

**THE CONTRIBUTION OF TRADE LIBERALIZATION TO
AGRICULTURAL GROWTH IN KENYA**

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DECLARATION

Declaration by Candidate

This project is my original work and has not been presented for a degree in any university. No part of this project may be produced without prior permission from the author and/or University of Nairobi.

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Declaration by Supervisor

This project has been submitted for examination with my approval as university supervisor.

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DEDICATION

I dedicate this project to my late brother Dan Rop who encouraged me to pursue Master of Research and Public Policy, to my sister Mercy Rop and brother Eli Rop for their encouragement and my mother Sarah Jepleting for her kindness and extensive support. I also dedicate the project to my father Nicholas Rop for his patience, motivation and inspiration to press on. In addition, the project is dedicated to my friends Gennady Malowa, Rashid Kiprono, Patrick Ngene and Victor Kering who have been key in offering valuable perspectives during the writing phase of the project. Finally, the project is dedicated to all those in search of knowledge and especially those who recognize agriculture as a main driver for the economy.

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ACRONYMS

ADF	Augmented Dickey Fuller
ARLDL	Auto Regressive Distributed Lag
DOLS	Dynamic ordinary least square
ECM	Error Correction Model
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
IMF	International Monetary Fund
OECD	Organization for Economic Co-operation and Development
OLS	Ordinary Least Squares
SADC	Southern African Development Community
SAPs	Structural adjustment programmes
UNCTAD	United Nations Conference on Trade and Development
VIF	Variance Inflation Factor
WTO	World Trade Organization

ABSTRACT

In developing economies such as Kenya, agriculture is a ‘special’ sector and a fundamental engine for economic growth. Kenya has actively pursued trade liberalization though the existing studies have not clearly delineated its effect on agricultural growth. Research from the World Bank and IMF suggest that poor growth in agriculture is attributed to restrictive trade policies by developing countries. However, studies on trade liberalization effects on agriculture have elicited inconclusive findings. As such, the focus of the study was on establishing the contribution of trade liberalization to agricultural growth in Kenya. Emphasis was on the influence of tariffs, FDI and trade openness on agricultural growth in Kenya. The study was based on the theory of firm heterogeneity. Time series data ranging from 1980 to 2017 was used. The source was the World Development Indicators. In the methodology, ADF test was used to test stationarity. ARDL bound test was used to test cointegration. The study established that, trade openness is key in enhancing agricultural growth in Kenya. As Kenya opens its borders for easy movement of agricultural produce, there is resultant increase in outputs for the domestic and foreign markets. Besides, FDI contribution to agriculture is negative since FDI tend to relate to other sector of the economy other than agriculture. Consequently, farmers are less likely to benefit from technology transfer and the advent of new processes in agriculture. Further, tariffs had no influence on agricultural growth in Kenya. This could be because despite Kenya making commitments to liberalize its trade, the implementation of the policies on free trade was not forthcoming. Therefore, there is need for stringent implementation of liberalized trade policy with the goal of liberalizing further trade in the agricultural sector. As well, there is need for the Ministry of Agriculture to create a conducive environment for investment in Agriculture and link up domestic farmers with investors so as to boost the production levels in agriculture.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Trade liberalization is the removal or reduction of constraints to trade between different countries. With trade liberalization, the barriers to free trade that have been imposed with the aim of protecting the domestic production from foreign competition are either reduced or completely removed (Baldwin, & Evenett, 2009). As such, it places under industrialized countries at a disadvantage, because their economies rely heavily on agriculture, particularly if their tax laws are not robust enough to reduce the cost of acquiring better machinery and modes of production. However, the probability that they might have the foresight to develop tax structures that promote flexibility in their agricultural sectors coupled with their relatively larger and more fertile tracts of land force the more developed countries, especially in the OECD, to institute policies to protect their own farmers and markets (Oxfam, 2005). As a consequence, developing countries have to overcome a lot of challenges and constraints for their produce to compete favorably in global markets. Nonetheless, despite the risks inherent in liberalizing agriculture, the global market for farm produce is considerable enough to offer both groups of countries sufficient opportunities for growth and profit (Anderson et al., 2006). Between the global food requirements, for both humans and animals, and the industrial non-food raw material requirements, liberalization offers countries the chance to feed their citizens and to sustain their manufacturing, therefore, creating much needed jobs.

Empirical evidence suggests that allowing liberalized trade in agriculture encourages the growth of the sector by creating an environment that promotes investor confidence (Liargovas and Konstatinos, 2012). As a result, not only does it influence the size of the pool of investors willing to pump in resources directly into farming enterprises, but also their quality. That is to say that investors, especially foreign ones, are willing to, and indeed make, significant financial investment directly into agricultural processes and concerns, therefore, resulting in a considerable increase in output levels and quality (Andersen and Babula, 2009). This improvement in output quantity and quality is the result of the adoption of internationally acceptable standards of quality in the production of farm produce to promote consumer health and wellbeing and to enhance environmental sustainability (Asafu-Adjaye, and Mahadevan, 2009). In addition, the

resulting specific knowledge development further enhances efficiency in the sector by increasing output and reducing wastage, therefore, making the enterprise more profitable and improving the outlook of agriculture as a business (McCulloch et al., 2001; Feenstra and Romalis, 2014).

However, despite all the potential opportunities for growth and development that opening up trade in agriculture offers, the demands it places on efficiency often bring about a myriad of socioeconomic problems particularly in developing countries because of the infancy of their structures (Lee, 2005). High unemployment, poor living conditions due to low wages, skewed development of infrastructure and price exploitation are some of the problems that arise from trade liberalization. What is more is that so far there is little evidence of success in increasing the level of agricultural output in countries that have implemented trade liberalization strategies (Boossabong and Taylor, 2009). In fact, most information actually points to trade liberalization as a cause of the reduction in production output. Also, the high government borrowing that often accompanies the institution of open trade policies causes' inflation that affects producer earnings adversely.

Nevertheless, there was a period of almost thirty years after the Second World War whereby countries that were developing focused on protecting weak industries from foreign competition (Krugman and Obstfeld, 2008). Despite the focus on protectionism, it was later on realized in the 1980s that countries that were pursuing import substitution were unable to be at par with developed countries. It was against this background that majority of the developing countries lowered the tariffs and removed restrictions that impeded international trade. From then henceforth, trade liberalization has been pervasive with developing countries.

However, despite all the real-life examples available to work with, evidence on how trade liberalization affects agricultural growth still remain unclear because of how intricately agriculture ties into overall economic performance especially in Africa (De Silva, Malaga, & Johnson, 2013). As such, there is a significant knowledge gap on the implications of opening up trade, especially in agriculture, that further disadvantages decision making particularly in developing nations (Blake, McKay and Morrissey, 2002). This study, therefore, sought to pursue the topic with a holistic approach so that it uncovers more than the trends in the performance of agriculture markets post

liberalization. Nevertheless, because of the broadness of the indicators used to measure trade liberalization, this study limits itself to trade openness, tariffs and foreign direct investment because of how they affect both the upstream and downstream stages of agricultural production.

1.1.1 Profile of Trade Liberalization in Kenya

Kenya has exhibited different trade regimes since its independence. To start off, from the year 1963 to 1979 focus was solely on protecting the infant industries. However, efforts towards protectionism of trade in Kenya suffered a huge blow upon the collapse of the East African community and economic shocks that were attributed to the oil crisis. Kenya was therefore prompted to adopt several structural adjustment programmes (SAPs) from the year 1979 to 1994 under the Breton Woods institutions specifically the World Bank and IMF. It was a requirement for the government to embrace trade liberalization and adopt an outward-oriented industrial policy. In actual fact, in the year 1982, Kenya sought funds from the IMF and vowed to pursue greater liberalization though the promised reforms were not forthcoming. Tariffs on certain goods were liberalized with import controls for certain items. Upon joining, the World Trade Organization early in 1995, the Kenyan government made further efforts towards tariff reduction on goods in an attempt to enable the free exchange of goods within and outside the country.

1.1.2 Profile of Agricultural Growth in Kenya

Kenya's agricultural production in the period 1965 to 1987 exceeded the average for Sub-Saharan Africa. This was also the case with manufacturing and services (World Bank, 1989). The reason for this was that the growth in agriculture stimulated growth in the other sectors in the economy. In 1984, Kenya experienced one of the worst droughts which resulted in declined production of tea, maize, wheat as well as livestock. During the aftermath of the drought in 1985, there was a drop in the output of coffee. After 1988, rainfall was good and this was reflected in crop production that year. Agricultural output yields took a further slump in the 90s due to poor production factors and market conditions that resulted in under investment in the sector and encouraged imports (Kimenyi, Mbaku, & Mwaniki, 2003). At the turn of the new millennium, the sector underwent a rejuvenation of sorts for the first decade but then experienced another drop at the beginning of the second. These changes are the result of the sector's performance relying on a lot of factors many of which are hard, if not impossible, to

control or predict such as weather patterns and market forces. In addition, the country lacks robust policies and structures to enhance the resilience of its agricultural sector which leaves its farmers open to the risks posed by its instability. As such, most of the time the government has to play catch up and react to changes rather than employ the more proactive responses strategy.

1.1.3 Profile of Pre and Post Liberalization Agricultural Growth Rate in Kenya

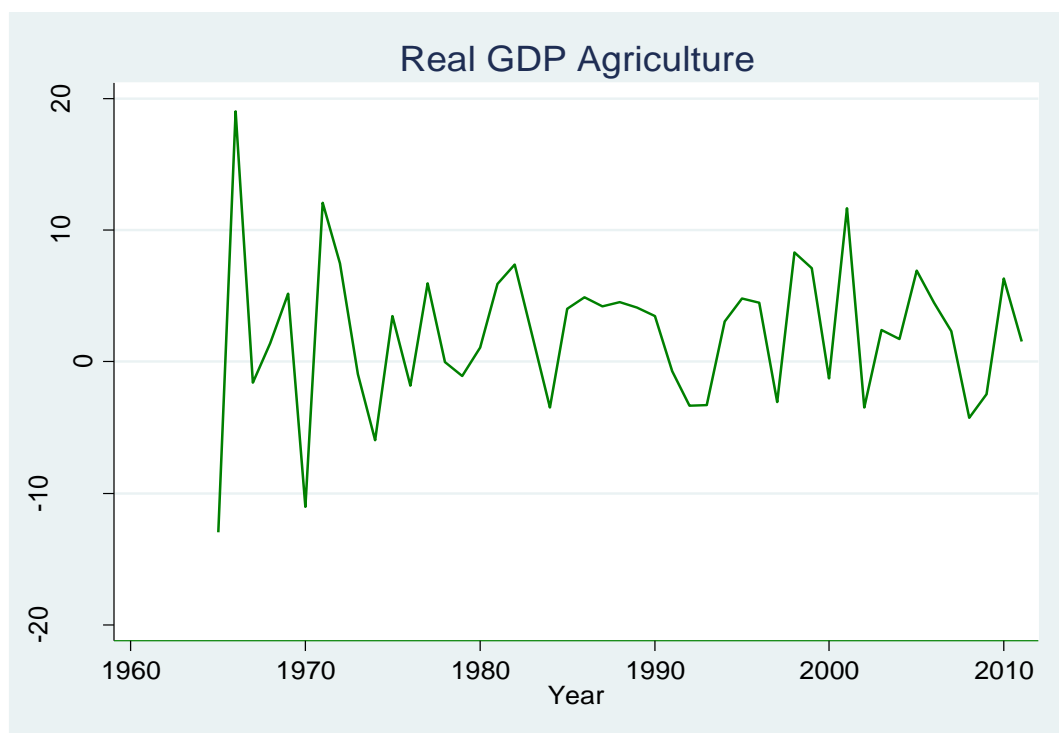
Real agricultural GDP is a measure used to determine a country's annual agricultural production by looking at the sector's contribution to its overall GDP. It provides the most objective outlook for the sector's performance because it actively factors in inflation and presents the information in the prevailing local currency reducing exchange rates errors. According to this metric, Kenya's local agricultural market has been experiencing a negative growth rate especially after the inception of free trade in the sector. However, the country experienced its highest ever agricultural growth performance at 19.048% (see Fig 2.1) which also positively affected living standards in the country.

Furthermore, as the country embarked on an industrialization campaign to boost its manufacturing capabilities and capacity in the 70s, investment in agriculture decreased significantly and affected the sector's performance (Leonard, 2013). Coupled with the oil crisis, severe drought and poor global commodity prices that characterized the same period, the country's sectoral performance in agriculture further suffered with 1974 registering its worst output at -5.95154%. To remedy the situation, the government agreed to adopt the economic recovery interventions developed by the World Bank in the 80s as a prerequisite in its efforts to access credit. However, in spite of this radical change in tact, the sector did not show any improvement in 1984 (-3.475%) than that ten years earlier. Nevertheless, despite the breakdown of most of Kenya's bilateral and multilateral relations with the international community in the 90's that saw the country lose critical funds as donors pulled away on the backdrop of claims of corruption and bad governance, agriculture experienced low agricultural rates of -3.326% in 1992 and -3.272% % the year after. This trend continued, although slowly, and the sector's performance registered a positive performance in 1995 for the first time in 21 years.

However, the loss of funding took its toll on the country's economic outlook as the decade progressed which also affected agriculture adversely plunging its ratios back

into the negatives by 1997 at -3.065%. Production improved in the following year with the country registering ratios of 8.290% and then took a slight dip in 1999 (7.092%). However, at the turn of the millennium, prolonged drought plunging the sector's performance further, until 2003 when it bounced back slightly but picked up after 2010 and standing at 1.559%. Agricultural performance in Kenya has been a rollercoaster of ups and downs with the down turns being relatively frequent despite the several efforts the country has made in its strategies. What is clear though, is that there is an urgent need for the development of a strategic long-term plan for the sector if the country is to make any headway in improving agricultural output. These structures should enhance accountability in the sector and encourage investor confidence leading to higher investments. It is especially important because of the uncertainties that the future promises because of the increasing unpredictability of weather conditions and the reduction of fresh water supply prompted by global warming.

Figure 2.1 Real Agricultural GDP



Source: Africa Development Indicators

1.2 Statement of the Research Problem

The increasing interconnectedness of global markets and financial systems coupled with the increasing effects of democracy, make it necessary for countries to adopt more open trade policies so as to be more economically and politically strategic. Liberalizing trade helps countries achieve the former by increasing the market size they sell to and source from thereby satisfying their commodity needs and the latter by increasing the strengths of its bilateral and multilateral ties with their neighbors. As such, developing countries are likely to gain competitiveness from making trade freer, especially in their agriculture sectors, because of the potential it offers them to reduce their production and mechanization costs and hedge out the risks associated with poor production and unfavorable global market dynamics.

However, despite the significant time and resources many of these countries, Kenya included, have, and continue to pump, into the venture, their lack of proper structures makes them unable to realize the letter of spirit of free trade in its entirety. In fact, the record of real agricultural GDP in Kenya has generally exhibited a downhill trend. In 1966, Kenya experienced commendable growth rate at 19.048% though not much was realized in the post-liberalization periods as indicated by real agricultural GDP of 1.8% in the year 2017. Evidently, agricultural growth in Kenya has been on the decline despite the country adopting trade liberalization policies in the late 1980s. The decline in agricultural growth has partly been attributed to poor governance that has discouraged high investor confidence in agriculture. Despite that, there is relatively little specific information on how trade liberalization has contributed to agricultural growth in Kenya.

As such, this study aims to bridge the gap by looking at the implications that freeing up trade in agriculture in Kenya has on the growth of the sector and how the country can make more from it. The insights it should develop should be instrumental in highlighting the essence of trade liberalization, therefore, facilitating the development of clearer, more practical and sustainable concepts and models in the future. As such, both scholars and practitioners in economic and agricultural policy would have an understanding of how to navigate the complexities that accompany higher trade openness to ensure consistent economic and social growth.

1.3 Research Questions

- i. Does trade openness have an influence on agricultural growth in Kenya?
- ii. What effect do tariffs have on agricultural growth in Kenya?
- iii. What effect do foreign direct investments have on agricultural growth in Kenya?
- iv. What is the nature of agricultural growth rate in pre and post liberalization Kenya?

1.4 Objective of the Study

The broad objective of the study is to analyze the contribution of trade liberalization to agricultural growth in Kenya. The specific objectives are:

- i. To find out the effect of trade openness on agricultural growth in Kenya.
- ii. To establish the influence of tariffs on agricultural growth in Kenya.
- iii. To establish the effect of foreign direct investments on agricultural growth in Kenya.
- iv. To highlight the profile of pre and post liberalization Agricultural growth rate in Kenya.

1.5 Justification of the Study

The study is of essence because it adds new and valuable insights to literature on trade liberalization in developing countries. Also, the research provides information on the status of agricultural growth rate in Kenya. In so doing, policy practitioners in agriculture are able to have a clear picture of the different trends in performance and the reasons behind it and thus develop suitable policies.

Moreover, the study is of utmost importance to the Ministry of Agriculture in terms of planning. In the past, farmers in Kenya have been in the receiving end especially those dealing with maize and coffee. Evidently, a lot of costs are incurred in farming though the returns are not commensurate with the amount spent. The only option of farmers is to sell their produce at higher price in relation to farmers in neighboring nations such as Uganda and Tanzania. With evidence from the study, the Ministry of Agriculture is well acquainted on how openness to trade, foreign direct investments impact on local farmers and plan accordingly.

Coincidentally, the study comes after the agreement by the forty-four African countries to facilitate free trade hence it is beneficial to the government as it raises awareness of

how Kenya is likely to benefit from the agreement. Finally, the study touches on one of the pillars of President Uhuru's Big Four Agenda which is food security. It is through the growth in agriculture that Kenya is able to attain food security.

1.6 Scope and Limitation of the Study

The study was limited to trade liberalization effects to agricultural growth in Kenya. The study is only limited to trade openness, foreign direct investments and tariffs as proxies of trade liberalization while controlling for inflation and domestic credit. Emphasis was also on the post-independent agricultural policy and the post liberalization agricultural policy of 1980 to 2017. The time period for the time series was between 1980 and 2017.

1.7 Chapter Outline

The study is broken down into five chapters. This chapter provides a background of the study that is the contribution of trade liberalization to agricultural growth in Kenya. The problem has been stated along with the general and specific research objectives. The chapter has also discussed the scope and significance of the study. A definition of terms as used within the context of the study has also been listed. The following chapter is a Literature review concerning this topic of study. The literature is reviewed based on the specific objectives in previous chapter. The chapter also highlights the theoretical and conceptual framework. Chapter three presents the research methodology that was used in conducting this study. Chapter four presents the findings of this study based on data collected and analysed using methodologies shown in chapter three. Chapter five summarizes the findings and presents the conclusion and recommendations of the study

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter provides an overview of the concept of agricultural trade liberalization, highlights the agricultural policies in Kenya and the empirical link between trade liberalization measures and Agricultural growth in Kenya. The chapter also presented a conceptual framework that reflects the hypotheses formulated in the study.

2.1 Concept of Agricultural Trade Liberalization

Trade liberalization in agriculture is epitomized by removal of trade barriers in international trade. The trade barriers are meant to protect domestic agricultural production from the competition imposed by foreign producers (Hoekman & Nicita, 2011). In the past, there was a lot of emphasis on restrictive trade policies especially by countries that were developing (Hur and Park, 2012). However, over the last three decades, there has been a paradigm shift in thought mainly due to structural and financial crises. The World Bank and IMF aided these countries on the condition that they embrace liberalization strategies (Rose, 2007). The problem was that there was no equal playing field hence the newly industrialized countries at the time benefited more from global trade liberalization to the extent of changing their status to developed economies. Despite the fact that, the economic depression and the two World wars acted against trade liberalization, strategies among the developed countries facilitated further liberalized trade policies (Montalbano, & Nenci, 2014). Evidently, tariff and non-tariff measures were predominant during the previous years' albeit at the moment, elimination of trade barriers is the state of affairs for both developed and developing nations.

2.2 Agricultural Policies in Kenya

The post-independent agricultural policy of 1966 to 1970 laid much emphasis on the diversification of the economy from being predominantly agriculturally based. Focus was on policy instruments such as tariff protection, quotas and subsidies. However, these interventions resulted in a declined growth in agriculture with the manufacturing sector receiving protection from foreign competition. Consequently, the country realized a deterioration in the ratio of exports prices relative to imports between the agricultural and non-agricultural produce (Sharpley, 1984). Nonetheless, real GDP in

agriculture grew over 40% during the same period despite the unfavorable policy environment. In fact, Kenya is yet to realize its highest ever real GDP growth rate in agriculture that stood at 19.048% in 1966.

In the post liberalization period of 1980 to 2017, the Kenyan government has endeavored to ensure that producers are the biggest beneficiaries of the returns to the agricultural sector. This has been characterized by government involvement in setting producers' and input prices. A good case example is price stabilization for maize through fixing the purchasing price for maize and the importations by the National Cereals and Produce Board for the purpose of gain reserve. There is also distribution of both seeds and fertilizers by government. Nonetheless, the implementation of these measures poses a challenge since the intended beneficiaries specifically producers rarely benefit from this endeavor. In recent times, efforts towards regional cooperation among East African countries has facilitated the free movement of agricultural produce in the region. However, the recurrent droughts especially in the North Eastern region of Kenya which has brought about food shortage has led to import bans specifically on maize in attempts to protect domestic industries and attain national food security (Resnick, 2004). Such efforts have been detrimental to trade in agriculture as the neighboring countries tend to apply similar measures to protect their agricultural sector. In light of the foregoing, interventions by government have mainly been on the premise of ensuring that there are input subsidies, short term import tariff reduction and support from foreign aid to sustain the agricultural sector.

2.3 Empirical Review

2.3.1 Trade openness on Agricultural Growth

Trade openness discloses the intensity of both trade regulations and restrictions by a given country to other global trade partners (Gulzar, 2016). As evidenced earlier, trade openness has been at the forefront of agricultural growth strategies in both the rich and developing countries. Several empirical works have addressed the contribution of openness to trade on the growth in agriculture. From a global outlook, opening up trade in agriculture has far-reaching implications especially for Sub-Saharan countries. In a study by Nuetah, (2018), it was established that liberalizing agricultural trade in both the European Union and United States negatively impacted Sub-Saharan countries that were beneficiaries of trade preferences. In fact, the prices of commodities that were being imported by Sub-Saharan countries increased substantially while commodity

exports from Sub-Saharan Africa fetched lower prices in the global market. Consequently, countries that were net food importers were exposed to high import bills which led to welfare losses. The situation was also worsened for sugar exporters that were beneficiaries of preferential trade agreement in both Europe and the USA. The implication is that Sub-Saharan countries were net losers of liberalized trade in both the Americas and Europe. This is linked to the fact that countries in Sub-Saharan Africa lack the capacity to compete favorably with other economies that have mechanized their agricultural processes and do not solely rely on agriculture as a driver of the economy.

Furthermore, Asma and Hasnat (2012) did a study aimed at ascertaining if trade openness had an impact on gross domestic product in Pakistan. The emphasis was on the period between 1972 and 2010. Cointegration among the variables was established with the ARDL Bounds test. The findings indicated that the growth in the economy in Pakistan was linked to trade openness. The point of divergence between the study by Asma and Hasnat (2012) and the current study is that the outcome variables are different. As opposed to establishing the role trade openness has in facilitating economic growth, the focus is on agriculture a fundamental engine for economic growth.

As well, Khan, Salam, & Batool, (2015) studied the nexus between openness to trade and the performance of Pakistani agricultural produce in foreign markets. The performance of produce in agriculture proxied the GDP growth. The focus of the study was the period between 1980 and 2013. From the results, the normalized co-integration equation showed that the opening up of trade positively influenced GDP growth. In a similar vein, a percentage increase in agricultural raw materials exported results in approximately 0.10 percent positive influence on GDP.

Also, Gholipour et al, (2012) delved into the influence of liberalizing trade in agriculture on the export and import gains in Iran. The sole focus of the study was the period ranging between 1961 to 2008. Vector correction model was used to elucidate the interactions. Basing on the Johansen test, the more the openness in agricultural trade, the higher the import shares of agriculture. However, trade liberalization caused the agricultural export produce to decline. Palpably, opening up trade acts against the gains in agriculture in Iran since the agricultural produce fetch less in the international market.

The impact of freer trade on Agriculture was also assessed by Darmawan, (2014) in the Indonesian context. The time period spanned from 1961 to 2013. The ECM was used to ascertain whether openness to trade and productivity growth in Agriculture exhibited a long- and short-term relationship. Evidently, in the long-term, freer trade is deterrent to the growth in agriculture. This was mainly because the liberalization of trade led to high importation of agricultural produce. Other than that, there was exponential population growth that was not commensurate with the growth in production in agriculture. There was therefore high demand for agricultural produce to the extent that the domestic producers could not meet the demand. The resulting outcome was import dependency which brought about debility in agricultural production, welfare loss among local farmers and exposure to unstable prices in the global market.

Asian countries have also been on the forefront in opening up trade in Agriculture. Particularly, Bashir, (2003) did an analysis of how openness to trade affects the performance of agricultural exports from Pakistan. Focus was on the impetus of demand and supply side factors on the favorability of agricultural produce from Pakistan in the global market. The study relied on cointegration analysis. The results indicated that Pakistan elicited gains from the agricultural exports mainly due to the domestic policies that were aimed at empowering the domestic producers. The results indicated that freer trade increased the demand for agricultural produce from Pakistan in the global market. The case of Pakistan is an instance whereby trade liberalization has brought about gains in Agriculture. This was mainly attributed to policies in Pakistan that were aimed at empowering the domestic producers to have the capacity to export their produce to global markets.

To further elaborate on trade openness, Hye, & Jafri, (2011) sought to establish the link between the growth in agriculture in Pakistan and freer trade. The time series data utilized was from 1971 to 2009. The long run association was established using the ARDL model. When the variables were cointegrated, it was established that the growth in agriculture was attributed to freer trade. On the other hand, there was a long run causal direction from human and physical capital as well as trade openness to real GDP in agriculture as evidenced by Granger causality test. The study is different in that it incorporates both investments and tariff measures as proxies of trade liberalization.

In addition, openness to trade in Agriculture is also linked to the population growth in developing countries as espoused by Fabiosa, (2008). This however occurs in stages. At the onset, open trade results in the growth in the economy which in turn increases the income levels of the citizenry. With an increase in income, there is increased food consumption among the households. Arguably, the increase in food production would prompt domestic producers especially those dealing with food produce to engage in measures to increase their production levels. In a way therefore, opening up trade results in population growth which necessitates producers to increase their production of agricultural produce to meet the rising population. Though a direct link between openness to trade and agricultural growth has not been evidenced by Fabiosa, (2008), liberalizing trade in agriculture also results in the growth of the agricultural sector.

Hassine, Robichaud and Decaluwe (2010) focused on the role of openness to trade on poverty mitigation in Tunisia. The household expenditure surveys of 2000 and 2001 were used by the study. Computable General Equilibrium model was used in the methodology to get an estimation of liberalized trade on both equity and standards of living in Tunisia. The findings revealed that trade liberalization enhanced agricultural productivity and led to a drop-in poverty by eleven percent. The study employs a different approach in that it focuses on a longer time period between the year 1980 to 2017 and emphasis is on agricultural growth.

Additionally, Manteli, (2015) did an analysis aimed at finding out if a causal link existed between the growth in the economy and trade openness. The focus of the study was on both developed and developing nations that were 87 in total. The time period for the panel data was between 1970 and 2013. Correlation matrix and OLS regression were used. The findings indicated that when countries open their borders to free trade, there is a resulting increase in economic growth. With emphasis on emerging economies, trade openness had a deleterious effect on income per capita though its effect on income growth were positive. Instead of OLS regression, the study used ARDL bound test approach to cointegration.

In Nigeria, Bernard (2014) explored the consequences of higher trade openness on the agricultural sector. In the study, the performance in the agricultural sector was an indicator of overall growth in the economy. The data used covered a 42-year period right from 1970 to 2012. Both the ARDL and ECM were used to establish if openness

to trade exhibited a link with the growth in agriculture. From the results of the Bounds test, there was no evidence of a relationship. Nevertheless, in the short -run, openness to trade was counterproductive to the growth in agriculture. The implication was that freeing up trade was deleterious to the performance of the agricultural sector in the short -run. The findings provide deeper insights on the role of trade openness though it is unclear whether the country had instituted policies to protect the domestic producers with the increase in competition brought about by opening up the economy to trade.

Ojeyinka, &Adegboye, (2017) focused on the influence of openness to trade to both the agricultural and manufacturing sectors in Nigeria. Time series data collected on annual basis from 1981 to 2014 were used. Openness to trade was used as an indicator for trade liberalization. The findings indicated that the increased output in the agricultural sector was due to liberalized trade though the openness to trade had a negative influence on the manufacturing output and the Nigerian economy. Notably, the study provides significant insights on the trade liberalization especially in sectors (agriculture and manufacturing) that stimulate the overall growth in the economy.

Specifically, in Agriculture, Fasoranti, (2014) provided further insights on trade openness and its impact on the production level of cocoa in Nigeria. The time period for the study ranged from 1980 to 2012. In the methodology, the study utilized cointegration test. The findings indicated that freer trade had influence on the cocoa output. The other variable of interest, domestic price had a negative implication on the cocoa output. The study is laudable in that it has focused specifically on a given agricultural produce that is cocoa in Ondo state, Nigeria. However, the results cannot be generalized to imply that openness to trade has no effect on agricultural productivity in Nigeria. As such, the study complemented the results by focusing on the effect of openness on GDP in Agriculture. Also, the difference was the delineation of the time periods to before trade liberalization and after so as to clearly establish the impact of openness to trade.

In Ethiopia, Abate, (2014) assessed the impact of freer trade on the productivity in agriculture. The study relied on an econometric analysis with data spanning a 30-year period. The findings indicated that trade openness contributed to productivity improvement in Ethiopian agricultural sector. The positive effect of freer trade was mainly attributed to policy reforms in Agriculture. As opposed to imposing tariffs in

the sector, the country eliminated all barriers to trade and worked towards creating a conducive environment for trade in the country. The outcome was growth in agriculture as well as welfare gains. In fact, in the post-liberalization period, the country has boasted of a marginal reduction in the poverty levels.

Moreover, in East Africa, it is clear from a study by Read and Parton (2009) that Kenya, Tanzania and Uganda have experienced the negative effects of liberalized trade. According to the authors, the balance of trade of Kenya, Tanzania and Uganda has worsened over a period of 25 years despite these countries adopting trade liberalization policies in the late 1980s. Instead of benefiting from trade liberalization, there is no level playing field in global agricultural trade. Specifically, the developing countries are exposed to unreciprocated market access conditions by the rich countries. The implication is that there is an artificial duty on agricultural exports from developing countries which results in a decline in the revenue.

In the Kenyan scene, Omolo, (2012) delved into the effect of trade openness on poverty reduction. The study was a micro-simulation. The analysis was conducted with reliance on the social accounting matrix of 2003. There were two scenarios that were stimulated. The first instance was whereby there was up to 70% reduction of the tariffs in agricultural while tariffs for non-agricultural produce were reduced by 42%. In the second instance, there were no tariffs imposed on all products. From the two scenarios, it was established that there were welfare gains during full liberalization as opposed to instances whereby certain produce were subject to tariffs.

Omolo, (2012) further established that the manufacturing sector was the biggest beneficiary of liberalized trade. Specifically, volume of trade in manufacturing output was threefold that of agricultural products. The only subsectors in agriculture that benefited immensely from open trade are trade in cash crops such as wheat, maize, tea and sugar. On the other end, textiles, beverages and footwear subsector were the biggest gainers in the manufacturing sector. The author noted that despite the manufacturing sector benefiting more from liberalization, efforts towards ensuring there is mobility of labor which reduces the poverty index in Kenya. Overall, the findings support the notion that the manufacturing sector is set to benefit immensely from trade liberalization when compared to agriculture.

2.3.2 Tariffs on Agricultural Growth

According to the World Trade Organization, tariffs are duties levied on imports that give the government revenue and at the same time offer domestic producers an advantage over foreigners (WTO, 2015). According to Chang (2003), at some of point of their development, the now developed countries employed protectionism in their trade policies. Specifically, Sweden and Germany used both tariffs and non-tariff measures to protect their industries that were predominantly in iron and steel. In most cases, the developing countries emphasize on imposing tariffs because they have to overcome a lot of challenges and constraints for their produce to compete favorably in global markets.

Trade liberalization has taken center stage of the 21st century. It is against this backdrop that Bureau, & Jean, (2019) sought to assess the impact of tariff regimes right from 2001 to 2018 on trade in agriculture. The impact of multilateral organizations had less implication on the opening up of trade during the period of investigation. Compared to the WTO ceilings, the bulk of the countries have emphasized on lowering of tariffs. Specifically, opening up of trade has been done outside the confines of both regional agreements and the WTO. With respect to tariffs, there has been a decline in tariffs in agriculture over the years which has brought about the development in agriculture. From the ensuing findings, trade liberalization has been the focus of the 21st century and it has mainly been elicited by the reductions in tariffs in agriculture.

The Trump era best typifies the inverse gains of trade liberalization. In fact, trade wars between the USA and China have been predominant since the Republicans took over in 2016. Among the studies that have made efforts towards establishing the possible implications of tariff impositions by China on agricultural produce from the USA is that of Taheripour, & Tyner, (2018). The tariffs that China intends to impose on agricultural produce from the USA is in response to the proposal by the USA to impose a 25% tariff on products imported from China. One of the largest agricultural export from the USA to China is soybeans. The authors simulate that the imposition of tariffs on Soybeans from the USA would have far-reaching consequences on the agricultural sector in the USA. Specifically, in the long-run, there will be a decline in Soybeans exportation to the tune of 17 million metric tons with the imposition of the 25% tariff. The figures suggest that the decision of China to impose tariffs on the USA is likely to harm the export of soybeans. The implication from the study is that the politics of the

day dictate the policies that are instituted by countries such as the USA and China. The Trump regime focuses first on their own countries hence there is a likelihood of protectionist policies that discourage trade liberalization.

In the Indonesian scene, Umboh, Hakim, Sinaga, & Kariyasa, (2014) investigated the influence of policy changes on tariff imposition on maize on the subsequent production and consumption of maize in Indonesia. The findings established that the elimination of tariffs has led to the increase in maize imports. As such, the price of maize in Indonesia has declined. This adversely affected farmers in Indonesia since land under maize production reduced by a big margin. Besides that, the use of farm inputs such as fertilizers also declined leading to closure of cottage industries in the country. On the flip side, the policy on reduction of tariffs benefited the production of poultry as well as rice in Indonesia. There was therefore increased income for farmers in these subsectors. The study clearly indicates that policy actions such as the reduction of tariffs might harm certain subsectors in Agriculture but might be beneficial to some. The current study therefore benefits immensely from the above insights since Kenya relies heavily on maize farming thus policy actions on opening up trade in Agriculture need to have a holistic outlook of the ripple effect on all the subsectors.

In an earlier study of Niemi, & Huan-Niemi, (2002), established the influence of elimination of tariff by China on the European Unions' exports in agriculture. Data collected semi-annually since 1980 to 2000 were used by the study. To measure the influence of comparative prices and the changes in trade policies on European Union's agricultural exports to China, the demand function was used. The study established that reduction in tariff led to a rise in the importation of agricultural food imports to China. Despite the increase in agricultural produce to China, it is not evident whether the increase in imports facilitated the growth in agricultural production.

Furthermore, Joramo, (2016) investigated the implications of tariffs on Norwegian agricultural imports. The study estimated trade elasticities with the use of regression analysis. Panel data for the period 2003-2013 indicated that tariffs had no independent influence on the agricultural goods imported. The implication was that market power prevented the prices from adjusting accordingly. The study however showed no link between tariffs and agricultural growth which the current study addressed.

Gonzalez, H elaine, Rau, & Tothova, (2010) investigated the implications of trade barriers by developing countries on the exportation of value-added agricultural produce. Focus was on the manner in which tariffs and non-tariffs barriers affect the diversification of agricultural exports from the emerging economies. Moreover, emphasis was also on how domestic non-tariff measures are a constraint to market access in agriculture. From the findings of the study, it is evident that developing countries ability to export value-added agricultural produce is mainly constrained by domestic non- tariff measures. The implication from the findings is that policy planners need to focus on addressing non -tariff measures both locally and internationally so as to gain optimally from the liberalization of trade. The current study however takes a different stand-point since focus is only on how tariffs influence the growth in agriculture.

Azarnert, (2014) evaluated the influence of tariffs on the volume of exports from emerging economies. The focus of this study was on agricultural produce that have high growth potential on the overall economy. The study was on the premise that developing countries can only benefit from international trade if they implemented the appropriate policy instruments that addressed constraints to trade. The results of the analysis indicated the reduction of tariffs shifts the demand of agricultural exports to foreign markets. Reduction of tariffs has an effect on other trade partners as they will also make efforts towards removing constraints to trade on their end. The implication from the study was that the reduction in tariffs brings about productivity gains in agriculture. As well, it makes it plausible for emerging economies to develop sectors with high growth potential. As opposed to the study, the current study utilizes the firm heterogeneity model which argues that trade openness enables domestic producers with high growth potential to expand their volume of production to serve foreign markets. With the inclusion of tariffs as a proxy for trade liberalization, the results are likely to provide important insights to boost agricultural growth in Kenya.

In addition, Galiani, & Porto, (2010) analyzed Argentinian trade policies over a 60-year period to uncover the reasons behind the dismal economic progress in the country. The authors noted that despite the country experiencing exponential economic growth at the turn of the 21st century, it has not fully developed in the past decade. The major culprits that have been credited with the declined economic progress are the trade policies implemented by the country and the liberalization of trade that has been pervasive since

the 2000s. The study established that the overemphasis on the manufacturing sector despite the country boasting of comparative advantage in Agriculture has contributed to the Argentine debacle. The resulting outcome is that the Argentine economy never took-off. The results suggest that nations can only gain from trade openness if they emphasis on sectors that they have comparative advantage in. The study therefore intends to build from the above insights though focus is on tariffs impact on agriculture in Kenya.

Regarding the effect of tariffs on agricultural growth, Chang, & Hayakawa, (2014) did an analysis that aimed at determining the impact of eliminating the tariff barriers that exist in agricultural trade. The model incorporated by the study was the computable general equilibrium. The results indicated that the elimination of import tariffs facilitated the trade in agricultural produce and at the same time boosted the net inflows of investment in agriculture. There is however need for more detailed results as the study has not established whether a link exists between tariff and agricultural growth.

In addition, Kalaba, Sacolo, & Kirsten, (2016) conducted a study focusing on the manner in which non-tariff measures affect trade in agriculture among SADC countries. The emphasis was on the period between 2000 and 2010. The findings revealed that most of the non-tariff measures are applied to cereals, dairy products and fruits. The countries in question substituted the tariffs with the non-tariff measure hence the countries in the SADC free trade area were unable to gain from trade liberalization.

On the other hand, Khouilid, & Echaoui, (2017) established the influence of tariffs on international trade by Morocco. The time period was between the year 2000 and 2015. In the methodology, emphasis was on the use of gravitational equation for countries that are not at par in terms of development phase together with the elasticity of imported demand. The results of the study revealed that the non-tariff measures had a negative influence on foreign trade by Morocco. The export sectors were affected adversely especially when in trade with developing countries.

In the Sudanese context, Elsheikh, Elbushra, & Salih, (2015) investigated the impact of changes in wheat tariffs on the country's Gross Domestic Product. The study relied on data from the county's Social accounting matrix for the year 2004. There were different scenarios that were simulated. To start off, it was predicted that the changes in tariffs on wheat imports would affect all the other sectors in the economy. For instance, in the

event of reduction in the tariffs, the volume of wheat imports would be on the increase. This would result in a decline in the imports of other agricultural produce as well as manufacturing inputs. Also, as evidenced in the Indonesian case whereby a reduction in maize imports resulted in declined domestic prices of maize, the same would also happen with the price of wheat in Sudan. As such, the resources directed to wheat production within the country would also reduce. On the other end, increasing the tariffs on wheat would lead to a decline in the imports and encourage its domestic production. This scenario would be of benefit to Sudan in terms of the contribution to the G.D.P.

2.3.3 Foreign Direct investments on Agricultural Growth

In agriculture, there is both domestic and foreign investment. Often times, the trade policy in place in a country has the potential to either induce or discourage investments in agriculture. Despite the economic growth agenda of developing countries being on liberalizing their economies, their efforts have only attracted limited inflows of FDI (UNCTAD, 2009). It is thus important to find out whether opening up trade increases the inflow of investments in agriculture. Regarding, the role of trade openness in facilitating FDIs in agriculture, Liargovas and Konstatinos (2012) did a study to establish the role FDIs have in promoting growth in the agricultural sector for emerging economies. The focus was on 36 countries for a period ranging from 1990 to 2008. The regression results showed that trade liberalization enhanced foreign direct investments. Though the study has established that trade openness results in FDI inflows, the resulting outcome on agricultural growth is non-existent. The current study fills this gap.

Ridzuan, Ismail, & Che Hamat, (2017) delved on the influence of FDI inflows on sustainable development in Singapore. The sample data of the study covered period of 1970 to 2013. ARDL estimation technique revealed that FDIs had a positive influence on the economy. Besides, FDI led to a significant decline in income inequality. Additionally, Gray, (2014) delved into the impact of net inflows of investment on the performance of manufacturing sector in emerging economies. Panel data between the periods of 1990 to 2010 was used by the study. Findings of the panel regression analysis showed that liberalization of trade results in increased inflows in the developing countries which in turn increases investments in the manufacturing sector. The study had a different standpoint since focus was on the agricultural sector.

In China, Lv, Wen, & Xiong, (2010) explored the determinants of inflows of investment from foreigners on agriculture. The focus of the study was the period spanning from 1985 to 2006. The study relied on the O.L.S regression for analysis. The findings indicated that the size of the agricultural market in China determined whether it attracted FDI. However, the importation of agricultural produce adversely affected FDI inflows in the country. Evidently, investors were unable to invest in agricultural industries because the bulk of the produce was imported from global markets. As expected, the effect of agricultural exports on FDI was positive. Despite this, there are still inherent weaknesses of the FDI policy in China since the FDI inflows have been on the decline in the past decade. Evidently, the net inflows of investment from foreigners is not commensurate to the agricultural market in China. This therefore necessitates a revision of the trade policies so as to create a conducive environment for FDI in agriculture. Contrary to the above study, emphasis is on the contribution of FDI to growth in agriculture.

Recently, Aktug, Mehmet, & Hama, (2019) evaluated the extent of FDI in the agricultural sector in Northern Iraq. The major focus of the study was on the factors that discourage foreign investors from directing their funds to agricultural processes in the country. The study focused on the period spanning from 2006 to 2016. It was established that FDI inflows to the country and specifically in agriculture have been dismal. The study therefore recommended for open trade policies that would encourage investment in agriculture. Also, there was need for the country to capitalize on the media in highlighting the success stories in agriculture so as to encourage investment from foreigners.

Moreover, Gilal, Hussain, Ajmair, & Akram, (2016) evaluated FDI and its contribution to agriculture in Pakistan for a 60-year period. The ADF results indicated that FDI was stationary at the absolute level. The cointegration results indicated that in the long run, inflows of FDI contribute to the growth in agriculture in Pakistan. However, in the short-run, FDI had a negative implication on agriculture. Contrary to this paper, the current study incorporates only tariffs, trade openness, domestic credit and inflation during the period when Kenya liberalized trade.

The focus of Ahmed, Devadason, & Jan, (2017) was also on the influence of FDI on Pakistani agriculture. The difference however is that the authors focuses on the period

between 1977 to 2015. The other difference is that the model used was the vector error correction model. The study indicated that the growth in agriculture in Pakistan is attributed to FDI inflows. Despite Pakistan liberalizing its trade in 1997, the policy on opening up trade to attract FDI was not forthcoming. FDI investments were only attracted when the country focused on developing its infrastructure and ensured that the business environment in the country was conducive for foreign investors. This points to the need for a policy convergence so as to focus on both opening up the trade and the same time ensuring there is development in infrastructure and other supporting sectors. In so doing, the country will be able to advance in agriculture.

In Haiti, Despeignes, (2013) evaluated whether growth in agriculture was attributed to liberalized trade. Secondary data spanning a period of 50 years (1961 to 2010) was used. The results indicated that trade liberalization leads to a decline in agriculture in Haiti. In fact, food crop production suffered adversely upon liberalization. Food security was therefore a challenge in Haiti. Besides the production of cash crop did not improve with trade liberalization. Notably, investments were not put into consideration while establishing the effects of liberalization on agricultural growth. This gap was filled by the study. Also, since Haiti is a developing nation, it would be interesting to establish if the same findings hold for Kenya.

The inflows of investment from foreigners was also assessed in Africa as a whole. Gunasekera, Cai, & Newth, (2015) delved into the factors that influenced FDI inflows in agriculture and studied the possible impacts of increased FDI on agriculture in Africa. The model that the study relied on is the dynamic Global Trade Analysis Project. The findings indicated that effort directed towards improving the land under production in Africa would go a long way in attracting more FDI in agriculture. Besides that, there will be an increase in the overall agricultural exports from Africa with an increase in FDI. The focus of the current study is on Kenya and the model that is used is both the ARDL and ECM.

In Ghana, Awunyo-Vitor, & Sackey, (2018) investigated the inflows of investment in agriculture and its subsequent effect on the economy. Focus was on ascertaining if there is a link between FDI and the agricultural sector in Ghana. FDI inflows were used as a measure openness to trade in Ghana. The study relied on data from the World Bank. Time series data was used to test for cointegration. Basing on the findings, the inflows

of foreign investment to the Ghanaian economy contributed to the growth in Agriculture. The growth in agriculture also boosted the economy through the development of the service and manufacturing sectors in the country. The study therefore intends to establish if the same holds in the Kenyan context.

In addition, Oloyede, (2014) explored the contribution of FDI to the growth in agriculture in Nigeria. The study utilized time series design. As such, it was important to establish if the assumption of O.L.S had been met by the variables under study. As such, the study tested for unit root with the ADF test. Johansen cointegration test assessed the relationship between FDI and the growth in agriculture. The variables of interest were FDI and domestic credit. From the cointegration findings, there was a long run relationship between the variables. Specifically, agricultural productivity was brought about by a rise in both domestic financing and investments from foreigners. The study concluded that it is utmost necessary to open up the agricultural trade so that it can benefit optimally from the inflows of investment from foreigners. However, this can only be established by ensuring that funds are directed towards the development of infrastructure especially in the rural areas since poor transportation adversely affects the agricultural sector.

Similarly, Awe, Akinlana, & Adesunkanmi, (2016) delved into the influence of FDI on the output in agriculture in Nigeria. Focus was on FDI since it is one of the techniques used to attain development especially in developing countries. Time series data for a 34-year period was used. ECM was used in the analysis. The findings indicated that in the short-run, the influence of FDI on agriculture is positive and insignificant. However, in the long-run, FDI contributes to increased output in agriculture. The control variables that were used by the study were the real exchange rate, employment and interest rates. All the control variables had a significant influence on the output in agriculture in the long-run. The study recommended for a reduction in the interest rates and the stabilization of the exchange rate so as to encourage foreign investors to invest in the agricultural sector. It is argued that these measures will bring about a positive contribution of foreign investment on agricultural production. The study intends to build from the findings by incorporating inflation and domestic credit as the control variables.

Also, Abubakar, & Olufemi, (2014) delved into the contribution of foreign direct investment on the competitiveness of the agricultural sector in Nigeria. The time of interest was between 1980 to 2009. Stationarity was tested with both the Phillip-Paron and ADF test. The findings indicated openness to trade and FDI were stationary at their absolute level. The results of the Johansen test indicated presence of cointegration. As such, openness to trade and FDI led to the development of agriculture in Nigeria. The implication of the results is that FDI boosts the output in agriculture. The study recommended for the government to provide a framework that will increase the exportation of agricultural produce. This will in turn increase foreign exchange earnings thereby improving the competitiveness of Nigerian agricultural produce in the global market.

However, Ajuwon, & Ogwumike, (2013) offered a different stand point on FDI in Nigeria. The study focused on how economic uncertainty affected the inflows of investment in agriculture from foreigners. The data used was time series ranging from 1970 to 2008. The cointegration technique was also different compared to the other studies done in Nigeria. The cointegration test used was the investment-cointegrated ECM. The results of this model indicated that FDI contributed positively to the agricultural sector. From the uncertainty dimension, political instability was deterrent to the inflows of investment in agriculture. Also, the presence of an enabling environment makes it plausible for foreign investors to increase their volume of investment in the agricultural sector in Nigeria. Other than that, the fluctuation in the exchange rate, the rising inflation rate and high government borrowing discouraged investment from foreigners.

Djokoto, (2013) delved on the influence of openness to trade on agricultural performance in Ghana. The study used data between 1995 to 2009. In the methodology, the study utilized error correction modelling which established that FDI inflows in Ghana had no effect on agricultural production. From the above analysis, trade openness has been counterproductive in agricultural performance in Ghana giving ground for the re-examination of the trade policies. The results give basis for the current study in that the study establishes if indeed trade openness and FDI results in detrimental agricultural performance.

Besides, Anowor, & Martin, (2013), did an examination of the contribution of open trade to agriculture in Nigeria. Cointegration test and ordinary regression established whether the degree of openness in agriculture has an influence on the export to import price ratio. The findings indicated that a correlation does exist between trade openness and the price ratio of exports to imports in agriculture. However, capital formation and investment in agriculture had no significant effect on the export to import price ratio. It appears that trade openness in agriculture has not brought about sufficient investments that will lead to increased output and enhance the exportation of agricultural produce. Consequently, the study finds out whether trade liberalization results in increased investment in the agricultural sector that in turn leads to production growth.

In addition, Zingwena, (2014) delved into the influence of FDI inflows on the development in agriculture in Zimbabwe for a period ranging from 1980 to 2012. The time period of the study was between 1980 to 2012. In the methodology section, regression analysis was used. The findings revealed that FDI inflows resulted in agricultural growth. The study however did not indicate if the FDI inflows were attributed to trade liberalization policies in Zimbabwe.

Liberalization of trade especially in Agriculture has also been predominant in the East African region. It is against this backdrop that Epaphra, & Mwakalasya, (2017) analyzed the role of FDI on the attainment of sustainable growth in the Tanzanian economy. Focus of the paper was also on establishing the reason behind agriculture's declined contribution to the overall economy in the past 25 years. This is notwithstanding the fact that the sector employs over 70% of the population. Data used was obtained annually from 1990 to 2015. The data was used to test two relationship. On the one hand, the nexus between net inflows of investment and growth in agriculture and on the other the link between net inflows of investment from foreigners and economic growth. The control variable used were exchange rate, the rate of inflation and population growth. The OLS regression was used for estimation. The diagnostic tests indicated that the assumption of normality was met. Besides, there was no presence of heteroscedasticity and serial correlation as indicated by the Breusch Godfrey test.

It was interesting to note that FDI had no significant effect on agricultural growth. This is despite the fact that FDI inflows in the country has been on the increase in the last two decades. However, the economic growth was attributed to increased FDI. Though

Agriculture is the biggest employer in the Tanzanian economy, its contribution to the GDP is only 30%. The result suggests that there is inefficiency in the agricultural sector in Tanzania. Efforts should therefore be on improving the agricultural processes within the country so that it can benefit from the net inflows of investment. Though Kenya's economy is bigger compared to that of Tanzania, it is of essence to ascertain if the same holds for Kenya.

Similarly, Missama, (2010) investigated the contribution of FDI to agriculture in Tanzania. Contrary to the study by Epaphra, & Mwakalasya, (2017, focus was on the manner in which the regulatory framework, supporting services and the status of infrastructure influenced the inflows of FDI into agriculture. Focus was also on how macroeconomic variables influenced the trends in the inflows of FDI into agriculture. The findings indicated that the sustainability of the country's currency coupled with foreign exchange rate discourage the inflows of investment from foreigners to the agricultural sector in Tanzania. However, the political stability in the country, tax holidays and good infrastructure attracted FDI to the sector. Overall, the inflows of foreign investment to agriculture had a negative on the economic growth. Nevertheless, it encouraged openness to trade. The study recommended for the government to invest in the infrastructure and encourage FDI inflows to all the other sectors of the economy.

Moreover, Msuya, (2007) delved into the contribution of FDI on productivity improvement in agriculture and poverty alleviation in FDI. As opposed to other studies, emphasis was also on factors that are deterrent to the inflows of FDI into agriculture and the policy reforms required to boost its inflow. The study reviewed literature so as to come up with policy recommendation to boost agricultural production in the county. From the results, FDI improved productivity in Agriculture. Specifically, domestic farmers that were linked to the foreign investors were capable of expanding their production to meet the needs of the global market. The implication from the findings was that FDI contributes immensely to the growth in agriculture which in turn reduces the poverty index in the country.

In Kenya, Njoki, & Sahal, (2016) assessed the influence of FDI on productivity improvement in Agriculture. In the analysis, time series data spanning from 1980 to 2012 was used. Stationarity was tested with ADF test while the presence of cointegration was tested with OLS. The findings were in tally with that of the existing

empirical work which alluded that FDI had no impact on agriculture. However, the inflows of investment led to the growth of the service sector. The study recommended that Kenya engages in attracting more foreign investment since it is key in the development of the service sector in the country. The current study is different in that focus is solely on the agricultural sector. Also, there is an extension of the time period up to 2017 to ascertain if FDI contribution to agriculture is significant.

Moreover, the authors noted that the government should ensure that there is a conducive environment in terms of security and political climate to support the growth potential of foreign investors in agriculture. The other prioritization to be made by the government was to improve the budgetary allocation and institute strict measures to prevent diversion of funds meant for the agricultural sector. As opposed to prior studies that have been done especially in the East African context, the study by Oloyede, (2014) indicates that the agricultural sector can benefit from the inflows of investment from foreigners. Palpably, this could be because of the measures in place to prevent the misuse of funds meant for agriculture and the focus by government to develop the sector.

2.4 Overview of Literature

Basing on the literature, the prior studies have exhibited that a direct link exists between trade liberalization as proxied by trade openness, FDI and tariffs and growth in agriculture. The studies have been done both in the European and African context. Notably, not much has been done on the link between tariffs and agricultural growth hence the study intends to build on the existing literature. Regarding the methodology, emphasis has been on ordinary least square regression with a few of the studies incorporating the Johansen cointegration test. The study therefore offers a different approach which is the Autoregressive Distributive Lag Bound test that intends to address the inconclusive results.

2.5 Theoretical Framework

Melitz (2003) theory of firm heterogeneity is best suited to explain the contributions of trade liberalization to agricultural growth in Kenya. The theory considers firms as heterogeneous entities that have different production levels. According to the model, a decline in the trading costs results in improved total productivity. The growth in productivity is attributed to selection effect and allocation of resource across firms of varied productivity levels. Firm heterogeneity model predicts that firms which are least productive exit the market while non-exporting firms that are most productive expand their production level and start to export. On the other hand, the existing exporters expand their sales in international markets as the costs of exporting declines (Bernard et al, 2003).

The key attribute of the model is the presence of productivity cut-off thresholds in differentiating firms by their exporting and profitability status. The first threshold indicates the least production level a firm has to have to obtain non-negative profits. The firms that exit are therefore those that produce below this threshold. Therefore, successful exporters were the most productive firms whereas the less productive only produce for the domestic market. The second threshold distinguishes the exporters from the non-exporters. Moreover, the least productive firms that were operating below optimal level before the economy opened up to trade have no choice but to exit the market since they are unable to cope with stronger foreign competition.

Firm heterogeneity has been applied numerously in the agriculture sectors by a wide array of authors. Particularly, while ascertaining the validity of the model, Golpinath, Sheldon &Echeverria (2007) concluded that farmers have an affinity to move their production whereby they would benefit immensely. Contingent upon export favorability in the global market, farmers may choose whether to increase or decrease their exports. Similarly, the ability of a farmer to cater for either the domestic or international market is dependent on their volume of production (Ahn, Khandelwal, and Wei 2011). Consequently, the study intends to build on this theory by assessing the role of trade liberalization in improving productivity in agriculture.

2.6 Conceptual Framework

The conceptual framework is an outline highlighting how the variables are expected to relate in the real setting and the knowledge that builds the basis of the study. The study dependent variable was real GDP in Agriculture which is a proxy for agricultural growth. De Silva, Malaga, & Johnson (2013) proxied trade liberalization with trade openness, investments and tariffs. The study independent variables were tariffs, foreign direct investments and trade openness.

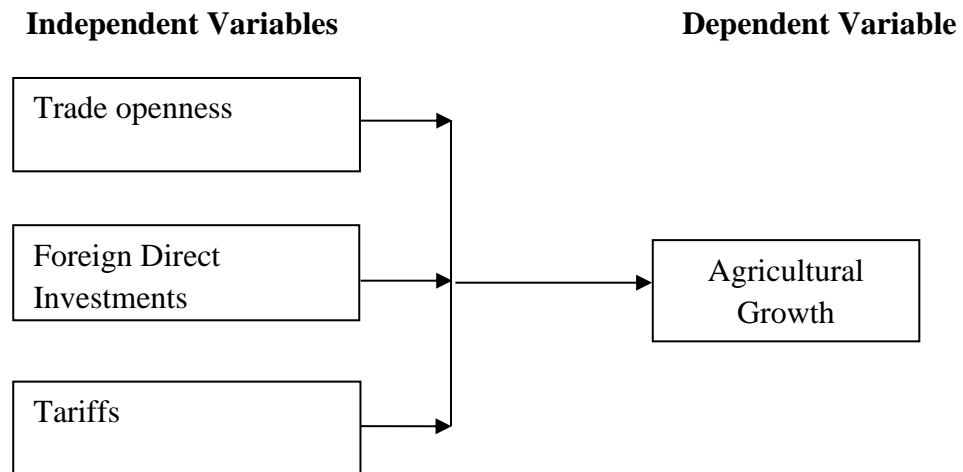


Figure 2.2: Conceptual Framework on Trade liberalization effect on Agricultural Growth

Source :(Author's Own Conceptualization, 2019)

2.7 Definition of Concepts

FDI	Net inflows of investment intended to obtain a long-term management interest in a venture operating in an economy rather than that of the investor.
Tariffs	Duties levied on imports that give the government revenue and at the same time offer domestic producers an advantage over foreigners (WTO, 2015).
Trade liberalization	Trade liberalization refers to the removal or reduction of constraints that bar free trade.
Trade openness	The intensity of both trade regulations and restrictions by a given country to other global trade partners (Gulzar, 2016).

2.8 Hypotheses

- i. Trade openness has a significant influence on agricultural growth in Kenya.
- ii. Tariffs have a significant influence on agricultural growth in Kenya.
- iii. Foreign direct investments have a significant influence on agricultural growth in Kenya.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter covers the research methodology that guides the study in addressing the formulated objectives and hypotheses. It entails the empirical model, methods, source of data and measurement, diagnostic tests and cointegration analysis.

3.1 Methodology and Research Design

The methodology is quantitative. Building from the reviewed literature, the study incorporates econometric time series design. The approach was selected because the variables of interest cover a 37-year time period from 1980 to 2017. The Auto Regressive Distributive Lag Bounds test is the method used to ascertain trade liberalization effect on the subsequent growth in agriculture.

3.2 Empirical Model

Trade liberalization effect on growth in agriculture was established with time series data. To begin with, stationarity was tested with Augmented Dickey Fuller test. Before running the Auto Regressive Distributive Lag Bounds test, the study assessed if the variables met the assumptions of the model. ARDL Bounds test followed to establish whether the variables of interests exhibited cointegration. After testing cointegration and the existence of it thereof, ARDL and error correction model are estimated.

3.3 Data Measurement

3.3.1 Dependent Variable

Real agricultural GDP growth rate proxied agricultural growth in Kenya. Basically, it typifies the annual rate of agricultural GDP. Real agricultural GDP growth rate was considered since it is in the current local currency and it considers the effect of inflation.

3.3.2 Independent Variables

3.3.2.1 Trade openness

Trade openness discloses the intensity of both trade regulations and restrictions imposed by a country to other global trading partners (Gulzar, 2016). Trade openness is the summation of the aggregate imports and exports as a percentage of the total gross domestic product.

3.3.2.2 Foreign Direct Investment

FDI is the net inflow of investment from foreigners to the Kenyan economy as a share of the gross domestic product. The net inflows of investment have an influence on both the upstream and downstream stages of agricultural production.

3.3.2.3 Tariffs

Tariffs are duties levied on imports that give the government revenue and at the same time offer domestic producers an advantage over foreigners (WTO, 2015). Since the data on tariffs is not readily available, it was derived by summing up all the taxes on foreign trade then dividing it with total imports. The results were used to proxy tariffs.

3.3.3 Control Variables

The study incorporated control variable in order to ensure that the coefficient on the causal variable of interest does not suffer from omitted variable bias. The control variables were as follows:

3.3.3.1 Domestic Credit

The study focused on the domestic credit offered by the monetary sector as a percentage of the GDP. The financial sector comprises of financial corporations together with other money authorities. Domestic credit is offered with the goal of spurring economic growth. In the past, economists such as Schumpeter in 1911 acknowledged banks role in enabling technological innovation through the role they play as an intermediary (Schumpeter,2017). On the other hand, technological innovation fosters specialization in agriculture. The reason for this is that the availability of credit is likely to facilitate the expansion of the agricultural sector.

3.3.3.2 Inflation

Inflation is proxied by the GDP implicit deflator. According to Hodge (2005), inflation leads to a decline in the output growth, savings and investments. In agriculture, high inflation level undermines the performance of exports by making them costly in foreign markets. As well, it discourages the net inflows of investment by foreigners. It is through macroeconomic stability (low inflation) that the gains of liberalizing trade can be realized.

Table 3.1 Summary Table of Variables

Variables	Description	Expected Results
Agricultural growth	Real GDP in agriculture	
Trade openness	GDP (X+M/GDP)	Positive
Tariff	Total taxes on foreign trade over total imports	Negative
Foreign Direct Investment	Net inflows of investment	Positive
Domestic Credit	Credit offered by the financial sector as a share of GDP	Positive
Inflation	Growth rate of GDP implicit deflator	Negative

Source: Author's own conceptualization

3.4 Data Types and Sources

Stata software was used in the analysis. The study made use of time-series data which covered a 37-year period that is from 1980 to 2017. The source of the data was World Development Indicators. The data was purely secondary in nature.

3.5 Time Series Analysis

Time series data is a set of values taken by a variable over time. In essence, the time series models take two forms that is univariate or multivariate. Univariate time series consists of single observations recorded over regular time intervals while multivariate time series models uses current and lagged value of the regressors to establish the effect on the variable Y_t under consideration. The study incorporated multivariate time series model.

In time series analysis, lagged variables are used in the estimation of the model. However, the use of lagged variables in ordinary least square regression poses a challenge because the values do not exhibit a trend. Also, there is a tendency of biased prediction in small sample sizes and a declining degree of freedom (Gujarati, 2004). Besides, regardless of the sample size, serial correlation results in more bias in standard error prediction using OLS. The other problem with time series data is that the predictor variables gives a false impression of being more significant whenever they exhibit a similar trend as the outcome variable. The above situation brings about a situation whereby the variables exhibit a relationship but in reality, there is no fundamental relationship (Studenmund, 2011).

The above situation is mainly caused by series that are non-stationary such as Real GDP that tends to change with the cycles in business and the global shocks (Hendry and Juselius, 2000). In nonstationary time series, the correlation between the treatment variable and its lagged value is attributed to other aspects rather than the lag length between the two variables (Studenmund, 2011).

It is therefore important to check for stationarity to establish whether generalization can be made because a series that is non-stationary can only be studied for the current timeframe and the results cannot be used to make meaningful prediction. Additionally, the results of the regression cannot be relied upon in the existence of unit roots. The study therefore used ADF to establish if the time series is stationary or non-stationary.

3.6 Diagnostic Tests

Diagnostic tests are instrumental in corroborating an ideal predictive effect between the outcome and predictor variables. The diagnostic tests that the study focused on are: normality, stationarity test, autocorrelation and heteroscedasticity.

3.6.1 Normality Tests

Normality is a critical assumption in multivariate analysis (Hair et al., 2010). It assumes that the errors in the prediction value of the outcome variable are distributed normally. The Jarque-Bera Test was used to ascertain if the prediction value of the dependent variable were distributed normally.

3.6.2 Stationarity Test

3.6.2.1 Augmented Dickey Fuller Test

ADF tests the assumption of stationarity. In situations whereby, the error terms correlate with its previous terms, the ADF adds the difference of both the present and past values of the outcome variable to the regression equation. ADF tests a non-stationary series that is randomly determined with either a drift or not. Using equation one as the foundation of the test, one obtains:

$$\Delta Y_t = \beta_1 t + \beta_2 Y_{t-1} + \sum_{i=1}^p c_1 \Delta Y_{t-1} + \varepsilon_t \quad (\text{equation 1})$$

Y_t is the time series being tested with t as the time, Δ is the first difference while p the lags incorporated to ensure that ε is purely random in nature. The null hypothesis in

the ADF test is that: $\beta_2 = 1$ while the alternative hypothesis is $\beta_2 < 1$. In case the computed test statistic is more than the critical value at the 95% confidence level, the decision is made to reject the hypothesis of a unit root (Gujarati & Porter, 2004).

3.6.3 Serial Correlation

It is wise to check for autocorrelation while dealing with time series data because if it exists, there will be a correlation between the error terms at time t with those at time $t-1$. In such a case, the regression estimators are unreliable, standard errors in such a case are underestimated implying that the estimated t values are inflated. As such, a coefficient is more significant than it actually is. Autocorrelation was tested with Breusch Godfrey test. The test was chosen because it makes it possible to test for serial correlation through several lags other than just one lag which is a correlation between the residual between time t and $t-1$.

3.6.4 Heteroscedasticity

In order for the regression model to hold, it is essential for the variance of the error term to be constant. In situations whereby the error terms have no constant variance, they are heteroscedastic. The presence of heteroscedasticity was tested with White's Test. The hypothesis of the tests is that there is constant variance.

3.6.5 Cointegration Test

As earlier noted, the use of non-stationary series is likely to lead to situations whereby two non-stationary variables may produce statistically significant results while indeed there is no underlying association between the said variables. Originally, the issue could be fixed by using the first difference of the variables in question. Nonetheless, it is a requirement that interpretations are made based on the relationship between variables in levels rather than differences. Since majority of the economic time series are non-stationary at level testing, Granger (1981) developed the cointegration test which does not necessitate for the series to exhibit constant variance and mean over a given period of time.

3.7 Auto Regressive Distributed Lag (ARDL) Bound Test

There are two main techniques of cointegration. The residual-based procedure to cointegration was developed by Engle and Granger (1987). Further development was made by Johansen and Juselius (1990) in testing cointegration with the advent of rank based cointegration approach. The main shortcomings of these methods being that variables that are not stationary at the absolute level should be only differenced once so that the test can be carried out. In cases whereby some variables are stationary after their first difference while others are stationary at their second, third or even fourth differencing, the test is no longer valid. Pesaran, Shin, & Smith, (2001) developed the ARDL bounds test which addresses the inconsistencies and shortcoming of prior cointegration tests.

Specifically, the ARDL technique is appropriate for variables that are stationary at their absolute level and those that are stationary after the first difference. However, it is unstable for variables that have undergone second differencing (Fosu and Magnus, 2006). There are three probable outcomes of the stationarity test. The series could be stationary at level, stationary after the first difference or a combination of both variables that are stationary at level and stationary after the first difference. The third possibility with combination of both variables' stationary at absolute level and after the first difference requires the bounds test for cointegration which was utilized by the study.

3.7.1 ARDL Model Specification

Autoregressive distributive lag model is a representation of both the past and present values of the dependent variable as well as the current and past values of the predictors. As opposed to the VAR model which uses strictly endogenous variables, the ARDL model uses both exogenous and endogenous variables.

The model representation of ARDL is as follows:

$$Y_t = \gamma_{0i} + \sum_{i=1}^p \delta_i Y_{t-1} + \sum_{i=0}^q \beta_i X_{t-1} + \varepsilon_{it} \quad (\text{Equation 2})$$

In the above model, the dependent variable is Y_t and (X_t) typifies variables which could either be stationary at level or after the first difference; β and δ are coefficients; γ is the constant or the intercept; the number of variables (i) ranges from 1 to k while the lag orders are represented by p for the maximum number of lags for the dependent variable while q for regressors. ε_{it} is the error term which is serially uncorrelated.

The null hypothesis of the bounds tests is that there is no cointegration while the alternative posits that there is cointegration. To perform the bounds tests for cointegration, the conditional ARDL ($p_1, q_1, q_2, q_3, q_4, q_5, q_6$) model with 6 variables is illustrated as:

$$\begin{aligned} \Delta Y_t = & \alpha_{01} + b_{11}Y_{t-i} + b_{21}TO_{t-i} + b_{31}FDI_{t-i} + b_{41}INFL_{t-1} + b_{51}DC_{t-1} + \\ & b_{61}TA_{t-1} + \sum_{i=1}^p \alpha_{1i}\Delta Y_{t-i} + \sum_{i=1}^q \alpha_{2i}\Delta TO_{t-i} + \sum_{i=1}^q \alpha_{3i}\Delta FDI_{t-i} + \\ & \sum_{i=1}^q \alpha_{4i}\Delta INFL_{t-i} + \sum_{i=1}^q \alpha_{5i}\Delta DC_{t-i} + \sum_{i=1}^q \alpha_{6i}\Delta TA_{t-i} + e_{1t} \end{aligned} \quad (\text{Equation 3})$$

Where Y is the real GDP in agriculture, TO is trade openness, TA is tariffs, FDI is foreign direct investments, INFL is inflation and DC is domestic credit. The difference operator is Δ , while the maximum lag orders for the dependent and independent variable are represented by p and q respectively.

If there is no cointegration, the ARDL ($p_1, q_1, q_2, q_3, q_4, q_5, q_6$) model is illustrated as:

$$\begin{aligned} \Delta Y_t = & \alpha_{01} + \sum_{i=1}^p \alpha_{1i}\Delta Y_{t-i} + \sum_{i=1}^q \alpha_{2i}\Delta TO_{t-i} + \sum_{i=1}^q \alpha_{3i}\Delta FDI_{t-i} + \\ & \sum_{i=1}^q \alpha_{4i}\Delta INFL_{t-i} + \sum_{i=1}^q \alpha_{5i}\Delta DC_{t-i} + \sum_{i=1}^q \alpha_{6i}\Delta TA_{t-i} + e_t \end{aligned} \quad (\text{Equation 4})$$

If there is cointegration, the error correction model (ECM) representation is illustrated as:

$$\begin{aligned} \Delta Y_t = & \alpha_0 + \sum_{i=1}^p \alpha_{1i}\Delta Y_{t-i} + \sum_{i=1}^q \alpha_{2i}\Delta TO_{t-i} + \sum_{i=1}^q \alpha_{3i}\Delta FDI_{t-i} + \\ & \sum_{i=1}^q \alpha_{4i}\Delta INFL_{t-i} + \sum_{i=1}^q \alpha_{5i}\Delta DC_{t-i} + \sum_{i=1}^q \alpha_{6i}\Delta TA_{t-i} + \lambda ECT_{t-1} + e_t \end{aligned} \quad (\text{Equation 5})$$

In that case, in the event of cointegration both the short-run (ARDL), and long-run error correction (ECM) model are specified. In the above equation, $\lambda = (1 - \sum_{i=1}^p \delta_1)$, which is the speed of adjustment parameter with a negative sign. The λ should come up with a negative sign after the estimations have been done to indicate that there is convergence in the long run. However, if it has a positive sign, it implies that the model is explosive hence no convergence. $ECT = (Y_{t-1} - \theta X_t)$ represents the long run relationship in the model, $\theta = \frac{\sum_{i=0}^q \beta_1}{2a}$ is the long run parameter while $a_{1i}, a_{2i}, a_{3i}, a_{4i}, a_{5i}$ are the short run dynamic coefficients of the model's adjustment long-run equilibrium. The outcome of the bound test therefore tells whether to specify an error correction model or an ARDL model.

Further, the short-run causal effect is represented by the **t- statistic** on the explanatory variables (short-run coefficients). For instance, if the **t- statistic** of a_{2i} is statistically

significant, then it can be said that the lagged value of trade openness has a significant causal effect on the current real GDP in agriculture. The long run causal effect is captured by the significance of the λ which is the parameter for the ECM, if significant then there is long-run causality effect among the variables. The short-run coefficients are as in any other linear model.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND DISCUSSION

4.1 Introduction

The main objective of the study is to critically analyze the contribution of trade liberalization to agricultural growth in Kenya. The Auto Regressive Distributive Lag Bounds test was the method used to address the objectives of the study. The results presented here are organized under four key sections: descriptive statistics, diagnostic tests, ARDL Bounds test of cointegration and the error correction representation of the ARDL model.

4.2 Descriptive Statistics

The sample drawn from the World Development Indicators covered a period ranging from 1980 to 2017. Ultimately, the findings of the descriptive analysis are interpreted and discussed. This paves way for ARDL Bounds test to ascertain if there is cointegration.

4.2.1 Descriptive Results of Study Variables

The summary statistics for trade openness, FDI, tariffs, domestic credit, inflation and real GDP agriculture are presented in table 4.1. Basing on the findings, within the period 1980 to 2017, trade openness typified by aggregate exports and imports as a share of the total GDP was at a mean of 52.912. Trade openness had a maximum value of 72.858 which was elicited in the year 1993 when Kenya made efforts towards the reduction of tariffs. This in turn attracted foreign firms that boosted the aggregate exports and imports. In 2016, the lowest ever trade openness was evidenced at 30.951 due to the weakening of the shilling and the deterioration of the total value of oil imports. The net inflows of investment (FDI) were at 0.731%. FDI was at a high of 3.457% in 2011 and a low of 0.005% in 1988. The low level of FDI in 1988 could be because both Uganda and Tanzania reformed their trade policies to be more accommodative to foreign investors' hence increasing competitiveness in the East African region and a decline in net inflows of investment in Kenya (Zekarias, 2016).

The tariffs on the other hand are at a mean of 6. 226. The maximum and minimum values for tariffs are at 14.489 and 0.690 respectively. In 1980, the tariff rate was lowest since Kenya had just signed its first Structural adjustment loan and was on the premise

of ensuring that there is import liberalization. Moreover, in the same year, efforts were made by the Kenyan government to allow duty-free importation of inputs and raw materials for manufacturers. For domestic credit, the aggregate value is 37.163 with the lowest score being 29.056 and the highest 57.746. In addition, the yearly growth rate of GDP implicit deflator was at a mean of 10.547 with the values ranging from 0.933 to 41.989. Finally, the real GDP in agriculture was at 3.716%. The values for real GDP in agriculture have elicited a mixed trend with the minimum value being -4.52 and the maximum 11.658.

Table 4.1 Descriptive Results of Study Variables (N = 38)

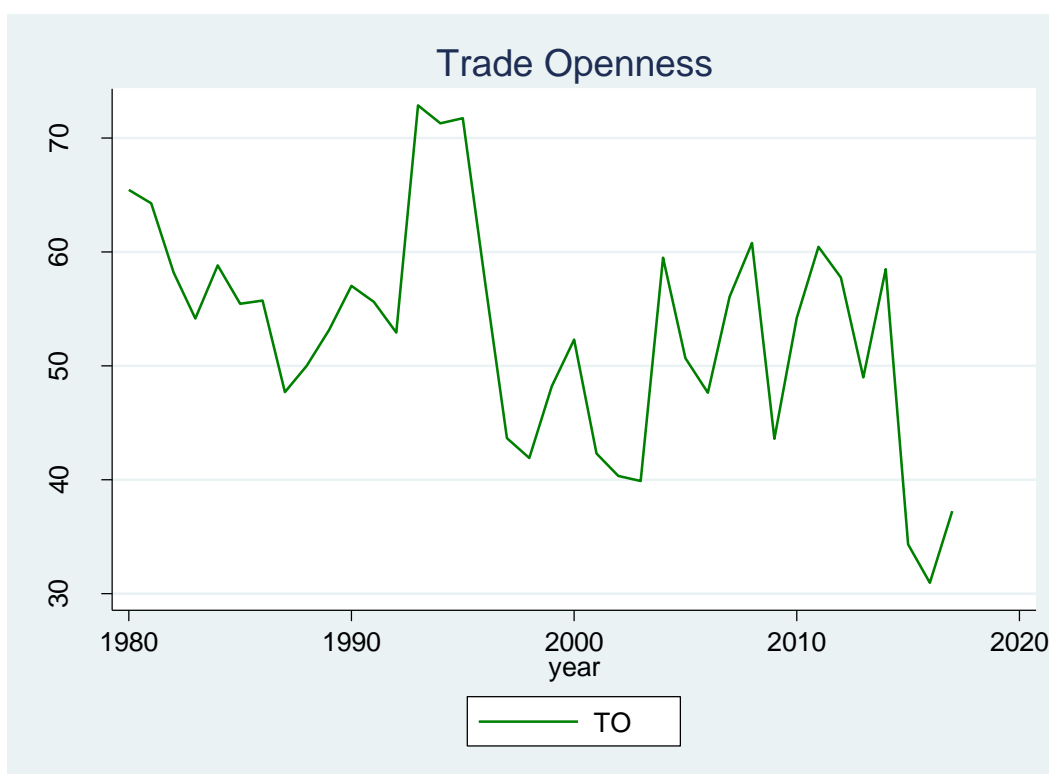
Variable	Mean	Std. Dev.	Min	Max
Trade Openness	52.912	9.9213	30.951	72.858
Foreign Direct Investment	0.731	0.8200	0.005	3.457
Tariffs	6.226	4.2149	0.690	14.489
Domestic Credit	37.163	5.3270	29.056	57.746
Inflation	10.547	7.3787	0.933	41.989
Real GDP Agriculture	2.438	3.716	-4.52	11.658

Source: Africa Development Indicators

4.2.2 Trade Openness

The intensity of trade regulation and restrictions by a given country to other global trade partners is referred to as trade openness. The key tenet of trade liberalization is to encourage countries to have an outward-oriented economy so that they could benefit from the global trade. Figure 2.3 highlights the trend in trade openness in Kenya. Basing on the findings in the figure, trade openness was at a value of 65.417 in the year 1980. In this year, Kenya adopted the prescribed Structural Adjustment Programs which required it to liberalize its trade. However, not much was realized with respect to the transformation of Kenya to an outward-oriented economy as trade openness declined from 1981 to 1983 and later on realized a minimal increase to 58.804 in 1984. It is only in 1993 that Kenya had the highest ever trade openness index at 72.859 during the post liberalization period. However, from 1993 henceforth there was a decline in trade openness with the lowest being in 1998 at 41.897. Since the year 2000, there has been a mixed trend in trade openness. During this period, the highest index was in 2008 at 60.763 while the lowest in 2016 at 30.951. Notably, in the post-liberalization period, Kenya has only experienced its highest trade openness index in 1993 that was at 72.859 while the turn of the century elicited lower trade openness index compared to the period between 1980 to 1995.

Figure 2.3 Trade Openness

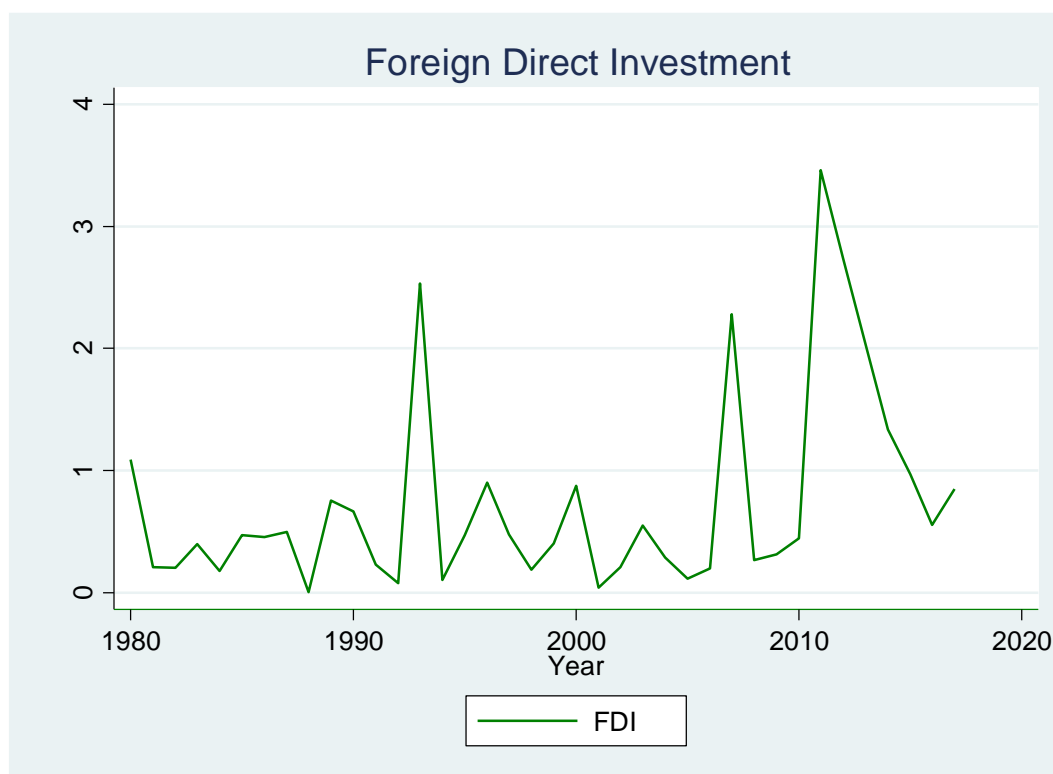


Source: Africa Development Indicators

4.2.3 Foreign Direct Investment

FDI findings are illustrated in figure 2.4. From the findings, Kenya net inflows stood at 1.08% in 1980 and steadily declined to 0.07% in 1992. Similar to trade openness, there was exponential growth in FDI in the year 1993 to 2.53%. From 1994 to 1998, Kenya net FDI inflows (% of GDP) has fluctuated substantially. Specifically, between 1996 and 2006, Kenya lost FDI competitiveness as indicated by the low levels of FDI inflows. This was mainly attributed to a hostile business environment for investors. However, FDI has tended to increase from 2010 ending at 0.8% in 2017.

Figure 2.4 FDI

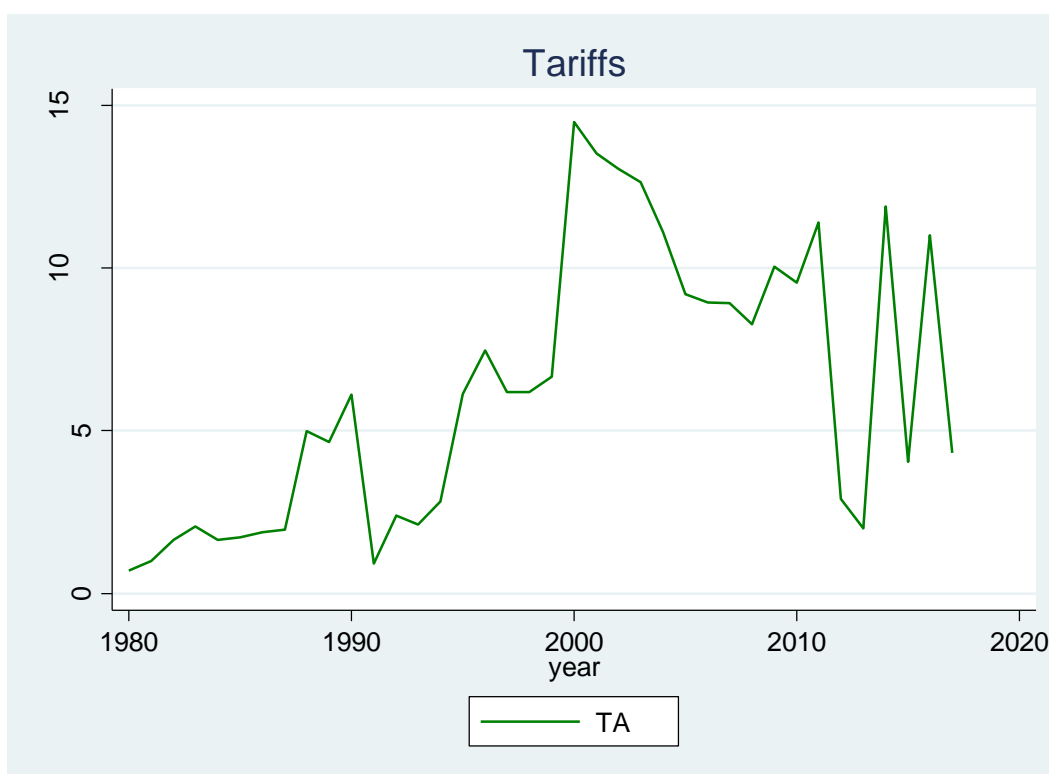


Source: Africa Development Indicators

4.2.4 Tariffs

Tariffs are duties levied on imports that give the government revenue and offer domestic producers an advantage over foreigners (WTO, 2015). Figure 2.5 highlights the findings on tariffs in the period 1980–2017. As evidenced in the figure, when Kenya made commitments to adopt more liberal trade, tariffs were at 0.69. However, despite Kenya making these commitments, few of them were adopted hence the tariff rate in 1983 was at 2.06. Kenya had imposed tariffs on certain goods with import controls for certain items. Upon joining the World Trade Organization in 1995, Kenya made efforts towards tariff reduction on goods with the goal of promoting trade within and outside the country. Nonetheless, there was not much change exhibited with tariffs as it fluctuated with the average tariff rate being 6.226. So far, the lowest tariff rate that has been evidenced from the year 2010 is 2 that was elicited in 2013 with the tariff rate ending at 4.3 in 2017.

Figure 2.5 Tariffs

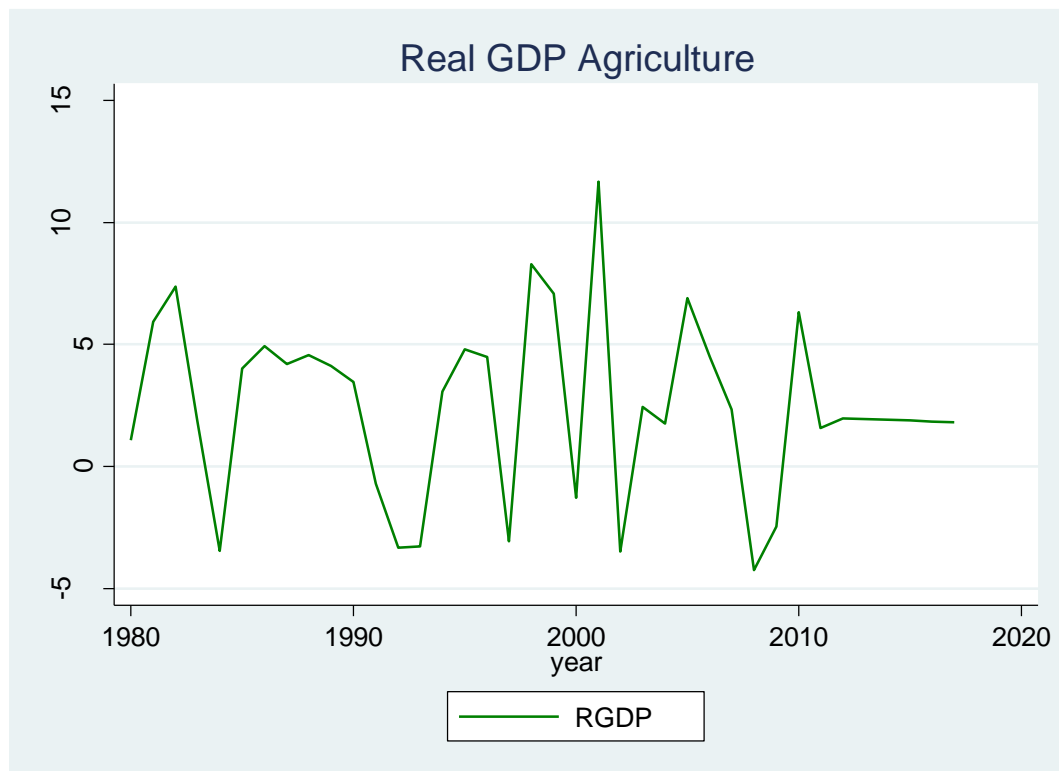


Source: Africa Development Indicators

4.2.5 Real GDP Agriculture

Figure 2.6 highlights the trend of real GDP Agriculture in the period 1980 – 2017. In 1980, real GDP in agriculture stood at 1.073% and it steadily increased to 7.367% when Kenya sought more funds from the IMF on the condition that they liberalize trade further. In 1984, there was a decline to -3.475 because of the foreign exchange crisis between the periods 1982 -1984. Though real GDP agriculture averaged 4% between 1985 to 1990, it declined to -0.71% in 1991 because of the suspension of both bilateral and multilateral aid that was brought about by poor governance. In the mid-1990s, there were signs of recovery as evidenced by GDP growth rate of 4.792% in 1995. However, there was a decline to -3.065% in 1997 upon the suspension of aid by donors citing corruption and bad governance. Though the rate stood at 8.290% in 1998, it declined to 7.092% in 1999. In the year 2000, agricultural growth rate worsened following long periods of drought. Growth rate in agriculture picked up in 2003. From 2011 to 2017, real GDP in agriculture has exhibited a constant trend averaging 1.8%.

Figure 2.6 Real GDP Agriculture



Source: Africa Development Indicators

4.3 Diagnostic Tests

4.3.1 Jarque-Bera Test for Normality

The Jarque – Bera test was utilized in testing normality. The decision criteria for the test is that: if the Chi (2) values are higher than the p-value, then the residuals are normally distributed. Table 4.2 shows that the chi (2) is 0.4654. The value surpasses the threshold value of 0.05 meaning there is no violation of normality.

Table 4.2 Jarque-Bera Test for Normality

Jarque-Bera	Normality test: 0.4654 Chi(2)	0.7924
Jarque-Bera	test for Ho: normality:	

4.3.2 Unit Root Test

Unit root was tested with ADF test. In case the computed test statistic is more than the critical value at 95% confidence level then the hypothesis of a unit root is rejected. As evidenced in table 4.3, test statistics for FDI is -3.335 which is less than 2.969 at the 95% confidence level. The implication is that FDI is stationary. Also, the test statistic for domestic credit is -3.428 which is less than -2.969 meaning that domestic credit is stationary. Besides, the test statistic for inflation is -2.998 which is less than -2.969 as well as the test statistic for real GDP agriculture is -6.312 way below the critical value of -2.969. Therefore, domestic credit, inflation and real GDP agriculture are stationary at their absolute level.

However, the test statistics for tariff is -1.967 meaning that at the absolute level, tariffs are non-stationary. As such, the series requires differencing to make it stationary. As shown in table 4.3, tariffs are stationary after the first difference since the test statistic (-5.288) is below the critical value (-2.972). In addition, at the absolute level, trade openness had a test statistic of -2.852 which was above the critical value (-2.969) at 95 percent confidence level an indication it was non-stationary. Nonetheless, trade openness had a test statistic of -5.590 which was lower than the critical value (-2.972) after the first difference. Therefore, the appropriate test is the ARDL test bound since there was no second-order differencing.

Table 4.3 Unit Root Test

ADF test	Variable	Test Statistic	5% critical value	P-value
At Absolute Level	Trade Openness	-2.852	-2.969	0.051
	FDI	-3.335	-2.969	0.013
	Tariffs	-1.967	-2.969	0.301
	Domestic Credit	-3.428	-2.969	0.010
	Inflation	-2.998	-2.969	0.035
	RGDP			
	Agriculture	-6.312	-2.966	0.000
First Difference	Trade Openness	-5.590	-2.972	0.000
	Tariffs	-5.288	-2.972	0.000

4.3.3 Test for Heteroscedasticity

The study tested homoskedasticity using White test. The findings in table 4.4 indicated that Chi2 (20) was 24.50, probability value of 0.2213 revealing that null hypothesis was accepted hence the assumption of homoskedasticity was not violated.

Table 4.4 Test for Heteroscedasticity

White's Test	Null hypothesis: Alternative hypothesis:	Homoskedasticity unrestricted heteroskedasticity
	chi2(20)	24.50
	Prob > chi2	0.2213

4.3.4 Autocorrelation Test

It is of essence to check serial correlation for time series analysis because of lags. Serial correlation was checked with Breusch Godfrey test. The test was chosen because it makes it possible to test for serial correlation through several lags other than just one lag which is a correlation between the residual between time t and $t - 1$. From the findings in table 4.5, the Prob > chi2 value of chi2 statistic (0.4137) is insignificant at 95 percent confidence level hence no autocorrelation.

Table 4.5 Autocorrelation Test

Breusch-Godfrey LM test for autocorrelation			
Lags (p)	chi2	df	Prob>chi2
1	0.668	1	0.4137
H0: no serial correlation			

4.4 Lag Length Selection

The optimal lag orders are illustrated in table 4.6. The purpose of lag selection is to select lags that lead to residual non-correlation. Basing on the results of the likelihood ratio, Final Prediction Error (FPE), Akaike Information Criteria (AIC) and Hannan-Quinn Information Criterion (HQIC) the optimal lag length of 4 is selected.

Table 4.6 Lag Length Selection

Selection order criteria								
Sample: 1984- 2017						Number of obs = 34		
Lag	Log Likelihood	Likelihood Ratio	df	p	FPE	AIC	HQIC	SBIC
0	-570.731				2.20E+07	33.925	34.017	34.195*
1	-521.146	99.17	36	0	1.00E+07	33.126	33.769	35.012
2	-492.732	56.828	36	0.02	2.00E+07	33.573	34.767	37.074
3	-424.919	135.63	36	0	5.60E+06	31.701	33.446	36.819
4	-349.858	150.12*	36	0	2.8e+06*	29.403*	31.699*	36.137

4.5 ARDL Bounds Test

The assumptions of the ARDL model have to be met before proceeding to cointegration test. Evidently, the assumption of constant variance, normality, no serial correlation and stationarity were met for the ARDL model. Following lag selection, the bounds test was done to establish if there is cointegration. The decision criteria for the Bounds test is that, if the determined F- statistic is higher than the critical value for the upper bound I (1), at that point we can say there is cointegration.

On the other hand, if the determined F-statistic is below the critical value for the lower bound I (0), the choice is made to run the short-run ARDL model since there is no cointegration. The test is inconclusive if the determined F- statistic falls between the upper and lower bound. The computed F- statistic of the test was contrasted with the upper and lower bounds at the 95% confidence level. Table 4.7 indicated that the F- statistic (10.883) is higher than the upper bound (3.79) critical values an indication of cointegration. This therefore necessitated the error correction model.

Table 4.7 ARDL Bounds Test

Ho: no levels relationship								
		Critical Values						Calculated F-Statistic
		10%		5%		1%		
Lower Bounds Model	& Upper	I (0)	I (1)	I (0)	I (1)	I (0)	I (1)	
		3.41	4.68	2.62	3.79	2.26	3.35	10.883

4.6 Error Correction Representation of ARDL Model

The Bounds Test established that there is cointegration hence there was need to run the ARDL and error correction model with matrix list e(lags) as the criterion for the lag order. The hypothesis test was conducted at the 95 percent confidence level with focus on the long-run model. The R^2 value shows how much variance in the dependent variable is explained by the independent variable included in the model. Adjusted R-squared takes care of the degrees of freedom. As highlighted in table 4.8, the model indicated that 93.69% of the variations in agricultural growth in Kenya is contributed by trade openness, tariffs, foreign direct investments, domestic credit and inflation as evidenced by $R^2 = 0.9369$. The adjustment term shows that the errors of the prior model are rectified in the present period.

4.6.1 Test of Hypotheses (Long-run model)

H₀₁: Trade openness has a significant influence on agricultural growth in Kenya.

Trade openness had a positive and significant influence on Agricultural growth (beta = 0.114, $p < 0.05$). It can also be observed that the calculated t (2.510) is higher than the critical t (1.96). This means that the alternative hypothesis was accepted. The implication is that there is up to 0.114 unit increase in agricultural growth in Kenya for each unit increase in trade openness (see table 4.8). Consistently, Yu and Nin-Pratt (2011) established that there was productivity growth in the agricultural markets in the period of post-liberalization. In a similar vein, Yoo et al, (2012) elucidated that agriculture in South Korea has exhibited a significant productivity growth mainly through trade liberalization. In fact, trade openness made it possible for South Korean consumers to benefit from lower output prices. As well, the study is in tally with findings from a study conducted by Ojeyinka, & Adegboye, (2017) which concluded that the increased output in the agricultural sector was because of liberalized trade. The results are also in tally with that of Gholipour et al, (2012) which espoused that in the long- run, agricultural produce is boosted by trade openness.

Further support to the study findings is by Hye, & Jafri, (2011) who established that trade openness contributed to agricultural growth in Pakistan. Similarly, Bashir (2003) indicated that openness to trade affects the performance of agricultural exports from Pakistan. In the context of Pakistan, the trade policies in place empowered the domestic producers to increase their production levels to cater for both the domestic and global markets. The above notion is in line with the proposition of the firm heterogeneity

model whereby trade liberalization in agriculture enables non-exporting firms that are most productive to expand their production level and start to export (Bernard et al, 2003). There is therefore a possibility that open trade in Kenya especially in agriculture would increase the capacity of domestic farmers to the extent of exporting produce in international markets.

As well, the findings of the study are in conformity with that of Abate, (2014) which established that freer trade brought about productivity improvement in Ethiopian agriculture. Among the reasons for productivity improvement in agriculture were the policy reforms in the sector. Specifically, there was elimination of tariff imposed on imports. Moreover, Ethiopia worked towards ensuring that there was conducive trade especially in Agriculture. The resulting outcome was growth in the agricultural sector in the country. Furthermore, the positive contribution of trade openness on development of the agricultural sector was also evidenced by Fabiosa, (2008). Though the link was not direct, the author argues that open trade brings about growth in the economy which in turn increases the income levels of the citizenry. With the increased income, there is increased demand for food produce hence producers are prompted to increase their level of agricultural food produce to meet the demand of the citizenry.

The above notion was also reiterated by Bashir, (2003) who opined that openness to trade increased the demand for agricultural produce from Pakistan in the global market. It was established in the study that the gains from agricultural trade elicited in Pakistan was not only because of freer trade but because of the Pakistan's agricultural policies that empowered the domestic producers. The implication therefore is that trade liberalization does not work in isolation. It requires policies that will create a conducive business environment for both locals and foreigners engaging in agricultural trade.

However, the study findings are contrary to that of Darmawan, (2014) which established that openness to trade led to a decline in the production levels in Indonesian agriculture. Similar to the study, the error correction model was used to test cointegration. There was however no delineation of time to indicate post and pre-liberalization trade periods in Indonesia. The findings suggested that in the long-term, freer trade is deterrent to the growth in agriculture. The reason for this was that when Indonesia opened its borders to other trading partners, there was an increase in the agricultural imports in the country. Other than that, there was increased population growth to the extent that the agricultural sector was not capable of sustaining the food

production. This necessitated the country to import more of agricultural produce. The resulting outcome was negative balance of payment which led to closure of majority of the industries that were agriculturally based. Consequently, there was agricultural production, welfare loss among local farmers.

H₀₂: Tariffs have a significant influence on agricultural growth in Kenya

Results in table 4.8 indicated that the effect of tariffs on agricultural growth was not significant (beta = 0.000, $\rho > 0.05$). This was confirmed by the calculated t (0.000) which was lower than the critical t (1.96). Therefore, the alternative hypothesis of a significance influence of tariffs on agricultural growth is rejected. As such, an increase or decrease in the tariff rate would have no influence on agricultural growth. In conformity with the results, Joramo, (2016) study on the effect of tariffs on Norwegian agricultural imports established that there is no link between tariff rate and agricultural growth in Norway.

However, the findings are in contrast with the firm heterogeneity model. The model argues that the liberalization of trade would enable domestic producers with high growth potential to expand their volume of production to serve foreign markets. The results however suggest that an increase or decrease in tariffs has no effect on agricultural growth. As such, there is need for further enquiry on the same since either a decline or increase in tariffs would have far-reaching implications on global trade in agriculture.

H₀₃: Foreign direct investments have a significant influence on agricultural growth in Kenya.

Research findings in table 4.8 showed that Foreign Direct investment had a negative and significant effect on agricultural growth in Kenya (beta = -1.931, $\rho < 0.05$). Also, the calculated t (3.200) is higher than the critical t (1.96). The implication is that the hypothesis of a significant association between FDI and agricultural growth in Kenya is accepted. The implication is that there is 1.931-unit decline in agricultural growth in Kenya for a unit increase in net inflows of investment. There is a likelihood that the government may have promoted loose frameworks because of the inherent loopholes they can exploit to redirect funds into other programs (Oloyede, 2014). Specifically, foreign direct investment is directed to other sectors of the economy as opposed to agriculture. In conformity with the firm heterogeneity model, there is self- selection by

foreign investors into sectors of the economy that are deemed to be more productive as opposed to agriculture. The implication is that there is limited focus on agriculture thereby leading to its declined growth.

In line with the findings, Galiani, & Porto, (2010) posited that despite Argentina having liberalized its trade for the past 60 years, not much has been realized in terms of economic growth. Particularly, the agricultural sector in the country has elicited dismal performance despite the country having comparative advantage in the sector. The authors espoused that the FDI inflows were channeled into manufacturing with limited focus on agriculture. The implication therefore was that the gains of freer trade are only realized if focus is on sectors that countries have comparative advantage in.

Past studies such as that of Njoki, & Sahal, (2016) indicated that FDI had no impact on agriculture. This is contrary to the findings since the study has found that an increase in FDI leads to declined growth in agriculture. The study by Njoki, & Sahal, (2016) was conducted from 1980 to 2012 while the current study uncovers the influence of FDI on agriculture up to 2017. This could explain the difference in the results. In support of the above notion, Epaphra, & Mwakalasya, (2017) found out that FDI had no significant effect on agricultural growth. This is despite the country receiving high inflows of investment in the last two decades. The study established that there was need to improve the agricultural processes in the country so that they could benefit from the net inflows of investment.

Furthermore, the findings are in contrast with that of Djokoto, (2013) which established that FDI inflows in Ghana did not have any effect on agricultural production. However, in the Zimbabwean context, FDI inflows resulted in agricultural growth (Zingwena, 2014). As reiterated earlier, FDI has in most cases elicited no effect on the agricultural growth in Kenya. In fact, Omolo, (2012) argued that the biggest beneficiary of FDI is the manufacturing sector in Kenya. Specifically, the inflows of investment from foreigners into manufacturing is threefold the FDI inflows into agriculture. According to the author, the only subsectors in agriculture that benefited immensely from open trade are trade in cash crops such as wheat, maize, tea and sugar. On the other end, textiles, beverages and footwear subsector were the biggest gainers in the manufacturing sector. The findings support the notion that the manufacturing sector benefits more from freer trade compared to agriculture.

Control variables

Inflation ($\beta = -0.268$, $\rho < 0.05$) had a significant influence on agricultural growth. Also, the calculated t (5.150) is higher than the critical t (1.96) an indication that increased inflation levels result in the deterioration of the agricultural sector. The results conform with Hodge (2005) assertion that inflation leads to a decline in the output growth, savings and investments. However, domestic credit ($\beta = 0.257$, $\rho < 0.05$) had a significant influence on the growth in agriculture. This was supported by the calculated t (2.040) which was higher than the critical t (1.96).

4.6.2 Short Run Model

In the short -run the first lag ($\beta = 1.349$, $t = 4.040$, $\rho < 0.05$), second lag ($\beta = 0.948$, $t = 3.680$, $\rho < 0.05$) and third lag ($\beta = 0.668$, $t = 4.550$, $\rho < 0.05$) of real GDP in agriculture positively influenced growth in agriculture. It can also be observed that the calculated t -values of the lags of real GDP in agriculture are higher than the critical t (1.96) meaning that real GDP in agriculture is significantly influenced by its lag. Furthermore, the first lag of trade openness led to a decline in the growth rate in agriculture basing on $\beta_1 = -0.321$ (p -value = 0.005 which is less than $\alpha = 0.05$). As well, the calculated t (3.400) is higher than the critical t (1.96). Therefore, the decline in agricultural growth in Kenya is brought about by the lag of trade openness. The findings are in conformity with that of Gholipour et al, (2012) which concluded that in the short run, trade openness acts against the gains in agriculture in Iran. Specifically, the agricultural produce tended to fetch lower earnings in the global market. Moreover, the results are in agreement with that of Bernard (2014) which explored the consequences of higher trade openness on the agricultural sector. The study concluded that in the short-run, openness to trade was counterproductive to the growth in agriculture. The implication was that freeing up trade was deleterious to the performance of the agricultural sector in the short -run.

As well, the first lag ($\beta = 4.797$, $t = 2.780$, $\rho < 0.05$) and fourth lag of FDI ($\beta = 2.019$, $t = 2.530$, $\rho < 0.05$) positively influenced growth in agriculture. Besides, the calculated t -values of the lags of FDI are higher than the critical t (1.96). Therefore, for each unit increase in the first lag of FDI, there is 4.797 unit increase in agricultural growth in Kenya. The same applies for the fourth lag of FDI whereby with a unit increase of the fourth lag, there would be a subsequent increase in agricultural growth by 2.019 units.

Cognate to the results, Ajuwon, & Ogwumike, (2013) indicated that FDI contributed positively to the agricultural sector. As well, the findings are in tally with that of Awunyo-Vitor, & Sackey, (2018) which indicated that the inflows of foreign investment to the Ghanaian economy contributed to the growth in Agriculture. According to the study, the growth in agriculture also boosted the Ghanaian economy through the development of the service and manufacturing sectors in the country.

In addition, the positive influence evidenced between FDI and agriculture in the short term conform with the findings by Oloyede, (2014) which indicated that agricultural productivity was brought about by a rise in both domestic financing and investments from foreigners. Palpably, the opening up of agricultural trade made it possible for the sector to benefit optimally from the inflows of investment from foreigners. Moreover, Abubakar, & Olufemi, (2014) postulated that openness to trade and FDI led to the development of agriculture in Nigeria. The implication of the results is that FDI boosts the output in agriculture. Further support the study findings is by Msuya, (2007) who established that FDI contributed to productivity improvement in Agriculture. Specifically, domestic farmers that were linked to the foreign investors were capable of expanding their production to meet the needs of the global market.

However, Awe, Akinlana, & Adesunkanmi, (2016) delved into the influence of FDI on the output in agriculture in Nigeria and established that in the short- run, the effect of FDI on agriculture is positive and insignificant. Besides, Gilal, Hussain, Ajmair, & Akram, (2016) noted that in the short- term, FDI had a negative implication on agriculture in Pakistan. From the ensuing discussion, it appears that the relationship between FDI and the growth in agriculture is mixed. Most of the studies conducted in the Nigerian context (Ajuwon, & Ogwumike, (2013); Oloyede, (2014); Abubakar, & Olufemi, (2014)) point to a positive relationship between FDI inflows and agricultural growth in the short-term. However, in cases such as in Pakistan and China, it is clear that FDI was not key to the development of the agricultural sector. Also, in the Chinese case, the size of the agricultural market could not sufficiently attract FDI. For the Pakistani case, the political climate and the trade policies in place did not favor the inflows of investment from foreigners. In the Kenyan case, the study has established that in the short- term, FDI leads to the growth of the agricultural sector. Nevertheless, the effect of FDI is deleterious to agriculture in the long-term.

Table 4.8 Error Correction Representation of ARDL Model

ARDL (4,1,4,0,4,2) regression							
Sample: 1984 – 2017		Number of obs	=	34			
		R-squared	=	0.9369			
		Adj R-squared	=	0.8399			
		Root MSE	=	2.2329			
Log likelihood = -59.213							
D.RGDP	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]	
Adjustment coefficient							
Real GDP Agriculture							
1 st lag of Real GDP Agriculture	-2.618	0.389	-6.730	0.000	-3.458	-1.778	
Long Run							
Trade Openness	0.114	0.045	2.510	0.026	0.016	0.212	
Foreign Direct Investment	-1.931	0.604	-3.200	0.007	-3.236	-0.626	
Tariff	0.000	0.043	0.000	0.996	-0.093	0.094	
Domestic Credit	0.257	0.126	2.040	0.062	-0.015	0.528	
Inflation	-0.268	0.052	-5.150	0.000	-0.380	-0.156	
Short Run							
Real GDP Agriculture							
1 st lag of Real GDP Agriculture	1.349	0.334	4.040	0.001	0.627	2.071	
2 nd lag of Real GDP Agriculture	0.948	0.257	3.680	0.003	0.392	1.503	
3 rd lag of Real GDP Agriculture	0.668	0.147	4.550	0.001	0.351	0.985	
Trade Openness							
1 st lag of Trade Openness	-0.321	0.094	-3.400	0.005	-0.526	-0.117	
Foreign Direct Investment							
1 st lag of foreign direct investment	4.797	1.725	2.780	0.016	1.070	8.524	
2 nd lag foreign direct investment	2.595	1.381	1.880	0.083	-0.388	5.578	
3 rd lag foreign direct investment	0.327	0.935	0.350	0.732	-1.692	2.346	
4 th lag foreign direct investment	2.019	0.799	2.530	0.025	0.292	3.746	
Domestic Credit							
1 st lag of Domestic Credit	-0.877	0.238	-3.690	0.003	-1.390	-0.364	
2 nd lag of Domestic Credit	-0.647	0.247	-2.620	0.021	-1.181	-0.113	
3 rd lag of Domestic Credit	-0.681	0.145	-4.690	0.000	-0.995	-0.367	
4 th lag of Domestic credit	-0.176	0.114	-1.550	0.145	-0.422	0.069	
Inflation							
1 st lag of inflation	0.195	0.108	1.800	0.095	-0.039	0.430	
2 nd lag of inflation	0.127	0.093	1.370	0.195	-0.074	0.328	
_cons	-23.001	13.169	-1.750	0.104	-51.450	5.448	

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the findings, conclusion and recommendation of the study. The recommendations are made in relation with the conclusion of the study while recommendation for further studies are essential for the extension of the study.

5.2 Summary of Findings

The primary objective of the study was to critically analyze the contribution of trade liberalization to agricultural growth in Kenya. The study period was between 1980 and 2017. The study utilized data from the World Development Indicators. Basing on the findings in the previous chapter, the net inflows of investment was at 0.731% while domestic credit had a cumulative mean of 37.163. Tariffs averaged 6.226 with the least being 0.69 in 1980 and the highest 14.489 at the turn of the new century. Besides, inflation was at a mean of 10.6547 with real GDP agriculture averaging 3.716%.

Furthermore, after highlighting the profile of trend in agricultural growth, trade openness, FDI and tariffs, diagnostic tests were performed. To start off, normality test indicated that the assumption of normality was met. Besides, there was no presence of heteroscedasticity. As well, there was no serial correlation as indicated by the Breusch Godfrey test. In addition, the ADF unit root test indicated that FDI, domestic credit, inflation and real GDP agriculture were stationary at level. However, trade openness and tariffs were stationary after the first difference. There was no presence of I (2) variables hence the assumption of constant variance, normality, no serial correlation and stationarity were met for the ARDL model.

The results of the bounds test indicated that there was cointegration hence the decision was made to estimate both the ARDL and ECM. Trade openness had a positive and significant impact on agricultural growth in the long- run though FDI had a negative implication on the growth in agriculture. Nonetheless, tariffs exhibited no effect on the growth in the agricultural sector. The first and fourth lag of FDI were key in facilitating growth in agriculture. Nonetheless, decline in agricultural growth was associated with the lag of trade openness. Finally, the first, second and third lag of inflation were associated with declined agricultural growth.

5.3 Conclusion

Trade openness is key in enhancing agricultural growth in Kenya. As Kenya opens its borders for easy movement of agricultural produce, there is resultant increase in outputs for the domestic and foreign markets leading to overall increase in agricultural growth. Moreover, trade openness offers more opportunities for farmers in terms of diversifying their agricultural produce which in turn increases their income. Though trade openness has exhibited a positive influence on agricultural growth, it requires trade policies that are on the premise of creating favorable conditions for agricultural trade especially for the domestic producers. This is because it is through trade openness that Kenyan farmers can benefit from technology transfers and investments in agriculture.

Furthermore, FDI is responsible for the decline in agricultural growth in Kenya. Specifically, the net inflows of investment are directed to other sectors of the economy instead of agriculture. As such, there is a possibility that FDI contribution to agricultural growth is relatively low compared to the inflows in sectors such as the manufacturing and service. The resulting outcome is that farmers are less likely to benefit from technology transfer and the advent of new processes in agriculture.

Finally, the influence of tariffs on agricultural growth was not significant. This could be because despite Kenya making commitments to liberalize its trade, the implementation of the policies on free trade was not forthcoming especially in the 1980s. Besides, the tariff rates were imposed on specific goods while for other goods there were import controls hence tariff rates could not sufficiently influence agricultural growth. It would therefore be plausible for future scholars to establish if the effects of tariff rates on agricultural growth appear in the periods before the liberalization of trade in Kenya.

5.4 Recommendations

Trade openness is associated with the improvement in agricultural growth. Therefore, there is need for stringent implementation of liberalized trade policy with the goal of liberalizing further trade in the agricultural sector. Moreover, since domestic producers will be facing competition from foreign producers, it is utmost necessary for the Kenyan government to provide financial aids and inputs to domestic producers so that they have a level playing field in the global agricultural trade.

Furthermore, the negative influence of FDI on agricultural growth is evident in the study. There is thus need for the Ministry of Agriculture to create a conducive environment for investment in Agriculture and link up domestic farmers and investors so as to boost the production levels in agriculture. Also, since FDI is mostly linked with other sector of the economy, agriculture could benefit from FDI by promoting mechanized agriculture with special emphasis on local production.

5.4.1 Policy Implications

The increasing uncertainties of agricultural production factors requires that Kenya adopts policies that are robust enough to enhance the flexibility of the sector especially as it is important to both its overall economic performance and the social wellbeing of the citizenry. Liberalization offers Kenya the best set of tools to accomplish this feat because of its ability to harness and leverage both capital and labor in such a way as to create a mix that encourages high production actively.

Consequently, the government needs to work on creating an environment that encourages smallholder participation in intensive agriculture by doing away with restrictive fees and tariffs on inputs. Emphasis should also be on exposing local producers to financial networks that are willing and interested in investing in their agricultural enterprises directly as opposed to the current case where foreign investment targets other sectors primarily.

5.5 Further Research Recommendations

The study has contributed immensely to the methodology through the user of the ARDL model which is a better alternative for analyzing the contribution of trade liberalization to agricultural growth in Kenya. Though the study has sufficiently highlighted the effect of trade liberalization on agriculture, there are a wide array of research areas that emerge from the findings of the study:

- i. Since tariffs had no significant influence on agricultural growth, future scholars could explore the effect of non-tariff barriers on agricultural growth in Kenya. Moreover, there is need to extend the study period to include both the pre and post liberalization period while conducting the ARDL Bounds test of cointegration.

- ii. Future research focusing on trade liberalization could incorporate the use of other measures of trade openness such as trade distortion indices and tariffs on imports to assess how trade openness influences agricultural growth in the East African region.
- iii. Future scholars could also analyze the effect of trade liberalization on agricultural growth by laying emphasis on specific industries in agriculture. This would offer better insights to policies aimed at enhancing growth in agriculture. Moreover, the effectiveness of protectionist policies that have been widely applied in agriculture would be assessed.

REFERENCES

- Abate, A. A. (2014). The impact of trade openness on poverty via agricultural TFP in Ethiopia: a sequential dynamic computable general equilibrium micro simulation analysis. *Ethiopian Journal of Economics*, 23(1), 1-30.
- Ahmed, A., Devadason, E. S., & Jan, D. (2017). Does inward foreign direct investment affect agriculture growth? Some empirical evidence from Pakistan. *International Journal of Agricultural Resources, Governance and Ecology*, 13(1), 60-76.
- Ahn, J., Khandelwal, A. K., & Wei, S. J. (2011). The role of intermediaries in facilitating trade. *Journal of International Economics*, 84(1), 73-85.
- Ajuwon, O. S., & Ogwumike, F. O. (2013). Uncertainty and foreign direct investment: A case of agriculture in Nigeria. *Mediterranean Journal of Social Sciences*, 4(1), 155-165.
- Aktuğ, S. S., Mehmet, D. A. Ğ., & Hama, M. R. (2019). Evaluation of foreign direct investments in agricultural sector in Northern Iraq. *Mehmet Akif Ersoy Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 6(1), 172-182.
- Andersen, L., & Babula, R. (2009). The link between openness and long-run economic growth. *J. Int'l Com. & Econ.*, 2, 31.
- Anderson, K., Martin, W., & Van der Mensbrugge, D. (2006). Market and welfare implications of Doha reform scenarios. *Agricultural trade reform and the Doha development agenda*, 333-399.
- Anowor, O. F., Ukwani, N. O., & Martins, I. (2013). The Impact of Trade Liberalisation on Nigeria Agricultural Sector. *Journal of Economics and Sustainable Development*, 4(8), 14-24.
- Arif, A., & Ahmad, H. (2012). Impact of trade openness on output growth: co integration and error correction model approach. *International Journal of Economics and Financial Issues*, 2(4), 379.

- Asafu-Adjaye, J., & Mahadevan, R. (2009). Regional trade agreements versus global trade liberalisation: Implications for a small island developing state. *The World Economy*, 32(3), 509-529.
- Awe, O. O., Akinlana, D. M., & Adesunkanmi, S. O. (2016). Foreign Trade-Foreign Exchange Nexus in Nigeria: A Vector Error Correction Modelling Approach. *Binus Business Review*, 7(1), 1-7.
- Awunyo-Vitor, D., & Sackey, R. A. (2018). Agricultural sector foreign direct investment and economic growth in Ghana. *Journal of Innovation and Entrepreneurship*, 7(1), 15.
- Azarnert, L. V. (2014). Agricultural exports, tariffs and growth. *Open Economies Review*, 25(4), 797-807.
- Baldwin, R., & Evenett, S. (2009). *The collapse of global trade, murky protectionism and the crisis: Recommendations for the G20*. Cepr.
- Bashir, Z. (2003). The impacts of economic reforms and trade liberalisation on agricultural export performance in Pakistan. *The Pakistan Development Review*, 42(4), pp-941.
- Bernard O. Muse (2014). An Auto regressive Distributive Lag approach to Co integration: An examination of Trade Openness and Economic Growth Relationship in Nigeria. *Research Journal of Economics and Business Studies*. 3(3), 85-91.
- Bernard, A. B., Eaton, J., Jensen, J. B., & Kortum, S. (2003). Plants and productivity in international trade. *American economic review*, 93(4), 1268-1290.
- Blake, A., McKay, A., & Morrissey, O. (2002). The impact on Uganda of agricultural trade liberalisation. *Journal of agricultural Economics*, 53(2), 365-381.
- Boossabong, P., & Taylor, M. F. (2009). Impact of trade liberalization on the agricultural sector and adjustment policy: The case of shallot plantations in northeastern Thailand. *Kasetsart Journal (Social Sciences)*, 30(3), 323-337.

- Brambilla, I., Galiani, S., & Porto, G. G. (2010). Argentine trade policies in the XX century: 60 years of solitude. *Available at SSRN 1680606*.
- Bureau, J. C., Guimbard, H., & Jean, S. (2019). Agricultural Trade Liberalisation in the 21st Century: Has It Done the Business?. *Journal of Agricultural Economics*, 70(1), 3-25.
- Chang, H. J. (2003). *Globalization, economic development and the role of the state*. Zed Books.
- Chang, K. I., Hayakawa, K., & Matsuura, T. (2014). Location choice of multinational enterprises in China: Comparison between Japan and Taiwan. *Papers in Regional Science*, 93(3), 521-537.
- Conditional Heteroskedasticity, Nobel Prize Committee.
- Darmawan, A. (2014). The Impact of Trade Liberalization on Agriculture in Indonesia.
- De Silva, N., Malaga, J., & Johnson, J. (2013, February). Trade liberalization effects on agricultural production growth: the case of Sri Lanka. In *Southern Agricultural Economics Association Annual (SAEA) Meeting, Orlando, Florida* (pp. 2-5).
- Despeignes, E. (2013). *Trade liberalization and agricultural growth in Haiti*. Southern Illinois University at Carbondale.
- Djokoto, J. G. (2013). Trade Openness and Technical Efficiency Change in Ghana's Agriculture. *Journal of Empirical Economics*, 1(1), 1-10.
- Elsheikh, O. E., Elbushra, A. A., & Salih, A. A. (2015). Economic impacts of changes in wheat's import tariff on the Sudanese economy. *Journal of the Saudi Society of Agricultural Sciences*, 14(1), 68-75.
- Engle, R. F., & Granger, C. W. (1987). Co-integration and error correction: representation, estimation, and testing. *Econometrica: journal of the Econometric Society*, 251-276.

- Epaphra, M., & Mwakalasya, A. (2017). Analysis of foreign direct investment, agricultural sector and economic growth in Tanzania.
- Fabiosa, J. F. (2008). *What Effect Does Free Trade in Agriculture Have on Developing Country Populations Around the World?* (No. 1040-2016-84895).
- Feenstra, R. C., & Romalis, J. (2014). International prices and endogenous quality. *The Quarterly Journal of Economics*, 129(2), 477-527.
- Fosu, O.-A. E. and Magnus, F. J. (2006) 'Bounds Testing Approach to Cointegration: An Examination of Foreign Direct Investment Trade and Growth Relationships', *American Journal of Applied Sciences*, 3(11), 2079-2085.
- Ghasemi, A., & Zahediasl, S. (2012). "Normality tests for statistical analysis: a guide for non-statisticians." *International Journal of Endocrinology and Metabolism*, Vol. 10 (2), pp. 486.
- Gholipour, S., Mohammadzadeh, R., Bakhshoodeh, M., Azarinfar, Y., & Rafati, M. (2012). Study of Agricultural Trade Openness Impact on Export and Import Shares of Agriculture and Services in Iran.
- Gilal, M., Hussain, K., Ajmair, M., & Akram, S. (2016). Foreign Direct Investment and Trade Components in Context of Pakistan. *European Scientific Journal*, *ESJ*, 12(34), 384. doi: 10.19044/esj.2016.v12n34p384
- Golpinath, M., Sheldon, I., & Echeverria, R. (2007). Firm heterogeneity and international trade: Implications for agricultural and food industries. *IATRC Trade Policy Issues Paper*, 5.
- Gonzalez, A., Hélaine, S., Rau, M. L., & Tothova, M. (2010). *Non-tariff measures affecting agro-food trade between the EU and Africa: Summary of a workshop* (No. JRC62522). Joint Research Centre (Seville site).
- Gray, G. E. (2014). *The Economic Impact of Trade Openness on Foreign Direct Investment Into Emerging Market Countries* (Doctoral dissertation, University of KwaZulu-Natal, Westville).

- Gujarati, D., & Porter, D. C. (2004). *Econometría*. México DF. *McGraw-Hill*. Ham, JC & Rea, SA (1987, julio). *Unemployment insurance and male unemployment duration in Canada*. *Journal of Labor Economics*, 5(3), 325-353.
- Gulzar, A. (2016). Does Trade Openness has Noteworthy effect on Bilateral Trade Flows of ECO Countries; an Empirical Investigation. *Timisoara Journal of Economics and Business*, 9(2), 95-114.
- Gunasekera, D., Cai, Y., & Newth, D. (2015). Effects of foreign direct investment in African agriculture. *China Agricultural Economic Review*, 7(2), 167-184.
- Hair, J. F., Jr., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). "Multivariate Data Analysis: A Global Perspective." (7th Ed.). Upper saddle River, NJ: Pearson.
- Hassine, N. B., Robichaud, V., & Decaluwé, B. (2010). Agricultural trade liberalization, productivity gain and poverty alleviation: A general equilibrium analysis. *Cahier de recherche/Working Paper*, 10, 22.
- Hodge, D. (2005). Inflation and growth in South Africa. *Cambridge Journal of Economics*, 30(2), 163-180.
- Hoekman, B., & Nicita, A. (2011). Trade policy, trade costs, and developing country trade. *World Development*, 39(12), 2069-2079.
- Hur, J., & Park, C. (2012). Do free trade agreements increase economic growth of the member countries?. *World development*, 40(7), 1283-1294.
- Hye, Q. M. A., & Jafri, Z. (2011). Trade, human capital and agricultural sector growth of Pakistan economy. *African Journal of Agricultural Research*, 6(27), 5999-6007.
- Isik-Dikmelik, A. (2006). *Trade reforms and welfare: an ex-post decomposition of income in Vietnam* (Vol. 4049). World Bank Publications.
- Izuchukwu, O., Huiping, H., Abubakar, A.S. & Olufemi, E.A. (2014). FDI Trade and Its Effects on Agricultural Development in Nigeria: Evidence From Time Series Analysis. *International Journal of Management Science and Business Administration*, 1(1), 28-40.

- Johansen, S., & Juselius, K. (1990). Maximum likelihood estimation and inference on cointegration—with applications to the demand for money. *Oxford Bulletin of Economics and statistics*, 52(2), 169-210.
- Joramo, O. M. S. (2016). *The Effect of Tariffs on Import* (Master's thesis).
- Kalaba, M., Sacolo, T., & Kirsten, J. (2016). Non-tariff measures affecting agricultural trade in SADC. *Agrekon*, 55(4), 377-410.
- Khan, M. Z., Salam, A., & Batool, A. (2015). Nexus between agricultural raw material exports, trade openness and economic growth of Pakistan. *Journal of Agricultural Research*, 53(4), 581-588.
- Khouilid, M., & Echaoui, A. (2017). The impact of Non-Tariff Measures (NTMs) on Moroccan foreign trade: Comparison between developed and developing countries. *IOSR Journal of Economics and Finance*, 8(3), 48-57.
- Kimenyi, M. S., Mbaku, J. M., & Mwaniki, N. (Eds.). (2003). *Restarting and sustaining economic growth and development in Africa: The case of Kenya*. Ashgate Publishing, Ltd.
- Krugman, P. R. (2008). *International economics: Theory and policy*, 8/E. Pearson Education India.
- Lee, E. (2005). *Trade liberalization and employment*. UN.
- Leonard, T. M. (2013). *Encyclopedia of the developing world*. Routledge.
- Liargovas, P. G., & Skandalis, K. S. (2012). Foreign direct investment and trade openness: The case of developing economies. *Social indicators research*, 106(2), 323-331.
- Lv, L., Wen, S., & Xiong, Q. (2010). Determinants and performance index of foreign direct investment in China's agriculture. *China Agricultural Economic Review*, 2(1), 36-48.
- MacKinnon, J. G. (1991). Critical values for cointegration tests. In Eds.), *Long-Run Economic Relationship: Readings in Cointegration*.

- Manteli, A. (2015). Does Trade Openness cause Growth? An Empirical Investigation.
- Manual, U. T. (2009). On Statistics for FDI and the Operations of TNCs. *INDIVIDUAL STUDIES*.
- McCulloch, N., Winters, L. A., & Cirera, X. (2001). *Trade liberalization and poverty: A handbook*. Centre for Economic Policy Research.
- Melitz, M. J. (2003). The impact of trade on intra-industry reallocations and aggregate industry productivity. *Econometrica*, 71(6), 1695-1725.
- Missama, A. A. (2010). *Analysis of factors affecting foreign Direct Investment flows into agricultural sector in Tanzania* (Doctoral dissertation, Sokoine university of agriculture.).
- Montalbano, P., & Nenci, S. (2014). Assessing the trade impact of the European Neighbourhood Policy on the EU-MED Free Trade Area. *Applied Economics*, 46(7), 730-740.
- Msuya, E. (2007). The impact of foreign direct investment on agricultural productivity and poverty reduction in Tanzania.
- NIEMI, J., & Huan-Niemi, E. (2002). The Effects of China's Tariff Reductions on EU Agricultural Exports. *Zaragoza (Spain)*, 28, 31.
- Njoki, R. R., & Sahal, M. A. (2016). *The Effect Of Foreign Direct Investment On Long Term Growth In Kenya Services And Agricultural Economic Sectors* (Doctoral dissertation, School of Economics, University of Nairobi).
- Nobel-Prize-Committee (2003) Time-series Econometrics: Cointegration and Autoregressive
- Nuetah, J. A. (2018). Global Agricultural Trade Liberalization and Its Implications for Sub-Saharan Africa.
- Ojeyinka, T. A., & Adegboye, A. A. (2017). Trade liberalization and economic performance in Nigeria: Evidence from agricultural and manufacturing sectors. *African Journal of Economic Review*, 5(3), 1-14.

- Oloyede, B. (2014). Impact of Foreign Direct Investment on Agricultural Sector Development in Nigeria (1981 - 2012). *Kuwait Chapter of Arabian Journal of Business and Management Review*, 3(12), pp.14-24.
- Omolo, M. (2012). The impact of trade liberalization on poverty in Kenya: a microsimulation.
- Oxfam (2005). A round for free. How Rich Countries are Getting a Free Ride on Agricultural Subsidies. Oxfam, United Kingdom.
- Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of applied econometrics*, 16(3), 289-326.
- Raimondi, V., Scoppola, M., & Olper, A. (2012). Preference erosion and the developing countries exports to the EU: a dynamic panel gravity approach. *Review of World Economics*, 148(4), 707-732.
- Read, D. M., & Parton, K. A. (2009). Economic deregulation and trade liberalization in Kenya, Tanzania and Uganda: growth and poverty. *Journal of Economic Issues*, 43(3), 567-586.
- Resnick, D. (2004). *Smallholder African agriculture: Progress and problems in confronting hunger and poverty* (No. 580-2016-39363).
- Ridzuan, A. R., Ismail, N. A., & Che Hamat, A. F. (2017). Does Foreign Direct Investment Successfully Lead to Sustainable Development in Singapore?. *Economies*, 5(3), 29.
- Rose, A. K. (2007). Do we really know that the WTO increases trade? Reply. *American Economic Review*, 97(5), 2019-2025.
- Schumpeter, J. A. (2017). *Theory of economic development*. Routledge.
- Sharpley, J. (1984). Macro-Economic Policies and Agricultural Performance in Kenya. *Unpublished Report. Paris: OECD Development Centre*.

- Shepherd, B., & Wilson, J. S. (2009). Trade facilitation in ASEAN member countries: Measuring progress and assessing priorities. *Journal of Asian Economics*, 20(4), 367-383.
- Studenmund, A. (2011). *Using Economics: A Practical Guide* (6th).
- Taheripour, F., & Tyner, W. E. (2018). Impacts of possible Chinese 25% tariff on US soybeans and other agricultural commodities. *Choices*, 33(2), 1-7.
- Umboh, S. J. K., Hakim, D. B., Sinaga, B. M., & Kariyasa, K. (2014). Impact of maize import tariff policy changes on production and consumption in Indonesia: A multimarket model analysis. *International Journal of Food and Agricultural Economics (IJFAEC)*, 2(1128-2016-92038), 113.
- World Bank, 1989. *Sub-Saharan Africa: From Crisis to Sustainable Growth*. Washington, D.C.
- World Trade Organization (WTO) (2015), Report on G-20 Trade Measures, 30 October.
- Yoo, C. K., Gopinath, M., & Kim, H. (2012). Trade policy reform, productivity growth and welfare in South Korean agriculture. *Applied Economic Perspectives and Policy*, 34(3), 472-488.
- Yu, B., & Nin-Pratt, A. (2011, December). Agricultural productivity and policies in Sub-Saharan Africa. In *2011 Annual Meeting, July 24-26, 2011, Pittsburgh, Pennsylvania* (No. 105400). Agricultural and Applied Economics Association.
- Zekarias, S. M. (2016). The impact of foreign direct investment (FDI) on economic growth in Eastern Africa: Evidence from panel data analysis. *Applied Economics and Finance*, 3(1), 145-160.
- Zingwena, T. (2014). Foreign direct investment (FDI) and agricultural growth in Zimbabwe.