2 Comparative Cost Advantage

David Ricardo theory responded to absolute cost advantage theory with the question that what if a country has absolute cost in production of both good? Comparative cost of Ricardo (1817) assumes that trade will be useful to countries if they concentrate and specialize in the production of those goods in which it has the greatest relative advantages over its trading partners and in turn export the surplus and import the goods that it has comparative disadvantage in production. The law is an extension of the absolute cost paradigm propounded by Adam Smith. That is a gain (benefit) will be available to a given country in as much as it channels resources to the industry in which its absolute or comparative advantages is greater. The country then sells the surplus to other countries and in turn channel resources towards those industries in which their deficiency is least. Then import from other countries goods and services they are deficient in terms of cost of production (those they have to produce at relative higher forgone cost). The theory is governed by assumptions such as occupational mobility of labour, differential opportunity cost ratios, the exchange rate of currency must lie between the limits set by the international (non-trading), variated price ratio for

differential products, transport cost should not be so high to crow out or reign the price advantage enjoyed by exporter over domestic producers (Gandolfo, 2014).

2.7.3 National Competitive Advantage

This theory is attributed to Michael Porter (Porter, 1985). The theory shows how a nation can gain competitive advantage over her partners in trade. Porter (1985) indicated that nations can gain competitive edge by creating a new factor advantage such as sophisticated technology and highly skilled labour for themselves. The theory further identified that a nation achieves competitive advantage due to certain strategic factors the country poses over the partner and how her government can serve as an agent of change to improve upon a nation's position in a competitive international environment. Porter argued that the elements of 'factor conditions' are more essential in determining a country competitive advantage than natural endowed factors such as land and other natural resource. Porter further indicated that the role of government in economic development is to create an enabling environment that challenges industry to concentrate and invent the elements of factor conditions. This could be achieved through promotion of healthy competitions between domestic firms to unravel their potential for customers' welfare. Michael Porter presented the factors that enable a country gain competitive edge over partners in a diagram known as Porter diamond. The diagram explains the factors that can propel competitive advantage for one national economy over the other. The diagram points to the source of competitive advantage and the way or path to attain it. Figure 2.5 is a mimic of Porters diamond.
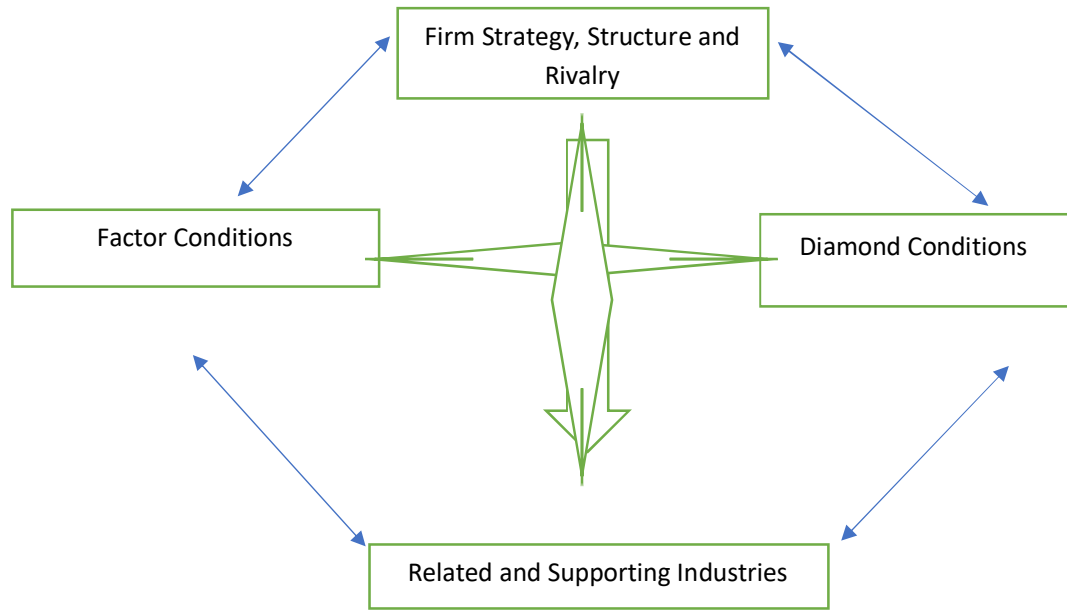
Figure 2.1: Porter's Diamond

Source: Adopted from Michael Porter's Diamond diagram

2.7.4 Factor Proportion or Endowment Theory

This is a theory of international trade that shows variations or disproportion of production factors such as labor, capital, and land among countries of which none may be specific to any one sector. This theory was developed by two Swedish economists, Eli Heckscher and Bertil Ohlin which has subsequently been extended in scores of international trade and economic growth literature. According to the proponent of factor endowment theory, under certain limited assumptions, a comparative advantage can be obtained due to variance in relative factor endowments. According to Ohlin (1933), a country has a comparative

advantage in the production of that commodity which uses the relatively abundant resource in that country more intensively. For instance, Ghana is relatively abundant in natural resources such as gold compared to Benin and Benin has abundant bronze than Ghana. Ghana will be better than Benin in terms of gold and Benin will be better than Ghana in terms of bronze. According to Heckscher-Ohlin, gold will be relatively cheaper in Ghana as compared to Benin. Thus, Ghana has a comparative advantage in gold and will therefore specialize and export gold to Benin. Likewise, Benin has a comparative advantage in bronze production and will therefore specialize and export bronze to Ghana.

2.7.5   Specific Factor Model

The specific factor model also known as Ricardo-Viner Model. According to Suranovic (2010) the specific factor model was initially brought forward by Jacob Viner as an amendment version of Ricardo model. As the name depicts, the model has a unique feature that is its assumption that one particular factor is fixed and specific to a particular industry and make it practically immovable from one industry to the other unlike Heckscher-Ohlin model which assumes mobility for the two factors of production (labour and capital). This model assumes that a specific factor is stuck to a particular industry and immobile across or between industries in response to changes in market conditions this may be due to specific in design in terms of capital or specific in training in terms of labour making it extremely difficult for the fixed factor to switch in between industries. The core function of the model is to is to demonstrate the effect of trade in an economy giving on factor to be immobile and specific to a particular industry as well as effects of economic changes on allocation of labour outputs levels and factor

returns. The theory is governed by the assumption that there are two goods produce in an economy using only labour and capital with capital assumed to be fixed to a particular industry which implies zero mobility of capital whiles labour is being mobile and can switch in between industries.

2.7.6   Leontief Paradox

The failure of the Heckscher-Ohlin factor endowment theory to tact the realities on the ground was seen as a fantasy model by Leontief and was responded to by Leontief with an empirical statistic (Smyth, 1997). Leontief noticed that going by factor endowment theory, US will export more of capital-intensive products and import more labour-intensive products because US has relative abundant of sophisticated capital so highly capital intensive inclined than labour. This led Leontief (1953) posed a paradox that was clearly in terms of the endowment-based explanation of trade patterns under the Heckscher-Ohlin theorem. Leontief instituted a study to corroborate the work of Heckscher-Orlin in the case of US. He tried to resolve the paradox with his interpretation that units of U.S labour were less than one unit of labour in the rest of world. Leontief, estimated his results using a constellation technique to test for the reliability or validity of H-O theorem with respect to American trade in 1947 since this was a nation with huge capital intensive as compare to labour. However, Leontief's empirical results rather suggested the reverse and hence cast huge aspersions on the Heckscher-Ohlin theorem as US imports were found to be more capital intensive and not labour intensive and exports were also reverse. This popular conclusion was drawn and titled as the Leontief paradox. The result of Leontief analysis is presented in the table 2.5 below.

Table 2.5: Wassily Leontief Data Set on United States trade in 1947/1951

Leontief:	Description	Exports	Imports	Imports/exports
	Capital	$2,550,780	3,091,339	
1947 US Trade	Labour (man-years)	182	170	
	Capital per man	$14010	$18,180	1.30
	Capital	$2,256,800	$2,363,400	
1951 US Trade	Labour (man-years)	174	168	
	Capital per man	$12,977	$13,726	1.06

Source: Smyth (1997)

Leontief's findings were also corroborated by subsequent studies of US trade in 1951 and 1962 and other studied outside US such as India, Canada and Japan. This makes arguments in support of the factor proportions theorem on the grounds that Leontief's data was underrepresented untenable (Smyth, 1997).

2.7.7 Product Life Cycle

Raymond Vernon an American economist developed the product life cycle theory in 1966. 'The product life theory says that over a period, a product undergoes different phases along with changes in certain variables such as technology, knowledge, information and costs. According to Vernon (1979, p. 225) on the

defense of his product life cycle argued that "the fact that new product constantly appears, matures and eventually dies does not mean it is not within the context of the new trade model and the mainstream international trade policy as opponents suggested but has always been fitted into mainstream theories of international trade and international investment". Export and import of the product depend upon these stages. Different stages in the life cycle of a product as prescribed by Vernon are described below.

1. New product – The development of a new product requires huge capital investment in research and development and highly skilled labour. So, product innovation mostly occurs in advanced countries. During the 20th century very large proportions of the world's products were developed and sold in US market. Raymond Vernon argued in his 1966 paper that in the early life of a new product, demand in countries other than USA was limited to high income groups. Therefore, other countries imported the new product from the USA to meet the limited initial demand.

2. Growth product –The demand for the new product surges in relation to time as it penetrates through different countries. According to Vernon, it is so, because it becomes worthwhile for these countries to start producing the new product in their home market. So, firms from the home market where the discovery was made for the case of Vernon USA, set up production facilities in those advanced countries where demand is growing. Then export value of the product from the discovered state then starts to fall.

3. Mature product – The market for the product in the original and other countries mature. So, competition becomes intense. At this time the cost becomes the main consideration for buyers. The production facilities are moved to countries with low-cost labour. Which will mean firms from these countries might now be able to export to the original country that discovered the product. The country moves now from being an exporter to an importer. Thus, international trade depends upon product life cycle (Vernon, 1966).

4. Decline Product: Under the decline product stage, sales of the product dwindle marginally and consumers shift their demand away from the product leading to decline in market share of the product. The market share decreases due to severe competition from rivalry products. Marketing at this level will not save the product, making marketing at this stage unaggressive. The product will "die" out of the market. Possible way to salvage the product is to redesign and reconfigure the product to meet customers' and consumers' needs. Else the product is gradually won out and displaced by new products introduced into the market as demand tilts towards the new products. At this level promotion might not save the product hence firms promotion budget is reduced significantly. Depending on the paste at which the product moves out of the market. If the decline is rapid then, the product will disappear quickly from the market and if otherwise will move out slowly from the market. What will save the product at this is to reengineer the product to include new features to reposition the product as well as develop an attractive packaging for the product. Economic model may also be introduced to evaluate and resurrect demand.

5. The Abandoned Product: Finally, if the strategies or measures in stage IV did not save the product, the ultimate thing for the firm to do is to abandon the product to make judicious use of the firm's resources to invent new product(s) with several new features that will meet the current demand of consumers to replace the abandoned product.

2.7.8 New Trade Theory

According to Sen (2010) this form of trade theory known as new trade theory was developed in the 1970s. This theory says that trade takes place due to economies of scale. Economies of scale means the advantage a firm derives from large scale production. This takes the form of reduction in per unit cost attributed to the large scale of production the firm embarked on. According to this theory a country produces that good whose average cost of production is lesser and imports other good whose cost of production is deemed higher from foreign country. The country exports the good which it produces at lower cost. According to this theory, a country produces a single product in huge quantity by using all resources and so average cost decreases. The country sells this good to foreign country after meeting domestic demand and the country's consumption and then order goods which it does not produce from foreign country. The proponents of this theory are Krugman (1979) as seen in his paper entitled an increasing return, monopolistic competition and international trade model, Dixit and Norman (1980) in a paper- theory of international trade a dual general equilibrium approach and others.

2.8 Empirical Review

Empirical review of literature on previous studies relating to the impact of nontraditional agricultural exports on economic growth as well as the determinants or factors that affect the growth of nontraditional agricultural exports is done under the following models/methodologies used by these researchers to achieve their study objectives;

2.8.1   Autoregressive Distributive Lag (ARDL) Model

The ARDL which stands for autoregressive distributed lag is a model which is "autoregressive" meaning it contains the lags terms of the dependent variables and a distributive lag meaning it contains the independent or the explanatory variables. This is denoted in notational terms as ARDL (p, q1.... qK), where p is the number of lags of the dependent variable, q1 is the number of lags of the first explanatory variable, qK is the number of lags of the Kth explanatory variable, and K is the number of independent variables (X1...XK) (Pesaran et. al., 2001). ARDL method provides unbiased estimates and valid t-statistic irrespective of the endogeneity of some regressors (Haris & Sollis, 2003). According to Ali et al. (2016) when appropriate lag is selected, residual correlation is eliminated and the problem of endogeneity mitigated. It is used when there is mixed integration of the variables (I(0) and I(1) but not I(2), and equally very efficient for small sample size (Ibid). This model is widely used in economic growth nexus literature because of its unique features. Related studies with this model are reviewed as follows;

Dube et al. (2018) used autoregression distributed lag bound approach to cointegration in an estimation of factors that affect the performance of nontraditional agricultural exports a case of horticulture product in Ethiopia. The study identified real exchange rate, RGDP of Ethiopia, FDI, prices and structural break as significant factors that affect the performance of Ethiopia's horticulture exports in both long and short runs with oversees GDP and interest rate only significantly affecting the performance of horticulture exports of Ethiopia in short run. The study recommended adopting a flexible exchange rate regime that moves in line with the other macroeconomic indicators of the country and also improving the growth performance of the home economy to attract investments which would propel exports' growth and diversification of commodity exports in the country.

In the study to examine the determinants of NTAE growth in Zambia, Mabeta (2015) used time series data from the duration period of 1980 to 2013 and an ARDL model to achieve the study's objectives. The ARDL bounds test confirmed the presence of cointegration between NTAE and the hypothesized variables. The study also revealed real exchange rate, real interest rate, global price and real income of trade partners to be important or determining factors that affect cotton exports' performance in the short run with variables such as GDP, interest rate and exchange rate being an important component in determining the cotton exports' performance in the long run. For tobacco exports, the study revealed exchange rate, income of trading partners and FDI as significant determinants of tobacco export growth in Zambia in short run whiles real exchange rate and real income of trade partners are the only significant determinants of the growth of

tobacco exports in the long-term period. The study proffered that government of Zambia should concentrate on measures towards attaining an exchange rate stability.

In examining the factors that affect Pistachio exports in Iran Dastjerdi et al., (2021) deployed ARDL model for the study. The study identified GDP growth, exchange rate appreciation and bank credit facilities as significant factors that have positive effect on pistachio export in Iran, with increased in banks' liquidity as a significant negative factor that effect pistachio export in Iran. The study recommended to appropriate quarters to provide funding to pistachio producers and exporters, credit advances in the economy should be channeled to the productive economic sectors, domestic inflation should be targeted and adjusted with exchange rate and finally the appreciation of the domestic currency should be a targeting goal in the economic management of Iran.

Using ARDL bounds approach, Okyere (2020) identified cointegration between exports and economic growth of Ghana with further assertion that exports have significant causal effect on the growth of Ghana's economy. The study concluded by recommending establishing a Chinese bank in Ghana to facilitate international trade between the two countries since they are major partners in trade.

In an examination of the role of FDI inflows and exports on economic growth in Sri Lanka, Sultanuzzaman et al. (2018) used ARDL approach to reveal that export has a direct influence on economic growth of Sri Lanka in the short run and in long run impinge Sri Lankan economy negatively whiles FDI significantly and inversely impinge economic growth of Sri Lanka in both long run and short run.

The study concluded that both FDI inflows and exports impinge economic growth in Sri Lanka. The study further drew a conclusion that FDI inflow is needful in ameliorating the production sector of the host country, which will lead to exports expansion and the economic performance of Sri Lanka.

In examining the contribution of exports to the economic growth of Pakistan, Awan and Bibi (2021) used time series data from 1980 to 2015 and an ARDL approach with exports, FDI and imports as independent variables and GDP proxied as economic growth being the dependent variable. The results of the ARDL showed that exports had significant positive influence on Pakistan's economic growth whiles imports and FDI have significant negative effects on the economic growth of Pakistan. The study attributed negative impact of FDI and imports to political instability, high dependence on luxury goods which are always imported, high tax rate, high inflation and FDI being used in speculative and nonproductive ventures rather than capital ventures. The study recommended to Pakistanis' government to widen export basket of goods that country has potential in production and also concentrate on providing education to the citizenry to build capacities as education serves as a bedrock to improve one's skills.

Fayisa (2021) used panel ARDL approach to examine the determinants of exports in East Africa using heterogenous panel data. The study through the pooled mean group estimation results identified real GDP, trade openness, labour supply, domestic demand and gross capital formation as significant factors that affect East African exports in short run and with gross capital formation, final

consumption, FDI, RGDP of both exporting and importing countries and trade openness being significant factors that affect East African exports in the long run. The study further identified real gross domestic product to have significant positive influence on exports of East Africa.

In the study conducted by Parajuli (2021) to examine the impact of foreign trade on the economic growth of Nepal using time series data from 1994/95 to 2018/19, the ARDL results revealed that exports are important component in the Nepalian economy as these impinge the Nepalian economy positively whereas imports remain negatively insignificant in promoting the economic growth of Nepal. The study concluded that foreign trade has an important role in the economy of Nepal and for that matter government and other policy makers should come out with a deliberate policy that will promote and propel production of exports goods as well as encourage exports of those goods.

2.8.2 Vector Autoregressive (VAR) Model

Urriola et al., (2018) in an examination of the impact of nontraditional and traditional agriculture exports in Peru, using VAR model revealed that nontraditional agricultural exports have direct and significant influence on the economic growth of Peru whiles that of the traditional agricultural exports exhibits direct but negligible impact on Peru's economic growth. The study further identified gross capital formation as a strong variable that marginally and directly impinge the economic growth of Peru whiles that of labour force has positive but negligible influence on the economic expansion of this country.

Also, Jacob et al., (2021) in an estimation of the impact of exchange rate and inflation on the export performance of the Indian economy using a secondary data from Reserve Bank of India from 1995 to 2020 and a VAR model. The study employed VECM to meet the objective of examining the impact of the above macroeconomic indicators on the export performance of the Indian economy. The results indicated presence of cointegration between export performance, inflation and exchange rate. The results further identified exchange rate volatility and wholesale price index to have significant impact on the performance of Indian exports. The VAR results also indicated that inflation and exchange rate have positive and significant effect on the performance of Indian exports. With the Var block exogeneity Wald test result which was incorporated to examine the causal relationship between exports performance and the hypothesized variables indicated that cumulatively all the hypothesized variables have significant causal relationship or impact on the performance of Indian exports and on individual variable basis, inflation remains the only significant factor that influence export performance whiles exchange rate volatility is insignificant determinant in the export performance of India. The study concludes on the basis of the empirical analysis that inflation and exchange rate are shown to positively affect export performance in India and put forth a recommendation that aims to ensure the maintenance of stable exchange rate, moderate rate of inflation to promote export performance. These recommendations include that government should give attention to export promotion to maintain a favourable balance of trade. Secondly, that Indian government should come out with effective fiscal and monetary policies, to attain a realistic exchange rate for India and lastly, that the

government should control the inflation rate for the promotion of export to enhance the economic growth of India.

Using the VAR model, Verter and Bečvářová (2016) deployed variance decomposition in the VAR environment to examine the contribution of each variable to the economic growth of Nigeria. The result of the variance decomposition indicated that GDP was 100% explained by its own innovation or impulse in the first year and gradually reduced to 38% in the 10th year. The study further revealed that agricultural exports account for 20%, agriculture degree of openness account for 17% and real effective exchange rate accounts for 25% of the fluctuation in the economic growth of Nigeria.

Using the VAR approach and VECM by Malefane (2021) to investigate ELGH in SACU region showed that there is a positive cointegrating relationship between exports and economic expansion in Botswana, Namibia, Eswatini, and South Africa, and an inverse relationship with Lesotho. The VAR causality results showed that the export-led growth hypothesis holds in Namibia and South Africa, but not in Botswana, Lesotho, and Eswatini. The study concluded that factors that obstructs the export-led growth strategy in Lesotho should be identified and work on.

2.8.3 Gravity Model

Apalatoya (2018) used augmented gravity model of trade to investigate the determinants of nontraditional exports growth in Ghana. In determining the effect of economic size, transportation cost, regional trading block and institutional quality on NTES in Ghana, the Poisson Pseudo maximum likelihood regression

showed that NTEs inflows increase significantly with the expansion of GDP of Ghana, her trading partners' GDP as well as population of her trading partner. The study further revealed that NTEs growth is positively related to low transportation cost which was proxied as distance, common border and language, and high level of the importing countries' level of trade openness. Political stability and absence of violence as well as rule of law facilities affect NTEs growth positively whiles regulatory quality control affects the performance of NTEs negatively according to (Apalatoya, 2018).

Using the gravity model to identify factors that are impinging on exports of agricultural product in Vietnam Son et al. (2021) identified GDP of Vietnam, level of economic development between Vietnam and importing country, population, exchange rate, economic openness, exporting country's accession to WTO, Vietnam being membership of a body such as APEC with exporting country as significant factors that have positive impact on the turnover of agricultural exports of Vietnam whiles agricultural land area and geographical distance between Vietnam and importing country of agricultural products of Vietnam have significant negative impact on the turnover of agricultural exports in Vietnam with inflation being nonsignificant factor impinging the turnover of agricultural exports in Vietnam.

2.8.4   Granger Causality

Verter and Bečvářová (2016) employed Granger causality test in an examination of the role of agricultural exports in Nigerian economy. The test showed a two-way causality between agricultural exports and economic growth and a

unidirectional causality running from real effective exchange rate to agriculture degree of openness in Nigeria.

In a similar vein, the Granger causality test results of Mabeta (2015) in an examining the determinants of NTAE growth in Zambia using two products as a case study (cotton and tobacco exports) identified that agricultural exports, from the two selected products have a one way causal effect on the share of agricultural gross domestic product and this is emanating from agricultural exports to agricultural share of GDP and no reverse causality was detected.

Okyere (2020) also used this test to empirically analyze the causal association between Ghana's economic growth and international trade. The study identified that there is a causality and this is one directional causality emanating from exports to GDP however, no reverse causality was detected.

Using Granger causality test in a study to examine agricultural exports and economic growth of Pakistan, Zahir (2012) revealed that there is a two way causality that is both agricultural exports and GDP causing each other in a reverse form with GCF-exports however, proving only one directional causality running from GCF to agricultural exports without reverse causality from agricultural exports in Pakistan.

Kang (2015) applied Granger causality to examine causality of rice exports - economic growth nexus. The results revealed that three countries' non-agricultural exports (Thailand, Vietnam, and Pakistan) spur economic growth, one country (Thailand) exhibits single direction causality flowing from

agricultural exports to economic growth; and all four countries studied indicated significant causality from rice exports to economic growth. The study concluded that there is evidence to support the fact that rice exports stimulate economic expansion of major rice exporters (Thailand, Vietnam, India, and Pakistan).

In similar vein, Niftiyev and Czech (2020) in an estimation of causality between values of vegetable exports and other hypothesized macroeconomic variables found a unidirectional causality running from exchange rate to production cost of vegetable exports, independent causality between crude oil prices and vegetable exports and a one way causality from crude prices to exchange rate.

The result of Granger causality test by Alemayehu and Tilahun (2021) in their work titled agricultural export and economic growth nexus : A case study of Ethiopia revealed that neither agricultural export nor GDP Granger causes the other which according to the authors implied no causal relation exist between the two and neither agricultural export led growth hypothesis nor economic growth driven agricultural export is valid in the context of Ethiopian economy. The study recommended that in order to spur economic growth, the government should export processed agricultural products instead of exporting primary agricultural commodities.

Using Granger causality test in the study agricultural exports -economic growth nexus in developing nations Sanjua (2010) revealed that agricultural exports together with nonagricultural exports Granger cause GDP which implied exports in general lead to economic growth in line with the export led growth hypothesis.

In the work of Nong et al., (2021) to assess the reciprocal impact of agricultural product exports between Vietnam and China on the economic growth. The granger causality test revealed two-way causality between the hypothesized variables. The result shows that growth in export turnover of agricultural products between Vietnam and China cause Vietnam agricultural economic growth and that of growth in turnover of agricultural exports products cause the agricultural economic growth of China. The study recommended that China and Vietnam should reinforce and empower their bilateral relationship and come together to put forth policies and solutions which are capable of exploiting the available potentials of both countries. The study further recommended that the duo should promote production, processing, trading and exporting agricultural product amongst themselves.

2.8.5 Other Models

Edeme et al. (2016) adopted a fixed effect model and evaluated the impact of agricultural exports on economic growth of fifteen ECOWAS countries using a panel data spinning from 1980 to 2013. The fixed effect model revealed that agricultural exports have no significant causal influence on the economic growth of some ECOWAS countries including Cote d' Ivoire and Nigeria with the variables such as labour force, capital stock, agricultural exports and inflation positively related to economic growth of ECOWAS countries whiles that of nonagricultural exports shows an inverse relationship with economic growth. The study revealed from the findings of the panel data that there is significant effect of agricultural exports on these countries but varies across the countries.

Using Johansen cointegration and ECM to ascertain cointegrating relationship between economic growth and agricultural exports of Nigeria, Ijirshar (2015) identified that long term relationship exist between agricultural exports and the hypothesized variables. The study further revealed that agricultural exports impact positively on the economic growth of Nigeria and recommended that government of Nigeria invest in research and development in the area of agriculture, improve the market infrastructure and institutions, improve irrigation facilities and capacities, strengthen the agriculture inputs supply system, provision of adequate funds for farmers and diversification of the Nigerian economy to avoid complete disorder and to improve agricultural exports in Nigeria.

Eliakim (2020) employed ordinary least square regression (OLS) to investigate the effect of exchange rate on agricultural exports in Tanzania using time series data from WDI spinning from 1997 to 2018. The results revealed an inverse and significant relationship between agricultural exports and foreign exchange rate. And the Johansen cointegration test also confirmed the cointegrating relationship between agricultural exports and exchange rate in Tanzania. The study recommended that the authorities of the country device strategies to stabilize the exchange rate as this affects the agricultural exports negatively.

Impulse Response Function was deployed by Verter and Bečvářová (2016) to measure impact of shocks to the hypothesized variables on the Nigerian economy. The results revealed that initial reaction of agriculture exports to economic growth impulse is positive and then diminished in the second year. This response

continues to fluctuate over the years and recorded an adverse shock in the eighth year, fourth year and the second year. The study further showed that real effective exchange rate and agriculture degree of openness exhibits asymmetric impact on economic growth of Nigeria.

In another vein, Soumya and Yeledhalli (2021) in an evaluation of trend and competitiveness of Indonesian agricultural exports from 2000 to 2018 using OLS approach revealed that seven agricultural commodities groups have comparative advantage throughout the period of study, five showed revealed comparative advantage by the end of the period whiles seventeen products showed revealed comparative disadvantage throughout the study period. The study also revealed an increasing trend in the growth of agricultural exports commodities in Indonesia. The study recommended that in order to widen exports, government should take measures to meet the standards established by the importing countries.

The impact of globalization on Indian exports was examined by Sharma and Saluja (2019) using secondary data published by Reserve Bank of India (RBI) from 1988-2018. The findings showed that though, the Globalization had brought enormous contributions and opportunities to various sectors of the Indian Economy it does not seem to favour Indian agricultural produces as its impact on the agricultural exports sub sector is minimal. According to the study, there is remarkable growth in all the four commodities of the study but when it is put aside the total export for the period of study for agricultural products, the study identified consistent decline in share of total export value. The study also showed

a fluctuation in growth of agricultural exports and inferred that change in policies and projects significantly affects the primary sector exports of the country.

Using Johansen cointegration test in a study to assess the impact of export instability on economic growth from the perspective of Jordan Abu-lila et al., (2021) identified a cointegration between the hypothesized variables and economic growth. The results further posited a direct and statistically significant causal influence of exports and fixed capital formation on RGDP. The conclusion of the study is that export instability directly and significantly impinges RGDP. That is an increased in export instability increases income uncertainty, which in turn influences savings culture and investment, and hence propels growth.

The OLS estimation results of impact of agriculture export on the economic growth of Nigeria by Verter and Bečvářová (2016) revealed a direct relationship between agricultural exports and economic growth of Nigeria. This study further showed a positive nexus between economic growth and exchange rate and a negative or inverse causality between agriculture trade openness and economic growth.

Using generalized method of movement in an estimation of the effects of export and technology on economic growth using some selected Asian countries as a case study, and adopting a panel data spinning from the period of 2000 to 2016 for the study, Sultanuzzaman et al. (2019), found export and technology as a greatest assets that positively or directly impinge the economic progress of selected emerging market economies of Asian countries. The generalized method of movement results showed that export and technology have greater causal effect

on the economic growth of selected emerging market economies of Asia with other hypothesized variables such as capital stock, human capital and FDI also kowtowing the same line of impact (positive) on the economic growth of these countries in both long run and short run. The study concluded that trade and technology are twin factors that propel economic growth of emerging market economies in Asia.

Meyer (2021) used Fisher-Johansen cointegration panel time series data from 1990 to 2019, FMOLS and DOLS approach to investigate a export-economic growth relationship in SACU region. The results showed cointegration between GDP, service exports, merchandized export, labour force and GCF in the SACU region. The FMOLS and DOLS methods both revealed that merchandized export, labour force and GCF have significant and direct impact on GDP. This further revealed that merchandize exports have higher impact on GDP than service export. The study recommended that in order to propel economic growth, export diversification should be a topmost component in the development strategies of the region.

Boafo (2019) used political ecology approach to ascertain the drivers of export-led agriculture in Ghana case of cashew production in Ghana. The author identified historical legacies, government policy narrative and global market/trade integration as driving the commodification of domestic agriculture in Ghana.

Niftiyev and Czech (2020) used Extractive Dependence Index (EDI) and an ANOVA on the sectoral investigation of the Dutch disease on vegetable exports

of Azerbaijan. The study identified that different levels of EDI impact vegetable exports differently and that Azerbaijan dependence on natural resources has a significant negative effect on her vegetable export.

Also, in an estimation of agricultural exports and economic growth with developing nations as case study, using panel cointegration method, Sanjua (2010) identified that long run relationship exists between GDP, agricultural and nonagricultural exports and that in long run as GDP increases agricultural exports falls and reverse for an increased in nonagricultural exports. The results also showed that nonagricultural exports have higher magnitude of impact on GDP than agricultural exports for countries with lower and upper incomes than those with low incomes.

Zahir (2012) used Johansen cointegration technique to study the relationship between economic growth and agricultural exports in Pakistan using annual data from the period of 1972 to 2008. The Johansen test result showed cointegrating relationship between economic growth, agricultural exports, GCF, nonagricultural exports and labour force in Pakistan. The study further revealed that nonagricultural exports have significant and direct influence on the economic expansion of Pakistan.

Using the fixed and random effect of regression analysis to analyze the impact of GDP, and other macroeconomic variables of Iran's neighbouring countries on the growth of agricultural exports of Iran Mojahed et al. (2021) revealed that neighboring countries' GDP has significant positive impact on Iranian agricultural exports whiles the other hypothesized variables such exchange rate

and price ratio of neighbouring countries have significant negative impact on the growth and development of agricultural exports in Iran. The study recommended that Iranian government implements policies that will lead to political and economic stability of her neighbouring countries as this will propel the growth and development of Iran's agricultural exports and exports in general. The study further recommends that stabilizing prices and exchange rates of neighbouring countries be prioritized by Iran in her international development affairs and diplomacy policies.

In the examination of the effect of international trade on the economic growth of Nigeria, Falaye and Afolabi (2021) used least square methods to arrive at a conclusion that international trade significantly impacts Nigerian economy positively. It further details that the exports exhibit significant direct effect on economic growth of Nigeria whereas imports exhibit reverse influence on the economic growth of Nigeria. The other variables in the study such as savings and CPI respectively have significant positive impact and nonsignificant negative influence on the economic growth of Nigeria. The authors concluded with a recommendation that advised government to engage in more of export-oriented trade and reduce the consumption of imports which have an adverse effect on the balance of trade position of the Nigerian economy.

In a study to explore the comparative analysis of growth, performance, and competitive advantage of services exports of Pakistan regarding ECO (Economic Cooperation Organization) countries, Hussain et al. (2020) studied the growth and performance of services exports of ECO countries using descriptive statistics.

The Revealed Comparative Advantage (RCA) of Pakistan regarding other ECO countries were analyzed by constructing a well-known Balassa index. Results of the study revealed that with the passage of time composition of exports of services in ECO countries have shifted from traditional services to non-traditional services particularly due to advancement in technology. And Pakistan has emerged as one of the largest exporters of the services among the ECO countries. Its volume of services trade and exports has risen consistently over the study period. The study further found that ECO countries vary significantly in their ranks in commercial services in global trade. It shows the diverse nature of economies as the difference in the ranks ranges between 29 to 162 for Turkey and Pakistan respectively. RCA index of Pakistan concerning ECO countries provides a clear view that Pakistan has managed to maintain and develop exports of royalties, license fees services and computer and information services over the years. Pakistan has particularly huge potential to exploit its RCA in computer and information services as it has one of the highest percentages of young population. The study recommended that Pakistanis government should spend on the education and training of its youth to enhance its human capital.

2.9 Theoretical Framework

The theoretical basis of this study is the concept of international trade which is premised on three main models, the classical model (Adam Smith, Robert Torrens and David Ricardo), factor endowment (Heckscher-Ohlin) model and neoclassical model (Alfred Marshall and John Steward Mills). Adam Smith in his book titled the enquiry into the Nature and causes of wealth of Nations Adam Smith indicated that it is not prudent to make at home what it will cost more to

make at home than to buy" (Smith, 1776, p. 22) . This buttresses his ACA theory where he admonished 'countries to specialize in manufacturing goods and services at which they have least cost and then exchange for goods they have absolute disadvantage to him this will promote mutual benefit. From Adam Smith, it is clear that if one country has absolute cost advantage over the other it is still prudent for trade to exist between the two. However, theory of trade especially export is mostly associated with David Ricardo's comparative advantage model and to the new trade theories like Heckscher-Ohlin. Theory of comparative advantage is of the view that nations should produce commodities either services or goods at lower forgone cost than a partner in the same line of production known as their best trade off option. The theory suggests that there is still basis for trade between two nations even if one nation has absolute cost advantage in the production of both commodities over the trading partner, it should specialize in one that she has lowest opportunity or forgone cost whiles the nations with disadvantage should also concentrate or specialize in the commodity which her production has least forgone cost and both will exchange their surplus to gain economic growth. The modern-day trade theory is the Heckscher-Ohlin model which is of the view that dissimilarities in resource endowments among nations call for the existence of international trade. Since nations are blessed differently with natural resources, it is prudent for every country to concentrate on production of commodities which they are naturally endowed with to exchange for those they are deficiently endowed this will provide mutual gain.

The neoclassical theory which is attributed to J.S. Mill and Alfred Marshall argued that, determinants or factors that influence trade are to be found concurrently in the differences between innovations (technologies), factor endowments, preferences and tastes of different countries. The taste and preference for different countries accounts for the possible presence of international trade, even if technologies and factor endowments were completely identical or almost the same between countries they will still gain in terms of economic growth when they engage in international trade.

2.10 Conclusion

The chapter reviewed literature on economic growth theories, Ghana trade policies, international trade theories, market of Ghana's NTEs and concluded with the theoretical backbone of the study. The section systematically collected and reviewed studies that focus, on agricultural export-economic growth nexus, determinants of agricultural exports with emphasis on NTAE by assessing findings, methodological approach and conclusions. From the review it can be seen that the authors used different methods to arrive at those findings. The most widely used method is the ARDL and VAR methods however, there are significant weaknesses of the aforementioned models which are the inability of these models to take into account asymmetric effect and cumulative dynamic multiplier effect of the regressors on the regressed (the dependent variable). These weaknesses are what this study addressed.

The review of literature showed three divergence findings. Thus, agricultural exports (traditional or nontraditional) have significant positive impact, significant negative impact and insignificant impact on economic growth. From the review of empirical evidence, there is inconclusive findings with regard to agricultural exports-economic growth nexus.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter contains methodology deployed to investigate the impact of non-traditional agricultural exports on Ghana's economic growth. The chapter basically discussed the source of data, description of variables used for the studies, estimations techniques used to arrive at the conclusions drawn with regards to the study objectives.

3.2 Research Design

The approach used in this study is the ex-post factor research design which uses the dependent variables and independent variables to explain an event that has already happened but does not have control of the attributable cause. This approach collects, verify and analyze the evidence to establish the fact that corroborates or refutes the null hypothesis.

3.3 Data Analysis

3.3.1 Method of Analysis for objective one

For objective one, that is to examine the trend of NTAE's growth in Ghana from 1961 to 2019, trend analyses were employed. Firstly, line graph was used to investigate whether the trend in NTAE for the period of the study is linear or not. Thereafter, a model was specified in such a way that NTAE was regressed on time. For analysis like this, the slope of the coefficient plays a significant role if it is positive, there is an upward trend on values of NTAE whereas if it is negative, it implies that there is a downward or declining trend in the growth of NTAE. The model is efficient because it provides mean to describe the trend using graph as well provides and inferential statistics for the purpose of inference. This is specified as;

Trend Analysis

Linear Trend: $V_t = \beta_0 + \beta_1 t + e_t$ ……………………………………………… (1)

Quadratic Trend: $V_t = \beta_0 + \beta_1 t + \beta_2 t^2 + e_t$ ……………………………(2)

where V_t is the actual value at time t, $t = 1, \dots, T$, e_t is the error term and, β_0 β_1, β_2 are the regression coefficients of the actual values on time.

3.3.2 Analysis for Objective Two- ARDL Model

The study adopted the ARDL model developed by Pesaran et al. (2001) and NARDL model by Shin et al. (2014) to examine the impact of NTAE on the economic growth of Ghana. The justification for adopting this model is based on

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the fact ARDL method provides unbiased estimates and valid t-statistic irrespective of the endogeneity of some regressors (Haris & Sollis, 2003). According to Ali et al. (2016) when appropriate lag is selected, residual correlation is eliminated and the problem of endogeneity mitigated. This is also efficient for small sample size (Pesaran et al., 2001). In literature, previous researchers have adopted this model to measure economic growth in their respective study areas. These include Dube et al. (2018), Ijirshar (2015) Lelya and Ngaruko (2021).

The study adopted the extended Solow economic growth model to model the impact of nontraditional agricultural exports on Ghana's economic growth. According to Solow (1956) economic growth is a function of $K_t\, L_t\; A_t$ where K is capital accumulation, L is labour force and A is technological progress which increases the efficiency of the physical capital and labour force to be more productive. Under this, the RGDP which is proxied for economic growth is treated as a dependent variable whiles NTAE, inflation, exchange rate, GCF and FDI are treated as explanatory or independent variables. And this is so because literature shows that these variables affect economic growth as already pointed out in this chapter under the explanation and choice of variables. Primarily, the study specified the following econometric model;

Y= f $(K_t\, L_t\; A_t)$ …………………………………………………………..eqn. 1

RGDP = F (NTAE, INFL, GCF, FDI, EXCR) …………………….eqn. 2

$$RGDP_t = \beta_0 + \beta_1 NTAE_t + \beta_2 INFL_t + \beta_3 GCF_t \quad + \beta_4 FDI_t + \beta_5 EXCR_t + \varepsilon_t \text{ .....eqn. 3}$$

The natural log is applied to the variables in order to bring into agreement difference in unit of measurement and reduce multicollinearity among the independent variables. This is then specified as follows;

$$LNRGDP_t = \beta_0 + \beta_1 LNNTAE_t + \beta_2 LNINFL_t + \beta_3 LNGCF_t + \beta_4 LNFDI_t + \beta_5 LNEXCR_t + \varepsilon_t \text{...................eqn. 4}$$

3.3.2.1 Unit Root/Stationarity Test

Stationarity test was performed to ascertain the level of integration of variables. Using ADF and other tests such as Philips-Perron, GLS-DF and KPSS tests. This is not a necessary condition for ARDL or NARDL model but it is prudent to be carried out to ensure that none of the variables is integrated of order two or I(2), as this will break the bound test assumption and when that happened the model cannot work well with I(2) variables. The Stationarity test takes the following form;

$$Y_t = \delta Y_{t-1} + \varepsilon_t \text{...eqn 5}$$

$H_0 : \delta = 0$ (Non stationary)

$H_0 : \delta \neq 0$ (Variable is stationary)

Since the variables can be stationary at I(0) and I(1) if the underlying series in equation 1 is non stationary at levels, then the first difference of it will be stationary. This is given by;

$\Delta Y_t = \delta Y_{t-1} + \varepsilon_t$ ……………………………………………………………..eqn 6

3.3.3 Cointegration in the ARDL model- ARDL Bound Test

Cointegration test is conducted to examine the presence of long run relationship or otherwise between the dependent and the independent variables. The ARDL Bound approach to cointegration was applied to examine whether cointegration or long run relationships exist between RGDP and NTAE. This was conducted using the bounds approach and is written in as follows;

$$\Delta LNRGDP_t = \beta_0 + \sum_{i=0}^{P} \beta_{1i} \Delta LNRGDP_{t-1} + \sum_{i=0}^{q} \beta_{2i} \Delta LNNTAE_{t-i}$$

$$+ \sum_{i=0}^{q} \beta_{3i} \Delta LNINFL_{t-i} + \sum_{i=0}^{q} \beta_{4i} \Delta LNGCF_{t-i}$$

$$+ \sum_{i=0}^{q} \beta_{5i} \Delta LNEXCR_{t-i} + \sum_{i=0}^{q} \beta_{6i} \Delta LNFDI_{t-i} + \varepsilon_t$$

………………. Eqn. 7

Where LNRGDP is a log form of real gross domestic product, LNNTAE is a log form of nontraditional agricultural exports, LNINFL is a log form of inflation, LNGCF is a log form of gross capital formation, LNEXCR, is a log form of exchange rate, LNFDI is a log form of foreign direct investment and ε_t is the error term which the model cannot account for. The F- test was used to test for cointegration among the variables where the null hypothesis that the betas were jointly equal to zero $(\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = 0)$ the F-test of Pesaran et al., (2001) provides critical F-values and T-values one for lower bound and the

other for upper bound for testing the presence of cointegration or otherwise. If the computed F and T values are higher than the critical F and T values for the upper bound then the null hypothesis of no cointegration is rejected and hence infer presence of cointegration and if the computed T and F values are lower than the critical bound of the lower value then we infer no cointegration and for that matter the null hypothesis cannot be refuted and we therefore failed to reject the null hypothesis and when it is in between the lower and the upper bound then the test becomes inconclusive.

If a bounds test results show cointegration then further estimation of Error Correction Mechanism (ECM) is required to ascertain the speed of adjustment (how quick the series will be reverted to equilibrium in case there is a displacement in equilibrium). And this takes the following form

$$\Delta LnY_t = a_1 + \sum_{i=1}^{1} a_{11} \Delta LnY_{t-1} + \sum_{j=0}^{m} a_{22} \Delta LnX_{t-j} + n_1 ECT_{t-1} + \mu_{1i}$$
……………………………………………………………………….…….Eqn. 8

$$\Delta LnX_t = a_1 + \sum_{i=1}^{1} a_{21} \Delta LnX_{t-1} + \sum_{j=0}^{m} a_{22} \Delta LnY_{t-j} + n_2 ECT_{t-1} + \mu_{2i}$$
…………………………………………………………………..………Eqn. 9

The ECM is of this form;

$$\Delta LNRGDP_t = a_0 + \sum_{i=0}^{P} \beta \, \Delta LNRGDP_{t-1} + \sum_{i=0}^{q} \gamma \, \Delta LNNTAE_{t-i}$$

$$+ \sum_{i=0}^{q} \phi \, \Delta LNINFL_{t-i} + \sum_{i=0}^{q} \psi \, \Delta LNGCF_{t-i}$$

$$+ \sum_{i=0}^{q} \omega \, \Delta LNEXCR_{t-i} + \sum_{i=0}^{q} \delta \, \Delta LNFDI_{t-i} + \lambda ECM_{t-1}$$

$$+ \varepsilon_t \dots \dots \dots \dots \dots .. Eqn. \, 10$$

ECM_{t-1}, λ represents the speed of adjustment, showing the time frame for equilibrium to be restored. Or the lengthy of time the series will take to revert to long run equilibrium after displacement. The must sign must be negative and significant to ensure convergence in long run.

3.3.4 Nonlinear Autoregressive Distributive Lag (NARDL) Model

The study further employed the NARDL developed by Shin et al. (2014) to take care of asymmetric impact. This method is appropriate when the Wald test results indicate that the variables (NTAE, EXCR, INFL, FDI and GCF) are nonlinear in coefficient with RGDP. As such this reason, the study also adopts the NARDL model for the following reasons; First and foremost, the non-linear ARDL model differs from the conventional ARDL model by decomposing the regressors Xs into a partial sum of positive and negative changes in each regressor (that is, Xi = Xi+ + Xi- for i= 1…, K). in addition, NARDL bounds test allows for both the static and dynamic effect(s) of the independent variables (NTAE, INFL, EXCR, GCF and FDI) on the dependent variable (RGDP) unlike a static model that accounts for static or fixed effect(s) only. Further, the bounds test determines the

presence of cointegration while at the same time taking into account that the impacts are not the same thus asymmetries (Shin et al., 2014). Lastly, the approach solves the problem of multicollinearity through appropriate lag selection of variables (Shin et al. 2014).

The functional form is specified as Y= f $(X_{1t}^+, X_{1t}^-,)$ …………………..Eqn. 11

Y= $\beta_0 + \beta_1 x_t^+ + \beta_2 x_t^- + U_t$ where x_t^+ and x_t^- are sum of positive and negative changes in Xt:

$$X_t^+ = = \sum_{j=1}^{t} Max\left(\Delta X_j, 0\right) \quad X_t^- = \sum_{j=1}^{t} \Delta X_j^- = \sum_{j=1}^{t} Max\left(\Delta X_j, 0\right)\ldots 12$$

Cointegration

$$\Delta Y = a_0 + \sum_{j=1}^{p} a_1 \Delta Y_{t-1} + \sum_{j=0}^{q} a_2 \Delta X_{t-1}^+ + \sum_{j=0}^{q} a_3 \Delta X_{t-1}^- + \rho Y_{t-1} + \varphi_1^+ X_{t-1}^+$$

$$+ \varphi_2^- X_{t-1}^-$$

$$+ \mu_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots.. Eqn.\, 13$$

For the purpose of this study, the asymmetric model is specified in the following form;

$$\Delta LRGDP = \beta_0 + \sum_{j=1}^{p-1} \lambda_1 \Delta LNRGDP_{t-1} + \sum_{i=0}^{q} \delta_i^+ \Delta LNNTAE_{t-1}^+$$

$$+ \sum_{i=0}^{q} \delta_i^- \Delta LNNTAE_{t-1}^- + \sum_{i=0}^{q} \lambda_i^+ \Delta LNGCF_{t-1}^+$$

$$+ \sum_{i=0}^{q} \lambda_i^- \Delta LNGCF_{t-1}^- + \sum_{i=0}^{q} \gamma_i^+ \Delta LNINFL_{t-1}^+$$

$$+ \sum_{i=0}^{q} \gamma_i^- \Delta LNINFL_{t-1}^- + \sum_{i=0}^{q} \phi_i^+ \Delta LNEXCR_{t-1}^+$$

$$+ \sum_{i=0}^{q} \phi_i^- \Delta LNEXCR_{t-1}^- + \sum_{i=0}^{q} \psi_i^+ \Delta LNFDI_{t-1}^+$$

$$+ \sum_{i=0}^{q} \psi_i^- \Delta LNFDI_{t-1}^- + \rho LNRGDP_{t-1} + \varphi_1^+ LNNTAE_{t-1}^+$$

$$+ \varphi_1^- LNNTAE_{t-1}^- + \varphi_2^+ LNGCF_{t-1}^+ + \varphi_2^- LNGCF_{t-1}^-$$

$$+ \varphi_3^+ LNINFL_{t-1}^+ + \varphi_3^- LNINFL_{t-1}^- + \varphi_4^+ LNEXCR_{t-1}^+$$

$$+ \varphi_4^- LNEXCR_{t-1}^- + \varphi_5^+ LNFDI_{t-1}^+ + \varphi_5^- LNFDI_{t-1}^-$$

$$+ \cup_t \dots \dots \dots \dots \dots .. Eqn. 14$$

The long run impact of X_1 on Y is calculated as $L_{m1+} = -\frac{\varphi_1^+}{\rho}$ and $L_{m1-} = -\frac{\varphi_1^-}{\rho}$

short run asymmetric effect of X on Y is represented by $\sum_{i=0}^{q} \delta_i^+$ and $\sum_{i=0}^{q} \delta_i^-$

using the Wald test if the null hypotheses $-\frac{\varphi_1^+}{\rho} = -\frac{\varphi_1^-}{\rho}$ for long run and

$\sum_{i=0}^{q} \delta_i^+ = \sum_{i=0}^{q} \delta_i^-$ for short run symmetric are rejected and conclude that the

impact of X on Y is asymmetric.

Similar to ARDL model bounds test, NARDL bound test is also joint test of all lagged one period levels of X^+, X^- and Y. F-test for Pesaran et al. (2001) if using sample (n) $= H_0 = \rho = \varphi^+ = \varphi^- = 0$

And T-test is also in a form $H_0: \varphi = 0$, $H_A: \varphi < 0$ if the null hypothesis (H_0) is rejected the conclusion will be that the variables are cointegrated in the presence of asymmetry.

3.3.4.1 The Dynamic Multiplier Effects

The cumulative dynamic multiplier effects of x^+ and x^- on Y_t was estimated and this is specified as follows: $M_k^+ = \sum_{i=0}^{k} \frac{dy_{t-i}}{dx_t^+}$ and $M_k^- = \sum_{i=0}^{k} \frac{dy_{t-i}}{dx_t^-}$

When k increases to infinity, the multipliers converge to the alphas.

3.3.4.2 NARDL Error Correction Model

Also, when NARDL bounds test confirmed cointegration in the presence of asymmetry, then there is the need to estimate error correction mechanism to measure the speed of adjustment in reverting back to equilibrium in long run when there is displacement in equilibrium. The error correction model for the asymmetric ARDL in this study is specified in the following form;

$$\Delta LRGDP = \beta_0 + \sum_{j=1}^{p-1} \lambda_1 \Delta LNRGDP_{t-1} + \sum_{i=0}^{q} \delta_i^+ \Delta LNNTAE_{t-1}^+$$

$$+ \sum_{i=0}^{q} \delta_i^- \Delta LNNTAE_{t-1}^- + \sum_{i=0}^{q} \lambda_i^+ \Delta LNGCF_{t-1}^+$$

$$+ \sum_{i=0}^{q} \lambda_i^- \Delta LNGCF_{t-1}^- + \sum_{i=0}^{q} \gamma_i^+ \Delta LNINFL_{t-1}^+$$

$$+ \sum_{i=0}^{q} \gamma_i^- \Delta LNINFL_{t-1}^- + \sum_{i=0}^{q} \phi_i^+ \Delta LNEXCR_{t-1}^+$$

$$+ \sum_{i=0}^{q} \phi_i^- \Delta LNEXCR_{t-1}^- + \sum_{i=0}^{q} \psi_i^+ \Delta LNFDI_{t-1}^+$$

$$+ \sum_{i=0}^{q} \psi_i^- \Delta LNFDI_{t-1}^- + \rho LNRGDP_{t-1} + \varphi_1^+ LNNTAE_{t-1}^+$$

$$+ \varphi_1^- LNNTAE_{t-1}^- + \varphi_2^+ LNGCF_{t-1}^+ + \varphi_2^- LNGCF_{t-1}^-$$

$$+ \varphi_3^+ LNINFL_{t-1}^+ + \varphi_3^- LNINFL_{t-1}^- + \varphi_4^+ LNEXCR_{t-1}^+$$

$$+ \varphi_4^- LNEXCR_{t-1}^- + \varphi_5^+ LNFDI_{t-1}^+ + \varphi_5^- LNFDI_{t-1}^- + \lambda ECM_{t-1}$$

$$+ \cup_{t \dots\dots\dots\dots eqn15}$$

As intimated, if found that the variables are cointegrated in the presence of asymmetry the error correction model is then estimated. This takes the above form;

Where ECM_{t-1}, λ shows the speed of adjustment of the parameter, indicating the time frame for equilibrium to be restored or how quickly the series can come back to its long run equilibrium after distortion from equilibrium.

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3.3.5 Method of Analysis for Objective Three

In order to meet the objective three which is to determine significant factors that affect the growth of NTAE in Ghana, the study again deployed the ARDL model to determine these factors and it is specified in following form;

$$LNNTAE_t = \beta_0 + \sum_{i=0}^{P} \beta_{1i} LNNTAE_{t-1} + \sum_{i=0}^{q} \beta_{2i} LNRGDP_{t-i}$$

$$+ \sum_{i=0}^{q} \beta_{3i} LNINFL_{t-i} + \sum_{i=0}^{q} \beta_{4i} LNGCF_{t-i}$$

$$+ \sum_{i=0}^{q} \beta_{5i} LNEXCR_{t-i} + \sum_{i=0}^{q} \beta_{6i} LNFDI_{t-i} + \varepsilon_{t\ \dots\dots Eqn16}$$

3.3.6 Impulse Response Function

The impulse response function was adopted to achieve objective four which is to measure the impacts of innovations (shocks) to the macroeconomic variables on NTAE's growth. The impulse response function was settled on because it reveals the effect of a standard deviation impulse or innovation on the dependent variable. This is presented graphically. This method was also employed by Verter and Bečvářová (2016) to measure the impact of innovations on agricultural exports in Nigeria in an assessment of the impact agricultural export on the economic growth of Nigeria so the choice of this method is justified.

3.4 Diagnostics Test

In order to ensure validity and reliability of the data and estimated results, appropriate diagnostics test prior and post estimation were performed. Prior to estimation, stationarity tests were conducted to make sure that, the underlying

time series variables are not integrated of order two. Post estimation, various tests were performed again in order to make sure that the obtained results are free from econometric problems such as serial correlation, multicollinearity, heteroscedasticity among others. This includes test for serial correlation, normality and heteroscedasticity. Diagnostic tests such as Breusch Godfrey test was performed to ascertain the presence or otherwise of serial correlation, Breusch-Pagan Godfrey test for heteroscedasticity and Jarque Bera test for normality as well as stability test were conducted on the models to ascertain the robustness and reliability of the models.

3.5 Techniques of Data Estimation

ARDL estimation technique was adopted to investigate the impact of NTAE on Ghana's economic as well as factors that affect the performance of NTAE in Ghana. This is similar to a least square estimation procedure and was used to estimate the parameters of the model. This estimation method is very efficient, provides unbiased estimates and valid t-statistic irrespective of the endogeneity of some regressors (Haris & Sollis, 2003). According to Ali et al. (2016) when appropriate lag is selected, residual correlation is eliminated and the problem of endogeneity mitigated. This is also efficient for small sample size (Pesaran et al., 2001). This model can be relied on to achieve the study objectives. Evidence to this can be seen in the work of many researchers including Dube et al. (2018), Mabeta (2015), Ikechukwu (2021), among several others in the study of a range of economics relationship that turned to be very efficient and unbiased in the production of satisfactory and acceptable results. So, the choice of this estimation technique is fully justified. The specified model estimates the data collected to

obtain the numerical values of the non-zero parameters to ascertain the predictive ability of the model.

3.6 Description of the Variables

3.6.1 Non-Traditional Agricultural Exports (NTAE)

NTAE refers to exports of agricultural products which previously were not exported but has evolved in recent times as export products. Non-Traditional export products are products outside the traditional exports. According to GEPA (2020) there are over 383 different NTE products grouped into agricultural, processed/semi-processed and handicrafts. Recently, some service exports have also been added to the NTEs (GEPA, 2020). Cashew, shea nuts, yam, medicinal plants, pineapples are among the leading NTAE products (GEPA, 2019). For the purpose of this study, NTAE refers to the total exports from the sum of products such as pineapple and banana, vegetables and cashew. These (the four products) were selected out of the many products because of the availability of data points which were deemed long enough to make this kind of study. The export values of these products in aggregate form were collected from the trade statistics division of FAO (FAOSTATS, trade indices 81) from the period of 1961 to 2019. There have been varied findings about the contribution of exports to economic growth of nations. But following the concept of export led growth hypothesis that postulates exports to have positive causal impact on economic growth and other studies such as Dube et al.(2018), Magar (2020) and Zhou (2021) the a priori sign is positive for NTAE.

3.6.2 Real Gross Domestic Product (RGDP)

RGDP is the overall monetary value of goods and services produced within the corridors of the nation irrespective of the nationals that produce it after adjustment of inflation. This variable is in the constant US dollars term of 2010 and sourced from the World Development Indicators (WDI). Real GDP is the sum of all monetary value of outputs or products produced by both nationals and foreigners living within the frontier of the country in addition to indirect taxes levied by the state and less any subsidies granted to consumers or producers in the domestic economy. This is calculated without adjusting for capital consumption allowance (depreciation) or capital worn-out of assets. However, this takes into account adjustment for inflation. GDP measures the health of an economy and is widely use in economic growth literature to measure or proxy for economic growth. Several studies including Darko (2015), Islam et al. (2021), Polat (2021) and Taoridi (2021) used GDP as a measure of economic growth. Using real GDP as a yardstick to measure economic growth in this thesis is fully justified.

3.6.3 Gross capital Formation (GCF)

This entails investments made in the economy from the quarters of government and the private sector. GCF includes all investments in the domestic economy emanating from domestic citizens to spur productivity and efficiency as well as boost the capacity of the production units. This includes factories, offices complexes, commercial buildings, plants and equipment and other fixed assets. This also includes investment in railway, roads, schools, hospitals and others. For the purpose of this study, the measurement of this variable is expressed as a

percentage of GDP and it is also obtained from the World Development Indicators. GCF is previous known as investment. And as investment increases economic growth is expected to increase. Since investment leads to increase in national output, the expected sign for GCF is positive. The inclusion of this variable is fully justified as previous researchers such as Darko (2015), Mabeta (2015), Qazi et al.(2021) and Urriola et al. (2018) included it in their work as independent variable to measure economic growth.

3.6.4   Exchange Rate (EXCR)

EXCR in simple terms refers to price paid to acquire another county's currency. The measurement of this variable is in terms of the Ghanaian Cedis relative to another country's currency but for the purpose of this study it is in relation to US dollar over a time period because this the most widely traded currency in the international market. This variable was also obtained from the WDI. For the purpose of this study, exchange rate refers to the rate determined by interbank market by the forces of demand and supply, and it is determined on daily basis, which culminates to weekly base on daily averages to monthly average base on weekly averages then to annual average based on monthly averages. This has been identified as a variable that has impact on economic growth and mostly been added to other variables to investigate economic growth especially with export. This is found in the work of Ahiabo and Amoah (2019), Alagidede and Ibrahim (2017) and Okyere (2020). So, the inclusion of this variable to measure economic growth is backed by literature. Depreciation in value of the exchange rate puts inflationary pleasures in the economy and this is expected to reduce aggregate demand and for that matter economic growth and reverse is true for appreciation

of exchange rate. Following studies on the impact of exchange rate on economic growth including Ahiabo and Amoah (2019) and Alagidede and Ibrahim (2017). The expected the sign is positive.

3.6.5   Inflation Rate (INFL)

INFL is the consistent rise or upward adjustment of general consumer price levels of goods and services in an economy. This is measured using Consumer Price Index (CPI) of basket of consumer goods. In Ghana, the number of goods in the inflation basket is 307 and it is calculated by Ghana Statistical Service on monthly bases. For the purpose of this study, the annual averages calculated from monthly rate is used and it is obtained from WDI. The choice of the variable is based on literature as authors such as Alagidede and Ibrahim (2017), Minhaj (2021) and Polat (2021) included this in their respective economic growth nexus studies. There have been varied findings on inflation-economic growth nexus whiles some empirical findings suggest positive impact (Minhaj, 2021) others dissent on this (Alagidede & Ibrahim, 2017) and (Polat, 2021). Inflation causes prices to rise leading to reduction in real income and hence reduce consumption or aggregate demand. A decreased in consumption will lead to decrease in economic growth. Inflation also leads to increase in cost of production. An increased in cost of production will lead to a decline in output hence affect total output which constitute GDP. So, the a priori expectation is that inflation should have a negative impact on economic growth.

3.6.6 Foreign Direct Investment (FDI)

Foreign direct investment refers to foreigners investing in physical infrastructure in the domestic economy other than shares and other marketable securities. This is commonly measured as a percentage of GDP when studying or analyzing its impact on economic growth but for this study the net inflows of FDI is used. Thus, FDI inflows less outflows. This is another form of investment but from the quarters of foreigners and as already indicated investment leads to output creation. So, the a priori expectation is that foreign direct investments impact an economy positively as supported by empirical studies including Alagidede and Ibrahim (2017), Bakkacha and Touhami (2021), Lelya and Ngaruko (2021), Mavidkhaan (2021) and Qazi et al.(2021). The expected sign is positive and the justification for including this in the model is fully met as the above authors also included it as an explanatory variable in their models to study economic growth nexus.

Table 3.1: Variables Explanations and A Prior Expectation

Variable	Explanation	Expected sign
LNRGDP Dependent Variable	Log form of real gross domestic product in constant dollar term of 2010	
LNFDI	Log form of net inflow of foreign direct investment	+
LNNTAE	Log form of values of nontraditional agricultural export obtained from aggregated data on cashew, banana, vegetables and pineapple	+
LNEXCR	Log form of official exchange rate (local currency per US$ period average) annual growth in %	+
LNINFL	Log form of inflation consumer price index (annual growth)	-
LNGCF	Log form of gross capital formation	+

3.7 Hypothesis testing

H0- NTAE has no impact on economic growth

H1- NTAE has an impact on economic growth

H0 – There is no positive trend in the values of NTAE

H1 - There is a positive trend in the values of NTAE

H0- Innovations (shocks) to the selected macroeconomic variables do not affect the performance of NTAE in Ghana

H1- Innovations (shocks) to the selected macroeconomic variables affect the performance of NTAE in Ghana

3.8 Source and Method of Data collection

Secondary data from 1961 to 2019 on real GDP, gross capital formation, FDI, inflation and exchange rate were sourced from World Bank (World Development Indicators). Aggregated values of some selected non-traditional agricultural exports (vegetables, pineapple, banana, and cashew) proxied as NTAE were obtained from trade statistics division of the Food and Agriculture Organization (Trade Indices 81) from 1961 to 2019. These (the four products) were selected out of the many products because of the availability of data points which were deemed long enough to make this kind of study.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Introduction

This chapter presents the data analysis and presentation of results of the study. The results are based on analysis of the data using the methodologies specified in chapter three. It uses results presentation formats such as tables and graphs to present the results to achieve the study objectives of examining the impact of non-traditional agricultural exports on Ghana's economic growth.

4.2 Descriptive Statistics

Before the analysis of the variables that constitute the data set, descriptive statistics were deployed to ascertain the nature or distinct features of the variables as well as data transformation and diagnostics that need to be carried out. This was aimed at ascertaining whether the distribution contains an outlier, normally distributed or otherwise. Inferences were made from the following reported statistics such as measure of central tendencies (mean, median, mode), measures of dispersion, skewness as well as kurtosis. From the table below, RGDP has an average value of 18.6 billion dollars with a deviation of 13.6 billion dollars away from its sample mean as well as minimum and maximum values of 7.25 and 57.3 billion dollars respectively. In terms of skewness the RGDP is fairly and positively skewed to the right. That is, it has a long right tail which means most of the values are higher than the average or its mean. The kurtosis value of the real GDP is 3.85 which means RGDP is leptokurtic it has a peak curve corroborating higher values above the sample mean of the variable as suggested by the value of its skewness. The normality test from the Jaque-bera statistics has

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a value of 21.55855 with the probability value of 0.000021 shows that the distribution is not normally distributed. Which means the null hypothesis of normal distribution of RGDP is rejected at 1% significant level. The Non-traditional Agricultural Exports has an average or mean value of 2,001,725.00 US dollars, variation of USD1,007,837.00 from the mean. It has the minimum and maximum values of 487,025.00 and 4,571,114.00 US dollars. Skewness value of 0.48 which mirrors a normal distribution that is the distribution is symmetric around its mean. The kurtosis value of 2.63 indicating that the distribution is platykurtic that is a flatten curve with more values lower than the average value. The Jarque-Bera statistics of 2.685469 and a probability value of 0.2611 which is insignificant and for that matter depicts a normal distribution because the null hypothesis of normal distribution cannot be rejected at 5% significance levels. For inflation it has an annual mean value of 26.48%, maximum and minimum values of 123.06% and -3.88% respectively, with standard deviation or dispersion from its mean at a value of 22.17%. The distribution is positively skewed and leptokurtic given the skewness and kurtosis values of 2.01 and 8.22 respectively. The distribution is not normally distributed given the probability value of the Jague-Bera statistic of 0.0000. For gross capital formation, exchange rate and foreign direct investment the variables respectively have a mean of 3.19 billion dollars, 0.7085 GH₵/ USD and net inflow of 721 million US dollars, maximum value of 17.7 billion US dollars, 5.217 GH₵/ USD, 3.88 billion US dollars, minimum value of 150 million US dollars, 0.000714 GH₵/ USD and (US$18260970.00) and standard deviation of 4.84 billion, 1.23 GH₵/ USD and 1.26 billion US dollars respectively. All the three variables (GCF, EXCR and FDI) are positively skewed, leptokurtic and non-normally

distributed given the respective values of skewness, kurtosis and Jarque-Bera statistics. This is presented in table 4.1.

Table 4.1:Descriptive Statistics

	RGDP	NTAE	INFL	GCF	EXCR	FDI
Mean	1.86E+10	2001725.	26.48685	3.19E+09	0.708560	7.21E+08
Median	1.21E+10	1766718.	20.04136	1.29E+09	0.032616	81800000
Maximum	5.73E+10	4571114.	123.0612	1.77E+10	5.217367	3.88E+09
Minimum	7.25E+09	487025.0	-3.878357	1.50E+08	7.14E-05	-18260970
Std. Dev.	1.36E+10	1007837.	22.16595	4.84E+09	1.283000	1.26E+09
Skewness	1.418629	0.487796	2.011532	2.034330	2.150455	1.480204
Kurtosis	3.848262	2.625016	8.215725	5.728545	6.720749	3.373993
Jarque-Bera	21.55855	2.685469	106.6642	58.99742	79.50693	21.88873
Probability	0.000021	0.261131	0.000000	0.000000	0.000000	0.000018
Sum	1.10E+12	1.18E+08	1562.724	1.88E+11	41.80504	4.25E+10
Sum Sq. Dev.	1.07E+22	5.89E+13	28497.09	1.36E+21	95.47320	9.15E+19
Observations	59	59	59	59	59	59

Source: Author's estimations, 2021

4.3 Trend Analysis

Trend analysis was performed on the variables to graphically ascertain the trajectory of movement from 1961 to 2019. The is presented below

4.3.1   Trend analysis of RGDP

RGDP from 1961 to 1984 was stable in growth but rose up 1984 and continue with a growing trajectory. This positive trend may be attributed to the efficient economic policy adopted by the military government of the period (mid 1980s) key among these were economic recovery and structural adjustment programmes. This period witnessed remarkable growth in GDP due to the optimum priority government gave to export diversification. This is corroborated by Baah-Nuakoh

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et al. (1996) that structural adjustment programme was heavily targeting exports which led to increase in export that culminated to increase in economic growth in Ghana. The period of 2007 also witnessed further increased in GDP growth as connotes by the figure 4.1 it can be seen that GDP further increased in higher magnitude. The growth in this period may attributed to the discovery of oil in commercial quantities that led to increase in both domestic investment and foreign direct investment in the oil sector. In sum, the trend from the period of 1961 to 1970 was constant in values of GDP, witnessed appreciable increase in the period between 1970 and 1985 and thereafter maintained an ascending trajectory.

4.3.2   Trend in Non-Traditional Agricultural Exports

The NTAE have been fluctuating in terms of growth. There was an upward trend in the values from the period of 1961 to 1965 the growth fell after 1965 rose again from 1965 to the period of 1970. It maintained this undulating trajectory. Between 1978 and 1985 the growth of NTAE attained the highest pinnacle. This is unsurprising because the period of mid 80s was the time when Ghana signed to World Bank and IMF ERP and SAP where exports were the key component of the SAP and ERP. According to Baah-Nuakoh et al. (1996) the structural adjustment program was pivoted on liberal trade and free market economy with emphasis on export led growth. The country capitalized on this to diversify her exports. This is corroborated by Whitfield (2011) that the period of 1980s witnessed export diversification where the horticultural sector which is a key component of NTAE emerged leading to a sharp rise in export of pineapples in the mid-80s which contributed to the sharp rise in NTAEs in this period. After

the period of 1980s the sector continues with its fluctuating trend throughout the period of study which is also consistent with the work of Apalatoya (2018) who found a fluctuating trend in the performance of nontraditional exports in Ghana from the period of 1987 to 2016.

4.3.3 Trends in Gross Capital Formation

GCF was near zero between the period of 1961 to 1975. The trend line lies asymptotic to the time line in the periods of 1961 to 1975. The trajectory changed, then there was an upward trend in the values of GCF for two consecutive years (1975-77) and abrupted following the coup de tat in the period of 1978 and its attending political instability in the country. This is corroborated by Aryeetey and Harrigan (2000) that the political instability between 1779 and mid-80s destabilized almost every sector of the economy including investment. According to the authors, the period was with no economic policy direction that affected every aspect of the economy. The trend of the values of GCF confirmed this. However, an upward trend with stable growth is seen after the country returned to a multi-party democracy in 1992 to a period of 2010 and rose sharply after 2010 and maintained the upward trend thereafter. This upward trend in gross capital formation may be attributed to the investment made prior to discovery of oil in commercial quantities and after discovery as well investment in physical infrastructure such as roads, hospitals and other capital investments in the economy. This investment manifested into Ghana attaining the highest economic growth within this period (2011). As investments serve as bedrock for economic growth.

4.3.4 Trend in Exchange Rate

Ghana adopted a fixed exchange rate regime after independence. From the trend in values of the exchange rate it can be seen that the exchange rate was fixed from 1961 and stable all over to 1992. The trajectory changed following the emergence of financial sector adjustment programme (FINSAP) a component under the ERP where the country abandoned the fixed exchange rate policy in favour of the flexible rate in the mid-80s (Alagidede & Ibrahim, 2017). Following the full implementation of the flexible exchange rate policy, the trajectory of the exchange rate then changed as observed in the figure 4.1 it can be seen that after the period of 1992 the trend has been in ascendency. It attained stability between the period of 2005 and 2009 and thereafter, it continues the upward movement. The upward movement signifies that the country currency is not stable it has been depreciating against the major trading currency in this case the US dollar since the country reverted to the flexible exchange rate regime in 1988.

4.3.5 Trend in Foreign Direct Investment

The FDI was on a constant trend and picked up after 1993. The growing strength in FDI after the period of 1993 can be attributed to a political stability the country enjoyed after her returned to multi-party democracy in 1992. The trend shows a sharp increase in FDI from the period of 2005 upward and maintained the trend since then. This positive trend could be attributed to the foreign inflows due to the discovery of oil in commercial quantities. The oil sector has attracted a lot of investment both upstream and downstream and could be one of the causes in the upward movement in the trend of FDI. Another reason for the trend could be the

government flagship programme of industrialization that has attracted foreign investment especially in the automobile industry.

4.3.6 Trend in Inflation Rate

The inflation rate has a fluctuating trend since 1961. The rate moves up and down however, the rates increased astronomically in the period of 1983 due to deteriorated economic performance the era witnessed that led to the general rise in the prices of goods and services in the country that resulted in the country going for IMF and World Bank support culminating into the introduction of the structural adjustment. Inflation maintained a reasonable trend after structural adjustment programme but at a fluctuating rate all over the period to almost a single digit in period 2006 and 2011 through to 2012. In sum, the trend in inflation rate as shown in the figure 4.1 below can be described as a fluctuating or an undulating trend.
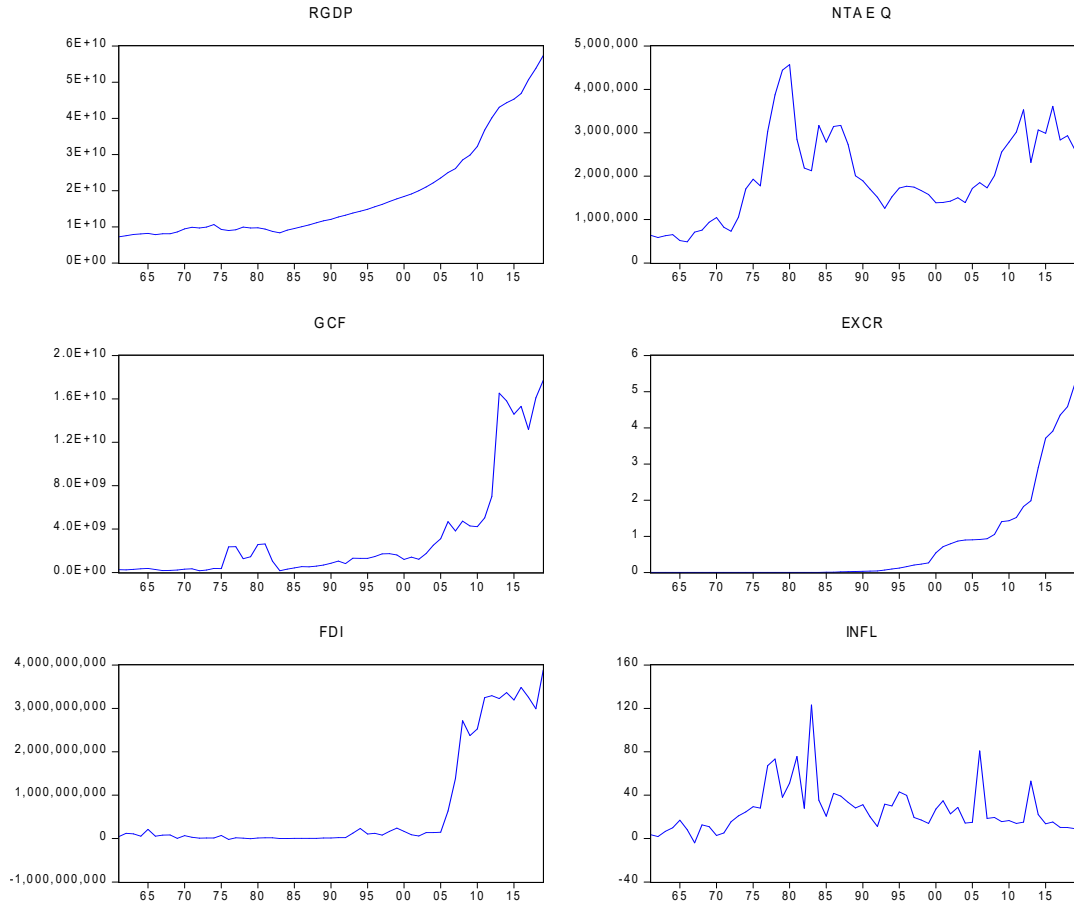
Figure 4.1: Trend Analysis/Linear Graphs

Source: Author's estimations, 2021

4.4 Correlation Analysis

Correlation and covariance analysis were performed to ascertain the degree of collinearity or relationship between the variables in the study. The table below shows correlation between RGDP and other variables in the study (non-traditional agricultural exports, inflation, exchange rate, FDI, and GCF). Attention is given to correlation between RGDP and other variables and that of NTAE and the other variables. The correlation and covariance results suggest that RGDP is positively correlated and covariance to all the variables except inflation which has weak and negative but insignificant relationship with RGDP. In terms

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of magnitude, GCF, FDI and exchange rate have very strong form of relation with that of RGDP. This is unsurprising because investment (GCF), exchange rate and FDI strongly influence economic growth (Alagidede & Ibrahim, 2017). The results also show correlation between non-traditional agricultural exports and the other variables. The results show that non-traditional agricultural export has a positive correlation between GCF, FDI, exchange rate and inflation. Inflation on the other hand has negative relationship with all the variables except non-traditional agricultural exports which has weak and positive significant relationship with inflation. The strong correlation between the some of the independence variables above the 0.8 correlation coefficient led to the log transformation of the data to reduce the multicollinearity effect as well as discards dissimilarities in units of measurement.

Table 4.2: Correlation Matrix for RGDP and Other Variables

Covariance Correlation Probability	RGDP	NTAE	GCF	EXCR	FDI	INFL
RGDP	1.81E+20					
	1.000000					

NTAE	5.29E+15	9.99E+11				
	0.393922	1.000000				
	0.0020	-----				
GCF	6.02E+19	2.07E+15	2.30E+19			
	0.932769	0.430961	1.000000			
	0.0000	0.0007	-----			
EXCR	1.64E+10	469740.2	5.75E+09	1.618190		
	0.958961	0.369543	0.941270	1.000000		
	0.0000	0.0040	0.0000	-----		
FDI	1.57E+19	5.16E+14	5.34E+18	1.41E+09	1.55E+18	
	0.939500	0.414733	0.893825	0.887922	1.000000	
	0.0000	0.0011	0.0000	0.0000	-----	
INFL	-5.14E+10	8657926.	-9.00E+09	-5.750762	-5.40E+09	483.0016
	-0.174072	0.394241	-0.085284	-0.205701	-0.197108	1.000000
	0.1873	0.0020	0.5207	0.1181	0.1346	-----

Source: Author's estimations, 2021

4.5 Unit Root Test

Unit root tests were conducted using Augmented Dickey Fuller test (ADF), Philips Perron (PP) test Generalised-Dickey Fuller test and Kwiatkowski-Phillips-Schmidt-Shin test (KPSS) to ascertain the order of integration of the variables. The tests revealed that only inflation was stationary at levels the remaining variables such as real RGDP, Non-traditional Agricultural Exports Exchange rate, Gross Capital Formation and Foreign Direct Investment were stationary at first difference. These variables are integrated of different orders (order one I (1) and order zero I(0)). This was done to ensure that none of the

variables is stationery or integrated at order two I (2). This is presented in the table below.

Table 4.3: Unit Root Test

	ADF TEST		PP TEST		GLS -DF		KPSS TEST	
Variable	Level	1st Difference	Level	1st Difference	Level	1st Difference	Level	1st Difference
LNRGDP	3.1775	-4.9011***	3.1775	-4.9011***	2.1908	-4.9214***	0.2355 ***	0.0765
LNNTAE	-1.8525	-6.6368***	-1.9096	-6.5849***	-0.8480	-6.2249***	0.4088***	0.1227
LNINFL	-2.9145**	-9.8525***	-3.503***	-11.051***	-2.1207**	-7.5969***	0.2468	0.2496
LNFDI	-1.0371	-9.2574***	-0.6790	-9.3186***	-1.0936	-2.8554***	0.6264***	0.1164
LNGCF	-0.8791	-7.0982***	-0.7058	-7.9311***	-0.3461	-6.9518***	0.8173***	0.1305
LNEXCR	-0.4021	-4.2932***	-0.1279	-4.1909***	0.5443	-3.9674***	0.9161***	0.1759

, * Rejecting the null hypothesis at 5% and 1% critical value respectively

Source: Author's estimations, 2021

4.6 Developmental Trend of Nontraditional Agricultural Exports from 1961 to 2019

To meet the study objective one, thus to examine the developmental trajectory or trend of performance in the nontraditional agricultural export sector, the quadratic or exponential trend analysis was performed on this variable and the results show that development in nontraditional exports is decelerating in trend. The coefficient of TREND^2 is -0.0137 which is significant at one percent which

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implies that the trend in development or growth of nontraditional agricultural exports is increasing at a decreasing rate or decelerating in trend.

Table 4.4: Trend Analysis for NTAE

Dependent Variable: LNNTAE
Method: Least Squares

Sample: 1961- 2019
Included observations: 59

Variable	Coefficient	Std. Error	t-Statistic	Prob.
@TREND	0.976843	0.073072	13.36821	0.0000
@TREND^2	-0.013754	0.001613	-8.528211	0.0000

Source: Author's estimations, 2021

4.6 Impacts of Nontraditional Agricultural Exports on Economic Growth

Using the symmetry ARDL to examine the impact of NTAE on Ghana's economic growth (objective two) the results is as follows;

4.6.1   Impacts of Nontraditional Agricultural Exports on Economic

Growth in Short Run

Before the estimation, optimal lag selection was done using Akaike Information Criteria (AIC) to select the appropriate lag length for the model. Thereafter the estimation results then followed;

In short run, the results of the traditional ARDL revealed that past values of RGDP have a significant and causal impact on economic growth. From the results it can be seen that first and third lags of RGDP are significant at 5% and 1% with 0.68 and 1.38 respective coefficients which means ceteris paribus an increase in value of these lag terms by 1% will bring about correspondence upward

adjustment in economic growth (RGDP) by 0.68% and 1.38% respectively in the short run.

For FDI, the results also revealed that both the contemporaneous term of FDI and its lag term have a significant causal influence on RGDP. The results suggest that a percentage increase in contemporaneous term of the FDI will bring a resultant decrease in economic growth by 0.02% whiles the past year's FDI (first lag term) will cause RGDP to increase by 0.03% when the first lag of FDI is increased by 1% in the short run.

GCF according to the results has a significant causal influence on RGDP in the short run. The contemporaneous term, the first, second as well as the third lags have all shown that GCF has a significant influence on RGDP in short run. The contemporaneous term of GCF will cause RGDP to increase by 0.074% in short run when it (GCF) is increase by a percentage and that of the past periods values-first, second and third periods will all cause economic growth to decline in short run at a respective rate of 0.18%, 0.13% and 0.07% when their respective values are increased by 1% all other things being equal.

Inflation as expected contributes significantly to RGDP growth. The results show that inflation contemporaneously impacts negatively on RGDP growth, such that when inflation is increased by 100 basis point the resultant impact on the economy will be a downward slide in growth by 0.018% in the short run. However, the past or the lag values both first- and second-years' lags will deliver an upward economic growth by 0.030% and 0.021% when the respective lag

inflation rate is up by 100 basis point in the short run provided all other things are constant.

Non-traditional agricultural export is the main variable of concern, but the results show that the current value of non-traditional agricultural export does not significantly cause RGDP in the short run. However, past values are reported to have a significant impact on RGDP growth in the short run period. From the results it is seen that an upward adjustment in the value of the first and second lags of non-traditional agricultural exports by 1% the resultant impact on the economy is to cause the economy to grow upward by 0.15% and 0.093% all things being equal.

Exchange rate does not contemporaneously influence RGDP growth in short run. However, the past year's value of exchange rate has a significant causal impact on RGDP. if there was an exchange rate depreciation in the past year that is when the cedi depreciated against the US dollar by one percent in the past year the resultant impact on the economy is to decrease economic growth by 0.073% in the current year in the short run.

Table 4.5: Short Run Impact of LNNTAE on LNRGDP

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNRGDP(-1))	0.685501	0.308529	2.221838	0.0402**
D(LNRGDP(-2))	0.551279	0.267043	2.064382	0.0546
D(LNRGDP(-3))	1.380900	0.421834	3.273562	0.0045***
D(LNFDI)	-0.020567	0.007081	-2.904449	0.0099***
D(LNFDI(-1))	0.026797	0.008867	3.021963	0.0077***
D(LNFDI(-2))	0.005513	0.005054	1.090644	0.2906
D(LNGCF)	0.073762	0.013605	5.421631	0.0000***
D(LNGCF(-1))	-0.181906	0.040783	-4.460388	0.0003***
D(LNGCF(-2))	-0.128488	0.026344	-4.877358	0.0001***
D(LNGCF(-3))	-0.074877	0.027120	-2.760969	0.0134**
D(LNINFL)	-0.017872	0.007158	-2.496727	0.0231**
D(LNINFL(-1))	0.030415	0.010098	3.011876	0.0079***
D(LNINFL(-2))	0.021490	0.007078	3.036212	0.0075***
D(LNNTAE)	0.040318	0.025593	1.575357	0.1336
D(LNNTAE(-1))	0.154930	0.043502	3.561427	0.0024***
D(LNNTAE(-2))	0.093943	0.034202	2.746754	0.0138**
D(LNNTAE(-3))	0.042008	0.021819	1.925283	0.0711
D(LNEXCR)	0.032008	0.022389	1.429614	0.1709
D(LNEXCR(-1))	-0.073277	0.019301	-3.796620	0.0014***
D(LNEXCR(-2))	0.033804	0.021655	1.561047	0.1369

***,   ** significant at 1% and 5% respectively

Source: Author's estimations, 2021

4.6.2   Long Run Impacts of NTAE on RGDP

In long run, the study identified FDI, GCF, inflation, and exchange rate as factors that have significant causal impact on RGDP. The traditional or the symmetry ARDL results as seen below revealed that in long run a percentage increase in foreign direct investment will bring about 0.144% decrease in real gross domestic product (economic growth). Whereas that of gross capital formation will bring a resultant increase in economic growth at a margin of 0.608% if all other factors held constant. In similar vein, increase in inflation rate by 1% will bring about a corresponding decline in RGDP growth by 0.239% in long run. The appreciation of the cedi against the world major trading currency the US dollar by 1% will bring about 0.033% increase in economic growth. The symmetric ARDL result could not establish a significant causal impact of non-traditional agricultural export on RGDP in long run given the probability value of 0.2835 which is higher than the 5% significant level.

Table 4.6: Long Run Impact of LNNTAE on LNRGDP

Levels Equation				
Case 3: Unrestricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNFDI	-0.144089	0.041648	-3.459718	0.0030***
LNGCF	0.608180	0.103175	5.894636	0.0000***
LNINFL	-0.238909	0.055579	-4.298537	0.0005***
LNNTAE	-0.117937	0.106481	-1.107589	0.2835
LNEXCR	0.033437	0.015416	2.169038	0.0446**

*** ** significant at 1% and 5% respectively
Source: Author's estimations, 2021

EC = LNRGDP - (-0.1441*LNFDI + 0.6082*LNGCF -0.2389*LNINFL -0.1179
*LNNTAE + 0.0334*LNEXCR)

4.7 ARDL Bounds Test

The bounds test results indicate the presence of cointegration among the variables
thus from the F-statistic value of 7.491829 which is greater than I(1) bound value
of 4.68 at 1% significant level this is reinforced by the t-bound test with a statistic
value of -4.910795 higher than -4.79 in absolute terms at 1% significant level.
Since the F and T statistics are greater than upper (I(1)) bound values at 1%
significant levels, the null hypothesis of no long run relationship is rejected at 1%
significant level and the conclusion drawn is that there is presence of
cointegration or long run relationship between RGDP and the regressors.

Table 4.7: ARDL Bounds Test Results

F-Bound Test				
Test Statistic	Value	Significance	I(0)	I(1)
F-statistic	7.491829	10%	2.26	3.35
K	5	5%	2.62	3.79
		2.5%	2.96	4.18
		1%	3.41	4.68
t-Bounds Test				
t-statistic	-4.910795	10%	-2.57	-3.86
		5%	-2.86	-4.19
		2.5%	-3.13	-4.46
		1%	-3.43	-4.79

Source: Author's estimations, 2021

Since cointegration is confirmed, the ECM is then estimated. The parameters of the long run coefficients are reparametrized to form the error correction module the results revealed the coefficient is -0.288315 and at 1% significant level. This implies that in long run displacement in equilibrium is restored at an adjustment speed of 28.83%.

Table 4.8: Error Correction Regression Results

ECM Regression
Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CointEq(-1)*	-0.288315	0.037802	-7.627047	0.0000

R-squared	0.925248	Mean dependent var	0.041755
Adjusted R-squared	0.853893	S.D. dependent var	0.040986
S.E. of regression	0.015667	Akaike info criterion	-5.167726
Sum squared resid	0.005400	Schwarz criterion	-4.275631
Log likelihood	135.6900	Hannan-Quinn criter.	-4.836894
F-statistic	12.96694	Durbin-Watson stat	1.719752
Prob(F-statistic)	0.000000		

Source: Author's estimations, 2021

Jointly the F static shows the model is significant, at 1% and hence best fit for inferences purpose. The R-squared (coefficient of determination) measures the fitness of the model. From the results, the reported R-squared is 0.9252 which mean that 92.52% of variations or changes in the dependent variable is explained by the independent variables. This implies that the model is fit for purpose only 7.48% variations in dependent variable is unexplained by the regressors and it is accounted for in the error term.

4.8 Diagnostic Test

The model diagnostic tests were carried out to confirm the stability of the model, normality, multicollinearity, serial correlation and heteroscedasticity or otherwise of the model. Using the cumulative sum (CUSUM) and cumulative sum of squares to ascertain the stability of the model. Both graphs revealed that the model is very stable. They both lie within the 5% significance boundaries confirming stability of the model.
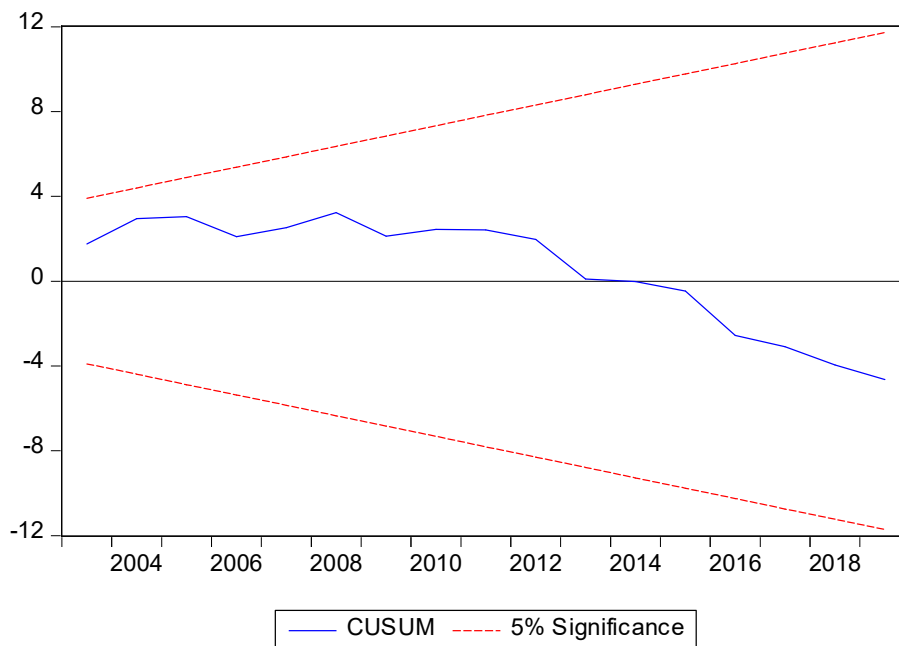
Figure 4.2: CUSUM Graph for Testing Model Stability

Source: Author's estimations, 2021
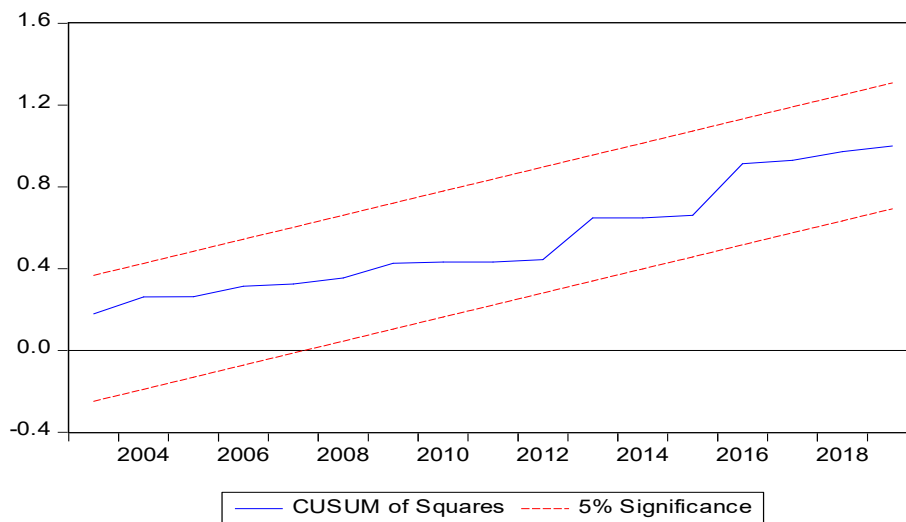
Figure 4.3: CUSUM of Squares Graph for Testing Model Stability

Source: Author's estimations, 2021

Serial correlation was conducted using Breusch-Godfrey test the reported probability value of the F-static is 0.3311 which is higher than the 5% significance level. Therefore, the null hypothesis of no serial correlation cannot be rejected at 5% significance level. Hence the model does not suffer from the problem of serial correlation.

Table 4.9: Serial Correlation Test Result for ARDL Model

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.190888	Prob. F(2,15)	0.3311
Obs*R-squared	6.029196	Prob. Chi-Square(2)	0.0491

The model was subjected to heteroskedasticity test using Breusch-Godfrey-Pagan test to confirm whether the variance of the error term is constant. The results show that the F-static has a probability value of 0.9609 which is higher than the 5% significance level and therefore failed to reject the null hypothesis of no heteroscedasticity. Hence, the conclusion is that the model is homoscedastic.

Table 4.10: Heteroscedasticity Results for the ARDL Model

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.467286	Prob. F(26,17)	0.9609
Obs*R-squared	18.33914	Prob. Chi-Square(26)	0.8631
Scaled explained SS	2.346195	Prob. Chi-Square(26)	1.0000

Source: Author's estimations, 2021

The variance inflation factor shows that none of the variables is above 10 which is the threshold for multicollinearity. Hence the model is free from multicollinearity.

Table 4.11: Variance Inflation Factor Results for the ARDL Model

Variance Inflation Factors
Date: 03/21/22   Time: 23:05
Sample: 1961 2019
Included observations: 59

Variable	Coefficient Variance	Uncentered VIF
LNEXCR	0.000520	3.632019
LNNTAE	0.029104	3.281129
LNFDI	0.005488	4.069451
LNGCF	0.024891	2.367371
LNINFL	0.012846	2.652332

Test for normality was conducted using histogram normality test and from the test results, the probability value of the Jaque-Bera statistic is 0.284870 which higher than the 5% significance level. Which implies that the null hypothesis of the model being normally distributed cannot be rejected and hence the model does not suffer from the problem of non-normality.

Series: Residuals	
Sample 1965 2019	
Observations 44	
Mean	1.01e-15
Median	0.001545
Maximum	0.017671
Minimum	-0.027775
Std. Dev.	0.011206
Skewness	-0.567475
Kurtosis	2.714047
Jarque-Bera	2.511447
Probability	0.284870
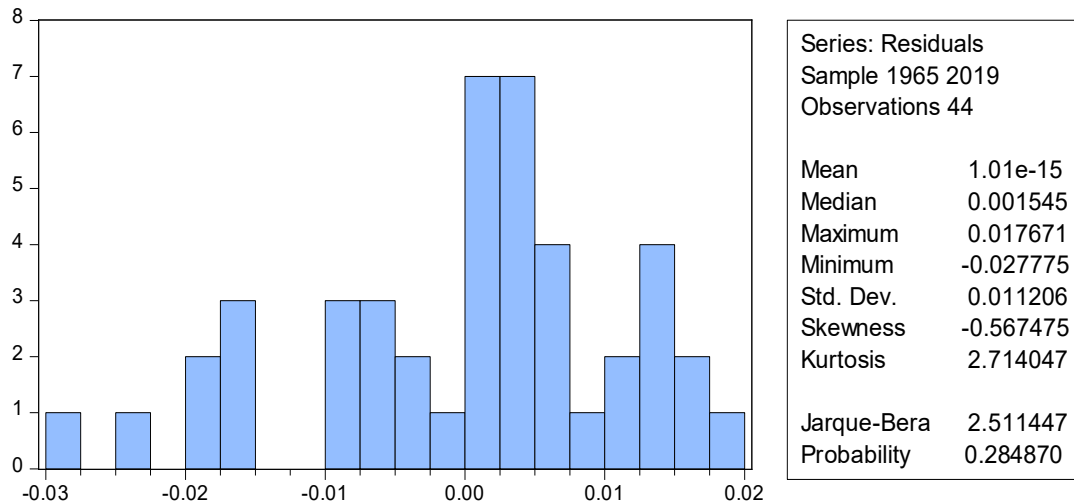
Figure 4.4: Normality Test result for the ARDL Model

4.9 Nonlinear Autoregressive Distributive Lag (NARDL) Model

Whiles the above analysis allows the examination of the impact of NTAE on economic growth (objective two), with an assumption that the impact is symmetric that is when the independent variables increase or decrease the magnitude of impact is the same. To, avoid such kind of utopian assumption the study applied the NARDL model which decomposed NTAE and the other variables (inflation, GCF, exchange rate and FDI) into their partial sum of positive and negative changes and estimated the asymmetric version of the ARDL model to account for the asymmetric impact. Therefore, NARDL framework of Shin et al. (2014) is suitable for this research problem because it allows not only to measure impact taking into account asymmetric effect, but also provides means to control multicollinearity as well as means to examine the dynamic multiplier effect of NTAE and other regressors on RGDP.

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4.9.1 Short Run Impacts of NTAE on RGDP

From the results it is revealed that first lag of RGDP has a significant causal influence on RGDP. That is an increase in previous year's RGDP by 1% the resultant impact will be an increase in economic growth by 0.43% in the short run ceteris paribus.

In short run, an increase in contemporaneous term, first and second lags of nontraditional agricultural exports by 1% will respectively and significantly increase economic growth by 0.128%, 0.111% and 0.055%. Whereas, decrease in contemporaneous term of nontraditional agricultural exports by 1% will decrease economic growth by 0.043% and that of decrease in first lag of NTAE by same percent will significantly cause economic growth to increase by 0.046% in the short run.

Increase in inflation does not contemporaneously affect RGDP in the short run but the first lag term does influence it in short run in that when there is upward movement in past period's inflation by 100 basis point will increase economic growth by 0.22% all other things being equal.

Decrease in inflation however, both contemporaneous and lag terms significantly affect economic growth. Negative shocks in current year's inflation by a percentage, significantly increases RGDP by 0.169%. Negative shocks in first and second lag terms of inflation will decrease economic growth by 0.059% and 0.048% in short run provided all other things being equal.

Positive change in gross capital formation both contemporaneous and the lag terms (first and second lags) significantly cause RGDP to grow in the short run. However, negative shock or decrease in gross capital formation does not significant affect or cause growth in RGDP contemporaneously. But the growth is rather found in the lag values of LNGCF in that 1% decrease in first and second lags of gross capital formation will resultantly cause RGDP to increase in growth by a margin of 0.11% and 0.06% respectively in short run provided all other factors are held constant.

Positive change in foreign direct investment in contemporaneous term does not significantly cause growth in Ghana's economy. However, the negative change in current or contemporaneous term of LNFDI significantly causes RGDP to grow in short run. From the results a decline in net FDI inflows by 100 basis points will result in an upward movement in RGDP by 0.0167% in the short run all else constant.

The current term of positive change in exchange rate does not significantly impact economic growth but the lag terms thus first and second lags do influence economic growth in the short run. As seen in the results 1% increase in the first lag term of exchange rate will resultantly cause real GDP to decrease by 0.087% and the same percentage increase in the past second year's exchange rate value will cause real GDP to increase by 0.024% in the short run period ceteris paribus.

The negative change in exchange rate does not contemporaneously impact RGDP significantly in the short run. The impact is seen in the past term as seen from the results a negative shock or decrease in exchange rate in past period one will

significantly cause RGDP to increase by a magnitude of 0.79% in the short run

provided all other things are equal.

Table 4.12: Short Run NARDL Results -Impact of NTAE on RGDP

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNRGDP(-1))	0.430120	0.062718	6.857958	0.0000***
D(LNNTAE_POS)	0.128697	0.024309	5.294179	0.0000***
D(LNNTAE_POS(-1))	0.111204	0.025993	4.278156	0.0002***
D(LNNTAE_POS(-2))	0.055860	0.024887	2.244489	0.0335**
D(LNNTAE_NEG)	0.043333	0.017541	2.470441	0.0221**
D(LNNTAE_NEG(-1))	-0.046458	0.021508	-2.160032	0.0425**
D(LNINFL_POS)	-0.008471	0.006725	-1.259704	0.2216
D(LNINFL_POS(-1))	0.022130	0.006707	3.299728	0.0034***
D(LNINFL_NEG)	-0.016920	0.006809	-2.484745	0.0215**
D(LNINFL_NEG(-1))	0.058609	0.006879	8.520297	0.0000***
D(LNINFL_NEG(-2))	0.048277	0.005958	8.102214	0.0000***
D(LNGCF_POS)	0.078525	0.009199	8.536744	0.0000***
D(LNGCF_POS(-1))	0.040266	0.008774	4.589452	0.0002***
D(LNGCF_POS(-2))	0.048985	0.007283	6.725769	0.0000***
D(LNGCF_NEG)	0.021947	0.012233	1.794091	0.0872
D(LNGCF_NEG(-1))	-0.112660	0.014990	-7.515930	0.0000***
D(LNGCF_NEG(-2))	-0.063665	0.011751	-5.417736	0.0000***
D(LNFDI_POS)	-0.002852	0.004033	-0.707218	0.4872
D(LNFDI_NEG)	-0.016689	0.004137	-4.034204	0.0006***
D(LNEXCR_POS)	0.010763	0.015478	0.695351	0.4945
D(LNEXCR_POS(-1))	-0.087419	0.015666	-5.580261	0.0000***
D(LNEXCR_POS(-2))	0.024408	0.010183	2.396956	0.0259**
D(LNEXCR_NEG)	0.231187	0.138281	1.671867	0.1094
D(LNEXCR_NEG(-1))	-0.790215	0.134053	-5.894791	0.0000***

***, ** significant at 1% and 5% respectively

Source: Author's estimations, 2021

4.9.2   Long Run Factors that Affect Economic Growth

In long run, both positive and negative changes in nontraditional agricultural exports have a causal influence on RGDP. In long run, 1% increase in nontraditional agricultural exports (positive change) will significantly cause

RGDP to increase by 0.233% whereas decrease in nontraditional (negative change) by 100 basis point will resultantly decrease RGDP by 0.196%.

Positive change in inflation does not significantly cause RGDP growth in long run however, decline in inflation (negative change in inflation) significantly cause its growth. Disinflation (reduction in inflation rate) in the economy by a percentage will increase RGDP by 0.21% all other things being equal.

Positive change in gross capital formation has no significant causal impact on RGDP in long run. Negative change that is 1% contraction in gross capital formation on the other hand will cause RGDP to decline by 0.21% in the long run.

The results also show that both positive and negative changes in FDI do not significantly cause RGDP growth in the long run.

Exchange rate changes both positive and negative have a significant causal impact on economic growth. From the results appreciation of the cedi against the US dollar that is an increase in exchange rate by 1% will cause RGDP to grow upward by 0.10% in the long run whereas, the same level of depreciation of the cedi against the US dollar in long run will decrease economic growth by 1.85%. the results are presented in the table below;

Table 4.13:Long Run NARDL Results- Impact of NTAE on RGDP

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNNTAE_POS	0.233486	0.075114	3.108434	0.0053***
LNNTAE_NEG	0.195869	0.077515	2.526847	0.0196**
LNINFL_POS	-0.058407	0.044301	-1.318410	0.2016
LNINFL_NEG	-0.213044	0.024035	-8.863725	0.0000***
LNGCF_POS	0.027342	0.055690	0.490960	0.6285
LNGCF_NEG	0.208652	0.035115	5.942043	0.0000***
LNFDI_POS	-0.005634	0.011534	-0.488455	0.6303
LNFDI_NEG	0.023793	0.012687	1.875318	0.0747
LNEXCR_POS	0.103392	0.024644	4.195452	0.0004***
LNEXCR_NEG	1.854143	0.714551	2.594837	0.0169**

***, ** significant at 1% and 5% respectively

Source: Author's estimations, 2021

4.10 NARDL Bound Test

The bound test performed revealed that there is presence of cointegration or long-term relationship between RGDP, NTAE, INFL, GCF and FDI. This is seen from the F and T bound tests results. The reported F-statistic is 22.89 which higher than the I(1) or the upper bound value of 3.24 and 3.86 at both 1% and 5% respective significance levels. The T bound test also has a statistic value of -5.09 which is higher than the 5% upper bound statistic value of -5.03 in absolute terms and this also confirmed cointegration in the presence of asymmetry.

Table 4.14: NARDL Bound Test Results

		F Bound Test		
Test Statistic	Value	Significance	I(0)	I(1)
F-statistic	22.89817	10%	1.83	2.94
K	10	5%	2.06	3.24
		2.5%	2.28	3.5
		1%	2.54	3.86
		t-Bounds Test		
t-statistic	-5.098147	10%	-2.57	-4.69
		5%	-2.86	-5.03
		2.5%	-3.13	-5.34
		1%	-3.43	-5.68

Source: Author's estimations, 2021

Since cointegration is confirmed the error correction model was then estimated and the results revealed a coefficient of -0.5484 which is significant at 1%. This implies that there will be a convergence in long run when equilibrium is distorted and the distortions in the equilibrium in long run will be corrected at an adjustment speed of 54.84%. This implies it will take approximately two years for equilibrium to be restored when there is disequilibrium in long run.

Table 4.15: NARDL Error Correction Results

ECM Regression				
Case 3: Unrestricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
CointEq(-1)*	-0.548427	0.028441	-19.28270***	0.0000
R-squared	0.954363	Mean dependent var		0.035674
Adjusted R-squared	0.920503	S.D. dependent var		0.044598
S.E. of regression	0.012575	Akaike info criterion		-5.614906
Sum squared resid	0.004902	Schwarz criterion		-4.738979
Log likelihood	178.4099	Hannan-Quinn criter.		-5.276178
F-statistic	28.18571	Durbin-Watson stat		2.637134
Prob(F-statistic)	0.000000			

***, ** significant at 1% and 5% respectively

Source: Author's estimations, 2021

The R-squared is 95.4% meaning variation in the dependent variable (economic growth proxied as RGDP) has been explained by the independent variables in the model which implies the model is fit for purpose. The overall or joint test for significance (F-Statistic) is significant at 1% which implies the model is reliable for predicting the impact of the regressors on the dependent variable.

4.11 Diagnosis Test for NARDL Model

Diagnosis tests were performed on the model to ascertain whether the model is fit and can be relied on for policy and other academic purpose. Firstly, the model was subjected to serial correlation test using Breusch-Godfrey test. The test results indicate a probability value of 0.2961 for the F-statistic which implies that the null hypothesis of no serial correlation cannot be rejected at 5% significance level and hence the model is not suffering from problem of serial correlation. The model was also subjected to heteroscedasticity test using Breusch-Pagan-Godfrey test. The reported F- statistic has a probability value of 0.93 which is higher than the probability value of 0.05 which implies the model is free from problems of heteroscedasticity. And therefore, concludes that the model is homoscedastic. The normality test also indicated that the model is normally distributed as shown by the Jaque-Bera statistic of 0.478 with a probability value of 0.783 which is higher than the 5% significant level. The implication of the above statistics is that the null hypothesis of the model being normally distributed cannot be refuted at 5% significance level. Hence, the model is normally distributed.

4.12 Stability Test

The model was subjected to a stability test using cumulative sum and cumulative sum of squares the graphical presentation of these revealed that the model lies within the 5% significance boundaries for both CUSUM and CUSUM SQUARE which implies stability of the model at 5% significance level.

Table 4.16: Diagnostic Test Result for NARDL Model

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.328903	Prob. F(3,18)	0.2961
Obs*R-squared	9.972797	Prob. Chi-Square(3)	0.0188

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.565042	Prob. F(33,21)	0.9309
Obs*R-squared	25.86746	Prob. Chi-Square(33)	0.8070
Scaled explained SS	3.712600	Prob. Chi-Square(33)	1.0000
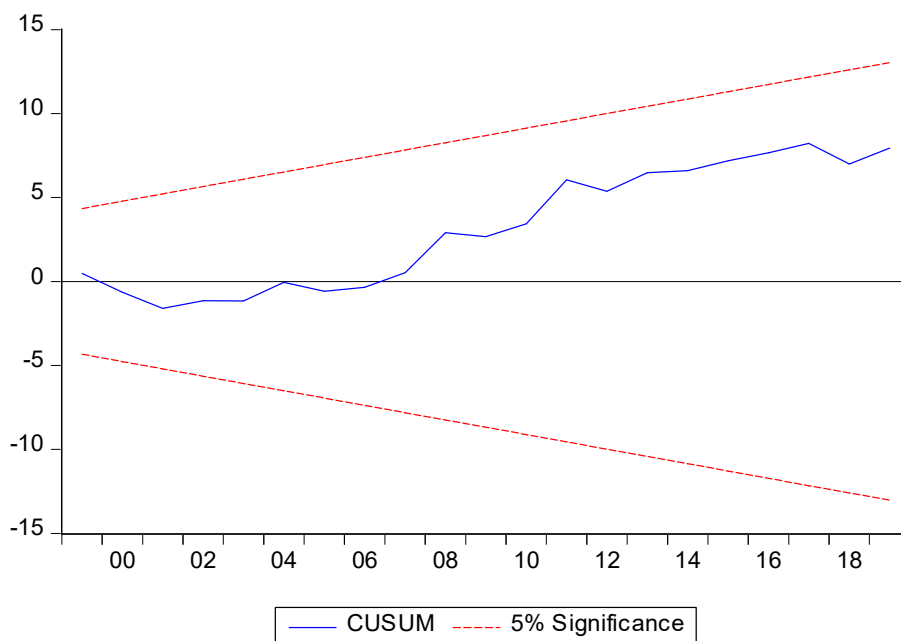
Figure 4.5: NARDL Stability Test Graph- CUSUM Graph
Source: Author's estimations, 2021
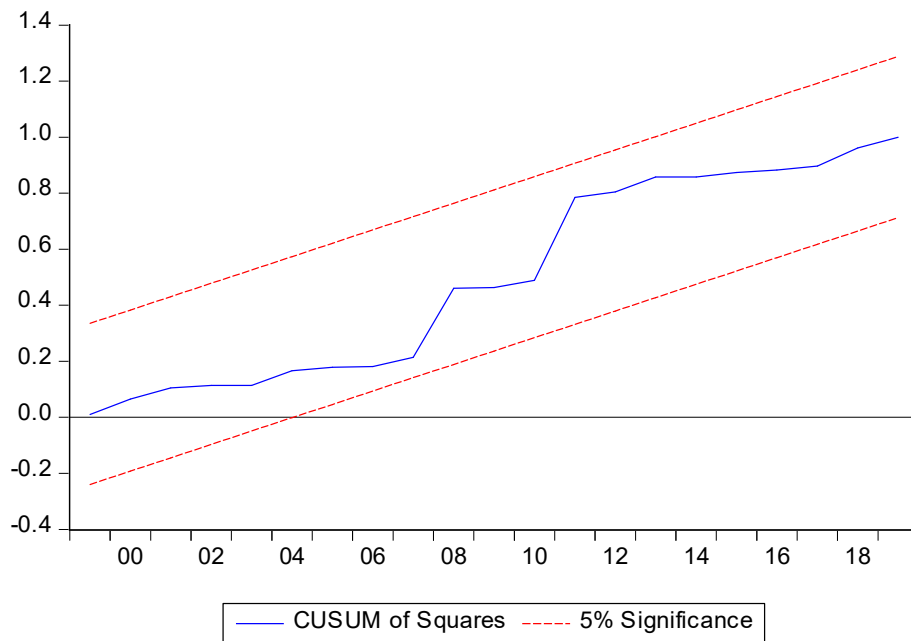
Figure 4.6: NARDL Stability Test Graph- CUSUM of Squares

Source: Author's estimations, 2021

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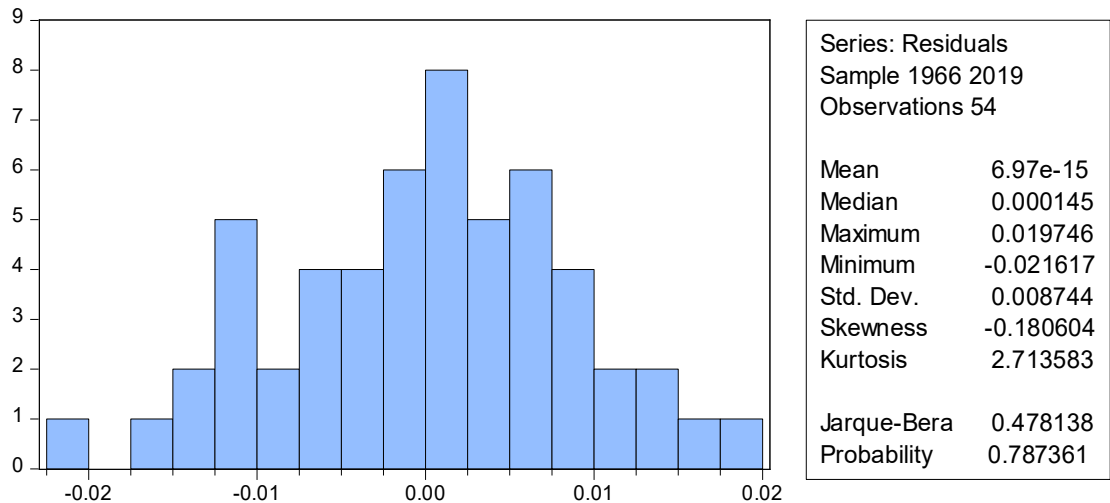
Figure 4.7: NARDL Normality Test Results
Source: Author's estimations, 2021

4.13 Test for the Presence of Asymmetric Relationship

The presence of asymmetry or nonlinear relationship between RGDP and the other variables were tested using the Wald test. Firstly, NTAE export was subjected to the Wald test. And the test results indicates that the F-statistic has a probability value of 0.000 which implies 1% significance and hence the null hypothesis of the variables being linear in coefficients is rejected at 1% significance level. The other variables were also subjected to the Wald test and were all significant except FDI and hence the null hypotheses of linearity in coefficients were rejected and hence concluded that all the variables thus nontraditional agricultural exports, inflation rate, gross capital formation, exchange rate except foreign direct investment are nonlinear. The study therefore, conclude that FDI exhibits a linear relation or symmetry relationship with RGDP whiles NTAE, GCF, EXCR and INFL have asymmetry or nonlinear relationship with RGDP in both short and long runs.

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Table 4.17: Wald Test Results

Variable	Test statistic	Value	Df	Probability
	SHORT RUN ASYMMETRIC			
LNNTAE	F-statistic	10.09863	(6, 26)	0.0000
	Chi-square	60.59177	6	0.0000
INFL	t-statistic	4.590570	26	0.0001
	F-statistic	21.07333	(1, 26)	0.0001
	Chi-square	21.07333	1	0.0000
EXCR	t-statistic	-3.422359	26	0.0021
	F-statistic	11.71254	(1, 26)	0.0021
GCF	F-statistic	4.138781	(2, 26)	0.0275
	Chi-square	8.277562	2	0.0159
FDI	t-statistic	-1.763792	26	0.0895
	F-statistic	3.110962	(1, 26)	0.0895
		LONG RUN		
LNNTAE	ASSYMETRY			
	Chi-square	3.110962	1	0.0778
LNINFL	F-statistic	3.666735	(2, 21)	0.0431**
	Chi-square	7.333470	2	0.0256**
LNEXCR	F-statistic	4.839231	(2, 21)	0.0187**
	Chi-square	9.678462	2	0.0079***
LNFDI	F-statistic	1.732242	(4, 21)	0.1806
	Chi-square	6.928968	4	0.1397
LNGCF	F-statistic	6.757548	(8, 21)	0.0002***
	Chi-square	54.06038	8	0.0000***

***, ** significant at 1% and 5% respectively

4.14 Dynamic Multiplier Effect

The multiplier effects of the variables both the positive and negative changes were estimated and the results show that negative shocks have greater multiplier effects on the economy than the positive shocks.

4.14.1 Multiplier Effect of NTAE on the Economic Growth

From the graph it is observed that positive shocks impact the economy positively whiles negative shocks impact the economy negatively. The multiplier graph also indicates that in both the short and long run the negative shocks in NTAE has more impact on economic growth (RGDP) than the positive shock of NTAE. From the graph an increase in NTAE (positive shock) in short run as represented by period 5 will lead to 0.17 times increase in RGDP growth and a decrease in NTAE (negative shocks) in period 5 will cause 0.20 times decrease in RGDP growth in short run. In long run however, the magnitude of the impact of positive and negative shocks is even wider in favour of the negative shocks. For instance, an increase in NTAE (positive shocks) in period 15 will only lead to 0.05 times increase in RGDP growth whereas, decrease in NTAE (negative shock) in the same period will lead to decrease in RGDP's growth by 0.37 times. This is presented in the figure below.
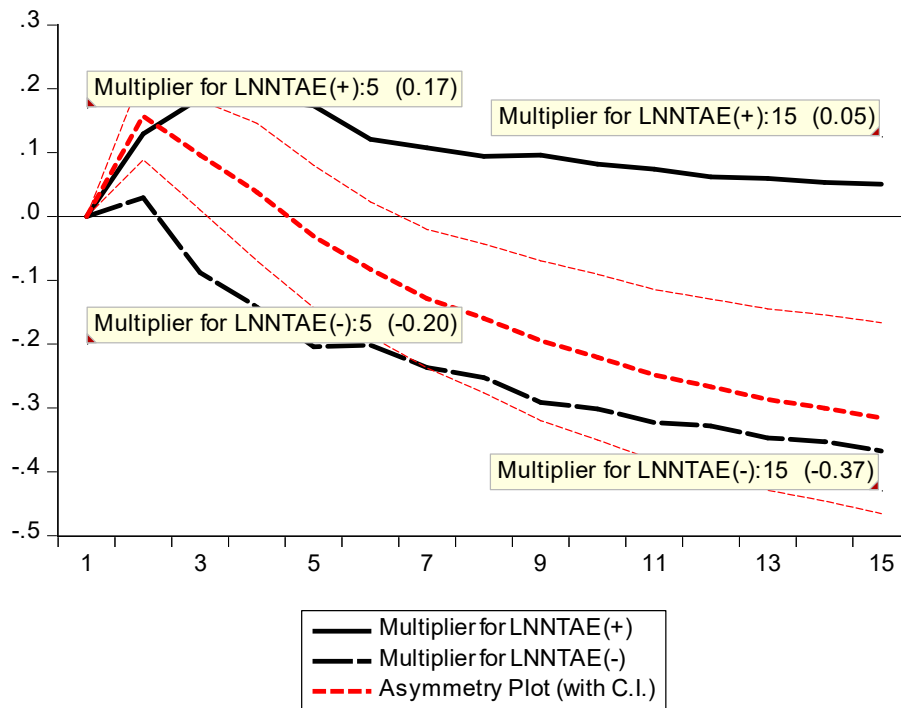
Figure 4.8: Dynamic Multiplier Effect of NTAE on the Economic Growth

Source: Author's estimations, 2021

4.14.2 Multiplier Effect of Inflation on RGDP

For inflation rate, negative shocks impact the economy positively and that of the positive shock has an inverse impact on the economic growth measured by RGDP. The impact is equal in short run in that negative shock in inflation for period 5 will increase RGDP by 0.08% whiles positive shocks in same period will decrease by 0.08%. In long run however, the response of economic growth to negative shocks or changes in inflation is higher than the response of economic growth (RGDP) to positive shocks or changes in inflation. As seen in the graph below at a period 15 decrease inflation growth resulted in 0.32% increase in economic growth whereas, increase inflation in this period by a unit will result in and decreasing economic growth by 0.12%
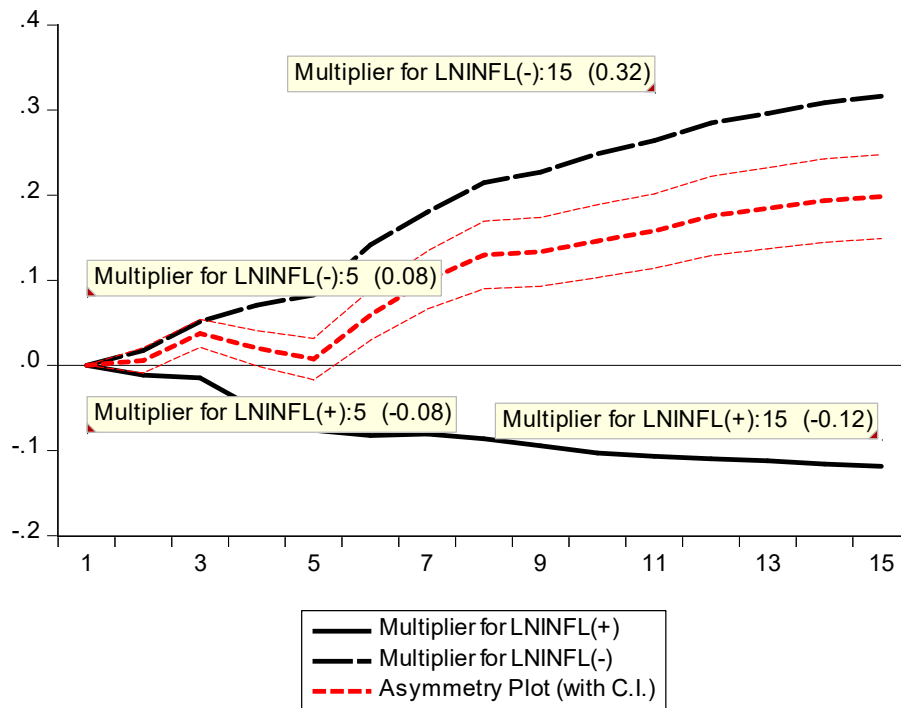
Figure 4.9: Dynamic Multiplier Effect of INFL on the Economic Growth

Source: Author's estimations, 2021

4.15 Multiplier Effect of Exchange Rate on RGDP

For exchange rate, the graph shows that positive changes have smaller magnitude of impact on RGDP than negative changes even though, visually the asymmetry is not clearly seen. The dynamic multiplier graph also revealed that the magnitude of impact of negative shocks is greater in both long run and short run than the positive shocks of exchange rate. In period 5 which represents short run in this analysis, it can be seen that negative changes in exchange rate will result about 1.75 times decrease in economic growth and that of positive changes in exchange rate within that same period will increase economic growth by 0.03 times. The trend continues in the long run as positive shocks (appreciation of the cedi) or changes in exchange rate in period 15 which is referred as long run in this analysis

will lead to 0.06% increase in economic growth whiles that of negative shocks

(depreciation of the cedi) will decrease economic growth by 1.95%.
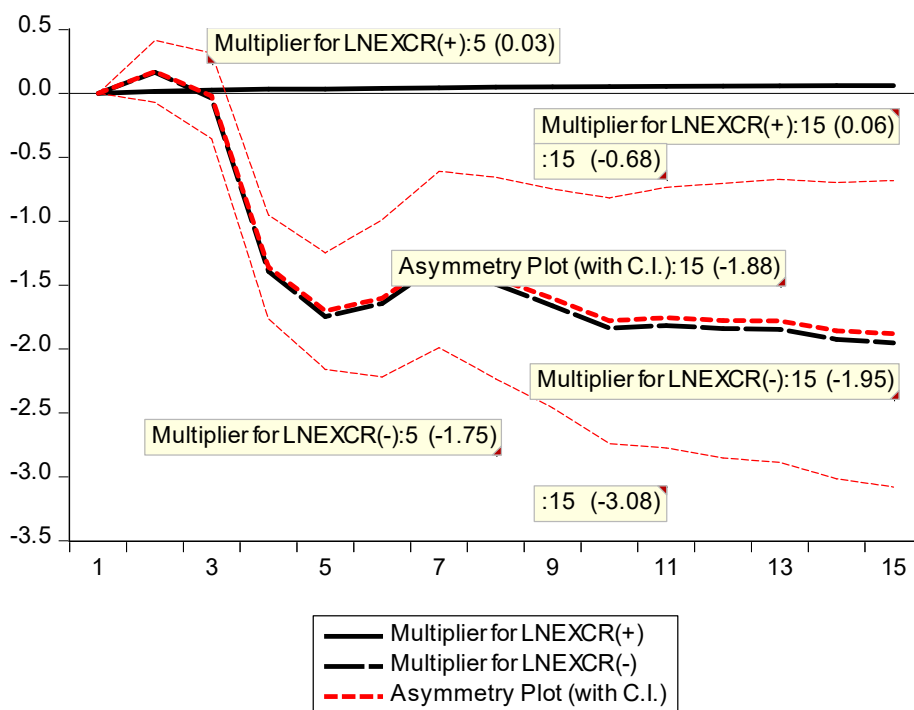
Figure 4.10: Dynamic Multiplier Effect of EXCR on the Economic Growth

Source: Author's estimations, 2021

4.16 Factors that Affect the performance of NTAE

To achieve the objective three which is to ascertain the factors that affect the

performance of NTAE in Ghana an ARDL model was employed the to ascertain

these factors the justification of the use of this model is seen in (Mabeta, 2015)

in an assessment of determinants of nontraditional agricultural growth in Zambia

and (Dube et al., 2018) in examining the export performance of the horticultural

sub-sector in Ethiopia. The results are presented as short run factors and long run factors that affect the performance or growth of nontraditional agricultural exports in Ghana.

4.16.1 Short Run Factors that Affect the Performance of Nontraditional Agricultural Exports

In short run, both contemporaneous term of RGDP and the second lag affect the performance of NTAE in that 1% increase in current RGDP will cause NTAE to increase by 3.16% and that of the second lag of RGDP will cause NTAE to decrease by 5.71% ceteris paribus.

Inflation does not contemporaneously affect NTAE performance in the short run however, past years inflations do. For instance, the first and second lag terms of inflation will respectively cause NTAE to decrease by 0.34% and 0.23% when respectively increase by a percentage in the short run provided all other factors are constant.

Current term of gross capital formation does not significantly affect NTAE growth in the short run. However, its lag terms affect the performance of NTAE. From the result, first and second lags of LNGCF are significant at 5% and 1% respectively which implies that when there an increase in first and second lag of gross capital formation by 100 basis point respectively the respective resultant impact on NTAE is 0.46% and 0.44% increase in growth in the short run all thing being equal.

Foreign direct investment does not contemporaneously affect NTAE but its third lag term affects NTAE growth. The third lag is significant at 5% with coefficient of 0.08 which implies an increase in third lag of FDI by one percent the causal impact on NTAE will be 0.08% increase in growth in the short run all the other thing being equal and vice versa.

For exchange rate both contemporaneous and lag term do not significantly affect NTAE in short run.

Table 4.18: Short Run Factors that Affect the performance of NTAE

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNNTAE(-1))	-0.249181	0.192600	-1.293777	0.2121
D(LNRGDP)	3.156660	1.142345	2.763316**	0.0128
D(LNRGDP(-1))	-0.738562	1.947380	-0.379259	0.7089
D(LNRGDP(-2))	-5.706019	1.761089	-3.240051***	0.0045
D(LNINFL)	0.118486	0.087907	1.347854	0.1944
D(LNINFL(-1))	-0.343976	0.123684	-2.781094**	0.0123
D(LNINFL(-2))	-0.232505	0.081080	-2.867583**	0.0102
D(LNINFL(-3))	-0.070113	0.059193	-1.184476	0.2516
D(LNGCF)	-0.188108	0.150013	-1.253951	0.2259
D(LNGCF(-1))	0.458171	0.179432	2.553451**	0.0200
D(LNGCF(-2))	0.444122	0.136880	3.244609***	0.0045
D(LNFDI)	0.022149	0.050210	0.441125	0.6644
D(LNFDI(-1))	0.031051	0.050727	0.612126	0.5481
D(LNFDI(-2))	0.057242	0.047743	1.198950	0.2461
D(LNFDI(-3))	0.081300	0.035437	2.294207**	0.0340
D(LNEXCR)	0.094583	0.181003	0.522550	0.6077
D(LNEXCR(-1))	0.266827	0.182273	1.463884	0.1605

***, ** Significant at 1% and 5%

Source: Author's estimations, 2021

4.16.2 Long Run Macroeconomic Factors that Affect the Growth of NTAE

In long run, the performance of NTAE is affected by three macroeconomic factors. These are RGDP, INFL and EXCR. Whiles foreign direct investment and that of gross capital formation insignificantly contribute to the growth of nontraditional agricultural exports in the long run. A percentage change in RGDP will significantly cause NTAE to grow by 5.02% whiles a percentage increase in inflation will result in 1.34% increase in NTAE granted all factors being equal. Appreciation in the cedi will result in decline in growth of NTAE. When the cedi appreciates by one percent the resultant causal influence on NTAE growth will be negative that is NTAE will respond negatively to this appreciation or increase in value of the domestic currency against the other trading currency in that, the appreciation will cause NTAE to decrease by 0.297% in growth.

Table 4.19: Long Run Factors that Affect the performance of NTAE

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNRGDP	5.022679	2.151701	2.334283**	0.0314
LNINFL	1.341024	0.512192	2.618205**	0.0174
LNGCF	-1.484675	0.976550	-1.520326	0.1458
LNFDI	0.100675	0.164805	0.610873	0.5489
LNEXCR	-0.297206	0.089854	-3.307649***	0.0039

***, ** Significant at 1% and 5%

Source: Author's estimations, 2021

4.17 Impact of Innovations in the Economy on NTAE Growth

To achieve the fourth objective which is to examine the impact of innovations in the macroeconomic variables in the economy specific exchange rate innovation, innovations in RGDP, innovations in FDI and innovations in GCF on the performance of NTAE. Inflation was intentionally ignored in the estimation because of the order of integration (I(0)). The VAR model was employed using the Impulse Response (IRF) of the VAR model to examine the innovations or shocks to macroeconomic factors on the performance of NTAE. The response of NTAE to the shocks of these variables are presented below.

From the graph one standard deviation shock to NTAE itself will response positively to itself in that it will start with an increasing or higher number (0.174) in the first period and maintain the statoscope till period three when it declines and thereafter continues to decline up to the tenth period. The response of NTAE to its on shock is positive in both short and long run. That is a shock to NTAE has positive impact on NTAE in the short and long runs.

Response of LNNTAE to LNNTAE Innovation
using Cholesky (d.f. adjusted) Factors
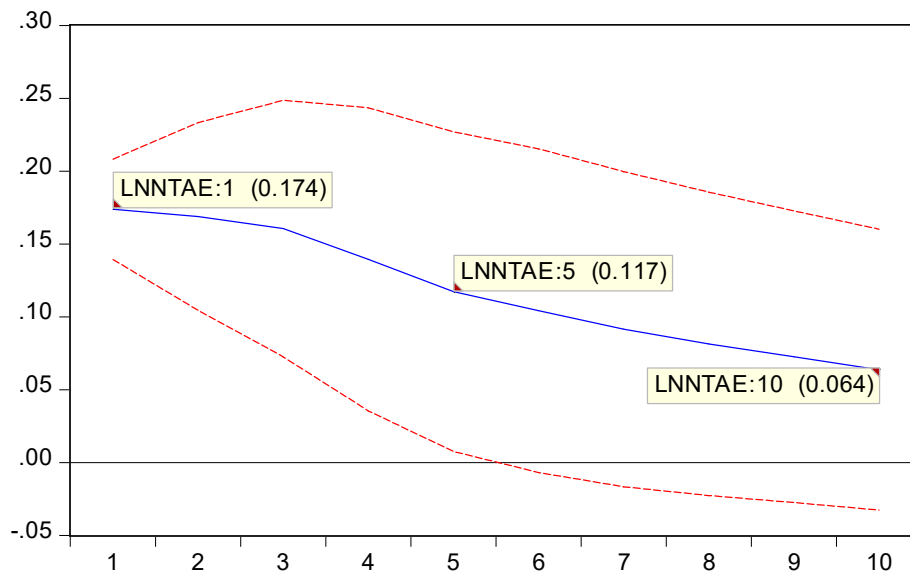
Figure 4.11: Impact of NTAE Innovations on NTAE Growth

Author's estimations, 2021

In the graph it can be observed that the shock to RGDP have asymmetric impact on NTAE in both short run and long run in that one standard deviation shock or innovation to RGDP will start with an increasing NTAE in the first period (0.014) later in the second period the response of NTAE declines and attain negative in period two (-0.087) and later keeps increasing onward up to period ten. As seen in the graph period five produce a higher value (-0.064) as compare to period two's -0.087 whiles period ten also produce an increasing value (-0.012) as a response to innovations in RGDP. There is both positive and negative responses from NTAE to impulse in RGDP implying that the shock to RGDP has asymmetric impact on NTAE in the short and long runs.

Response of LNNTAE to LNRGDP Innovation
using Cholesky (d.f. adjusted) Factors
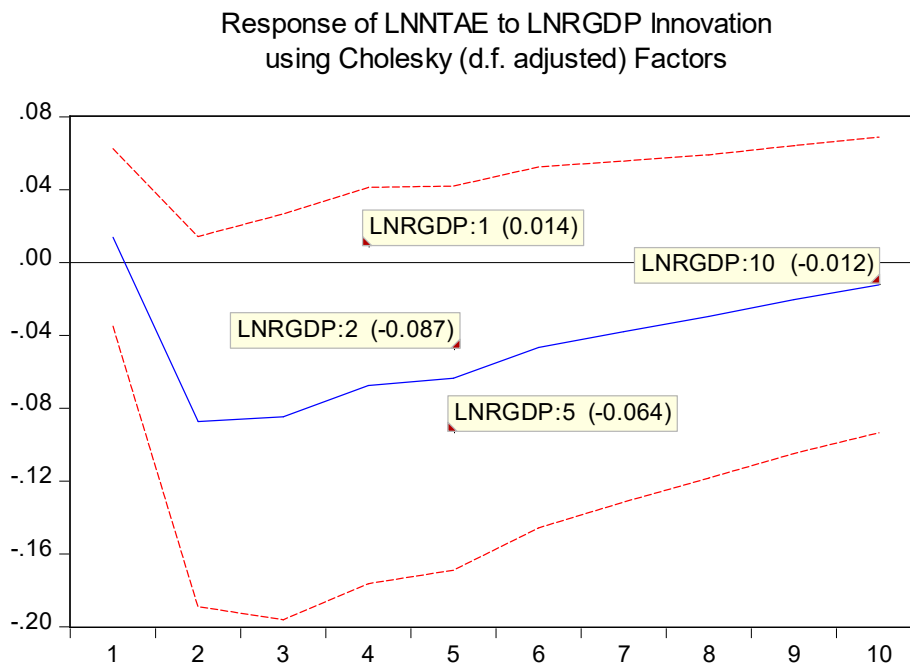
Figure 4.12: Impact of LNRGDP Innovations on NTAE Growth

Source: Author's estimations, 2021

One standard deviation shock or impulse given to LNFDI will result in a negative response from NTAE. It will first of all start from 0 and decrease in period one to negative and then increase to a smaller negative in period two. Thereafter it continues to decline in growth up to period five and then maintain a constant term throughout the period. From the graph it can be seen that the NTAE response is zero in period one decrease to -0.004 in period two and increase to -0.002 in period three. From period five onward the response is -0.0016 in continuum. In sum the response of NTAE to a standard deviation impulse to FDI is negative.

Response of LNNTAE to LNFDI Innovation
using Cholesky (d.f. adjusted) Factors
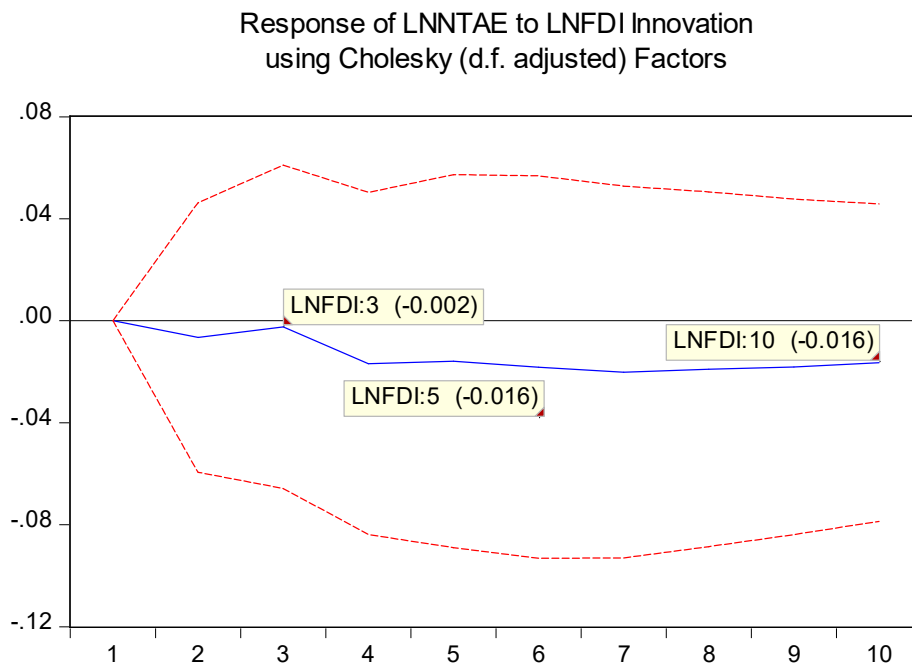
Figure 4.13: Impact of LNFDI Innovations on NTAE Growth

Source: Author's estimations, 2021

The response of NTAE to one standard deviation innovation in GCF will result in zero response at period one decline to -0.03 in period two appreciate to -0.026 in period five and maintain its trajectory up to period seven and declines continuously from period seven onward. The response of NTAE to one standard deviation innovation to GCF can be described as a negative response which implies that impulse or shock to GCF will have a negative impact on the performance of NTAE in both short run and long run.

Response of LNNTAE to LNGCF Innovation
using Cholesky (d.f. adjusted) Factors
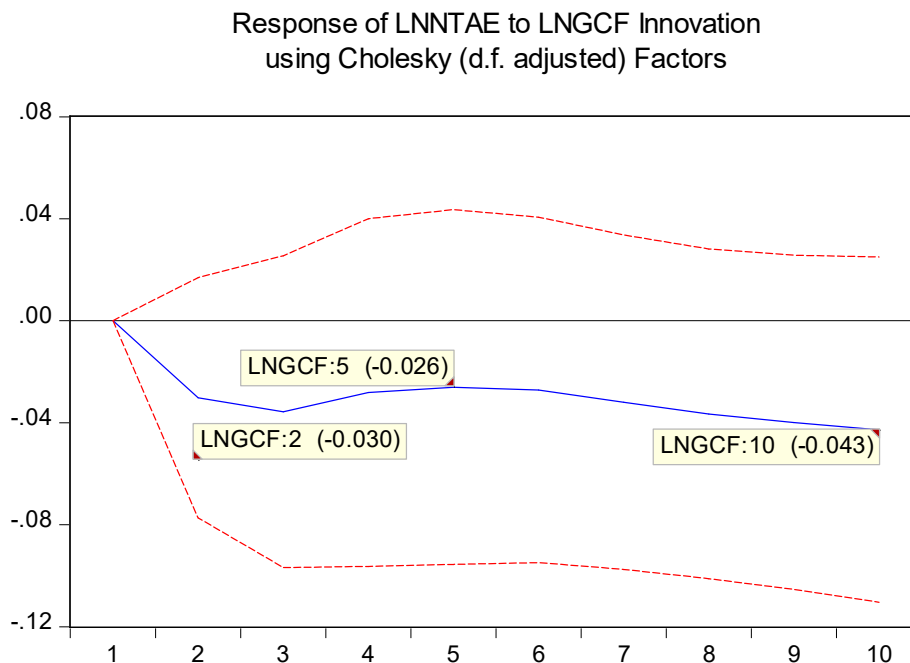
Figure 4.14: Impact of LNGCF Innovations on NTAE Growth

Source: Author's estimations, 2021

From the impulse response graph, it can be observed that one standard deviation innovation to exchange rate will result in increased NTAE from period one to period two maintained stability up period three quarter-two thereafter declines up to zero in period six and attain negative from period six onwards. This implies that the response of NTAE to one standard deviation impulse given to exchange rate in short run is positive response that is to the say impact as result of innovation or impulse to exchange is positive in the short run whiles that of long run results a negative impact or negative response of NTAE. From the graph it can be seen that period two up to period 5 is positive (0.0206 in period two and 0.005 in period five) and from period six onward is negative as can be seen the value of period ten is negative (-0.0249). In sum, it can be adduced that the innovation to exchange rate will have asymmetric impact on NTAE in both short

run and long run that is positive impact in short run and negative impact in long run.

Response of LNNTAE to LNEXCR Innovation
using Cholesky (d.f. adjusted) Factors

LNEXCR:2 (0.0206)

LNEXCR:5 (0.0050)

LNEXCR:10 (-0.0249)
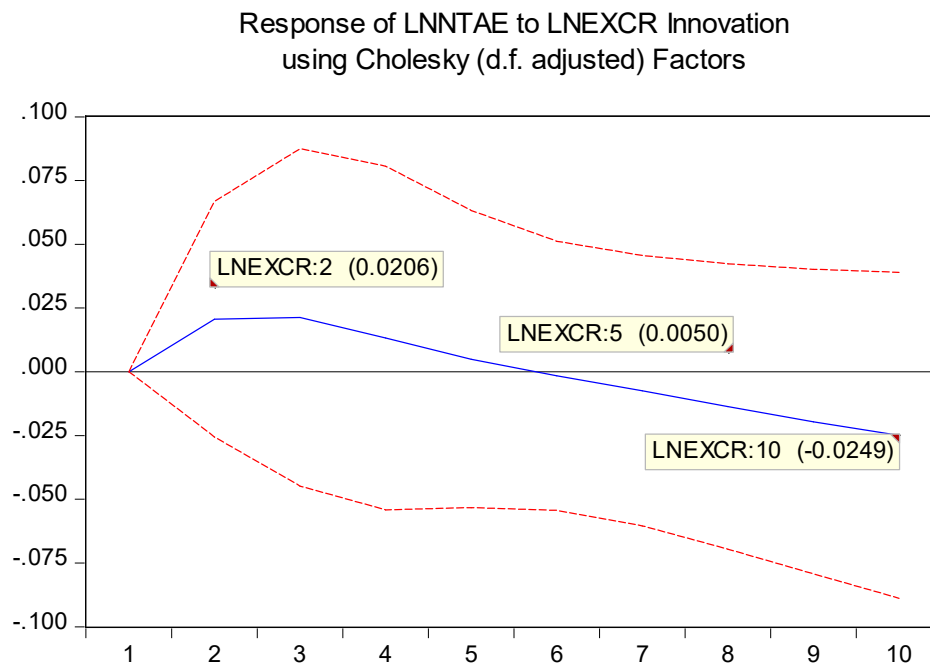
Figure 4.15: Impact of LNEXCR Innovations on NTAE Growth

Source: Author's estimations, 2021

4.18 Discussion of Results

After running the descriptive statistics and the correlation matrix to respectively ascertain the nature of the kind of diagnostics that need to perform on the data set and the relationship between the variables. Further analyses were done based on the study objectives and the discussion of the results are as follows;

To examine the developmental trajectory or trend of development in the nontraditional agricultural export sector, the quadratic or exponential trend analysis was performed on this variable (NTAE) and the results showed that development in nontraditional exports is decelerating in trend. The coefficient of

TREND^2 is -0.0137 which is significant at one percent which implies that the trend in development or growth of nontraditional exports is increasing at a decreasing rate or decelerating in trend. This is consistent with the findings of Apalatoya (2018) who found similar trend in the value of nontraditional exports in Ghana in examining the determinants of NTEs in Ghana. The analysis of the data revealed that the continuous decelerating of NTAE is as a result of declined in production over the years. This is corroborated by GEPA (2020) that decline NTAEs was as a result of decline in production as well as standardization, regulatory and marketing issues. EU is the largest destination market for Ghana's NTEs and in recent times (2015) it banned vegetable exports from Ghana because of contamination and in recent times the EU again has issued series of threat to Ghana that she risks being sanctioned for inappropriate agronomical practices in the areas of vegetable and fruit production. This could be a significant cause of the decelerating trend in the growth of NTAE.

To explore the impact of nontraditional agricultural exports on Ghana's economic growth, the traditional ARDL and asymmetric ARDL were both deployed after the stationarity test results from ADF, PP, GLS-DF and KPSS tests confirmed that the variables are integrated of different order thus I(0) and I(1) but not I(2) and the results from the analyses as presented above are discussed below.

From the results, it is seen that the lag term of RGDP has positive and significant causal impact on economic growth in both the symmetry and asymmetry ARDL models and this is unsurprising because increased in previous years GDP is expected to attract investment from the quarters of government, private sector

and foreigners and this intends increase future economic growth. As such investment, government expenditure will also increase following an increment in GDP and individual consumption will also rise due to increase in RGDP which will culminate into increase in real income. And consumption with government expenditure together with investment propel economic growth. Hence lag values of GDP as expected conforms with the a prior expectation and also corroborating the findings of Alagidede and Ibrahim (2017) when they found the coefficient of lag GDP to have positive impact on economic growth of Ghana and Urriola et al., (2018) who found the lag value of GDP to have positive and significant impact on the economic growth of Peru.

FDI which is about foreigners investing in physical infrastructure of a host nation rather than marketable securities has mixed findings from researchers whereas, one group is of the view that FDI has positive impact on economic growth Alagidede and Ibrahim (2017) and Dube et al.,(2018) others find contrary view of negative impact on economic growth (Awan & Bibi, 2021). There is also another class of researchers who find FDI to be insignificant to economic growth (Ikechukwu, 2021). The finding from ARDL results indicate FDI has negative nexus with economic growth consistent with Nicholas (2018) who revealed a negative nexus between FDI and economic growth and Awan and Bibi (2021) who had similar findings. The result is however, contrary to the works of Bakkacha and Touhami (2021), Dube et al., (2018), Lelya and Ngaruko (2021), Mavidkhaan (2021) and Sultanuzzaman et al., (2018). As mentioned earlier, the symmetry ARDL model results indicate that FDI has negative impact on Ghana's economic growth in both short and long run whereas, the asymmetric model

shows negative shock in FDI promotes economic growth but positive change in FDI is insignificant in short run. The long run asymmetry results indicate no significant causal impact either from the positive shock or the negative shock from FDI on economic growth. This is unsurprising for a developing country with weaker internal control mechanism and law enforcement because most foreign firms repatriate their annual profit to their home country. This puts pressure on the country's currency as these profits are converted to foreign currency this causes depreciation of the cedi. And as empirically proven by this study, the cedi depreciation has huge negative impact on the economic growth of Ghana. Another possible cause of zero or negative impact of FDI is that most developing countries the local firms may not be highly capacitated and competition from the foreign firms crow out local business whose proceeds will have huge multiplier effect in the economy than that of the foreign firms. Dijk and Stichele (2008) revealed that most FDI cause pollution in developing country and this affect economic growth negatively. This finding is consistent with Awan and Bibi (2021) who found negative impact of FDI on the economic growth of Pakistan.

GCF has positive impact on Ghana's economic growth in both the long and short run, the symmetry ARDL results indicate that GCF has positive impact on economic growth in Ghana while asymmetry ARDL also revealed similar but slightly different result where the positive shock or change contemporaneously affect economic growth positively in short run with insignificant positive change in long run and negative shock (changes) affect economic growth negative in the long run with insignificant negative impact in the short run. In the overall we can impugn that GCF has positive impact on economic growth and this is consistent

with Polat (2021) who found GCF to have positive impact on economic growth of OECD countries and Meyer (2021) who also found GCF to have positive influence on economic growth of Southern African Custom Union (SACU) and others including Bakkacha and Touhami (2021) and Urriola et al., (2018). The result from the study is expected as investment which is proxied for GCF is the key source of production or national output in a macroeconomic environment an increase in this should result in increase in national output as well as standard of leaving and this is what constitute economic growth. As already defined in the chapter three GCF embodies factories and other domestic investment and an increase in any of this will undoubtedly result in an increment in economic growth. This finding is however, contrary to the findings of Kirikkaleli et al., (2021) who found no significant impact of GCF on economic growth of Republic of Chad.

On the Inflation –economic growth nexus, the study found an inverse and significant relationship between the two in both short run and long run when ARDL is used this is not much different from NARDL results which show that negative shock in inflation (decline in inflation rate) has a significant positive impact on Ghana's economic growth in both long run and short run. This finding corroborates the works of Ijirshar (2015) who found inflation to have negative impact on the economic growth of Nigeria, (Alagidede & Ibrahim, 2017; Okyere, 2020) and Polat (2021) who respectively find inflation to be significant and negatively influence economic growth in Ghana and in OECD countries but contradicts (Edeme et al., 2016) who found positive impact of inflation on economic growth of ECOWAS region. The result met a prior expectation, an

increased inflation causes prices of goods and services to hike this discourages consumption as real income decreases. Decrease in consumption affect aggregate demand which will automatically decrease in economic growth (GDP). Also increase in inflation rate will receive counter measures from Monetary Policy Committee (MPC) in a form of increasing the policy rate this increases cost of borrowing which discourages access to finance for investment and business expansion as well as consumer loans. In the absent of business expansion and consumption national output which measures economic growth decreases. Again, when there is high inflation the local currency erode in value due to high prices and as empirical studies show that exchange rate volatilities has negative impact on economic growth (Alagidede & Ibrahim, 2017) this accounts for the negative growth nexus between inflation and economic growth.

The exchange rate is one of the key determinants of economic health of Ghana. It affects the economy in diverse forms. From the results, exchange rate impact on economic growth shows no significant contemporaneous short run causal impact on economic growth for both the symmetric and asymmetric ARDL models. In long run however, the appreciation of the cedi has a minimal positive (0.103) impact on economic growth whiles depreciation has a huge negative impact (1.85) on the economic growth this implies that exchange rate exhibits asymmetric or nonlinear relation as confirmed by Alagidede and Ibrahim (2017) that the exchange rate volatilities in Ghana portrays a nonlinear relationship with economic growth. In the traditional ARDL we infer that exchange rate has a positive causal impact on economic growth. The finding contradicts the work of Ikechukwu (2021) who finds negative and insignificant impact of exchange rate

on economic growth of Nigeria and Ahiabo and Amoah (2019) who also infer a negative and significant relation with economic growth of Ghana. The exchange rate affect economic growth through international trade in that lower exchange rate makes exports cheaper and imports costly this promotes exports and discourages consumption of imports due to higher prices and promote favourable balance of trade. The situation becomes favourable to export driven economy because more revenue will be raked into the country to expand domestic exports firms there by leading to economic growth. The situation is however, unfavourable to import dependent economy. Under this circumstance, appreciation of the cedi makes Ghana gains in economic growth because she imports more and so the growth is earned from consumption rather than production or exports.

The primary objective was to ascertain how nontraditional agricultural exports influence economic growth in Ghana. We examined the impact using ARDL and NARDL which the previous indicates no causal impact of NTAE on economic growth at both long and short run. However, the asymmetric ARDL model indicate that positive change in NTAE has positive and significant causal impact on economic growth in both short run and long run and negative shock has negative causal impact on economic growth in both short run and long run. The results indicate that NTAE exhibits an asymmetric relationship with RGDP with the positive change (increase in NTAE) having greater impact than the negative change (decrease in NTAE). Since positive change results positive causal impact and negative change results negative causal impact, we can infer a general positive relation of NTAE-economic growth nexus. Which is in line with the

export led growth hypothesis which postulates positive impacts of exports on economic growth, and other studies such as Urriola et al. (2018) who found positive impact of nontraditional agricultural export on economic growth of Peru, Ijirshar (2015) found positive impact of agricultural exports on economic growth of Nigeria and this is similar to other works (Awan & Bibi, 2021; Falaye & Afolabi, 2021; Kang, 2015; Okyere, 2020)   and contradict the findings of Ikechukwu (2021) who finds negative and insignificant nexus between economic growth and exports of Nigeria and Edeme et al., (2016) who found negative impact of agricultural exports on economic growth of ECOWAS region. The result in the study is unsurprising as increased in exports promotes favourable balance of trade, increases the amount of foreign exchange reserves, generate revenue, create employment, provide income to manufacturers among others. And all these factors enumerated propel economic growth.

The study also examined the macroeconomic factors that affect the performance of NTAE in Ghana. The study identified three macroeconomic variables that affect the growth or performance of NTAE in Ghana and these include GDP growth, inflation and exchange rate.

RGDP has a significant and positive causal effect on the performance of nontraditional agricultural exports in both short run and long run. An increase in real GDP will result in an increase in growth of NTAE in Ghana. This is consistent with Dastjerdi et al., (2021) who found GDP to have positive impact on pistachio exports in Iran, Dube et' al., (2018) who found positive impact of GDP on the performance of nontraditional exports in a case of selected

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horticultural crops in Ethiopia in both short run and long run as well as consistent with Mojahed et al. (2021) and Fayisa (2021) who respectively found positive effects of GDP on expansion of agricultural exports in Iran and positive impact of RGDP on the exports of East African countries in the empirical assessment of the determinants of export in East Africa: heterogeneous panel data analysis . In Ghanaian context, it is consistent with Apalatoya, (2018) who found NTES to increase with GDP growth in Ghana.

According to the results, inflation has positive impact on the growth of NTAEs in Ghana which is consistent with the finding of Jacob et al., (2021) who found inflation to have positive impact on the performance of exports in India and further intimated that moderate inflation propel economic growth through export promotion . This is however, inconsistent with the findings of Eliakim (2020) who found no significant impact of inflation on the performance of agricultural exports in Tanzania. Inflation affects the growth of NTAE positively through two ways- through exchange rate and the elasticity of NTAE. An increased inflation erodes the value of the country's currency against her trading partner causing depreciation of the currency which in the end makes her exports cheaper compare to the domestic products of the trading partner this increases the demand of exports making exports better off in terms of growth. Also, an increase in inflation in Marshallian demand theory is expected to reduce demand as it makes cost of production higher which intend makes exports more costly in the international market. All other things being equal higher price resulting from high cost of production will attract lower demand which affects the performance of NTAE negatively. However, this assumption holds only when the demand for the

good is elastic. Situation where the demand is inelastic, price increase will affect decrease in quantity demand in a relatively lessor proportion and this will increase more revenue. Most of the NTAEs are naturally endowed in the country because of her geographical position making the country to have lower comparative cost advantage in production or even being the sole producer, this makes the demand for these products inelastic so increase in price will rather generate higher revenue than fall in revenue as demand will decrease in a less proportionate than the price increment. However, given the inflation-NTAE elasticity coefficient our inelastic demand of NTAE assumption cannot hold. We rather infer that the positive impact of inflation on NTAE stems from inflation-exchange rate effect where the coefficient of exchange rate-NTAE is 0.29 which implies inelastic.

Exchange rate has deleterious impact on NTAE in the long run. This conforms to a prior expectation of the study. Increase in value of domestic currency makes exports costly and this makes exports less attractive in the international market. This means demand will drip and the revenue from exports will decline hence impacting the growth or performance of NTAE negatively. The study is consistent with the empirical findings of Eliakim (2020) who found exchange rate to have negative and significant impact on agricultural exports in Tanzania, Mojahed et al.,(2021) who found exchange rate to have negative impact on export income of agricultural exports in Iran and inconsistent with Apalatoya (2018) where in the findings of the author exchange rate was insignificant in determining nontraditional exports growth in Ghana.

FDI has no significant causal impact on NTAE sector in both short and long run. The result did not meet a prior expectation. The reason which could account for this is that FDIs are not in the critical sectors of the economy especially the agricultural sector as compare to other sector of the economy. Most of the foreign investments are into the service and manufacturing sector and little or no investment is made in the entire area of agriculture let alone the NTAE sector. The financial service subsector for instance, as at December, 31, 2018 the number of banks in the country were 23 and out of the 23 banks in operation 14 were foreign controlled-banks (PWC, 2019). Government industrialization derive policy has attracted major automobile manufacturing sector leading to the establishment of assembling plants in the country and other manufacturing firms but the agricultural sector remains unattractive to foreign investors. This accounts for the insignificant contribution of FDI to the performance and growth of nontraditional agricultural exports in the country.

Similarly, GCF has no significant causal impact on NTAE. The agricultural sector is not prioritized in term of major investment in the economy this could account for why investment in the economy (GCF) has no significant impact on NTAE. For instance, road network in the hinterlands which serves as basket of NTAE are unmotorable, the hinterlands still use cruel farm implement for production all these and many others account for nonsignificant impact of GCF on NTAE growth. Previous studies revealed that the agricultural sector investment is less than 2% of government investments and of this limited amount, the concentration is on the cocoa subsector to the detriment of the other nontraditional export crops (Brooks et al., 2007; WorldBank, 2017). These

cement the widely notion that the Comprehensive African Agricultural Development programme (CAADEP) of the Maputo declaration where African leaders committed to make to 10% of budgetary allocation to agriculture is a fiasco.

4.19 Conclusion

The chapter started by running a descriptive statistic of the variables to have fair hand information about the nature of the variables to aid in the necessary data transformation and appropriate diagnostics. Then followed a correlation analysis, trend analysis and stationarity test. After these, a model was selected and estimations carried out, then followed an interpretations and discussion of the result to make inferences to inform the conclusion and recommendations.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The chapter contains summaries of the findings, conclusions drawn as well as recommendation made for policy intervention.

5.2 Summary of Findings

The results of the analysis started with a descriptive statistic of the variables to ascertain the nature of the variables to inform appropriate diagnostics and data transformation. The correlation analysis revealed that all the variables are positively correlated with real gross domestic product except inflation that shows a negative correlation with RGDP. The unit root tests also showed that all the variable were stationery at order one except inflation which was stationary at levels.

Trend analysis of RGDP shows that from the period of 1961 to 1970 there was a constant trend in values of RGDP, and trended upward in the period between 1970 and 1985 and thereafter maintained an upward trend throughout the period of study (1961-2019). The trend analysis of NTAE and inflation rate showed a fluctuating trend in growth from 1961 throughout the period of study whiles FDI had a constant trend up until 2005 where it starts trending upward. The trajectory of exchange rate was fixed or constant in trend from 1961 up until the 1988 where the country adopted a flexible exchange rate regime, there exchange rate trajectory picked up and continue to trend upward. For GCF, the trend curve was asymptotic to the time line during the period of 1961 to 1975 and fluctuate in

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trend to the period of 1988 and thereafter maintained an increasing trend throughout the period.

The inferential statistics (least square method) adopted to achieve objective one revealed that NTAE has a decelerating or negative trend in growth from 1961 to 2019.

The study found that positive change in NTAE has significant and positive impact on economic growth whiles negative change in NTAE has negative impact on RGDP in both short run and long run. The study further found that inflation and FDI have negative impact on economic growth in both short and long run whiles gross capital formation has significant and positive influence on economic growth in short run. The study also confirmed cointegration between RGDP as dependent variable and NTAE, INFL, GCF, EXCR, and FDI as regressors. The error correction models showed a respective coefficient of -0.2883 and -0.5484 for symmetric and asymmetric ARDL models with 99% confidence level implying that in the long run disequilibrium will be restored at an adjustment speed of 28.83% and 54.84%.

The study also revealed that all the variables exhibit asymmetric relationship with RGDP except FDI which has symmetric relationship implying that the impact of NTAE and the over variables (INFL, GCF and EXCR) is asymmetric with dynamic multiplier effect of inflation, exchange rate and NTAE on economic growth showed that negative changes to these variables have greater impact on economic growth than that of the positive changes.

The study further revealed the following factors to have significant influence on the growth performance of NTAE in Ghana; In short run contemporaneous and lag terms of RGDP, lag term of FDI, and lag term of GCF are identified as factors that affect the growth of NTAE. The study however, found no significant impact emanating from the contemporaneous term of FDI, GCF, INFL and EXCR on the growth of NTAE. And in the long run, RGDP, INFL and EXCR are the factors that significantly affect the growth of NTAE in Ghana. GCF and FDI are not significant factors that affect the growth of Ghana's NTAE in the long run.

Lastly the study revealed that one standard deviation impulse or innovation to NTAE itself has a positive impact on NTAE in the in both the short and long runs. For that of RGDP, one standard deviation shock or impulse given to real gross domestic product has an asymmetric impact on NTAE in both short run and long run. Whiles the response of NTAE to one standard deviation shock or innovation to FDI and GCF is a negative response which implies negative impact on the performance of NTAE in both short run and long run. With innovation to exchange rate exhibits asymmetric impact on NTAE in both short run and long run that is positive impact in short run and negative impact in long run.

5.3 Conclusion

The study examined the impact of nontraditional agricultural exports on the economic growth of Ghana with time series data from 1961 to 2019 on variables such as real gross domestic product at a constant dollar term of 2010, gross capital formation, inflation rate, exchange rate and net flow of foreign direct investment obtained from World Development Indicators (WDI) database from World Bank

and that of aggregated values of some selected nontraditional agricultural exports obtained from the Trade Statistics Division of Food and Agriculture Organization (from Trade Indices 81). Prior to adopting the asymmetric ARDL, the study started by estimating the symmetric ARDL also known as linear ARDL, which confirmed the presence of a long-run/cointegrating relationship between the NTAE and economic growth (RGDP). However, no conclusions regarding the response of the RGDP to positive and negative changes of the NTAE and the other regressors (GCF, INFL, EXCR, and FDI) were drawn. Then the nonlinear ARDL version was then estimated to take care of the asymmetric impact of NTAE, and other regressors such as GCF, INFL, EXCR on RGDP (the economic growth of Ghana). From the nonlinear autoregressive model, the study revealed that positive change in NTAE has positive impact on the economic growth of Ghana in both long run and short run which implies an increase in NTAE will increase in economic growth and the negative change in NTAE has significant negative impact on economic in both long run and short run. However, the negative change cumulatively has greater negative impact on economic growth in long run when infer from the dynamic multiplier graph. That is a decline in NTAE growth will hugely decrease economic growth. To this, the study concludes that NTAE contributes positively to the economic growth of Ghana. The study further concluded on the trend of NTAE growth which revealed a decelerating trajectory in the growth of nontraditional agricultural exports in Ghana over the period of 1961 to 2019. For factors that affect NTAE growth, the study revealed RGDP, inflation and exchange rate as significant factors that affect the growth of nontraditional agricultural exports and that of foreign direct investment and gross capital formation as insignificant factors that affect the

growth of nontraditional agricultural exports in Ghana. Finally, the study drew a conclusion that innovations in the macroeconomic environment have asymmetric (both positive and negative) impacts on the performance of NTAE in both long and short runs. In sum, the research conclusively discovered that nontraditional agricultural export has a significant positive impact on Ghana's economic growth in line with the ELGH.

5.4 Recommendations

The study recommends that the following measures be taken to promote Ghana's economic growth in line with the agricultural export led growth hypothesis;

Firstly, the trend value indicates that NTAE is decelerating in growth and a carefully analysis revealed that the deceleration is caused by continuous decline in production or supply of NTAE as well regulatory/marketing issues. To this, the Ghana Export Promotion Authority which is an agency mandated to promote exports in Ghana should take immediate steps such as exhibitions, incentives to farmers in the NTAE sector, trade fairs and other available means to reverse the decelerating trend in the growth of NTAE in Ghana.

Secondly, the nontraditional agricultural exports-economic growth nexus exhibits an asymmetric relationship which the results suggest that cumulatively negative shocks (decline in growth) of nontraditional agricultural exports has a greater negative impact on the economy than the positive impact emanating from the positive shocks (increase in growth) of NTAE. Thus, the positive change in NTAE contribution to RGDP is lesser and even insignificant when infer from symmetric ARDL model and this is partly because Ghana agricultural exports are

in a form of raw materials thus, unprocessed or semi processed products. These (unprocessed products) command lower prices in the international market and for that matter do not yield maximum revenue as compare to the processed exports giving the volatility and fluctuation in the prices of unprocessed products in the international market. To this, the study recommends that appropriate steps be taken by government through Ministry of Trade and Industry to add value to the nontraditional agricultural exports in the country in order to rake in the maximum exports revenue and foreign exchange from this sector to spur economic growth as well improve cedi stability. The government industrialization flagship programme (One District One Factory Programme) should concentrate on establishing NTAE factories to add value to these products for exports.

Thirdly, foreign direct investment is reported to have negative impact on the economic growth and insignificant to nontraditional exports growth which mean that FDIs are not placed at the strategic sectors of the economy and probably their activities are not properly monitored and regulated which become injurious to the economy. In the absence of proper regulation, efficient control and monitoring systems in place, tax evasion and avoidance as well as environmental pollution become the order of the day which deny government the needed revenue as well as cost government in reclaiming the environment which in the end impact economic growth negatively. To this, the study proffers that government through Ghana Investment Promotion Center (GIPC) appraise all the sectors in the economy and identify the strategic areas that need foreign investment and make it attractive to foreign investors. Same should be done for the NTAE sector as FDI contribution to NTAE is insignificant. The study again recommends that

government through trade ministry should come out with a comprehensive foreign investment policy that regulates, guides and monitor the operations of foreign investments so as not lose oversight of their operation which cause harm to the environment and lost in tax revenue as the literature and this study suggest.

The exchange rate is an important component in an economic buildup. The study revealed that the negative change (depreciation of the cedi) hugely impacted economic growth of Ghana negatively whiles the appreciation of the cedi or positive change to the exchange rate causes negligible positive impact on the economic growth. To this, government and Bank of Ghana measures on exchange rate control specific de-dollarization policy should be vigorous implemented in the economy as this (cedi depreciation) has to do with the demand and supply factors. Also, the Bank's exchange rate policy should rather be targeting exchange rate stability and not appreciation of the cedi as this brings minimal or less impact on Ghana's economic growth.

Government through the Ministry of Food and Agriculture should invest more in the agriculture sector and specific non-traditional exports sector as the findings suggest that decline in GCF impacts the economic growth negatively. Government again, through MoFA should invest in agriculture technologies to improve production so as to increase the volume of NTAE and its storage this will reverse the decelerating trend of NTAE and also makes NTAEs attractive in the international market as the study shows that investments in the area of NTAE are not enough to propel its growth which fuels it decelerating trend over the period of the study.

Lastly, inflation affects the economic growth negatively and impacts the growth of NTAE positively. Inflation rate is double sword as it is deleterious to economic growth when too high as well as when too low. Moderate rate of inflation is needed for positive growth in the economy. As seen from the dynamic multiplier above 5% growth is deleterious to economic growth and below 5 is also deleterious to exports (NTAE). As seen from the asymmetric results a decline in inflation rate results in positive economic growth and also when inflation rate increases the performance of NTAE also improve. To this, the Bank of Ghana inflation targeting policy should focus on setting an appropriate inflation rate specific 5% rate that will propel growth and work towards achieving this acceptable rate of inflation in the economy.

5.5 Further Research

Further study should look at the comparative analysis of the impact of nontraditional and traditional agricultural exports on economic growth of Ghana so as to compare which one has higher magnitude of impact than the other as well as its cumulative impact on the economic growth of Ghana to fully establish the agricultural export led growth hypothesis or otherwise.

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APPENDIX

Dependent Variable: LNNTAE

Method: Least Squares

Date: 07/16/21   Time: 06:08

Sample: 1961 2019

Included observations: 59

Variable	Coefficient	Std. Error	t-Statistic	Prob.
@TREND	0.976843	0.073072	13.36821	0.0000
@TREND^2	-0.013754	0.001613	-8.528211	0.0000

R-squared	-65.516043	Mean dependent var	14.36519
Adjusted R-squared	-66.682991	S.D. dependent var	0.573495
S.E. of regression	4.718128	Akaike info criterion	5.974012
Sum squared resid	1268.862	Schwarz criterion	6.044437
Log likelihood	-174.2333	Hannan-Quinn criter.	6.001503
Durbin-Watson stat	0.011888		

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ARDL Long Run Form and Bounds Test
Dependent Variable: D(LNRGDP)
Selected Model: ARDL(4, 4, 3, 3, 4, 3)
Case 3: Unrestricted Constant and No Trend
Date: 06/03/21   Time: 05:28
Sample: 1961 2019
Included observations: 44

Conditional Error Correction Regression				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.538911	0.901409	5.035348	0.0001
LNRGDP(-1)*	-0.288315	0.058710	-4.910795	0.0001
LNNTAE(-1)	-0.034003	0.031312	-1.085933	0.2927
LNEXCR(-1)	0.009640	0.004142	2.327740	0.0325
LNFDI(-1)	-0.041543	0.013123	-3.165670	0.0056
LNGCF(-1)	0.175347	0.044839	3.910619	0.0011
LNINFL(-1)	-0.068881	0.015531	-4.434968	0.0004
D(LNRGDP(-1))	0.685501	0.308529	2.221838	0.0402
D(LNRGDP(-2))	0.551279	0.267043	2.064382	0.0546
D(LNRGDP(-3))	1.380900	0.421834	3.273562	0.0045
D(LNNTAE)	0.040318	0.025593	1.575357	0.1336
D(LNNTAE(-1))	0.154930	0.043502	3.561427	0.0024
D(LNNTAE(-2))	0.093943	0.034202	2.746754	0.0138
D(LNNTAE(-3))	0.042008	0.021819	1.925283	0.0711
D(LNEXCR)	0.032008	0.022389	1.429614	0.1709
D(LNEXCR(-1))	-0.073277	0.019301	-3.796620	0.0014
D(LNEXCR(-2))	0.033804	0.021655	1.561047	0.1369
D(LNFDI)	-0.020567	0.007081	-2.904449	0.0099
D(LNFDI(-1))	0.026797	0.008867	3.021963	0.0077
D(LNFDI(-2))	0.005513	0.005054	1.090644	0.2906
D(LNGCF)	0.073762	0.013605	5.421631	0.0000
D(LNGCF(-1))	-0.181906	0.040783	-4.460388	0.0003
D(LNGCF(-2))	-0.128488	0.026344	-4.877358	0.0001
D(LNGCF(-3))	-0.074877	0.027120	-2.760969	0.0134
D(LNINFL)	-0.017872	0.007158	-2.496727	0.0231
D(LNINFL(-1))	0.030415	0.010098	3.011876	0.0079
D(LNINFL(-2))	0.021490	0.007078	3.036212	0.0075

* p-value incompatible with t-Bounds distribution.

Levels Equation				
Case 3: Unrestricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNNTAE	-0.117937	0.106481	-1.107589	0.2835
LNEXCR	0.033437	0.015416	2.169038	0.0446

LNFDI	-0.144089	0.041648	-3.459718	0.0030
LNGCF	0.608180	0.103175	5.894636	0.0000
LNINFL	-0.238909	0.055579	-4.298537	0.0005

EC = LNRGDP - (-0.1179*LNNTAE + 0.0334*LNEXCR - 0.1441*LNFDI +
   0.6082*LNGCF -0.2389*LNINFL)

F-Bounds Test			Null Hypothesis: No levels relationship	
Test Statistic	Value	Signif.	I(0)	I(1)
		Asymptotic: n=1000		
F-statistic	7.491829	10%	2.26	3.35
K	5	5%	2.62	3.79
		2.5%	2.96	4.18
		1%	3.41	4.68
		Finite Sample: n=45		
Actual Sample Size	44			
		10%	2.458	3.647
		5%	2.922	4.268
		1%	4.03	5.598
		Finite Sample: n=40		
		10%	2.483	3.708
		5%	2.962	4.338
		1%	4.045	5.898

t-Bounds Test			Null Hypothesis: No levels relationship	
Test Statistic	Value	Signif.	I(0)	I(1)
t-statistic	-4.910795	10%	-2.57	-3.86
		5%	-2.86	-4.19
		2.5%	-3.13	-4.46
		1%	-3.43	-4.79

ARDL Error Correction Regression
Dependent Variable: D(LNRGDP)
Selected Model: ARDL(4, 4, 3, 3, 4, 3)
Case 3: Unrestricted Constant and No Trend
Date: 06/03/21   Time: 05:37
Sample: 1961 2019
Included observations: 44

ECM Regression
Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.538911	0.597902	7.591391	0.0000
D(LNRGDP(-1))	0.685501	0.175948	3.896032	0.0012
D(LNRGDP(-2))	0.551279	0.212546	2.593698	0.0189
D(LNRGDP(-3))	1.380900	0.261629	5.278091	0.0001
D(LNNTAE)	0.040318	0.019728	2.043762	0.0568
D(LNNTAE(-1))	0.154930	0.024038	6.445270	0.0000
D(LNNTAE(-2))	0.093943	0.023751	3.955318	0.0010
D(LNNTAE(-3))	0.042008	0.018524	2.267760	0.0367
D(LNEXCR)	0.032008	0.014822	2.159500	0.0454
D(LNEXCR(-1))	-0.073277	0.016315	-4.491294	0.0003
D(LNEXCR(-2))	0.033804	0.015690	2.154529	0.0458
D(LNFDI)	-0.020567	0.005277	-3.897249	0.0012
D(LNFDI(-1))	0.026797	0.005207	5.145958	0.0001
D(LNFDI(-2))	0.005513	0.003783	1.457097	0.1633
D(LNGCF)	0.073762	0.010854	6.795754	0.0000
D(LNGCF(-1))	-0.181906	0.018785	-9.683559	0.0000
D(LNGCF(-2))	-0.128488	0.015684	-8.192524	0.0000
D(LNGCF(-3))	-0.074877	0.018185	-4.117486	0.0007
D(LNINFL)	-0.017872	0.004909	-3.640766	0.0020
D(LNINFL(-1))	0.030415	0.007644	3.979000	0.0010
D(LNINFL(-2))	0.021490	0.005494	3.911271	0.0011
CointEq(-1)*	-0.288315	0.037802	-7.627047	0.0000

R-squared	0.925248	Mean dependent var		0.041755
Adjusted R-squared	0.853893	S.D. dependent var		0.040986
S.E. of regression	0.015667	Akaike info criterion		-5.167726
Sum squared resid	0.005400	Schwarz criterion		-4.275631
Log likelihood	135.6900	Hannan-Quinn criter.		-4.836894
F-statistic	12.96694	Durbin-Watson stat		1.719752
Prob(F-statistic)	0.000000			

* p-value incompatible with t-Bounds distribution.

	Null Hypothesis: No levels
F-Bounds Test	relationship

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	7.491829	10%	2.26	3.35
K	5	5%	2.62	3.79
		2.5%	2.96	4.18
		1%	3.41	4.68

t-Bounds Test			Null Hypothesis: No levels relationship	
Test Statistic	Value	Signif.	I(0)	I(1)
t-statistic	-7.627047	10%	-2.57	-3.86
		5%	-2.86	-4.19
		2.5%	-3.13	-4.46
		1%	-3.43	-4.79

Dependent Variable: LNRGDP
Method: ARDL
Date: 06/10/21   Time: 06:59
Sample (adjusted): 1965 2019
Included observations: 55 after adjustments
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (3 lags, automatic): LNNTAE_POS
LNNTAE_NEG
     LNINFL_POS LNINFL_NEG LNGCF_POS
LNGCF_NEG LNFDI_POS
     LNFDI_NEG LNEXCR_POS
LNEXCR_NEG
Fixed regressors: C
Number of models evalulated: 4194304
Selected Model: NARDL(2, 0, 3, 2, 3, 3, 3, 0, 2, 3, 2)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LNRGDP(-1)	0.881694	0.110896	7.950614	0.0000
LNRGDP(-2)	-0.430120	0.178012	-2.416244	0.0249
LNNTAE_POS	0.128050	0.049135	2.606065	0.0165
LNNTAE_NEG	0.043333	0.026716	1.621980	0.1197
LNNTAE_NEG(-1)	0.088053	0.036297	2.425866	0.0244
LNNTAE_NEG(-2)	-0.070424	0.039558	-1.780289	0.0895
LNNTAE_NEG(-3)	0.046458	0.038828	1.196532	0.2448

LNINFL_POS	-0.008471	0.014159	-0.598269	0.5561
LNINFL_POS(-1)	-0.001431	0.013565	-0.105456	0.9170
LNINFL_POS(-2)	-0.022130	0.011595	-1.908572	0.0701
LNINFL_NEG	-0.016920	0.013730	-1.232291	0.2315
LNINFL_NEG(-1)	-0.041310	0.013952	-2.960900	0.0075
LNINFL_NEG(-2)	-0.010333	0.009601	-1.076155	0.2941
LNINFL_NEG(-3)	-0.048277	0.010548	-4.576751	0.0002
LNGCF_POS	0.078525	0.018124	4.332683	0.0003
LNGCF_POS(-1)	-0.023265	0.026450	-0.879582	0.3890
LNGCF_POS(-2)	0.008719	0.015844	0.550294	0.5879
LNGCF_POS(-3)	-0.048985	0.009969	-4.913698	0.0001
LNGCF_NEG	0.021947	0.021376	1.026681	0.3163
LNGCF_NEG(-1)	-0.020177	0.030164	-0.668903	0.5108
LNGCF_NEG(-2)	0.048996	0.028624	1.711710	0.1017
LNGCF_NEG(-3)	0.063665	0.016325	3.899834	0.0008
LNFDI_POS	-0.003090	0.006666	-0.463529	0.6478
LNFDI_NEG	-0.002852	0.007049	-0.404671	0.6898
LNFDI_NEG(-1)	-0.000788	0.008337	-0.094560	0.9256
LNFDI_NEG(-2)	0.016689	0.008566	1.948237	0.0649
LNEXCR_POS	0.010763	0.022273	0.483217	0.6339
LNEXCR_POS(-1)	-0.041479	0.036527	-1.135548	0.2689
LNEXCR_POS(-2)	0.111827	0.028672	3.900203	0.0008
LNEXCR_POS(-3)	-0.024408	0.018258	-1.336883	0.1956
LNEXCR_NEG	0.231187	0.249061	0.928236	0.3638
LNEXCR_NEG(-1)	-0.004541	0.266358	-0.017047	0.9866
LNEXCR_NEG(-2)	0.790215	0.262516	3.010157	0.0067
C	12.48689	2.426915	5.145171	0.0000

R-squared	0.999754	Mean dependent var	23.48853
Adjusted R-squared	0.999367	S.D. dependent var	0.607334
S.E. of regression	0.015278	Akaike info criterion	-5.251270
Sum squared resid	0.004902	Schwarz criterion	-4.010373
Log likelihood	178.4099	Hannan-Quinn criter.	-4.771405
F-statistic	2585.251	Durbin-Watson stat	2.637134
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model
    selection.

ARDL Long Run Form and Bounds Test
Dependent Variable: D(LNRGDP)
Selected Model: ARDL(2, 0, 3, 2, 3, 3, 3, 0, 2, 3, 2)
Case 3: Unrestricted Constant and No Trend
Date: 06/10/21   Time: 07:27
Sample: 1961 2019
** Variable interpreted as Z = Z(-1) + D(Z).

| | Levels Equation | | |
| | Case 3: Unrestricted Constant and No Trend | | |
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNNTAE_POS	0.233486	0.075114	3.108434	0.0053
LNNTAE_NEG	0.195869	0.077515	2.526847	0.0196
LNINFL_POS	-0.058407	0.044301	-1.318410	0.2016
LNINFL_NEG	-0.213044	0.024035	-8.863725	0.0000
LNGCF_POS	0.027342	0.055690	0.490960	0.6285
LNGCF_NEG	0.208652	0.035115	5.942043	0.0000
LNFDI_POS	-0.005634	0.011534	-0.488455	0.6303
LNFDI_NEG	0.023793	0.012687	1.875318	0.0747
LNEXCR_POS	0.103392	0.024644	4.195452	0.0004
LNEXCR_NEG	1.854143	0.714551	2.594837	0.0169

EC = LNRGDP - (0.2335*LNNTAE_POS + 0.1959*LNNTAE_NEG -0.0584
    *LNINFL_POS -0.2130*LNINFL_NEG +
0.0273*LNGCF_POS + 0.2087
    *LNGCF_NEG -0.0056*LNFDI_POS + 0.0238*LNFDI_NEG + 0.1034
    *LNEXCR_POS + 1.8541*LNEXCR_NEG)

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
		Asymptotic: n=1000		
F-statistic	22.89817	10%	1.83	2.94
K	10	5%	2.06	3.24
		2.5%	2.28	3.5

		1%	2.54	3.86
			Finite Sample:	
Actual Sample Size	55		n=55	
		10%	-1	-1
		5%	-1	-1
		1%	-1	-1

t-Bounds Test			Null Hypothesis: No levels relationship	
Test Statistic	Value	Signif.	I(0)	I(1)
t-statistic	-5.098147	10%	-2.57	-4.69
		5%	-2.86	-5.03
		2.5%	-3.13	-5.34
		1%	-3.43	-5.68

ARDL Error Correction Regression
Dependent Variable: D(LNRGDP)
Selected Model: ARDL(2, 0, 3, 2, 3, 3, 3, 0, 2, 3, 2)
Case 3: Unrestricted Constant and No Trend
Date: 06/10/21   Time: 07:34
Sample: 1961 2019
Included observations: 55

ECM Regression
Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	12.48689	0.646267	19.32157	0.0000
D(LNRGDP(-1))	0.430120	0.062718	6.857958	0.0000
D(LNNTAE_NEG)	0.043333	0.017541	2.470441	0.0221
D(LNNTAE_NEG(-1))	0.023966	0.020009	1.197715	0.2444
D(LNNTAE_NEG(-2))	-0.046458	0.021508	-2.160032	0.0425
D(LNINFL_POS)	-0.008471	0.006725	-1.259704	0.2216
D(LNINFL_POS(-1))	0.022130	0.006707	3.299728	0.0034
D(LNINFL_NEG)	-0.016920	0.006809	-2.484745	0.0215
D(LNINFL_NEG(-1))	0.058609	0.006879	8.520297	0.0000
D(LNINFL_NEG(-2))	0.048277	0.005958	8.102214	0.0000
D(LNGCF_POS)	0.078525	0.009199	8.536744	0.0000

D(LNGCF_POS(-1))	0.040266	0.008774	4.589452	0.0002
D(LNGCF_POS(-2))	0.048985	0.007283	6.725769	0.0000
D(LNGCF_NEG)	0.021947	0.012233	1.794091	0.0872
D(LNGCF_NEG(-1))	-0.112660	0.014990	-7.515930	0.0000
D(LNGCF_NEG(-2))	-0.063665	0.011751	-5.417736	0.0000
D(LNFDI_NEG)	-0.002852	0.004033	-0.707218	0.4872
D(LNFDI_NEG(-1))	-0.016689	0.004137	-4.034204	0.0006
D(LNEXCR_POS)	0.010763	0.015478	0.695351	0.4945
D(LNEXCR_POS(-1))	-0.087419	0.015666	-5.580261	0.0000
D(LNEXCR_POS(-2))	0.024408	0.010183	2.396956	0.0259
D(LNEXCR_NEG)	0.231187	0.138281	1.671867	0.1094
D(LNEXCR_NEG(-1))	-0.790215	0.134053	-5.894791	0.0000
CointEq(-1)*	-0.548427	0.028441	-19.28270	0.0000

R-squared	0.954363	Mean dependent var		0.035674
Adjusted R-squared	0.920503	S.D. dependent var		0.044598
S.E. of regression	0.012575	Akaike info criterion		-5.614906
Sum squared resid	0.004902	Schwarz criterion		-4.738979
Log likelihood	178.4099	Hannan-Quinn criter.		-5.276178
F-statistic	28.18571	Durbin-Watson stat		2.637134
Prob(F-statistic)	0.000000			

* p-value incompatible with t-Bounds distribution.

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	22.89817	10%	1.83	2.94
K	10	5%	2.06	3.24
		2.5%	2.28	3.5
		1%	2.54	3.86

t-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
t-statistic	-19.28270	10%	-2.57	-4.69
		5%	-2.86	-5.03

	2.5%	-3.13	-5.34
	1%	-3.43	-5.68

Dependent Variable: LNNTAE
Method: ARDL
Date: 06/11/21   Time: 17:41
Sample (adjusted): 1965 2019
Included observations: 42 after adjustments
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic): LNRGDP LNINFL
LNGCF LNFDI
     LNEXCR
Fixed regressors: C
Number of models evalulated: 12500
Selected Model: ARDL(2, 3, 4, 3, 4, 2)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LNNTAE(-1)	0.336284	0.193495	1.737944	0.0993
LNNTAE(-2)	0.249181	0.192600	1.293777	0.2121
LNRGDP	3.156660	1.142345	2.763316	0.0128
LNRGDP(-1)	-1.813146	1.947117	-0.931195	0.3641
LNRGDP(-2)	-4.967457	2.491464	-1.993791	0.0616
LNRGDP(-3)	5.706019	1.761089	3.240051	0.0045
LNINFL	0.118486	0.087907	1.347854	0.1944
LNINFL(-1)	0.093439	0.057552	1.623558	0.1219
LNINFL(-2)	0.111471	0.067517	1.651001	0.1161
LNINFL(-3)	0.162391	0.053287	3.047497	0.0069
LNINFL(-4)	0.070113	0.059193	1.184476	0.2516
LNGCF	-0.188108	0.150013	-1.253951	0.2259
LNGCF(-1)	0.030830	0.149880	0.205698	0.8393
LNGCF(-2)	-0.014049	0.154777	-0.090771	0.9287
LNGCF(-3)	-0.444122	0.136880	-3.244609	0.0045
LNFDI	0.022149	0.050210	0.441125	0.6644
LNFDI(-1)	0.050635	0.056023	0.903829	0.3780
LNFDI(-2)	0.026191	0.061175	0.428124	0.6736
LNFDI(-3)	0.024058	0.050006	0.481104	0.6362
LNFDI(-4)	-0.081300	0.035437	-2.294207	0.0340
LNEXCR	0.094583	0.181003	0.522550	0.6077
LNEXCR(-1)	0.049042	0.273789	0.179124	0.8598
LNEXCR(-2)	-0.266827	0.182273	-1.463884	0.1605
C	-32.90921	6.064015	-5.426967	0.0000

R-squared	0.962430	Mean dependent var	14.44665
Adjusted R-squared	0.914424	S.D. dependent var	0.464520
S.E. of regression	0.135888	Akaike info criterion	-0.858419

Sum squared resid	0.332378	Schwarz criterion	0.134535
Log likelihood	42.02680	Hannan-Quinn criter.	-0.494462
F-statistic	20.04817	Durbin-Watson stat	2.305319
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection.

ARDL Long Run Form and Bounds Test
Dependent Variable: D(LNNTAE)
Selected Model: ARDL(2, 3, 4, 3, 4, 2)
Case 3: Unrestricted Constant and No Trend
Date: 06/11/21   Time: 18:02
Sample: 1961 2019
Included observations: 42

Conditional Error Correction Regression				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-32.90921	6.064015	-5.426967	0.0000
LNNTAE(-1)*	-0.414535	0.183183	-2.262957	0.0362
LNRGDP(-1)	2.082075	0.371807	5.599886	0.0000
LNINFL(-1)	0.555901	0.191832	2.897849	0.0096
LNGCF(-1)	-0.615450	0.193775	-3.176108	0.0052
LNFDI(-1)	0.041733	0.055593	0.750689	0.4625
LNEXCR(-1)	-0.123202	0.040066	-3.075016	0.0065
D(LNNTAE(-1))	-0.249181	0.192600	-1.293777	0.2121
D(LNRGDP)	3.156660	1.142345	2.763316	0.0128
D(LNRGDP(-1))	-0.738562	1.947380	-0.379259	0.7089
D(LNRGDP(-2))	-5.706019	1.761089	-3.240051	0.0045
D(LNINFL)	0.118486	0.087907	1.347854	0.1944
D(LNINFL(-1))	-0.343976	0.123684	-2.781094	0.0123
D(LNINFL(-2))	-0.232505	0.081080	-2.867583	0.0102
D(LNINFL(-3))	-0.070113	0.059193	-1.184476	0.2516
D(LNGCF)	-0.188108	0.150013	-1.253951	0.2259
D(LNGCF(-1))	0.458171	0.179432	2.553451	0.0200
D(LNGCF(-2))	0.444122	0.136880	3.244609	0.0045
D(LNFDI)	0.022149	0.050210	0.441125	0.6644
D(LNFDI(-1))	0.031051	0.050727	0.612126	0.5481
D(LNFDI(-2))	0.057242	0.047743	1.198950	0.2461
D(LNFDI(-3))	0.081300	0.035437	2.294207	0.0340
D(LNEXCR)	0.094583	0.181003	0.522550	0.6077
D(LNEXCR(-1))	0.266827	0.182273	1.463884	0.1605

* p-value incompatible with t-Bounds distribution.

Levels Equation

Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNRGDP	5.022679	2.151701	2.334283	0.0314
LNINFL	1.341024	0.512192	2.618205	0.0174
LNGCF	-1.484675	0.976550	-1.520326	0.1458
LNFDI	0.100675	0.164805	0.610873	0.5489
LNEXCR	-0.297206	0.089854	-3.307649	0.0039

EC = LNNTAE - (5.0227*LNRGDP + 1.3410*LNINFL - 1.4847*LNGCF +
    0.1007*LNFDI -0.2972*LNEXCR)

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
		Asymptotic: n=1000		
F-statistic	6.101415	10%	2.26	3.35
K	5	5%	2.62	3.79
		2.5%	2.96	4.18
		1%	3.41	4.68
		Finite Sample: n=45		
Actual Sample Size	42			
		10%	2.458	3.647
		5%	2.922	4.268
		1%	4.03	5.598
		Finite Sample: n=40		
		10%	2.483	3.708
		5%	2.962	4.338
		1%	4.045	5.898

t-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
t-statistic	-2.262957	10%	-2.57	-3.86
		5%	-2.86	-4.19
		2.5%	-3.13	-4.46
		1%	-3.43	-4.79

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.631437	Prob. F(4,14)	0.2215
Obs*R-squared	13.35306	Prob. Chi-Square(4)	0.0097

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.173896	Prob. F(23,18)	0.3683
Obs*R-squared	25.19985	Prob. Chi-Square(23)	0.3401
Scaled explained SS	4.853555	Prob. Chi-Square(23)	1.0000