

**THE EFFECT OF EXCHANGE RATE, INFLATION RATE, INTEREST RATE AND  
ECONOMIC GROWTH ON AGRICULTURE EXPORT EARNINGS IN TANZANIA**

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**M.Sc. (Finance and Investment) Dissertation  
Institute of Accountancy Arusha  
November, 2020**

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ECONOMIC GROWTH ON AGRICULTURE EXPORT EARNINGS IN TANZANIA**

**By**

**Abass Vuai Moh'd**

**A dissertation submitted in partial fulfillment of the requirements for the  
degree of Masters of Science in Finance and Investment of the Institute of  
Accountancy Arusha**

**Institute of Accountancy Arusha**

**November 2020**



**CERTIFICATION**

I, the undersigned certify that I have read and hereby recommend for acceptance by Institute of Accountancy the dissertation entitled: *“The effect of exchange rate, inflation rate, interest rate and economic growth on agriculture export earnings in Tanzania”*, in partial fulfilment of the requirements for the degree of Master of Science in Finance and Investment of the Institute of Accountancy Arusha.

.....

CPA Richard Laswai

(Supervisor)

Date .....

## DECLARATION

I, **Abass Vuai Moh'd** declared that this dissertation is my own original work and that it has not been presented and will not be presented to any university for similar or any other degree award.

Signature.....

Date.....

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## **ACKNOWLEDGEMENT**

This work could not have been possible without the extensive moral and material support from a substantial number of people, being it directly or indirect. It is therefore impossible, within this limited space to thank all the people whose assistance has enabled me to produce this work. However, a few person and institutions deserves a special appreciation despite the limited space available.

I would like to thank Almighty God for protection and guidance due to his power and Graciousness.

I wish to express my sincere appreciation to CPA Richard Laswai my research supervisor for his outstanding guidance and commitment which at the end made my work run smoothly. His tireless guidance has shaped the research to look the way it is now.

Since it is not possible to thank everyone who actually contributed to this study, personally I would like to convey my appreciation to everyone who assisted me in one way or another. Frankly speaking there is no way I can pay you back; my aim is you all to understand that I thank you all, God bless you.

## **DEDICATION**

I dedicate this research dissertation to my mother Safia Haji Foun and my wife Latifa Mzee Mussa for their endless prayers, inspirations and encouragement. I also dedicate this research to my children Abdul-latif Abass Vuai, Ahmed Abass Vuai, Awatif Abass Vuai and Rukaiya Abass Vuai.



## ABBREVIATIONS AND ACRONYMS

<b>BOT</b>	Bank of Tanzania
<b>EAC</b>	East African Countries
<b>EPZ</b>	Export Processing Zone
<b>FDI</b>	Foreign Direct Investment
<b>GDP</b>	Gross Domestic Product
<b>IFE</b>	International Fisher Effect
<b>IS-LM</b>	Investment Savings - Liquidity Preference Money supply Model
<b>NBS</b>	National Bureau of Statistics
<b>OLS</b>	Ordinary Least Square
<b>PPP</b>	Purchasing Power Parity
<b>SSA</b>	Sub-Saharan Africa
<b>UN</b>	United Nations
<b>UNCTAD</b>	United Nations Conference on Trade and Development
<b>UNCTAD</b>	United Nations Conference on Trade and Development
<b>URT</b>	United Republic of Tanzania
<b>US</b>	United States
<b>VAR</b>	Vector Autoregressive

## **ABSTRACT**

The study examined the effect of exchange rate, inflation rate, interest rate and economic growth on agriculture export earnings in Tanzania. Non experimental research design was deployed and the secondary data were collected and analysed from 1990 to 2019. Multiple linear regression analysis was employed to measure the effect of independent variable on dependent variable. Multicollinearity, heteroscedasticity and autocorrelation were performed to validate the model. The study findings showed insignificant relationship between exchange rate and agriculture export earnings. The inflation rate has a positive and significant influence on agriculture export earnings. Moreover, the economic growth positively influences agriculture export earnings and the interest rate is significant and positively influences agriculture export earnings which mean effective monetary targeting and accommodating monetary policies should be designed and implemented as the needs arise. The study recommends that, the government should use its fiscal and monetary policy to maintain the level of interest and inflation in a country since they have great influence to agricultural export earnings. The government needs to boost further economic growth, using fiscal and monetary policy tools to maintain the level of inflation and interest rate so as to archive a significant increase in agricultural export earnings. There is also need to boost supply in the agriculture sector through incentives and subsidies that will lead to lower cost of production.

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## CHAPTER ONE

### INTRODUCTION

#### 1.1 Introduction

One of the most important engines of development and growth of the nations around the world is agriculture. The agriculture sector enables the nations as well as individual economy to grow and get rid from the poverty (Oluwatoyese et al, 2016). Tanzanian agricultural land from the latest measure in 2016 is about 44million ha that represents total land of the country by 45%, according to Bank of Tanzania and World Bank. Major agricultural commodities for export are coffee, cashewnuts, cloves, cotton, tobacco and tea. Currently, agricultural sector in Tanzania provided 67% of employment, according to FYDP 2016/17 – 2020/21. Small famers operate agriculture sector by 83% of all holdings and contributing 75% agricultural outputs. Despite of large number of workforce engaged in agriculture but poverty remain high and about 39% of the smallholders live below the national poverty line in Tanzania (FAO 2016). The role of agriculture export earnings in economic growth and development has become a major focus for many developing countries. Industrial growth and development contributed by the agriculture which regarded as one among the source (Oluwatoyese et al, 2016). The export earnings of agriculture sector activities stimulate growth which is the key to achieving sustainability and stability in the economy. According to MoFP, in recent years the agricultural growth rates fail to reach the targets. According to the Bank of Tanzania, in 2020 the Tanzanian exports increased to 1,476.24 USD Million in quarter two compared to quarter one which was 1,444.60 USD Million while the imports in quarter one and two was 2,127.10 USD Million and 2,138.90 USD Million respectively. That means Tanzania imports more than exports. This study examined the effect of exchange rate, inflation rate, interest rate and economic growth on agricultural export earnings in Tanzania because the selected variables have huge impact on the development of the developing countries like Tanzania which mostly its growth depend on the export earnings especial agricultural outputs.

#### 1.2 Background to the Study

The economic growth, job creation and hard currency generation is the result of agriculture sector (Rutto and Ondiek, 2014). Agricultural sector's importation and exportation lead the exchange rate

fluctuation to affect the sector in huge extent like any other sector (Adenkule, & Innocent, 2018). Trade flows might be blocked by the exchange rate volatility which brings the uncertainty that impose costs to avoid any possible risk (Isitua and Neville, 2006).

The relationship between a nation's exchange rate, export earnings, and economic growth is a crucial issue from both economic and a political point of view. Edwards (2015) states, "It is no exaggeration to say that exchange rate conduct plays a central role in policy assessment and development." A country's exchange rate is an important determinant of its growth in cross-border trade and export earnings and a measure of its global competitiveness (Bah & Amusa, 2003).

The exchange rate plays a key role in directing the domestic economy's broad output allocation and investment between foreign and domestic goods. It has been shown that the exchange rate level relative to the equilibrium exchange rate level and its stability has a significant influence on export earnings, resource allocation, consumption, production, employment and private investment (Aron et al., 2002). The exchange rate plays an economic role for this crucial role; in particular, it induces emerging economies to follow their policies in order to gain this relative macroeconomic right. The right exchange rate should not go far away from its balance price (Otieno & Mudaki, 2011). Inflation is one among the macroeconomic factors that bring huge challenge to the world's economy regardless developed or developing economies. In agriculture sector inflation affects the productivity and brings shortage of agricultural output (Chaundry et al, 2013). High inflation and destruction of natural resources have a tendency to be linked with low level of exports and growth. Inflation at high level tends to destroy production of the country by slicing apart between the returns to real and financial capital. Investment quality and savings might be reduced by reducing real interest rates (Gylfason, 1997).

High level of inflation tends to cause the imperfect financial markets, conflict within the society and also distort growth. The economic growth of any country can be delayed by the rapid inflation (Gylfason, 1997). According to Hernandez (2011), the number one goal of policy makers around the world is economic growth. In developing countries the key factor that considered at huge extent to boost economic growth is exports (Dreger, 2011). Large numbers of developing countries focusing to export their primary commodities to the developed countries (UNCTAD, 2005). Exporting primary commodities might cause the economies to change from competitive sectors which are required for sustainability of economic growth (Alam & Myovella, 2016). High

nominal rate of interest cause the overvaluation of the real exchange rate which lead the loss to exports. Difference between the international interest rate and domestic interest rate invites speculative capital which probable resulting to exchange rate valuation (Sonaglio et al, 2016).

A high exchange rate decreases export earnings, thus rising export earnings. On the other hand, a low exchange rate raises export earned receipts to increase export earnings. A fluctuation in the exchange rate has either a positive or a negative direct effect on export earnings. Exchange rate instability could have a negative impact on exporters and economic growth trend by preventing companies from spending, innovating, and trading. It can also prevent companies from entering the export market. Wide fluctuations in the exchange rate impose costs of economic transition as capital shift from tradable to non-tradable sectors. This could permanently transfer capital to non-tradable sectors if companies were excluded from export markets as a result of high exchange rate volatility (Kiptui, 2008). If shifts in exchange rates are not fully expected, a rise in exchange rate volatility leads to a decrease in risk-averse agents ' international trade activities. The assumption of a adverse correlation between currency fluctuations and export earnings is an argument that is regularly used by advocates of regulated or fixed exchange rates. Exchange rate fluctuations result in exchange rate risk, which is a possible gain or loss due to exchange rate fluctuations. The following equations can be used to calculate exchange rate fluctuations: the Purchasing Power Parity Theorem (PPP), the Mundell-Flemming method, the Balassa-Samuelson model or the IFE model (Madura, 2014).

Export earnings defined as earnings produced by a business or nation exporting goods and services (Otieno&Mudaki, 2011). Sales of agricultural products play huge role to the economies of less developed countries. Employment issues, expenditure balance, income distribution and cost and revenue stabilisation are therefore directly linked to the agricultural export sector.

Export production is vulnerable to exchange rate fluctuations which govern export-oriented products and financial performance of crops. Variations in world agricultural prices have a strong impact on their export earnings under the regime of adjustable exchange rates. A higher demand or a short in supply would trigger an appreciation of the foreign currency that results to a decrease in export earnings (Charles, 2006). This theoretical concept can be applied in the case of Tanzania as a developing country where international financial markets arrive. The positive relationship between exchange rate depreciation and export earnings in Tanzania between 2002

and 2015 may perhaps explain why there was concern about shilling appreciation with exporters complaining about job losses in Tanzania's major export sectors (Kiptui, 2008). Nevertheless, the nation has experienced a drop in currency compared to giant foreign currencies, generally the US dollar. Empirical evidence is mixed to support the view that there is a negative correlation between exchange rate volatility and export earnings. The related study by McKenzie (1999) suggests that exchange rate variations can have a different impact on different markets and calls for further research using export-specific information.

Coric and Pugh (2010) found that exchange rate fluctuations typically adversely affect international trade. Exporting firms may be more sensitive to exchange rate volatility than domestic firms, but this vulnerability is likely to be minimized by factors such as the existence of hedging instruments, the prevalence of imported inputs and the presence of firms on the global market where upward and downward movements of different exchange rates cancel. Like other developing countries, Tanzania has encountered a combination of exogenous shocks, such as declining terms of trade, primarily due to changes in global commodity prices, shocks in oil prices and volatility in capital flows. External shocks require effective fiscal and monetary policies and a stable exchange rate system to avoid unsustainable current account deficits, higher foreign debt burdens, and steady global competitiveness losses.

### **1.3 Statement of the Problem**

Exporters of all commodities hope to benefit from their export trade. Currently, in Tanzania the earnings from the exports are small compared to the imports. This situation is bad indicator for the growth of many developing countries. The growth of developing countries like Tanzania depends on the earnings from the exports. Export earnings in Tanzania heavily contributed by the agricultural output. Low level of agricultural export earnings led people in Tanzania to live low standard life and even below nation's poverty line. Low level of agricultural export earnings was the main reason for the researcher to undertake this study which examined the effect of the exchange rate, inflation rate, interest rate and economic growth. Drop of the export earnings caused by the production shortage which normally force the developing countries to put their efforts in food importation. Performance of the economic among developing countries where importing dominate the situation is not convincing one because it lead incremental of expenditure of importing food which might result growing of balance of payment deficit (FMARD, 2014).

Exporters are negatively vulnerable to exchange rate fluctuations because the depreciation rates higher than that for inflation (Naguita, 2015). Kimani (2007) tested the effectiveness of the foreign exchange market and found that forward exchange rates are predictors of future spot rates. Ndunda (2002) and Kurgat (1998) conducted studies on the quality of foreign exchange markets in Kenya on the basis of simple trade laws and noted that there were unexploited profit opportunities for those participating in exchange rate transactions on the Tanzanian exchange market and thus concluded that the practical foreign exchange perception strategy was ineffective. Gil et al (2009) carried out the study about effect of alterations in the financial related policy and the exchange rate on supply, prices and exports of agricultural from 1967 to 2002. The study variables was interest rate, exchange rate, inflation, input prices, money supply, agricultural supply, agricultural output, rate of commercial openness and income. The study results show that agriculture influenced by the chosen macroeconomic variables.

According to Anderton and Skudelny (2001), the economic theory underpinning the negative relationship between currency fluctuations and export earnings leads to the aversion of export firms to exchange, leading to loss of export earnings. A study by Baldwin, Skudelny and Taglioni (2005) found that the effect of exchange rate risk caused by exchange rate fluctuations on export earnings in most African countries was negative; therefore, export earnings increased as currency fluctuations decreased and decreased as currency fluctuations increased.

## **1.4 Research Objectives**

### **1.4.1 General objective**

This study seeks to examine the effects of economic growth, interest rate, inflation and exchange rate on agriculture export earnings in Tanzania.

### **1.4.2 Specific Objectives**

- i. To assess the effect of exchange rates on agriculture export earnings in Tanzania
- ii. To investigate the effect of inflation rate on agriculture export earnings in Tanzania
- iii. To determine the effect interest rate on agriculture export earnings in Tanzania
- iv. To assess the effect economic growth on agriculture export earnings in Tanzania

## **1.5 Research Hypothesis**

The study was guided by the following hypothesis.

**Ha<sub>0</sub>:** Exchange rate, inflation rate, interest rate and economic growth have no relationship with the agriculture export earnings in Tanzania.

**Ha<sub>1</sub>:** Exchange rate, inflation rate, interest rate and economic growth have relationship with the agriculture export earnings in Tanzania.

## **1.6 Scope of the Study**

This study was limited to the effect of exchange rate fluctuations on agriculture export earnings in Tanzania. The study used a secondary data that was gathered from National Bureau of Statistics, Bank of Tanzania, Ministry of Agriculture and livestock Tanzania and the World Data Indicators for the period of thirty years (1990-2019).

## **1.7 Significance of the Study**

The results of this study will be benefit to the Tanzanian government in managing exposure to exchange rate fluctuations. This allows the government to plan to reduce the risk of fluctuating exchange rates to its exporters and importers. It also helps the government to improve its foreign exchange reserve management strategy.

The study may allow the government to plan and allocate adequate resources to the export sector and enhance the capacity of farmers who rely entirely on agriculture as their source of income and all other stakeholders in the export sector. This can be accomplished by rising export earnings, a core feature of foreign currency volatility.

It will also help researchers interested in researching local currency movements against hard currencies. The findings of this study open up new areas of interest in the academic world because scholars become involved in the outcomes of the report.

This research supports smallholder farmers with the export market as their main market. The study provides information on the earnings of the agricultural industry as such awareness is crucial to enhancing the ability of farmers to make money by understanding the currency regulatory framework that would allow them to know how to manage vulnerability to exchange rate

changes. The findings also assist investors in monitoring their exchange earnings and exposure to fluctuations in the exchange rate.

It should be noted that most developing countries in Eastern and Central Africa depend on cash crop exports to obtain the much-needed foreign exchange. Stability of trading currency will sustain projected foreign exchange gains from output and tourism. Proper management of access to exchange rates helps eradicate poverty, raise the standard of living for exporters and increase the level of GDP among the countries involved. This work helps all export business investors to make crucial decisions to cope with fluctuating exchange rate exposures and helps exporters to prepare with some degree of certainty for foreign exchange exposure. Finally, it is also a requirement for successful completion of MSc.FI at the Institute of Accountancy Arusha.

### **1.8 Limitations of the Study**

The time for conducting the research was very limited, however the researcher started to investigate the variables earlier prior to time so that the findings would be useful to policy formulators. Furthermore, financial constraints was a problem, therefore the researcher utilized secondary data from recognized and credible institutions to study the effect of the variables under consideration.

### **1.9 Organization of the Study**

This study comprises five chapters. Chapter one unveils the problem which informs the study and its context. It provides the justification for the study. Chapter two presents a review of relevant literature to the study. Chapter three describes the research methodology and procedures of data collection and analysis. Chapter four entails data presentation, analysis and discussions, while chapter five provides the summary, conclusions and recommendations of the study.

## **CHAPTER TWO**

### **LITERATURE REVIEWS**

#### **2.1 Introduction**

#### **2.1 Introduction**

This chapter describes the theories of exchange rate fluctuations, determinants of export earnings, and an empirical review of past studies on related areas after which it concludes with a summary of the literature review.

#### **2.2 Conceptualization of Key Terms**

##### **2.2.1 Determinants of Export Earnings**

Export earnings are considered as one of the key indicators of an economy's performance. Research into export earnings has grown considerably during the past few years. While many studies have been conducted to explain export earnings and its antecedents, there is no generally accepted conceptualization. Export earnings represent the outcome of an economy's activities in export markets (Sousa, Martinez-Lopez, and Coelho, 2008). Exports are very important in making economic growth of the country sustainable (Odetola, 2013). Agricultural sector has huge importance to economic growth of the developing countries international perspective (Veter, 2015).

##### **2.2.2.1 Exchange Rate Fluctuations**

One among the macroeconomic factors is exchange rate which has huge influence on the foreign trade, unemployment, foreign direct investment, gross domestic product and inflation. Exchange rate is very important economic variable which influence the import and export. Prices of agricultural products affected by the exchange rate of a currency, therefore it leads to the competition of the agricultural industry of a country, due to that situation, the relationship between the exports and the value of currency is negatively (Ali et al, 2020). Otieno and Mudaki (2011) found that export-country export earnings were calculated by fluctuations in exchange rates. Recently, fluctuations in exchange rates have growing macro-management challenges. Kiptui(2008) found that exchange rate fluctuations need to be controlled and effective monetary and fiscal policies need to be implemented to ensure exchange rate stability and therefore export



earnings stability. Exporters and policymakers have often been concerned about the recent steep appreciation of the exchange rate, and there is a need to turn to exchange rate instability and support for reforms that allow exporters to prevent against exchange rate risks such as developing forward and future markets that are essentially long-term solutions.

Nevertheless, in short term, adopting effective fiscal and monetary policies to combat unpredictable short-term inflows of capital will help to reduce the impact of such adjustments on the currency of the country. Although it is essential to maintain a stable exchange rate, policies leading to a relatively overvalued exchange rate may be a disincentive for exports, suggesting that flexibility in exchange rate fluctuations may be advantageous in line with the economic fundamentals. With globalization rising, openness through an export-led growth strategy is unavoidable, especially in consideration (Were et al., 2002).

#### **2.2.2.2 Inflation**

Lower inflation rate in a country lead its currency value to rise and the purchasing power of that currency increases compared to other currencies. Currency with higher inflation rates depreciate in relation to other currencies and this also associated with higher interest rates. A difficult in assessing the impact on export earnings of exchange rate fluctuations is that; most of the big macroeconomic impacts are indirect. Especially important are the connections between exchange rates, inflation and export earnings. In the sense of a gradually changing nominal exchange rate, which is regulated by the central bank to preserve price stability, a typical problem is generated by high and rising inflation. The resulting real exchange rate overvaluation hinders export growth and creates uncertainty about possible future exchange rate changes (Mcpherson and Rokavoski, 2000). High inflation bring worse situation in the country because it weaken growth of economic due to inefficiency productivity (Eastly and Fisher, 2001). Price incremental of agricultural products is the impact of high level of inflation and that is a macroeconomic problem. When relative prices within agriculture vary due to inflation, the economic welfare of society may be decreased as a whole sectorial. Inflation causes a risk of choosing a type of products to produce, this situation make the famers to get loss of real income (Olatunji et al, 2010)

### **2.2.2.3 Economic growth**

Economic growth is the capacity increases of producing goods and services from one period to another or the volume of produced goods and services by the economy over time and the measurement can be done in nominal terms (take in inflation) or real terms (adjust inflation). Usually economic growth measured as percentage rate increase in real gross domestic product (real GDP). Economic growth determined by the natural resources, capital accumulation, organization, technical progress and structural changes (Ijirshar, 2015). A positive links between gross domestic products and exchange rate clearly identify the agricultural export output boost up the economic growth and that is the strong goal for policy makers (Sokolov et al, 2011). Economic growth stimulated by increase of import and export (Ali, 2020). The economic relationship between two countries can be established by foreign trade and better life standard of people, poverty reduction and get rid unemployment in the country is the result of economic growth. Also better services and goods, health and education is facilitated by the stable economic growth (Svatoš et al, 2014). A study conducted by Izuchukwu (2011) was employed multiple regression analysis which used to examine the contribution of agricultural sector on the development of Nigerian economic and found the positive relationship between the gross domestic product, government expenditure on agriculture, foreign direct investment and domestic savings for a period of 1986 to 2007. Also found that, foreign direct investment, domestic savings and government expenditure on agriculture explain the variation in gross domestic product by 81%.

### **2.2.2.4 Domestic Transport Infrastructure**

Export earnings depend critically on the infrastructure that available physical, including roads and ports to energy and telecommunications. It seems that internal transport costs have a major impact on export earnings. International transportation plays an important role across all areas in illustrating export earnings in later periods. Its significance appears to be more marked among better performing exporters. External transport infrastructure plays a major role in the growth of the export sector. Most African countries have weak transport infrastructure and are considered to be poor export performers in all periods. This suggests that by investing in transport infrastructure, Tanzania could do more to expand its production potential. This hypothesis is backed by the Limao&Venables (2001) report, which presents some empirical analysis suggesting that the rates of export trade flows observed for African countries are relatively low, mainly due to lack of

transport infrastructure. This might be more acute in the case of landlocked countries because of their geographical handicaps. The fact that there is still a substantial investment in infrastructure in Tanzania could explain the slow upward mobility in export earnings (Fugazza, 2004).

#### **2.2.2.5 Macroeconomic Environment**

An overrated currency, sometimes as a result of fixed exchange rates used as a nominal anchor to control inflationary pressures, translates into a direct loss of exporting firm's price competitiveness. In other words, in more capital-intensive or differentiated product markets, successful export performers are more likely to have a stronger position and may face less aggressive competition than exporters on more labor-intensive commodity markets. As a result, their profitability could be expected to be less sensitive to small fluctuations in the real exchange rate and much more dependent on their product's technical content and therefore largely on resources. This is not likely to be the case for producers exporting low skill intensive products, which are highly substitutable and whose demand is very volatile and price sensitive (Fugazza, 2004).

#### **2.2.2.5 Interest Rates**

Interest rate, exchange rate and inflation rate are linked. A change on interest rate impact the inflation and value of the currency. Foreign capital attracted by the higher interest rate which normal cause the rise of exchange rate. The differences of interest rate from one market to another normally cause the fund to flow from low interest rates market to the higher interest rate market. Existence of interest rate differential occurs only if the exchange rate is anticipated to change in a way that the higher interest rate advantage offset by the foreign exchange rate transaction loss (Mulei, 2015). Lower interest rates tend to decrease exchange rate (Bergen, 2010). A study conducted by Karfakis and Kim (1995) on Australian exchange rate revealed that interest rate rise and exchange rate depreciation associate the unexpected current account deficit. Evidently show that exchange rate overshooting and diminish of domestic wealth led by that current account deficit.

## **2.3 Theories Guiding the Study**

Four theories were used to explain the movements in exchange rates between countries. These are the PPP (Purchasing Power Parity theorem), IFE (International Fisher Effect), MFM (Mundell-Fleming model) and the BSM (Balassa- Samuelson model) as elaborated below.

### **2.3.1 Purchasing Power Parity Theorem**

Cassel developed this theory in 1918. The principle is based on the law of one price, which suggests that similar goods should have the same value in different markets in the absence of transaction costs. The PPP theory, after taking into account their exchange rate, one currency will be used to calculate the buying power against another currency. Under this principle, the exchange rate between the two currencies is calculated by the difference between the buying powers of different currencies. When the gap in the inflation rate between two currencies increases, the exchange rates adjust to the relative purchasing power of the currencies. The relationship under this principle is based on the basic idea that changes in the exchange rate reflect changes in the relative price rates among countries in the absence of trade restrictions (Engel, 1996). At the same time, under free trade conditions, prices of similar commodities cannot differ between the two countries because, until price differences are eliminated, arbitrators will take advantage of such conditions. This results in the rule of one value, which means that what is true of one commodity is true of the economy as a whole. The price level in both countries should be related by the exchange rate and hence the idea that adjustments in the exchange rate are due to variations in the inflation rate. If the theory does not hold, it is concluded that between the two currencies there is no buying parity (Madura, 2007). The PPP (purchasing power parity theorem) as articulated by Madura(2007) said that, the percentage change is the difference in the domestic inflation rate less the foreign market inflation rate multiplied by the direct quota.

### **2.3.2 International Fisher Effect**

The IFE (International Fisher Effect) was developed by Fisher in 1930 as an exchange rate model. The theory is based on nominal interest rates that are present and future risk-free rather than pure inflation. This notes that interest rate differences in different markets can result in a flow of funds from markets with low interest rates to high-interest-rate markets. This theory is that interest rate differentials will only exist if the exchange rate is expected to change in such a way as to offset

the advantage of the higher interest rate by the loss of the exchange rate transactions. The interest rate differential should be approximately equal to the forward differential in an efficient market without transaction costs. When this holds, it is said that the forward rate prevails in the money market at interest rate parity and equilibrium. Interest parity guarantees that the return on prevented foreign investment is just equal to the same-risk domestic interest rate on investments, which implies the interest gap protected (Madura, 2007). The International Fisher Effect (IFE) indicates strong expected inflation in currencies and is therefore expected to depreciate. Therefore, investors based in the home country may not necessarily try to invest in interest-bearing securities in foreign countries because the effect of the exchange rate might offset the advantage of the interest rate. The effect of the exchange rate is not expected to offset the interest rate advantage in any period perfectly. In some times it might be less pronounced and more pronounced in other periods. Yet IFE advocates say that on average, investors who seek to invest in interest-bearing securities with high interest rates would not benefit because the best expectation of return after adjusting for the impact of the exchange rate in any time would be equal to what they could receive domestically.

### **2.3.3 The Mundell-Fleming Model**

This theory was established by Fleming and Mundell in the early 1960's. The Keynesian open economy model of macroeconomic policy was independently extended to systematically incorporate the role of capital flows. Dornbusch published a series of exchange rate policy articles in 1970, which codified these contributions into the Mundell Fleming model. This model extends the IS-LM model to an open economy and therefore provides an understanding of how the exchange rate is determined (Akila, 2004). The IS-LM model considers three markets: commodities, money, and capital markets, and is primarily used to evaluate monetary and fiscal policy impacts. Under this framework, in contrast to the money market and the goods market, the balance of international payments is known to be another state of equilibrium. Among the main concern that the model tackles is the trilemma, which states that total flexibility of capital, autonomy of monetary policy and a fixed exchange rate system cannot be accomplished at the same time. In particular, it argues that, the country cannot maintain freedom in monetary policy in a fixed exchange rate regime with perfect mobility of capital. However, this argument is made in a small country setting, and it is not necessarily true in bigger economies (Akila, 2004).

### **2.3.4 Balassa-Samuelson Model**

Balassa and Samuelson developed this theory in 1964. They separately offered a definitive explanation as to why the absolute theory of PPP is faulty as a theory of exchange rates. The Balassa-Samuelson model is one of the cornerstones of the real equilibrium exchange rate's standard theory (Akila, 2004). The main empirical observation behind the Balassa-Samuelson model is that countries with higher tradable output relative to non-tradable appear to have high prices. The B-S model hypothesis notes that productivity increases in the tradable sector allow for a commensurate increase in real wages, and since wages are expected to connect the tradable with the non-tradable sector, wages and prices also increase in the non-tradable sector. It leads to an increase in the economy's overall price level, resulting in an appreciation of the real exchange rate (Akila, 2004).

### **2.4 Empirical Review**

Various researchers have conducted studies on the effects on export quality of exchange rate fluctuations. Some of them concluded that the relationship between fluctuations in the exchange rate and export output was positive, though others finalised that, the relationship was negative. Some of these studies are listed below; Oluwatoyese et al (2015) examined some of the macroeconomic variables influencing agriculture in Nigeria concluded that, interest rate, commercial bank loan and food import value are significant and affect output from agriculture on other hand variables like exchange rate, unemployment rate and inflation rate are insignificant. The study recommended that, there should be adequate financing to improve agriculture and also new and strong policy should be structured. Shobande (2019), in the study about the effect of economic integration on agricultural export performance in selected west African countries found that economic integration is strong predictor of export performance in west Africa, on the other hand the study examined the effect of geographical distance measure by effective nominal exchange rate and found the negative effect on the explained variable. Rutto and Ondiek (2014), in the study of the impact of exchange rate volatility on Kenya's tea exports which used cointegration and error correction model (ECM), the results indicated the negative effects of exchange rate volatility on tea exports performance in Kenya. Ngondo and Khobai (2018) conducted the study which examines the exports and exchange rate relationship in South Africa for a certain period, the annual time series data was used and mentioned the following in the

study; current free floating exchange rate in an inflation target as take up by Reserve Bank in certain month, yet only cost is very household currency volatile bring blockage to export. Batten and Belongia (1984) conducted a study on the decrease in U.S. agricultural export earnings as a result of exchange rate fluctuations. The agricultural export earnings were taken as the dependent values for the fluctuations in the exchange rate between 2010 and 2018. Following estimates of their time series results, they concluded that there is a negative connection between exchange rate fluctuations and agricultural export earnings. In the study about the impact of agriculture exports on economic growth of Peru: the case of avocado and grapes, Nora and Pradeep (2018) found the positive impacts avocado exports to economic growth while negative impacts found on grape exports to economic growth.

Fabiosa (2002) examined the impact of exchange fluctuations on exports of pork and live swine. The formula of the pork export supply was expressed as a function of the expected level of the real exchange rate and a variability of the real exchange rate in time. To analyse the vulnerability of pork exports from the countries such as Canada, United States and Denmark to Japan, the same template was used. The parameters of all pork and live pigs were theoretically consistent in export equations and many were significant. His study concluded that; the exchange rate level has a significant positive impact on the export earnings of pork, with more pork products being exported as the domestic currency depreciates.

Karuraa (2017) sought to understand the impact of exchange rate fluctuations determinants on export earnings in Kenya using annual data over 1970-2015 time periods by posting a structural relationship between exchange rate fluctuations determinants and export earnings. The results reveal that from unit root tests, the data series used in the model in this study are  $I(1)$  in the level series and the first differences series are  $I(0)$ . Implication of these findings is the existence of a long run relationship between the dependent and independent variables. Cointegration test results that, on the basis of the trace test statistics, show there is one cointegrating vector for the VAR model suggesting that there is a unique long run equilibrium relationship. The coefficients of the dependent variables are all significant and less than one. Thus the responsiveness of export earnings in Kenya to fluctuations in inflation rates, interest rates, money supply and market liberalization is inelastic. From the error correction model, the results show that Kenya's export earnings can effectively be explained using the specified independent variables since the

coefficient of multiple determinations; (R<sup>2</sup>) is high at approximately 80 percent. The significant error correction term implies that Kenya's export earnings model adjusts to changes in the specified independent variables. The economic importance of this empirical finding is that the export earnings speed of adjustment to correct long run disequilibrium between itself and its determinants is moderate, and 56 percent of the disequilibrium is eliminated in one year.

Arize, Osang and Slottje (2000) studied the effect on export flows of eight Latin American countries of real exchange rate volatility. Using a six-year fixed effects panel data estimator, they found that increases in exchange rate fluctuations have a significant negative effect on export demand in both the short and the long run, thereby reducing export earnings.

In the country of Ghana; Bhattarai&Armah (2013) confirmed a steady long-term relationship between exports and imports and the exchange rate in their seven-year study using time series data estimator. They also found that the effect on both imports and exports is contractionary when the domestic currency weakens.

Cameron et al. (2005) studied the impact of exchange rate fluctuations on Uganda's tropical freshwater fish exports which used a fixed effects panel data estimator for the duration of the analysis and the empirical evidence suggested that, the export earnings of Uganda's fish were negative and meaningfully correlated with exchange rate fluctuations. They revealed that exchange rate fluctuations trigger a negative income shift that exporters receive from their exports.

Bristy (2013) analysed the impact of exchange rate volatility on Bangladesh's exports from 2001 to 2012. In this study the researcher examined how the depreciation of the exchange rate and its instability affect Bangladesh exports. His studies are based on a time series data on the period of study and found out that exchange rate depreciation has a positive impact on export earnings of Bangladesh. Despite a positive link between export demand and depreciation of the exchange rate, he found that Bangladesh's trade balance deteriorated over the year. He attributes this to too much exchange rate fluctuation which offsets the depreciation-generated export development. He notes that international trade is based on interpersonal relationships and on long-term relationships between countries; trade may not respond immediately to exchange-rate policy change. Therefore, the exchange rate of the previous year plays an important role in increasing



exports. He concludes that, a good understanding of economic and business environment of trading partners policies are needed to improve export earnings of Bangladesh.

Were et al., (2002) carried out a study on Kenyan export performance. They attempted to examine factors that influence trends in Kenya Agricultural exports. These factors were categorized into price and production factors. The production or non-price factors generally included government intervention, costs of inputs and labor costs. They used fixed effects panel data estimator and concluded that the exchange rate has a profound effect on Kenyan Agricultural export performance and the potential for export supply response is evident. They stated that, while maintaining a stable exchange rate is important strategies that lead to a relatively overvalued exchange rate could be a disincentive to export performance, implying that flexibility in the exchange rate movements, in line with the fundamentals of the economy might be beneficial to Agricultural export performance.

Mwangi et al., (2014) examined the effects of exchange rate volatility on French beans exports. In this study, the values of exchange rate volatility of the Kenya shilling against the US dollar were computed using a generalized autoregressive conditional heteroscedasticity model. The results of co-integration analysis using vector autoregressive model indicated the presence of a long run equilibrium relationship between French beans exports and exchange rate volatility. The exchange rate volatility variable had negative long run effects on French beans exports. The responsiveness of French beans export demand in the EU market to exchange rate volatility was negative and elastic. This implied that an increase in the shilling exchange rate volatility leads to a more than proportionate decrease in demand for French beans exports from Kenya in the EU market. As the results indicated, a unit increase in exchange rate volatility in Kenya leads to a two-fold decrease in French beans exports to the European Union. The short-run dynamics of the French beans export demand model were estimated using a Vector Error Correction model and the coefficient on error correction term was found to be -0.77. The negative sign of this coefficient indicated that the direction of correction is towards the long-run equilibrium while the size indicated the speed of adjustment towards the long-run equilibrium. The results of this study indicate that exchange rate volatility is one of the variables that influence performance of French beans exports from Kenya to the European Union market with a negative and elastic short run

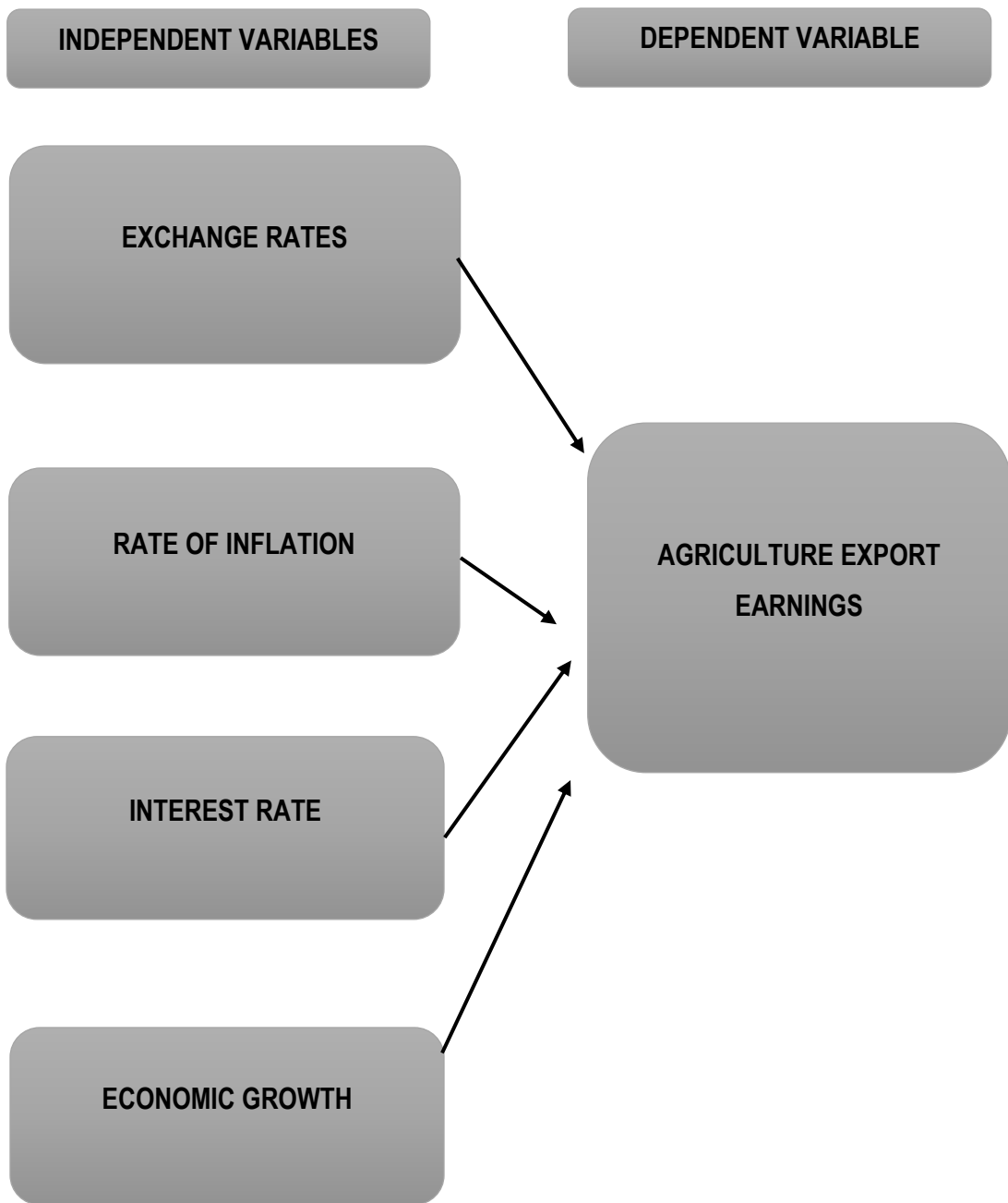
and long run relationship. They also conclude that there is interdependence between exchange rate stability, macroeconomic stability, institutional reforms and export performance.

Dawson (2005) conducted the study on how the economic growth contributed by the agricultural sector in developing countries and found the significant structural differences in economic growth between upper, middle and lower income countries. Sanjuan and Dawson (2010) in their study about the contribution of agricultural exports to economic growth in developing country, the study found the long run relationship where the agriculture export elasticity of gross domestic product was 0.07 and non-agriculture export elasticity of gross domestic product was 0.13. The study recommended that those countries classified as poor ones should adopt balanced export promotion policies and the rich class countries can gain stable economic growth from non-agricultural exports.

## **2.5 Conceptual Framework**

Conceptual framework of this study also explains relationship between independent variables and dependent variable. Independent variables in this study are exchange rates, rate of inflation, interest rate and economic growth on agriculture export earnings in Tanzania. Dependent variable of this study is agriculture export earnings.

**Figure 2.1: Conceptual Framework**



Source: Researcher, 2020

## 2.6 Research Gap

From the empirical studies conducted by different researchers on the agricultural sector came out with different conclusions. From the study conducted to analyse the relationship between the economic growth and agricultural resources in Nigeria by Olijie et al (2012). In this study the data was analysed by using ordinary least square regression and the results revealed that, there is a positive relationship between the agricultural output and the gross domestic product in Nigeria. The contribution of agricultural sector in variation of gross domestic product for the period of 1970 and 2010 in Nigeria is 34.4%. . Kingu (2014) in his study about determinants of Tanzania agricultural export; a case of cotton lint which error correction model was employed found that, earnings from exporting cotton lint mostly are determined by internal factors such as agricultural productivity and real exchange rate. It was also found that agricultural productivity and exchange rate are statistical significant and have positive contributions on the earnings from the cotton lint exports in Tanzania. Alagh (2011) conducted a study that examined macroeconomic factors linkage with agriculture in India. From the review of past study, Alagh investigated macroeconomic strategy factors especially money supply on agricultural prices, interest rate and government spending. It was found that, econometrically large view of policies effect agriculture import. Eyo (2008) conducted a study that examined the macroeconomic strategies impact on yield growth in Nigeria agriculture. Result of the study was the agricultural export was not stimulated by the exchange rate system. Michael, (2017) conducted the study about the relationship between economic growth and the agricultural sector by using co-intergration test, granger causality test and vector error correction model, the result revealed that, there is significant contribution and causality between variables. In the same line of study, in Peru the study carried out by Cisneros (2014) about the connection between the gross domestic products with agriculture sector and between agriculture sector with no traditional exports using the correlation method. The findings revealed a good relationship between the variables and impact in the economic growth found positive. Bakari (2017) did the study on the impact of vegetables exports on economic growth in Tunisia. This study investigated the vegetables exports impacts on economic growth in long run and short run. The study findings were exports of vegetables in Tunisia have a positive effect on economic growth in shot run and long run. Yifru (2015) conducted the study on the impacts of agricultural exports on economic growth in Ethiopia; the case of coffee, oilseed and pulse. In this

study Granger causality model, Error correction model and co-integration model were used to analyse the data and the result was, exports of coffee and oilseeds have positive and significant relationship with growth of economy, but the export of pulses is insignificant with negative effect on growth of economy. Furthermore, various studies conducted by different researchers on the effect of exchange rate fluctuations on export earnings, different conclusions have been made. While some researchers such as Rutto and Ondiek (2019) and Mwangi et al., (2014) posit a negative relationship between fluctuations in exchange rates and export earnings, others such as Fabiosa (2002) and Bristy (2013) conclude that the relationship between export earnings and exchange rate fluctuations are positive. Some studies however, conclude that the relationships established are statistically insignificant. The Economic Report of Africa (2010) shows that most countries with floating exchange rate regimes have performed poorly in the export sector, in terms of export earnings and volumes, especially those with a comparative advantage in the agriculture export sector. A wide range of factors have been identified from related studies as factors responsible for export earnings, most studies empirically tend to narrow these factors to price variables, indicating the difficulty of quantifying non-price variables or obtaining reliable and complete set of data (Alemayehu, 2001).

Prior studies on this area have mainly focused on the effect of exchange rate fluctuations and economic growth even though there are other factors apart from fluctuations of exchange rates and economic growth that hinder agriculture export earnings most of which are not correlated with either the floating or fixed rate regimes. Apart of exchange rate and economic growth, this study took into the consideration another two macroeconomic factors which are inflation rate and interest rate that altogether with exchange rate and economic growth were used to examine their effect on agricultural export earnings in Tanzania. This study covered earnings of agricultural exports as a specific sector in Tanzania and not focused on individual commodities export earnings like previous studies did.

## CHAPTER THREE

### RESEARCH METHODOLOGY

#### **3.1 Introduction**

According to Babbie, (2002) research methodology refers to the procedural plan that is embraced by the researcher to accurately, objectively, economically and validly answer the questions of the research. It is a detailed explanation of the techniques and processes that were used while collecting, processing and analyzing data. This chapter spells out the approach to be employed in the conduct of the research. It seeks to systematically find out the results from the research under study so as to answer the research questions and to achieve the objectives set in the research.

#### **3.2 Research Design**

Kothari (2003); defines research design as the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to research purpose with economy in procedure. This study employed non-experimental research design. The research design employed in this study enables one to investigate the relationship of one variable and another by employing several statistical techniques.

#### **3.3 Research Approach**

The selection of an approach to be employed in any research normally rest on the nature of the question under consideration and objectives of the research itself (Best & Khan 1993). There are two basic approaches to research, namely, quantitative approach (involving the generation of data in a quantitative form) and qualitative research (involving the subjective assessment of attitude, opinions and behavior) (Kothari, 2003). Quantitative research approach was adopted in this study since the results obtained will be generalized to the entire population.

#### **3.4 Variables selection and their measurements**

Under this area, the variables are explained in detail together with how to measure them. The variables are categorized into two parts, these are dependent variable and the other one is independent variable.

**Table 3.1 Variables Descriptions**

<b>Variable Name</b>	<b>Variable Measurements</b>
Agricultural export earnings	Measured as annual percentage of total workforce unemployed in a country
Economic growth	Measured as annual percentage growth of the economy
Exchange rate	Official exchange rate period average TZS/USD
Inflation rate	Consumer Price Index
Interest rate	Measured as annual percentage growth lending rate

Source: Researcher (2020)

In this study the researcher considered four macroeconomic variables which are exchange rates, inflation rates, economic growth and interest rate. All together were selected and examined to see their effects on agricultural export earnings because are the important factors and play meaningful role in determination of the agricultural export earnings in most of the developing countries. These variables were selected because they have huge impact on the development of the developing countries like Tanzania which mostly its growth depend on the export earnings especial agricultural outputs. The study employed economic growth because growth of export earnings is affected by the domestic factors, while on the other side export earnings growth is affected by the external factors, therefore the study employed real exchange rate, inflation rate and interest rate. Also the study employed the mentioned above variables because of the availability of data from the reliable sources.

### **3.6 Data Collection**

The study employed secondary data that will be gathered from Bank of Tanzania, and NBS for the period of ten years (1990-2019), the data gave a whole-some understanding of the stated objective. Agriculture export earnings statistics data will be obtained from Ministry of Agriculture and livestock Tanzania; Data on exchange rate fluctuations was obtained from the BOT for a period of thirty years (1990-2019). Inflation rates and the foreign direct investments as a

percentage of the GDP were obtained from NBS. Therefore, the study has a total sample size of 30 years period of investigation.

### 3.7 Data Analysis Techniques

The data collected was analysed using STATA software for the entire period. The researcher employed Ordinary Least Square method (OLS) to investigate the relationship among the variables. OLS is considered to be efficiency linear regression estimator when all its assumptions hold. Therefore the researcher tested for the specifications by conducting post estimation test to make sure the results adhere to classical linear regression assumptions.

#### 3.7.1 Model Specification

Following econometric estimation technique, the following model was specified

$$AGR_t = \alpha + \beta_1 EXCH_t + \beta_2 ECOG_t + \beta_3 INFL_3 + \beta_4 INTR_t + \varepsilon_t$$

Where:

AGR= Agriculture export earnings

EXCH= Exchange rate

INFL = Inflation rate

ECOG= Economic growth

INTR = Interest Rate as lending interest rate

$\varepsilon$  = Error term      t = time factor (1, 2,.....n)

$\beta_1, \beta_2, \dots, \beta_n$  = estimated parameters in a model.

### 3.8 Ethical Considerations

The data used in this research were considered to be public information where anyone can have an access to it. However, there is no manipulation encountered in analysing the data. The researcher utilized the data as provided by the relevant source. Above all no plagiarism and



fabrication of data was encountered. Everything used in preparing this work were given proper acknowledgment.

### **3.7 Validity and Reliability Test**

A very important section in econometric modelling after estimation is testing for the validity and the reliability of the estimated results. For this case the researcher performed test for major econometric problems, this include test for multicollinearity, heteroscedasticity and autocorrelation. However, to ensure the consistency of the estimated parameters, the researcher performed parameters stability test using CUSUM and also model specification test were observed

## CHAPTER FOUR

### PRESENTATION AND DISCUSSION OF FINDINGS

#### 4.1 Introduction

This chapter presents findings from analyzed secondary data. Inferential statistics and model results are presented. This chapter also includes results interpretation and summary of the findings. Researcher examined the influence of macroeconomics variables to agriculture export earnings of Tanzania through using the selected factor that were believed to determine agriculture export earnings.

#### 4.2 Descriptive statistics

The results in Table 4.1 below depict the descriptive statistics of the variables from the data collected from 1990 to 2019.

**Table 4.1 Descriptive Statistics**

Variable	Obs	Mean	Std. Dev.	Min	Max
AGREX	30	3.39952	0.2354705	3.146111	3.802764
EXCH	30	6.862286	0.672315	5.273307	7.735525
ECOG	30	0.889	1.779853	-6.74	3.69
INFL	30	5.466667	2.09257	0.6	8.5
INTER	30	12.34907	9.590461	3.412729	35.82677

The findings from the summary statistics for all variables incorporated in the study revealed that, agricultural export earnings stood at the average of 339.952% annually for the entire period of 1990 to 2019 with the minimum and maximum value of 3.146 and 3.802 respectively. Exchange rate during 1990-2019 stands at the average of 686.228%, whereas the mean of economic growth stand at 88.9% per annum. The findings further indicate that, inflation and interest rate stand at the average of 546.66% and 123.349% respectively for the entire study period with the minimum and maximum value of 0.6, 8.5 and 3.41, 35.82 respectively. For this case, it is clearly seen that in

mean of the variables are very close to each other and their standard deviation revealed that, there is no much diffusion of the variables from their means.

### 4.3 Correlation Analysis

The researcher explores the pairwise correlation analysis in order to measure the strength of the association between the variables. Table 4.2 below shows the correlation between the study variables under the period 1990-2019.

**Table 4.2 Pairwise Correlation**

Variable	AGREX	EXCH	ECOG	INFL	INTER
AGREX	1.0000				
EXCH	-0.5745	1.0000			
ECOG	-0.5067	0.4184	1.0000		
INFL	0.6387	-0.6722	-0.5062	1.0000	
INTER	0.5686	-0.1986	-0.1443	0.5370	1.0000

The findings show that there is strong relationship between dependent variable and independent variables as shown in the first row. Exchange rate and economic growth are negatively correlated with the correlation coefficient of -57.45% and -50.67% respectively. However, inflation rate and interest rate have a correlation coefficient of 63.87% and 56.86% respectively for the period under consideration. Furthermore, the findings revealed that there is no strong association among regressors. This provides evidence that there is no problem of multicollinearity, where the rule of thumb is to suspect the problem when the correlation coefficient is 75% and above.

### 4.4 Regression Analysis

The researcher employed the multiple linear regression analysis to measure the effect that one independent variable has on the dependent variable. The technique was utilized to test the hypothesis enumerated in chapter one so as to provide clear clarifications to the study objectives. Table 4.3 below provide the results obtained from the regression analysis. The value of F-statistics revealed in the model is 22.99 with the probability value of 0.0000 provide sufficient evidence that the overall model is statistically significance at 5 per cent level.

**Table 4.3 Regression Summary**

AGREX	Coef.	Std. Err.	t	P>t
EXCH	-0.023080	0.058984	-0.39	0.669
ECOG	0.031322	0.0145485	-2.15	0.041
INFL	0.0159675	0.004128	3.87	0.001
INTER	0.0312415	0.0126722	-2.47	0.021
_Cons	3.55972	0.4303496	8.27	0.000
F-statistic = 22.99				
Prob> F = 0.0000				
R-Squared = 0.7862				

*Source: Author's computation*

The coefficient of determination which provides the predictive power of the model is 78.62%. This findings means that about 78.62% percent of the variation in agriculture export earnings is influenced by exchange rate, inflation, economic growth and interest rate while the remaining percent 21.38% is not explained in the model, meaning explained by other variables not included in the model. The findings validate that the predictive power of the model is high and therefore suggests that policy may be developed based on this relationship if we are to develop and achieve the desired level of agriculture export earnings.

Furthermore, the findings from the regression summary shows that all explanatory variables are statistically significant in influencing agricultural export earnings in Tanzania at 5 per cent level of significant except for exchange rate over the study period. This is because the coefficient for all variables has the p-value which is less than 0.05 level of significant except for exchange rate whose p-value is greater compared to the desired level of significant.

#### **4.4.1 Exchange rate and Agricultural Export Earnings**

The findings from the study show that there is insignificant relationship between exchange rate and Agriculture export earnings, and also the negative relationship between them revealed. The exchange rate has a P- value of 0.669 which is insignificant at 5% level and the coefficient is - 0.023080. Even though, exchange rate is insignificant in this study when considering agriculture

export earnings in Tanzania, but it is an important factor for the growth of the developing countries like Tanzania.

#### **4.4.2 Inflation and Agricultural Export Earnings**

The findings from the study show that there is a positive relationship between inflation rate and agricultural export earnings. The positive relationship among the two variables is supported by the theory. The findings shows that a unit increases in inflation rate will leads to 0.015967 increases in agricultural export earnings holding other factor constant. The coefficient of the variable is statistically significant at 5 per cent level, this is because it has the probability value of 0.001 which is less than 0.05 level of significant.

#### **4.4.3 Economic Growth and Agricultural Export Earnings**

The findings in this study revealed that there is a significant positive relationship between economic growth and agricultural export earnings in Tanzania. A unit increase in economic growth will lead to 0.031322 increases in agricultural export earnings over the period under consideration holding other factor constant. The obtained results have contradicted with the theory, where a positive sign was expected. However, the coefficient has the p-value of 0.041 which is less than 5 per cent level of significant. This validates the fact that the parameter is significant.

#### **4.4.4 Interest Rate Agricultural Export Earnings**

Furthermore, the findings suggested the existence of the positive and significant relationship between interest rate and agricultural export earnings. A unit increase in interest rate will leads to 0.03124 increases in agricultural export earnings, holding other factor constant. The coefficient have the probability value of 0.021 which is less than 5 per cent level of significant, hence this validate the findings that the parameter is statistically significant.

#### **4.5 Diagnostic Checking**

Before validating the estimated results in Table 4.3, it is very important to perform post estimation analysis to make sure that the obtained regression does not violate the classical linear regression assumptions. This involves the test for heteroscedasticity, multicollinearity and autocorrelation for econometric problems, model specification bias performed by link-test and parameters stability test performed by recursive CUSUM.

#### 4.5.1 Test for Heteroscedasticity

The researchers also check for the existence of econometric problem (heteroscedasticity) in a model. The Breusch Pagan test was applied to test the following hypothesis;

Ho: residue have constant variance/homoscedastic

H1: residue have no constant variance/heteroscedastic

The results for the test is in Table 4.4 below;

**Table 4.4 Test for Heteroscedasticity**

Breusch-Pagan/ Cook Weisberg Test for Heteroscedasticity	
Ho: Constant Variance	
Chi2 (1) =	1.83
Prob> Chi2 =	0.1758

*Source: Authors Computation 4*

Based on the results of the test, the p-value is 0.1758; (17.58%) which is greater than 5% level of significant, therefore we fail to reject the null hypothesis and declare that residues have constant variance (residue are homoscedastic).

#### 4.5.2 Test for Autocorrelation

The researcher also tested for serial correlation to examine whether there is serial correlation among variables or not. The Durbin Watson test was used to make investigation under the following hypothesis;

H0: Residual are not serial correlated

H1: Residuals are serial correlated or autocorrelation

#### Decision Criteria

Decision criteria on the above hypothesis the results from Durbin Watson test is that accept the null hypothesis when P value is more than 5% and reject the null hypothesis when p-value is less than 5% significant level. The findings are presented in Table 4.5 below.

**Table 4.5 Test for Autocorrelation**

Durbin's alternative test for autocorrelation

Lags (p)	chi2	df	Prob> chi2
1	2.383	1	0.1227

Based on the results shows that the probability value (p-Value) is 12.27% more than 5% significant level and therefore we cannot reject the null hypothesis and we conclude that there is no serial correlation.

#### 4.5.3 Test for Multicollinearity

The multicollinearity was tested by using Variance inflation factor (VIF) to make sure that there is no correlation between one independent variable and the other. The existence of collinearity between regressors violate the classical assumption of the linear regression hence makes difficult to interpret partial coefficient in the regression model. That means it will be difficult to interpret one variable while holding the other constant. The results for the test is shown in Table 4.6 below.

**Table 4.6 Test for Multicollinearity**

VARIABLES	VIF	1/VIF
INFLATION	2.37	0.421695
EXCHANGE RATE	2.37	0.422472
ECONOMIC GROWTH	2	0.499611
INTEREST RATE	1.13	0.883891
Mean VIF	1.97	

The findings reveled that, there is no problem of multicollinearity since the VIF are less than 10.

#### 4.5.4 Test for Normality Assumption

The researcher also looked at the model whether the residual is normal distributed or not. In order to perform for diagnostic checking the researcher created another new variable namely U-variable as a new variable in the work sheet under the following hypothesis;

H0: Residual is normally distributed

H1: Residual is not normally distributed

### Decision Criteria

Decision criteria on the above hypothesis and the results from Shapiro Wilk test for normal data is that to accept the null hypothesis when P value is more than 5% and reject the null hypothesis when p-value is less than 5% significant level.

**Table 4.6 Test for Normality Assumption**

Shapiro- Wilk W Test for Normal Data					
Variable	Obs	W	V	n	Prob> n
U	30	0.93702	2.002	1.435	0.07563

**Source:** Field Data, 2020

Based on the above hypothesis results from Shapiro Wilk W test for normal data shows that the probability is 7.563% which is more than 5% and therefore we cannot the reject the null hypothesis and the researcher conclude that the residual are normally distributed.

### 4.5.4 Test for Model Specification Bias

The model specification test was conducted using link test. The test is used to investigate whether the regression model is well specified and there is no additional independent variable to be significant above that level. The test at the specific kind of specification error named link-error where within the dependent variable need to be transformed (linked) to accurately relate to independent variable(s). The decision based on this test, is that the p-value for hat-square (hatsq) need to be insignificant to accept that there is no miss-specification bias committed in the model.

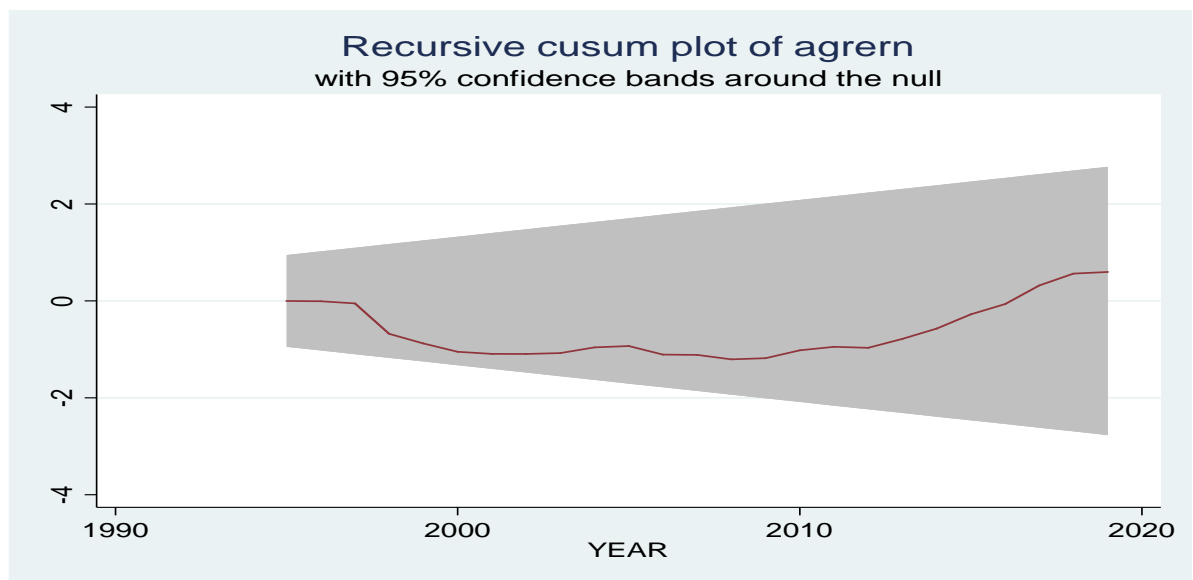
The result for the test shown in Appendix 08, the hatsq is probability value is 88.9% which is greater than 5% level of significant. Hence we conclude that the model is well specified with no omitted variables.



#### 4.5.5 Model Stability Test

Further test was conducted to test whether the estimated coefficient in a regression model are stable (consistency) over time or not. To do that the recursive CUSUM plot was used to investigate whether the parameters in the regression are stable overtime. The results in Figure 4.1 show that the parameters in the regression model are stable. This is because the red line under the plot doesn't the upper and lower bound at 5 per cent level of significance.

**Figure 4.1 Model Stability Results**



#### 4.6 Discussion of Findings

This study established that there was a significant relationship between inflation, economic growth and interest rate. Table 4.1 shows the results of the correlations from which the exchange rate had a correlation coefficient of -57.45% to Agriculture Export Earnings. This is because when the exchange rate is overvalued, the farmer exporter receives less in local currency for exported products than would be otherwise hence encouraged to smuggle his products crops to a neighboring countries. Inflation had coefficient of correlation of 63.87%; Economic growth had coefficient of -50.67 while interest rate had a correlation coefficient of 56.86%. The correlation coefficient matrix further reveals strong relationships between Agriculture Export Earnings Versus Inflation and interest rate while exchange rate and economic growth had negative effect on

Agriculture Export earnings. The findings inconsistent with Batten and Belongia (1984), Arize, Osang and Slottje (2000) and Cameron et al., (2005) who did their study on the fluctuations of exchange rates on earnings of Agricultural products and found out that domestic currency weakens with the strengthening of exchange rates leading to low export earnings.

The results value of  $R^2$  found to be 78.62% means that exchange rate, inflation, economic growth and interest rate account for 78.62% of the changes in Agriculture Export Earnings in Tanzania at 95% confidence level. An increase in exports help to achieve greater capacity utilization, permits the exploitation of economies of scale, generates incentives for technological improvement and brings efficient growth due to comparative advantage (Edwards, 2015).

From the research findings and based on the magnitude of the beta coefficients, the interest rate is the greatest predictor of Tanzania's Agriculture Export Earnings followed by economic growth, inflation and lastly exchange rate. The interest rate is therefore a major determinant of Agriculture Export Earnings in Tanzania. The results indicate that holding other things constant, a unit increase in the interest rate would lead to a 0.03124 unit increase in Agriculture export earnings in Tanzania. Looking at the study as a whole, the findings were statistically significant since the significance values of the coefficients were found to be close to 0.021 and less than 0.05. This is an indication that the error rate on making conclusions using the model derived from the findings was low and therefore the recommendations from these findings reflect the true picture of the effects of the independent variables on Agriculture Export Earnings in Tanzania. However, Tanzania government has to ensure measures to help improve agricultural exports are in place. The government should provide various agricultural incentives including an increase in the producer prices of various export crops and subsidizing major inputs to make them affordable to farmers as well as providing credit facilities through agricultural financial institutions. Also, the government should put up agricultural research centers in an effort to come up with high quality seeds and variety of crops which are high yielding.

The findings of this study are consistent with those of Fabiosa (2002), Otieno and Mudaki (2011) and Bristy (2013) who concluded that the macroeconomic variables are important determinants of countries agriculture export earnings. It is important to note that, an economy becomes more open when the share of tradable goods relative to non-tradable goods.

## CHAPTER FIVE

### SUMMARY, CONCLUSION AND RECOMMENDATIONS

#### 5.1 Introduction

This chapter summarizes the study and makes conclusions based on the results of the study. Policy recommendations, Critical Evaluation of the study and recommendations for further research are also presented. This section also presents the findings from the study in comparison to what other scholars have concluded as noted under literature review.

#### 5.2 Summary of the Findings

The objective of this study was to examine the effect of exchange rate, inflation rate, interest rate and economic growth on Agriculture Export Earnings in Tanzania. An agriculture export earnings was set as dependent variable while the independent variables were, exchange rate, inflation, economic growth and interest rate. The correlation analysis was used to analyze the linearity between the independent variables and Agriculture export earnings. The research findings indicate that there is insignificant relationship between exchange rate and Agriculture export earnings over the study period. The correlation between inflation and Agriculture export earnings stood at (0.6387); the relationship between economic growth and Agriculture export earnings was 50.67%.

Also, the table above portrays further the relationship between Interest rate and Agriculture export earnings system which stand at 56.86%. The results value of  $R^2$  is 78.62% which is significant level to explain about our model. This means that variation in agriculture export earnings can be influenced by exchange rate, inflation, economic growth and interest rate about 78.62%. Based on the diagnostic test which were carried to make sure that the regression model does not violate the classical linear regression assumptions, the results of normal distribution of the error from Shapiro Wilk W test for normal data shows that the probability is 7.563% which is more than 5% and therefore we cannot reject the null hypothesis and the researcher conclude that the residual is normally distributed. The model does not suffer from heteroscedasticity, multicollinearity and autocorrelation.

### **5.3 Conclusion**

This study examined the effects of exchange rate, inflation rate, interest rate and economic growth on Agriculture export earnings in Tanzania using secondary data from 1990 to 2019. The study concluded that there is insignificant relationship between exchange rate and Agriculture export earnings. The study concluded that inflation in the country has a positive and significant influence on Agriculture export earnings. Furthermore, the findings show that economic growth positively influences Agriculture export earnings. Moreover, the study concluded that interest rate is significant and positively influences Agriculture export earnings system which means effective monetary targeting and accommodating monetary policies should be designed and implemented as the needs arise. This is in line with the need for the government to ensure price stability, as this help to reduce the pressure on the general price level. A stable and predictable inflation rate in an economy would stimulate exports by encouraging local production. This consequently adds to exportable products, which can generate some foreign currency, that will beef up the supply side of foreign exchange market and hence assist the economy to grow.

### **5.4 Policy Recommendations**

Under Vision 2030, Tanzania should have been transformed into an industrialized middle income country with a middle income economy and it should be able to provide quality life to all farmers. If this is to be realized, there is need for the government to encourage and boost agriculture exports in order to boost the country's export earnings. The government needs to establish special economic zones in partnership with private investors to support increased agriculture exports and competition and this will definitely lead to export diversification and hence increased export earnings. There is need for the government to ensure economic stability by dealing with the any acts that may indulge the economy worsening in the country. Macroeconomic stability in Tanzania is the key to the success of the country's development and improved agriculture export performance and growth.

### **5.5 Critical Evaluation of the Study**

This study has been successfully and timely completed regardless of the limitations faced by the researcher. The research outcome was able to reveal that that variation in agriculture export earnings can be influenced by exchange rate, inflation, economic growth and interest rate by

78.62%. If the researcher had to do this research again, would concentrate on the factors which accounted to 21.38% to investigate the relationship with respect to agricultural export earnings.

### **5.6 Recommendations for Improvements**

From the study above, the following recommendations are made for consideration;

Macroeconomic stability in Tanzania is the key to the success of the country's development and improved agriculture export performance and growth. Therefore the government should use its fiscal and monetary policy to maintain the level of interest and inflation in a country since they have great influence to agricultural export earnings.

The government needs to boost further economic growth, using fiscal and monetary policy tools to maintain the level of inflation and interest rate so as to archive a significant increase in agricultural export earnings.

The adoption of East African Country common currency should be implemented because it will provide much help in mitigation of exchange rate negativity.

There is also need to boost supply in the agriculture sector through incentives and subsidies that will lead to lower cost of production. The EAC common market protocol allows for free movement of capital and labor, goods and services and this contributes positively to increased trade and Tanzania appears to be one of the biggest beneficiaries of this act in the region.

### **5.7 Recommendations for Further Research**

This study recommends a further in-depth study on the effect of other determinants of Agriculture export earnings in Tanzania or in East Africa. A similar study should be conducted over a longer period of time for example 40 years to investigate the long run relationship existing between Agriculture export earnings and other macroeconomic variables.

This study was carried out on the Agriculture industry in Tanzania; further research could be carried out on other economic sectors of the country and even the broader East African region to establish the effect of exchange rate fluctuations on export earnings from the different sectors under study and across the east African region.

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## APPENDICES

### APPENDIX 01: DESCRIPTIVE STATISTICS

Variable	Obs	Mean	Std. Dev.	Min	Max
agrern	30	3.39952	.2354704	3.146111	3.802764
exch	30	6.862286	.672315	5.273307	7.735525
landingint~e	30	.889	1.779853	-6.74	3.69
ecogrwdp	30	5.466667	2.09257	.6	8.5
inflation	30	12.34907	9.590461	3.412729	35.82677

### APPENDIX 02: CORRELATION ANALYSIS

	argear~s	exchan~e	inflat~n	ecogr w	intres~e
argearnings	1.0000				
exchangerate	-0.5745	1.0000			
inflation	0.6387	-0.6722	1.0000		
ecogr w	-0.5067	0.4184	-0.5062	1.0000	
intrestate	0.5686	-0.1986	0.5370	-0.1443	1.0000

### APPENDIX 03: HETEROSCEDASTICITY TEST RESULTS

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of agrern

chi2(1) = 1.83

Prob > chi2 = 0.1758

## APPENDIX 04: AUTOCORRELATION TEST RESULTS

Durbin's alternative test for autocorrelation

lags (p)	chi2	df	Prob > chi2
1	2.383	1	0.1227

H0: no serial correlation

## APPENDIX 05: MULTICOLINEARITY TEST RESULTS

```
. estat vif
```

Variable	VIF	1/VIF
inflation	2.37	0.421695
rer	2.37	0.422472
ecogrwdp	2.00	0.499611
landingint~e	1.13	0.883891
Mean VIF	1.97	

## APPENDIX 06: NORMALITY TEST RESULTS

```
. swilk U
```

Shapiro-Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z
U	30	0.93702	2.002	1.435	0.07563

```
.
```

## APPENDIX 08: LINK-TEST RESULTS

. linktest

Source	SS	df	MS	Number of obs	=	30
Model	1.26609475	2	.633047375	F(2, 27)	=	50.00
Residual	.341848828	27	.012661068	Prob > F	=	0.0000
				R-squared	=	0.7874
				Adj R-squared	=	0.7717
Total	1.60794358	29	.05544633	Root MSE	=	.11252

agrern	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
_hat	.4511962	3.898613	0.12	0.909	-7.548096	8.450489
_hatsq	.0785435	.5577768	0.14	0.889	-1.06592	1.223007
_cons	.9546485	6.787987	0.14	0.889	-12.97315	14.88245

## APPENDIX 09: DATA USED

YEAR	ARG-EARNINGS %	RER	Inflation	Ecogr (GDP)	Landing Intrest Rate
1990	42.0469	195.06	35.82677	7	1.12
1991	43.8552	219.16	28.69565	2.1	1.33
1992	44.7049	297.71	21.84685	0.6	1.03
1993	44.8249	405.27	25.27726	1.2	1.78
1994	41.5849	509.63	34.08336	1.6	1.2
1995	43.6504	574.76	27.42779	3.6	1.73
1996	44.0136	579.98	20.97726	4.5	1.26
1997	42.6019	612.12	16.09065	3.5	0.97
1998	26.5491	664.67	12.79975	3.7	1.45
1999	26.4323	744.76	7.890433	4.8	1.61
2000	26.2083	800.41	5.923961	4.9	0.88
2001	25.8003	876.41	5.147468	6	0.75
2002	25.1631	966.58	5.317834	7.2	0.57
2003	24.9107	1038.42	5.303566	6.9	0.95
2004	25.697	1089.33	4.735801	7.8	0.88
2005	24.6488	1128.93	5.03457	7.4	1.15
2006	23.6693	1251.9	7.250973	4.7	0.77
2007	23.2455	1245.04	7.025514	8.5	0.77
2008	24.7655	1196.31	10.27839	5.6	0.64
2009	26.0352	1320.31	12.14223	5.4	0.99
2010	25.5824	1395.63	6.200156	6.4	0.68



2011	24.9769	1557.43	12.69097	7.9	2.11
2012	26.5509	1571.7	16.00109	5.1	2.18
2013	26.7909	1597.56	7.870724	6.8	2.79
2014	25.8026	1653.23	6.131614	6.7	1.26
2015	26.7459	1991.39	5.587837	6.2	1.28
2016	27.4441	2177.09	5.04406	6.9	3.69
2017	28.7421	2228.86	4.500283	6.8	0.64
2018	30.0401	2263.78	3.956506	7	-3.05
2019	31.3381	2288.21	3.412729	7.2	-6.74