

FACULTY OF COMMERCE

DEPARTMENT OF ECONOMICS

THE EFFECT OF GOVERNMENT AGRICULTURAL EXPENDITURE ON

AGRICULTURAL OUTPUT IN ZIMBABWE from (1990 to 2022).

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# DEDICATION

This dissertation is dedicated to my family especially my mother, father, brother, sister and wife for their unwavering support throughout my studies

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# Abstract

# Government agricultural expenditure is important for the success of agricultural sector leading to economic growth and development. There is a global increase in recognizing the importance of public financing on agriculture in terms of supporting economic growth and development . The primary purpose of this study was to assess the contribution of government agricultural expenditure on agricultural output in Zimbabwe. Specifically, the study investigated the impact of public financing on agriculture's contribution to agricultural GDP. The study focused on the classical and the modern theories mainly the Neoclassical Growth Theory, Transmission Mechanism Of Fiscal Policy, Agriculture Development Theory, Keynesian theories, Agricultural-led industrialization theory, Dual Economy Theory , the public expenditure theory and Endogenous Growth Theory. This study adopted an explanatory correlational study design since it helped the researcher to comprehend and describe how government agricultural expenditure drives economic growth through expansion in agricultural output . In this study all agriculture sector received funding from the government through budget allocated to agriculture denominations namely crop production, fisheries, forestry and and animal farming constituted the population since 1990. The agriculture sector was selected due to its importance in Zimbabwe achieving the economic pillar of Vision 2030. The data gathered was presented and analysed in a way that enabled statistical inferences to be made. Statistical methods of presentation such as descriptive statistic tables ,ARDL model, correlations and multiple linear regression model were used to help in achieving meaningful interpretation. Tests were performed on sample data to ensure that required conditions were met before regression modelling. The model was fitted using EViews 10 statistical data analysis package. In a correlational study, the researcher examined whether and to what degree a statistical relationship exists between agricultural expenditure on agricultural output . This study employed Autoregressive Destributed Lag to ascertain the statistical relationship between agriculture sector financing and agricultural productivity . To evaluate the appropriateness and validity of the model the study analysed the properties of the statistical distribution of the residuals generated by the fitted model to check for autocorrelation, heteroscedasticity and normality. The overall significance of the model was also evaluated by inspecting the model’s coefficient of determination (R-squared) and the probability value for the F-statistic. The research findings suggested that government expenditure on agriculture has a positive impact on agricultural output both in the short run and in the long run. Therefore an increase in GEA is associated with a corresponding increase in AGOUT as a 1% increase in GEA in the long run results in a 0.332957 increase in AGOUT and also 0.190369 increase in the short run.Therefore policymakers should consider increasing government investment and expenditure in the agricultural sector, as this can have a positive multiplier effect on agricultural output, as suggested by the Keynesian theory. Targeted and efficient allocation of agricultural expenditure like incentives to farmers, providing fertilizers and also programes like command agriculture and pfumvudza showed be invested more on as they can help boost productivity, modernize farming techniques, and improve access to inputs and infrastructure.

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# Acronyms

# WB World Bank

# FAO Food and Agriculture Organization

# GDP Gross Domestic Product

# ARDL Autoregressive Distributed Lag

# AGOUT Agriculture Output

# CA Consumption of Agricultural Output

# FIV Food Import Value

# GAE Government Agriculture Expenditure

# AGWORK Agricultural Workers

# CPI Consumer Price Index

# ECT Error Correction Term

# ZAIP Zimbabwe Agricultural Investment Plan

## CLRM Classical Regression Model

## ADF Augmented Dickey Fuller

## VIF Variance Inflation Factor

# CHAPTER 1

# Introduction

## 1 Introduction

Agricultural output refers to the total quantity and value of agricultural products generated within a specific time period, typically measured in terms of crop yields, livestock production, or other agricultural commodities (World Bank, 2013). It represents the tangible results of agricultural activities, including the production of crops, livestock, fisheries, and forestry products.

According to Smith et al. (2019), government agricultural expenditure has a significant positive impact on agricultural productivity in developing countries.Agriculture serves as a vital sector in Zimbabwe, supporting the livelihoods of a large portion of the population and contributing substantially to the nation's economy (Chikozho et al., 2020). The sector encompasses various activities, including crop production, livestock farming, and agribusiness. Historically, Zimbabwe has been known as the "breadbasket of Africa," with its fertile land and favorable climate for agricultural production (Moyo, 2018).The government plays a crucial role in supporting the agriculture sector through various programs, including budget allocations for agriculture expenditure. However, the effectiveness of government spending on agriculture towards stimulating agricultural output in Zimbabwe has been a subject of debate and scrutiny. This chapter will go through the study’s history, statement of the problem, objectives, research questions and hypotheses. The subsections will explore the study’s relevance and limitations.

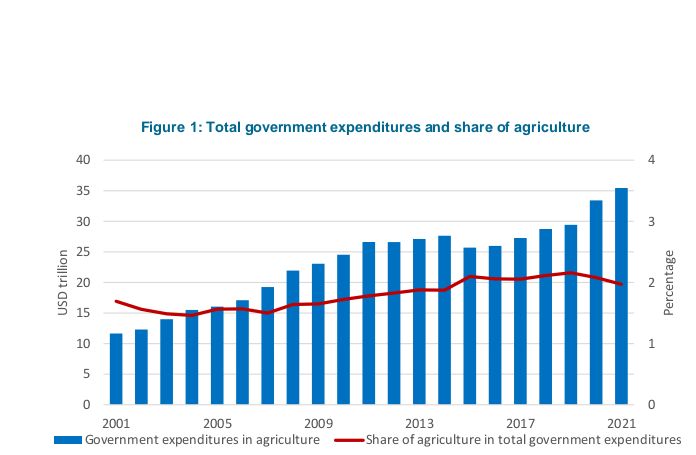
## 1.1 Background

One of the foremost direct and productive ways to advance financial development and kill starvation and destitution on the landmass is through government venture within the horticulture division (Bahta et al., 2014; Mwabutwa & Pauw, 2017). Government investing on agribusiness from 2001 to 2021:

Worldwide and Territorial Patterns, FAO (2022). Add up to government investing expanded between 2001 and 2021, coming to an all-time tall of USD 35 trillion in 2021 (Figure 1), basically as a result of the Covid-19 widespread reaction and the generally expansive monetary jolt bundles that different countries received.

All through the period, government use spoken to between 35 and 40 percent of the worldwide residential item (GDP). Whereas government utilized a blend of approach and financial measures to pad the impacts of the widespread (IMF, 2021), the by and large share of agribusiness investing fell in most nations, with other division getting the next share of consumptions compared to farming.

**Figure 1Total government expenditures and share of agriculture**



Source: FAO. 2022. FAOSTAT

The agribusiness segment is as it were one of the consumption categories among different capacities of government. Between 2001 and 2021, government spend 1.5 to 2.2 percent of their add up to uses in agribusiness whereas the segment contributed 3.1 to 4.5 percent of the worldwide GDP amid the same period. Two major occasions that moved the patterns of horticulture division investing are the 2007-2008 nourishment costs emergencies and the covid-19 widespread. Between 2005 and 2007 the share of farming investing declined to 1.5 percent; it moved forward amid the cost emergencies from 1.64 percent in 2008 to as tall as 2.10 percent in 2015. The nourishment cost emergencies watched amid this period empowered nations to spend more on agribusiness pointed at supporting little makers to extend farming generation (FAO, 2009). Government uses on horticulture remained above 2 percent of the full until the covid-19 widespread hit coming about in coming about in agribusiness investing pulled back to 1.97 in 2021. Especially, government consumptions expanded by more than 250 percent from USD 197 billion in 2001 to nearly USD 700 billion in 2021. Measured in terms of commitment of horticulture to GDP, the 2001 and 2021 investing is generally proportionate to 18 percent and 19 percent of the agribusiness esteem included, separately.

Concurring to Edeh et al. (2020), government investing may be a component utilized to boost financial development through divisions like horticulture in Nigeria. Nwer et al. (2021) said that there are components that impact generation within the agrarian segment. Government investing on agribusiness is recognized as one of the essential sources of financing for the segment (FAO 2022). But government investing can moreover be incapable, which brings down the esteem of generation in businesses like agribusiness (Moreno-Dodson 2008). Besides, an wealth of government investing might dishearten private venture.

Agreeing to (FAO 2021), Asia distributed 5.35 percent of its government consumption to farming, driven by China whereas this assignment was 2.3 percent for Africa and 0.6 for Americas, 0, 64 percent for Europe, and 0, 65 percent for Oceania. Concurring to Aaron O'Neil, (2014) the share of horticulture to net residential item was 7.19 percent. In spite of all these financial challenges, farming remains the foundation of Zimbabwe economy, contributing around 17-20 yearly GDP (FAO, 2019; Maiyaki, 2010). This makes horticulture division exceptionally vital in spite of in not as it were work era, and diminishment of destitution and nourishment frailty but generally financial development.

## 1.2 Problem statement

After *Third Chimurenga,* Zimbabwe’s national crop production has been affected badly (WorldBank, 2007). Most land beneficiaries are failing to feed themselves (Richardson, 2005). According to Zimbabwe Vulnerability Assessment Committee (ZimVAC) Report (2009), the number of households’ consuming three meals a day declined from 54% in 2006 to 23% in 2009. Public expenditure on agriculture is vulnerable to challenges such as inadequate funding, misallocation of funds, lack of transparency and accountability, lack of infrastructure and policy inconsistencies. Addressing these challenges requires a concerted effort from the government, stakeholders, and development partners to improve the effectiveness of public expenditure on agriculture in Zimbabwe. This dissertation aims to investment the relationship between government agricultural expenditure and agricultural output in Zimbabwe.

## 1.3 Research Objectives

1. To examine the short run and long run relationship between government agricultural expenditure and agricultural output in Zimbabwe.

2. To assess the effectiveness of public investment policies in stimulating agricultural productivity.

3. To analyse the patterns and trends in government agricultural expenditure and agricultural output in Zimbabwe.

4. To contribute to the understanding of the impact of financial resources allocated by the government on the performance of the agricultural sector in Zimbabwe.

## 1.4 Research Questions

1. What is the relationship between government agricultural expenditure and agricultural output in Zimbabwe?

2. How effective are public investment policies in stimulating agricultural productivity in Zimbabwe?

3. What are the patterns and trends in government agricultural expenditure in Zimbabwe?

4. What is the impact of financial resources allocated by the government on the performance of the agricultural sector in Zimbabwe?

5. What are the potential factors or mechanisms through which government agricultural expenditure influences agricultural output in Zimbabwe?

6.How do other contextual factors, such as climate, market conditions, and policy environment, interact with government agricultural expenditure to affect agricultural output in Zimbabwe?

7.What policy recommendations can be derived from the findings to enhance the effectiveness of government agricultural expenditure in Zimbabwe?

## 1.5 Research Hypothesis

**H**o: There is no relationship between government agricultural expenditure and agricultural output.

**H1**: There is a relationship between government agricultural spending and agricultural output.

## 1.6 Significance

The research study is important in identifying the need for government agricultural expenditure. This research will help readers in understanding and identifying the impact of public spending on agriculture on agricultural output inZimbabwe. The significance is summarized below**:**

### 1.6.1 To the researcher

Successful completion of this research is fulfilling part of the requirements of Bachelor of Science Honors Degree in Economics. This study is very important to the researcher. The study will aid the researcher to have deeper understanding on agriculture sector funding.

### 1.6.2 To Bindura University of Science Education

Successful completion of this study should give Zimbabwe higher learning institutions especially BUSE a platform for further research on the subject of public expenditure on agriculture in Zimbabwe given the sector is important in increasing agricultural output, creating employment contributing to GDP. This area of study should be of interest to policy makers and will serve as reference for student.

### 1.6.3 To the Zimbabwe economy

The study will help the Zimbabwe economy in making policies that enhances government spending on agriculture, having access to adequate finance and improving in transparency and accountability, funding allocations . Since agriculture sector is regarded as the backbone of Zimbabwe economy, it is important that policy makers pay attention to factors that affect government agricultural expenditure. This research is an addition to the knowledge of policy makers with its recommendations aimed at improving government spending on agriculture.

## 1.7 Assumption of the study

This study has the following assumptions:

* Data collected provides necessary information which is required to carry out the research.
* Government agricultural expenditure positively impacts agricultural productivity.
* There is efficient allocation of agricultural funds.
* The study assumes that is positive spillover effects.
* Policy coherence and implementation.
* The study assumes there is stable macro environment.
* Literature review gives a detailed explanation of the study

## 1.8 Scope

* This study focuses on the of government agricultural expenditure from 1990 to 2021.
* This study utilizes yearly data collected from government budget report, agriculture sector reports, economic indicators, academic journals international organizations (World Bank, IMF and FAO) and surveys and interviews.

### 1.8.1 Delimitations

* This study is centered on government expenditure on an agriculture as represented by the national budget of Zimbabwe.
* This study is confined to yearly time series data on government expenditures gathered over a period of 30days.

### 1.8.2Limitations

* Data that is important to carry out a research is considered by the ministry as sensitive
* The study timeframe may be limited to a specific period , which could affect the generalizability of the findings to different time periods or economic conditions
* Limited availability or reliability of data on government agriculture expenditure and economic indicators in Zimbabwe could impact the accuracy and robustness of the analysis.

## 1.9 Definition of terms

GOVERNMENT AGRICULTURAL EXPENDITURE :alludes to the sum of cash that a government designates towards supporting and contributing within the agribusiness segment. This consumption incorporates reserves designated for different agrarian programs, appropriations, investigate and improvement, expansion administrations, and other activities.

AGRICULTURAL OUTPUT :alludes to the full amount and esteem and agriculture products produced inside a particular time period, ordinarily measured in terms of edit yields, animals generation, or other rural commodities (World Bank, 2013). It speaks to the unmistakable comes about of agrarian exercises, counting the generation of crops, animals, fisheries, and ranger service items.

ECONOMIC GROWTH :It is the method where the country's genuine net household item increment than that of the past a long time (Learmer, 2014).

## 1.10 Chapter summer

This chapter provided a detailed explanation on the background, statement of problem, objectives, hypotheses and questions. The significance, delimitations, limitations and definition of terms were outlined.

# CHAPTER 2

# LITERATURE REVIEW

## 1 Introduction

This chapter centers on the writing which is pertinent to the consider. It takes after the hypothetical system and observational system. The method of reasoning of the consider is to examine the impact of government rural consumption on agrarian yield in Zimbabwe.

## 2.1 Theoretical Framework

## 2.2 Underlying theory

### 2.2.1 Neoclassical Growth Theory

The Neoclassical Growth Theory suggests that government agricultural expenditure can stimulate economic growth by increasing productivity and efficiency in the agricultural sector, leading to overall economic development (Barro, 1990). In the context of Zimbabwe, this theory implies that targeted government spending on agriculture can enhance the country's agricultural productivity, which in turn can contribute to economic growth. Under the New Classical Growth Theory, productivity improvements in agriculture can be achieved through various means, such as investment in research and development, human capital development, adoption of technology, infrastructure development, and property rights and market reforms (Mankiw, Romer, & Weil, 1992). These strategies focus on fostering innovation, improving efficiency, and enhancing the overall productivity of the agricultural sector to drive long-term economic growth.

According to Barro's neo-classical approach, investments in R&D can lead to technological advancements, increased productivity, and overall economic progress. For example, a study by Barro and Sala-i-Martin (1995) found that R&D spending has a positive impact on economic growth by enhancing the accumulation of knowledge and human capital. Additionally, Barro emphasizes the role of government policies in promoting R&D activities through incentives, funding, and regulatory frameworks that support innovation.

Human capital development is a critical component of economic growth and prosperity. Robert Barro's research emphasizes the significance of investing in education and skills development to enhance human capital. According to Barro's neo-classical growth theory, improvements in human capital through education and training can lead to higher productivity levels, innovation, and overall economic advancement. For instance, Barro and Lee (2013) highlight the positive relationship between education levels and economic growth, demonstrating that countries with higher levels of human capital tend to experience faster rates of economic development. In the context of agriculture, enhancing human capital through training programs for farmers and agricultural workers can lead to improvements in productivity, sustainability, and innovation in the sector. By investing in education and skills development for individuals involved in agriculture, governments can support rural development, increase food security, and drive economic growth.

Barro (1990) emphasizes the importance of infrastructure development in supporting economic growth by reducing transaction costs, improving connectivity, and facilitating trade and investment. In the context of agriculture, adequate infrastructure, such as roads, irrigation systems, and storage facilities, is essential for increasing productivity, reducing post-harvest losses, and connecting farmers to markets. By investing in agricultural infrastructure, governments can support rural development, improve food security, and boost the overall performance of the agricultural sector.

According to Barro (1990), the adoption of technology plays a crucial role in promoting economic growth and development. In the context of agriculture, the adoption of technology, such as precision farming techniques, digital tools, and biotechnologies, can help farmers increase yields, reduce production costs, and improve sustainability. By leveraging technology in agriculture, countries can enhance food security, promote environmental conservation, and boost the overall performance of the agricultural sector.

### 2.2.2 Transmission Mechanism Of Fiscal Policy

Fiscal policy, which refers to the use of government spending and taxation to influence the economy, can provide insights into the relationship between government agricultural expenditure and agricultural output in Zimbabwe. Fiscal policy measures can directly impact agricultural production and output through various policy views.Fiscal policy can involve the provision of subsidies to the agricultural sector, which can incentivize farmers to increase production and improve agricultural output. Subsidies on inputs such as seeds, fertilizers, and machinery can reduce production costs for farmers, making agriculture more profitable and encouraging higher levels of output (Fan et al., 2017).

Firstly, government subsidies are a fiscal policy tool used to provide financial support to the agricultural sector. Subsidies can take various forms, including direct payments, price supports, and input subsidies, and are aimed at reducing production costs, increasing farmers' incomes, and stimulating agricultural output. Government subsidies in agriculture can be targeted towards specific commodities, such as staple crops or livestock, or provided more broadly to support the overall agricultural sector. These subsidies are often designed to offset the risks and challenges faced by farmers, such as volatile market prices, natural disasters, or input cost fluctuations. The impacts of government subsidies on agricultural output can be significant. Subsidies can incentivize farmers to increase production by reducing their costs and improving profitability. By lowering the costs of inputs like seeds, fertilizers, and machinery, subsidies make it more financially viable for farmers to invest in their operations and expand their output (Fan et al., 2017).

Additionally, subsidies can contribute to increased agricultural productivity and output by promoting the adoption of modern technologies and best practices. For example, subsidies for improved seeds or irrigation systems can encourage farmers to adopt these technologies, leading to higher crop yields and overall agricultural output (Huang et al., 2018).

Secondly, fiscal policy can also include tax incentives aimed at promoting agricultural activities and investment. Tax breaks or exemptions for agricultural inputs, machinery, or income generated from agricultural activities can stimulate the sector and encourage farmers to expand production, leading to increased agricultural output (Rada, 2015).Tax incentives are a fiscal policy tool used by governments to stimulate agricultural activities and investment by providing favorable tax treatment to individuals or businesses engaged in the agricultural sector. These incentives aim to reduce the tax burden on agricultural operations and encourage increased agricultural output and productivity.Tax incentives in agriculture can take various forms, including exemptions, deductions, credits, or lower tax rates. They are designed to provide financial benefits to farmers, agribusinesses, and other stakeholders involved in agricultural production.By offering tax incentives, governments aim to create a supportive environment for agricultural development and investment. These incentives can have several positive effects on agricultural output.

Moreso, tax incentives can attract private investment in the agricultural sector by reducing the costs and risks associated with agricultural activities. Lower tax rates or accelerated depreciation allowances, for example, can incentivize farmers and agribusinesses to invest in modern machinery, equipment, and infrastructure, leading to increased agricultural output (Hailu & Veeman, 2013).Tax incentives can promote the adoption of new technologies and practices in agriculture. For instance, tax credits or deductions for investments in research and development (R&D) related to agriculture can encourage the development and implementation of innovative farming techniques, leading to improved productivity and increased agricultural output (Pardey et al., 2014). Tax incentives can be targeted to support smallholder farmers, who often face financial constraints and limited access to resources. By providing tax exemptions or deductions for certain inputs or income thresholds, governments can alleviate the tax burden on smallholders, increase their profitability, and encourage them to expand their agricultural output (Minten et al., 2013).

Government agricultural expenditure can be directed towards infrastructure development in the agricultural sector. Investing in rural roads, irrigation systems, and storage facilities can improve access to markets, reduce post-harvest losses, and enhance the efficiency of agricultural production, ultimately contributing to higher agricultural output (World Bank, 2019).

### 2.2.3 Agriculture Development Theory

Agricultural development theory encompasses various perspectives on the factors and strategies that contribute to agricultural growth and development. These theories provide insights into how government agricultural expenditure can promote agricultural output.

The Green Revolution theory emerged in the mid-20th century and emphasizes the role of technological advancements in increasing agricultural productivity. It suggests that government investment in research and development, along with the dissemination of improved seeds, fertilizers, and irrigation techniques, can significantly enhance agricultural output. The introduction of high-yielding crop varieties, combined with appropriate agronomic practices, can lead to increased yields and overall agricultural productivity (Evenson & Gollin, 2003). The Green Revolution in countries like India and Mexico serves as a notable example of how government support and investment in agricultural technology can drive agricultural development.

Secondly, sustainable agriculture theory focuses on the long-term viability of agricultural practices while considering environmental and social factors. It emphasizes the importance of balancing productivity with environmental conservation and social equity. Government agricultural expenditure aligned with sustainable agriculture theory might involve investments in practices such as organic farming, agroecology, and conservation agriculture. By promoting sustainable farming techniques and minimizing the use of harmful inputs, governments can enhance agricultural productivity, preserve natural resources, and support the resilience of farming communities (Pretty et al., 2011).

Finally, value chain development theory emphasizes the importance of integrating smallholder farmers into agricultural value chains to enhance their productivity and market access. Government agricultural expenditure can support value chain development by providing infrastructure, market information systems, and capacity-building programs for farmers and agribusinesses. By strengthening the linkages between farmers, processors, distributors, and consumers, governments can facilitate the flow of agricultural products, improve market opportunities, and increase agricultural output (Kaplinsky & Morris, 2001).

### 2.2.4 Keynesian Theory

Keynesian economics, named after the influential economist John Maynard Keynes, offers insights into the relationship between government agricultural expenditure and agricultural output in Zimbabwe. Keynesian theory emphasizes the role of government intervention in the economy to stimulate aggregate demand and address market failures.From a Keynesian perspective, government agricultural expenditure can play a crucial role in boosting agricultural output through various policy measures. Here are some policy views within Keynesian economics that relate to government agricultural expenditure:

Firstly Keynesians argue that increased government spending, including agricultural expenditure, can stimulate overall demand in the economy. By injecting funds into the agricultural sector, the government can create additional demand for agricultural products, leading to increased production and output (Blanchard, 2018).

Secondly, Keynesian economists advocate for countercyclical policies, whereby government expenditure is increased during economic downturns to offset a decline in private sector spending. In the context of agriculture, government agricultural expenditure can help stabilize the sector during periods of low agricultural output, ensuring continued production and supporting farmers' incomes (Aiyar et al., 2016).

Keynesians emphasize the importance of public investment in infrastructure, including rural infrastructure, as a means to stimulate economic growth. Government expenditure on agricultural infrastructure, such as irrigation systems, rural roads, and storage facilities, can enhance agricultural productivity, reduce post-harvest losses, and improve access to markets (World Bank, 2019).

Finally, Keynesian economics highlights the role of income redistribution in promoting economic stability and reducing inequality. Government agricultural expenditure can be directed towards supporting smallholder farmers, providing them with access to credit, subsidies, and technical assistance. This targeted support can help alleviate poverty, improve rural livelihoods, and enhance agricultural productivity (Deininger & Jin, 2018).

### 2.2.5Agricultural-led industrialization theory

Agricultural-led industrialization theory, also known as the "agricultural transformation hypothesis," posits that the development of the agricultural sector can serve as a catalyst for industrialization and economic growth in developing countries (Hayami & Ruttan, 1985). According to this theory, improvements in agricultural productivity, such as the adoption of modern farming techniques and technologies, can generate surpluses that fuel the growth of agro-processing industries and create linkages with other sectors of the economy (Hayami & Ruttan, 1985).The theory suggests that a vibrant and modernized agriculture sector can provide a solid foundation for industrial development by generating income, creating employment opportunities, and stimulating demand for goods and services (Hayami & Ruttan, 1985). By investing in agricultural research, infrastructure, and extension services, policymakers can enhance the productivity and competitiveness of the agriculture sector, leading to increased agricultural output and higher incomes for rural households. Furthermore, agricultural-led industrialization theory emphasizes the importance of integrating agriculture with industry through value chain development, agro-processing activities, and technology transfer (Hayami & Ruttan, 1985). By promoting linkages between agriculture and industry, countries can leverage the comparative advantages of both sectors to drive sustainable economic growth and structural transformation.

### 2.2.6 Dual Economy Theory

Dual economy theory can also be applied to explain the dynamics of the agriculture sector. According to Lewis (1954), the concept of a dual economy refers to the coexistence of a traditional, subsistence-based agricultural sector alongside a modern, industrialized sector in developing countries. In this context, agriculture often serves as the primary source of livelihood for a large segment of the population, particularly in rural areas, while the industrial sector provides opportunities for urban employment and economic growth (Lewis, 1954).The dual economy framework highlights the structural transformation that occurs as economies transition from agrarian-based to industrial-based systems. In many developing countries, the agriculture sector plays a crucial role as a supplier of raw materials and food, while the industrial sector contributes to higher productivity and technological advancement (Lewis, 1954).Moreover, dual economy theory underscores the importance of government intervention in promoting balanced development between the agriculture and industrial sectors. By investing in infrastructure, education, and technology transfer, policymakers can facilitate the transition from a predominantly agricultural economy to a more diversified and resilient economy that benefits both rural and urban populations (Lewis, 1954).

### 2.2.7The Public Expenditure Theory

The public expenditure theory examines the composition and efficiency of the government spending can impact economic growth (Devarajan, Swaroop, & Zou, 1996). This theory suggest that the allocation of public resources, including expenditures on the agricultural sector, can have significant implications for a country’s economic development (Devarajan et al., 1996).According to Musgrave (1959), public expenditure on agriculture can help correct market failures and provide public goods such as research and extension services, infrastructure development, and agricultural education. This can lead to increased productivity, efficiency, and competitiveness in the agriculture sector (Musgrave, 1959).Furthermore, public expenditure theory suggests that government spending in agriculture can also help address income inequality and poverty by supporting smallholder farmers and promoting rural development (Musgrave, 1959). By investing in agricultural subsidies, credit programs, and social safety nets, governments can improve the livelihoods of farmers and their families, leading to overall economic growth and social welfare (Musgrave, 1959).

### 2.2.8 Endogenous Growth Theory

Endogenous growth theory suggests that government agricultural expenditure can have a positive impact on economic growth by promoting technological innovation, productivity improvements, and overall efficiency in the agricultural sector. This theory posits that economic growth is driven by factors within the economic system, rather than exogenous factors (Romer, 1986; Lucas, 1988). According to the endogenous growth model, government investment in the agricultural sector can contribute to long-term economic growth through several channels. Government spending on agricultural research and development can foster innovation and technological advancements that boost agricultural productivity (Barro, 1990; Aghion and Howitt, 1992).

The theory put more emphases on the essence of human capital development. Investment in agricultural education, extension services, and training can improve the skills and knowledge of the rural workforce, enhancing their productivity and income earning potential (Lucas, 1998; Mankiw et al., 1992). The theory also explain the importance of infrastructure development and Institutional strengthening such as land tenure systems , credit markets and marketing boards, can address market failures and improve the overall efficiency of the agricultural sector (North, 1990; Acemoglu et al., 2001).

## Empirical Literature Review

The relationship between government agricultural expenditure and agricultural output has been a subject of interest in Zimbabwe. Several empirical studies have explored this relationship, shedding light on the potential impacts of government spending on the agricultural sector. This consider examined the affect of open rural consumption on rural yield in Nigeria for the period 1981 to 2014 with time arrangement information gotten from the Factual Bulletin and Yearly Reports of the Central Bank of Nigeria, 2014. The Expanded Dickey-Fuller test, Johansen Cointegration test, Mistake Redress Strategy (ECM) and Granger Causality test were utilized as explanatory apparatuses within the course of the consider. Rural yield was clarified by open rural consumption, commercial bank advances to the agrarian division and intrigued rates. The Johansen Cointegration test uncovered that there exists a long-run relationship between agrarian yield, open rural consumption, commercial bank advances to the rural division and intrigued rates in Nigeria. The comes about of the miserly ECM demonstrate appeared that public agricultural consumption incorporates a critical negative affect on rural yield whereas commercial bank advances to the agrarian division and intrigued rate have inconsequential positive impacts on rural yield in Nigeria. The esteem of the coefficient of determination (R2) of 0.630677 appeared that the exogenous factors within the ECM condition viz; open agrarian consumption, commercial bank credits to the rural division and intrigued rate clarifies over 63% of the precise varieties in agrarian yield. The mistake adjustment term was exceedingly critical at the 5% level with the fitting negative sign, demonstrating that the alteration is within the right course to reestablish the long-run relationship. The ponder concluded that the negative affect of open agricultural expenditure on agrarian yield may have brought about due to disparities that existed between the sum distributed to the agrarian division and the sum really spent on the division within the nation. We hence prescribed that checking organizations be set up by the government government to guarantee that the sum apportioned to the rural segment is really and reasonably went through on thesector in Nigeria.

Public spending on agriculture has to be considered to have a great impact in agricultural output at national level. This information have been accepted I several studies, countries and institutions. Taking into account agricultural sector as the pillar of most African economies, this study examines the impact of government expenditure on agricultural productivity in South Africa using time series data from 1983 to 2016. It is indicated that there is a long run positive relationship between government expenditure on agriculture and agricultural productivity, and positive relationship is expected in the long run. The low and declining level of government agricultural expenditure in this sector in South Africa, therefore the wanted and expected productivity growth impact will only be noticed in the long run assuming ceteris paribus. Increasing

Diao et al. (2010) examined the impact of agricultural public investment on economic growth in Sub Saharan Africa and found that a 1% increase in agricultural spending led a 0, 15% increase in GDP growth. Similarly, Mogues et al. (2012) analysed the effects of different types of agricultural spending in Ethiopia and concluded that investment in agricultural research and development has the largest impact on economic growth. Benin et al. (2012) conducted a study across several African countries and reported that a 1% increase in government expenditure was associated with a 0, 05 to 0, 15 increase in agricultural GDP.

One study conducted by Nyoni and Moyo (2017) examined the effect of government agricultural expenditure on maize production in Zimbabwe. Nyoni and Moyo (2017) used a multiple regression model to test the relationship between government agricultural expenditure and agricultural output in Zimbabwe. They included variables such as government spending on agricultural programs, subsidies, and other relevant factors in their model. By employing the multiple regression analysis, they were able to examine the extent to which government agricultural expenditure influenced agricultural output in Zimbabwe, while controlling for other potential factors that could affect the relationship.Nyoni and Moyo (2017) found that for every 1% increase in government agricultural expenditure, maize production in Zimbabwe increased by an average of 2.5%. They analyzed data from 2005 to 2015 and concluded that government spending on agricultural programs and subsidies had a significant positive impact on maize output.They found a positive and significant relationship, suggesting that increased government spending on agriculture led to higher maize output.

Makombe and Mutasa (2019) used a panel data regression model to test the relationship between government agricultural expenditure and agricultural output in Zimbabwe. Panel data allows for the analysis of data over time and across different regions or units. By using this model, Makombe and Mutasa were able to control for both time-specific effects and regional variations, providing a more comprehensive understanding of the relationship between government agricultural expenditure and agricultural output in Zimbabwe. They concluded that such investments positively influenced agricultural output, particularly in areas with improved access to water resources. They found that areas with improved access to water resources experienced an average increase of 30% in agricultural output. Furthermore, for every additional $1 million invested in irrigation infrastructure, crop production increased by an average of 5%.

In contrast, a study by Sibanda et al. (2020) focused on the efficiency of government agricultural expenditure in Zimbabwe. They found that while increased spending had a positive effect on agricultural output, the impact was limited due to inefficiencies in resource allocation and implementation of agricultural policies.Sibanda et al. (2020) utilized a production function model to examine the relationship between government agricultural expenditure and agricultural output in Zimbabwe. The production function model is commonly used in agricultural economics to analyze the relationship between inputs (such as government spending) and outputs (such as agricultural production). By employing this model, Sibanda et al. were able to estimate the efficiency of government agricultural expenditure and its impact on agricultural output, considering factors such as labor, capital, and other input variables.They found that while increased spending had a positive effect on agricultural output, the impact was limited. Specifically, their analysis revealed that due to inefficiencies in resource allocation and policy implementation, only 40% of the allocated funds were effectively utilized, resulting in a suboptimal increase in agricultural output.

Gwebu and Chikwama (2018) employed a difference-in-differences (DID) model to test the relationship between government agricultural expenditure and agricultural output in Zimbabwe. The difference-in-differences model is a popular econometric technique used to estimate causal effects by comparing changes in outcomes before and after a treatment or intervention (in this case, government agricultural expenditure). Gwebu and Chikwama likely compared the changes in agricultural output between areas or groups that received government agricultural expenditure (treatment group) and those that did not (control group), allowing them to estimate the specific impact of the government spending on agricultural output. They found that targeted subsidies, such as fertilizer subsidies, had a significant positive impact on crop yields. Specifically, farmers who received fertilizer subsidies experienced an average increase of 20% in their crop yields compared to those who did not receive the subsidies.

Nyoni and Bonga (2017) utilized Cobb Douglas production function model to assess the effect of agricultural spending on agricultural output in Zimbabwe from 1980 to 2015. They reported a positive and statistically significant impact, where 1% increase in agricultural expenditure led to rise in agriculture output. In contrast, Mpofu (2013) employed a simultaneous equations model to analyse the relationship between agricultural spending and economic growth in Zimbabwe from 1980 to 2010. The study founded an insignificant impact of agricultural expenditure on GDP growth, suggesting that the effect may not as straight forward as the previous studies have indicated.

Similarly, Mazvimavi and Tmbe (2019) used an ordinary least squares regression and reported a positive and statistically significant effect of government agricultural expenditure on agricultural GDP in Zimbabwe. The authors argued that higher government spending on agriculture can boost productivity and contribute to overall economic growth.

A study by Chisango et al. (2019) examined the relationship between government agricultural expenditure, agricultural productivity, and economic growth in Zimbabwe. The study found that government spending on agriculture positively influenced agricultural productivity, which in turn contributed to economic growth. The results suggest that targeted investments in the agricultural sector can enhance productivity and drive economic development in Zimbabwe.

## 2.3 Research gap analyses

Several Studies focused on the relationship between government agricultural expenditure and economic growth in Zimbabwe. The existing literature tends to look at the overall impact of total government expenditure on agriculture. Mapuranga et al. (2018) found that government agricultural expenditure had a positive impact on economic growth in the short run, indicating that investments in the agriculture sector can stimulate economic activity and contribute to GDP growth. Similarly Diao et al. (2010) examined the impact of agricultural public investment on economic growth in Sub Saharan Africa and found that a 1% increase in agricultural spending led to a 0, 15 increase in GDP growth. However, the researcher emphasized that there is need for more disaggregated analysis to understand the differential effects of specific types of agriculture expenditure on economic growth. For instance capital expenditure on agricultural infrastructure (irrigation, storage facilities, roads as well as public expenditure on researches and subsidies.

## 2.4 Chapter summary

The chapter offered the study’s most fundamental theoretical basis. The chapter outlined the neoclassical growth model, agricultural-led industrialization theory, dual economy theory, the public expenditure theory and endogenous growth theory. The chapter went on to evaluate the empirical literature on government agricultural expenditure on economic growth before analyzing the research gap to identify variations across the studies.

# CHAPTER 3: RESEARCH AND METHODOLOGY

## 3.0 Introduction

For investigation and accomplishing the goals of this consider, this chapter gives an over see of the investigate method as well as the technique utilized to carry out the consider on the impacts of government rural use on rural yield in Zimbabwe . The chapter comprise of the demonstrate detail as well as the legitimization of the factors utilized within the ponder.

## 

## 3.1 Research Design

The study provides an empirical review of the role of government agricultural expenditure on agricultural output in Zimbabwe. A quantitative data approach which is acceptable in the econometrics field was used to collect the secondary data. The secondary data is used because of some of its benefits in conducting a study which include cost effectiveness, its availability at a large sample and most importantly historical analyses.

## 3.2 Theoretical Model

The neoclassical growth model, established by the works of Solow and Swan (1956), serves as the theoretical foundation for this study. This model posits that output growth is a function of the capital stock and labor, given the prevailing state of technology. According to the neoclassical growth theory, technology is a key factor that can be improved through investment in research, education, and training. The enhancement of technology is expected to lead to improvements in the capital stock and the quality of the labor force. Hence economic growth is driven by the accumulation of capital and the quality of the labor force, which can be augmented through technological advancements facilitated by investments in research, education, and training. The closed economy Solow model or production functions given as below;

**Q = A *f* (K, L)**

**(1)**

Where; Q is the output produced by the factors Labor (L), capital (K) and technology (A)

Assuming a Cobb-Douglas production function the equation 1 will be expressed as equation 2 below which consist of the elasticities of the variables ().

**Q = AKαL(1-α)**

**(2)**

The production function above allows for complete interchangeability between capital and labor in the production process i.e. any desired output level can be achieved by using any amount of capital, as long as the corresponding amount of labor is also employed. To make this model suitable for the current study, the researchers specify an agricultural output model that expresses agricultural output as a function of agricultural expenditure and other factors that drive growth in the agricultural sector and the equation 2 is therefore linearized as;

**LnY = lnA + lnK + lnL**

**(3)**

Where we Y, is the agricultural output (AGOUT), K = is the capital input to agriculture proxies by the government expenditure on agriculture (GEA), L= Labour force. Therefore the equation for agricultural sector output will be in the form below (eqation 4) where, Ut is the error term, 𝛽0 is the intercept and 𝛽1 - 𝛽2 the coefficients of the independent variables;

**lnAGOUTt = 𝛽0 + 𝛽1lntGEA + 𝛽5lnLAB + Ut**

**(4)**

## 3.3 Model Specification

In order to capture the effects of agricultural expenditure on agricultural output in Zimbabwe the study study modified equation 4 and come with a model that specifically explains the effect of agricultural expenditure in Zimbabwe, using a multiple regression model with agricultural output (AGOUT) as the dependent variable, government expenditure on agriculture, consumer price index, food import value, Consumption of agricultural output, and labour force as independent variables adapting the idea of the model by Ngobeni and Muchopa, (2022).

The functional form of the model is as follows;

**AGOUT = F (GEA, CA, FIV, CPI, LAB)**

**(5)**

Where; AGOUT = Agricultural output; GEA = Government expenditure on agriculture (proxy for capital invested to the agricultural sector); CA = Consumption of agricultural output; FIV = Food import value (proxy for net exports on agricultural output); CP = consumer price index; LAB = Labour force (proxy for labour).

The econometric model is then as follows;

**lnAGOUTt = 𝛽0 + 𝛽1lntGEA+ 𝛽2InCAt + 𝛽3lnFIV𝑡 + 𝛽4lnCPI𝑡 + 𝛽5lnLAB𝑡 + U𝑡**

**(6)**

Equation 6 is then transformed into an ARDL model which was used in this model and the specified econometric model which was used in this model is as follows;

**DlnAGOUT t = *α0* + *α1*DlnAGOUTt + *α2*DlnGEAt + *α3*CAt + *α4*InFIVt + *α5*lnCPIt  + *α6*lnLAB𝑡  + 𝛽1lntGEA+ 𝛽2InCAt + 𝛽3lnFIV𝑡 + 𝛽4lnCPI𝑡 + 𝛽5lnLAB𝑡 + ECMt-1 + U𝑡**

**(7)**

Where; P = it is the optimal lag length for each variable which probably differs with variables; Ut = Disturbance term or error term, ***α0*** = Intercept, β1 – β5 and ***α1*** - ***α2***= Coefficient of the independent variables and t is the time trend. = Error correction coefficient, = difference operator; The first part of equation 6 with the short run dynamics of the model whilst the second part with β1 – β5 represents the long run relationship.

## 3.4 Estimation Method

The study used the autoregressive distributed lag (ARDL) Bound testing procedure to examine the cointegration (long-run) relationship between the dependent variables and the explanatory variables, as well as the short-run dynamics. This method is preferred over the Engle-Granger and Johansen techniques for cointergration analysis (Pesaran, Shin & Smith, 2001). In this method, an F-test is used to test the hypothesis of no cointegration among the variables against the presence of cointegration. The F-test has a non-standard distribution, irrespective of whether the variables are I(0) or I(1). More over the ARDL approach is relatively straightforward to implement, as it involves the estimation of a standard OLS regression with lags of the dependent variable and the regressors. This makes it more accessible for researchers, especially those with limited econometric expertise.

Pesaran et al. (2001) proposed two sets of adjusted critical values that provide the lower and upper bounds used for inference. If the computed F-statistic falls above the upper bound critical value, the null of no cointegration is rejected. If it falls below the lower bound, the null cannot be rejected. If it falls between the lower and upper bound, the result would be inconclusive, and the estimation could proceed as long as the variables are I(0) and I(1) (Ilyas, Hafiz, Afzal & Tahir, 2010). After determining the existence of cointegration, the autoregressive distributed lagged model is used to estimate the regression coefficients.

## 3.5 Justification of Variables

### 3.5.1 Agricultural Output (lnAGOUT)

According to the World Bank, agricultural output refers to the quantity of agricultural goods and services produced by a country or region. It is typically measured in terms of crop yields, livestock production, and other agricultural products (World Bank, 2020). The data from the World Bank shows that the contribution of the agricultural sector to Zimbabwe's Gross Domestic Product (GDP) has varied over time. The sector's share of GDP was around 20% in the early 1980s but declined to less than 10% by the early 2000s. However, it has since remained relatively stable at around 10-15%. The researcher used the "Agriculture, forestry and fishing, value added (% of GDP)" variable in Zimbabwe to measure the agricultural sector's contribution to GDP. This variable measures the net output of the sector after adding up all outputs and subtracting intermediate inputs.

### 3.5.2 Government Expenditure on Agriculture (lnGEA)

Government agricultural expenditure refers to the financial resources allocated by the government towards supporting and maintaining the agricultural sector (Rude & Ker, 2013). This research used fertilizer consumption (kilograms per hectare of arable land) as the measure for government expenditure on agriculture according (World Bank, 2023) fertilizer consumption measures the quantity of plant nutrients used per unit of arable land. Fertilizers include nitrogenous, phosphate, and potash fertilizers (including ground rock phosphate). Government policies and investments in the agricultural sector often aim to increase agricultural productivity and output, one of the key ways to achieve this is by promoting the use of fertilizers through some sought of incentives or support programs to farmers hence GEA is a proxy to measure the capital invested to agricultural sector. The data was collected is from World Bank world development indicators.

Higher fertilizer consumption, especially when compared to historical trends or peer countries, may indicate increased government focus and spending on agriculture development. According to the Keynesian theory GEA is expected to have a positive impact to agricultural output and also as it save as a proxy for capital to agriculture the neoclassical theory also suggests a positive sign. Matthew and Mordecai, (2016) however found a negative effect that’s contradicting with the expected sign from the theory as well as the results obtained by Ngobeni and Muchopa, (2022) on their study who obtained a positive relationship.

### 3.5.3 Consumption of Agricultural Output (lnCA)

Consumption of agricultural output refers to the use of agricultural products and commodities for various purposes, primarily human consumption, animal feed, and industrial applications (FAO, 2022). As indicated by the main aspects of agricultural output consumption this study employed the Agricultural land (% of land area) from the World Bank development indicators as the proxy to measure consumption of agricultural output. Agricultural land refers to the share of land area that is arable, under permanent crops, and under permanent pastures (World Bank, 2022). The consumption of agricultural output is a crucial aspect of the agricultural sector, as it directly impacts food security, the livestock industry, and various industrial sectors. Understanding the patterns and trends in agricultural output consumption is essential for policymakers, researchers, and stakeholders to make informed decisions and ensure sustainable development in the agricultural and food systems i.e. AGOUT. From the Keynes theory CA should portrays a positive impact on AGOUT and Matthew and Mordecai, (2016) used the variable and find out the anticipated positive relationship.

### 3.5.4 Food Import Value (lnFIV)

World Bank, (2021) defined food import value as the monetary value of agricultural and food products that are imported into a country or region from other parts of the world. This is an important metric for understanding a country's food security and its reliance on international trade to meet its domestic food demand and therefore it was used as proxy to measure the net exports on agricultural output. The Food imports (% of merchandise imports) indicator was used as the measure of FIV, according to Keynes theory the net exports of commodities in this case (agricultural goods) is expected to have a positive relationship with overall output, hence the variable is also expected to have the same effect on agricultural output. FIV was employed in a study by Ngobeni and Muchopa, (2022) and they found that in the first year it had positive effects and a negative effects of FIV on AGOUT was found in the second year.

### 3.5.5 Consumer Price Index (lnCPI)

The Consumer Price Index (CPI) is a measure of the average change in the prices paid by consumers for a basket of consumer goods and services over time. It is a widely used indicator of inflation and the overall cost of living. According to the U.S. Bureau of Labor Statistics, the CPI is calculated by measuring the change in prices for a representative basket of goods and services that are typically purchased by households (BLS, 2023). The data to measure CPI was obtained from the International monetary Fund (IMF). As an indicator of inflation it is expected to have a negative or positive relationship to AGOUT depending on the level of inflationary environment. Ngobeni and Muchopa, (2022), Setshedi and Mosikari (2019) and Gou (2017) found a negative relationship between CPI and the agricultural sector output.

### 3.5.6 Labour Force (lnLAB)

The labor force, also known as the economically active population, refers to the total number of people who are employed or actively seeking employment within a given geographic area or economy (Emmanuel *et al,* 2020). According to (ILO, 2023) it is a key measure of the working-age population that is available and willing to contribute to the production of goods and services. In the context of Zimbabwe, the labor force is often used as a proxy for labour, as the agricultural sector in Zimbabwe is highly labor-intensive. This is because a significant portion of the Zimbabwean population is engaged in small-scale, subsistence-level farming, where labor is the primary input for agricultural production (FAO, 2022). The size and composition of the labor force in Zimbabwe can provide insights into the availability of labor resources for the agricultural sector, as well as the overall economic activity and employment trends in the country. According to the neoclassical theory labour force should cause a positive relationship to output, therefore the anticipated sign here is positive sign. A research by Emmanuel *et al,* (2020) found that LAB was negatively related to agricultural value added which is AGOUT in the first year but positive effect thereafter.

### 

## 3.6 Types of Data and sources

This research extracted data from the World Bank, Zimbabwe Agricultural Investment Plan (ZAIP), World Bank and Food and Agricultural Organization (FAO) and from the IMF. The data used in this research is a time series secondary data collected from year 1990 to 2022 a period which is experienced with different macroeconomic phases. The purpose of choosing this period was to empirically test the significance the agricultural sector public financing had within the period or the extent to which this financing contributed to the agricultural sector growth of Zimbabwe as against the previous studies. The study choose to study the agricultural sector because of its greater importance as a pillar strength to the achieving the objectives of CAAD. Also, there is sufficient evidence that the output brought by agricultural sector in Zimbabwe has significantly contributed to economic development. As a result, the study used the Agriculture, forestry and fishing, value added (% of GDP) this measure of agricultural GDP, shows the all contributions of forms of agriculture to agricultural GDP.

**Table 3.1 Data source and expected sign**

|  |  |  |  |
| --- | --- | --- | --- |
| Variables | Time Span | Expected Sign | Sources |
| lnAGOUT | 1990-2022 | N/A | World Bank |
| lnGAE | 1990-2022 | Positive | ZAIP & World Bank |
| lnCA | 1990-2022 | Negative | World Bank |
| lnFVI | 1990-2022 | Positive | World Bank |
| lnCPI | 1990-2022 | Positive/Negative | IMF |
| lnLAB | 1990-2022 | Positive | World Bank |

### 3.7.1 Unit Root Test

It is important to determine if the time series is stationary because time series data usually follow a particular trend and therefore the need to de-trend it otherwise spurious results will be obtained (Gujarati, 1995). Non-stationarity of time series data means that predictions based on them have little stability over time and therefore of little predictive value. If the series are non-stationary, standard econometric techniques can lead to misleading results. Prior to this study Augmented Dickey-Fuller (ADF) test was conducted at 1%, 5%, and 10% level of significance under the hypothesis that;

H0: There is no stationary (presence of the unit root problem).

H1: There is stationary (absence of unit root problem)

If the p-value under this test is less than 5% significance level we reject the null hypothesis and conclude that there is no unit root problem.

### 3.7.2 Optimal Lag Length Selection

### The choice of the suitable lag length is basic in autoregressive modeling since we need the blunder terms to be Gaussian (i.e., have a standard ordinary dispersion without issues like non-normality, autocorrelation, or heteroscedasticity) (Nkoro and Uko 2016). The ideal number of lags can be decided utilizing fitting demonstrate arrange determination criteria, such as the Akaike Data Measure (AIC), Schwartz Bayesian Model (SBC), or Hannan-Quinn Model (HQC). In this think about, the Akaike Data Basis (AIC) was utilized for slack length determination, and the choice run the show is to select the show with the most reduced AIC because it is the one that equalizations goodness of fit (Nkoro and Uko 2016).

### 3.7.3 Co integration Test

Granger and Newbold (1987) argued that if there is a long run relationship between two variables then no matter how much they fluctuate over time the difference between the two series must remain relatively constant. Since the variables of this case some are stationary at level and the others at first difference therefore the ARDL Long Run Form and Bounds Test was used to test for the long run relationship.

H0: Co-integration is absent

H1: Co-integration is present

If the computed F-statistic from the Bounds Test is greater than both the lower bound critical value for I(0) variables and the upper bound critical value for I(1) variables, then the null hypothesis of no cointegration is rejected. This means that there is evidence of a long-run cointegrating relationship among the variables. In other words, we can conclude that there is the presence of cointegration between the dependent variable and the explanatory variables.

## 3.8 Diagnostic tests

The Classical Straight relapse show (CLRM) presumptions agreeing to, Gujjarti (2004) recommend that all econometric demonstrate must have factors which a stationary, free from multicollinearity, auto-correlation as well as heteroscedasticity additionally, they ought to take after an ordinary dispersion and there must be presence of a long run relationship inside the factors. As a result, the in quire about conducted the demonstrative test to check for non-violation of those suspicion.

### 3.8.1 Multicolinearity Test

Gujarati, (2004) proposed that this issue happens when indicator factors are exceedingly connected, in basic way it implies there's straight relationship among illustrative factors. This research therefore conducted 2 test to check for multicollinierity which are the correlation matrix and the Variance Inflation Factor (VIF) typically since the relationship lattice as it were can capture a direct relationship between two factors as it were on the other hand the VIF captures on more than three factors. The test was conducted beneath the hypothesis that:

H0; Multicolinearity Present

H1; Multicolinearity Absent

The decision rule is that of the correlation coefficient on the correlation matrix are less than 0.8 we reject the null hypothesis and conclude that there is no multicolineraity on the model. Meanwhile on the VIF if the centred VIF are less than 10 we also reject the null hypothesis and conclude that there is no multicolineraity on the model.

### 3.8.2 Normality test

According to Hair *et al.* (2006) it is very crucial to check if the generated series follows a normal distribution, the Jarque-Bera test was conducted to check for normality under the hypothesis bellow;

HO: Data is normally distributed.

H1: Data does not follow a normal distribution

If the Jarque-Bera probability value is greater than 0.05 level of significance we fail to reject the null hypothesis and conclude that the data follows a normal distribution.

### 3.8.3 Heteroscedasticity test

It is a violation of the assumption of homoscedasticity which suggest that the variance of the error term should remain constant over time, thus according to Gujarrati, (2004). Among the several methods of detecting heteroscedasticity the research conducted the Breusch Pagan-Godfrey test under the following;

Ho: Heteroscedasticity is absent

H1: Heteroscedasticity present

We fail to reject the null hypothesis and conclude that there is homoscedasticity when the p-value test statistics are more than 0.05 significance level.

### 

### 3.8.4 Serial Correlation LM autocorelation Test

### If there is autocorrelation, or correlation between the residuals in the model, it suggests that the model is not perfectly specified or fitted to the data. This implies that the model may not be an accurate representation of the underlying relationships, and using it for policy-making decisions may not be appropriate. The presence of autocorrelation in the residuals indicates that the model is missing important variables or the functional form is not correctly specified. This can lead to biased and inefficient estimates of the model parameters, which in turn can result in inaccurate policy prescriptions.The Breusch - Godfrey Serial Correlation LM Test is used to test for the presence of serial correlation in the residuals of a regression model (Godfrey, 1978).

HO: There is no serial correlation in the residuals of the regression model

H1: There is serial correlation in the residuals of the regression model

If the p-value on the Serial Correlation LM is greater than 5% significance level we fail to reject the null hypothesis and conclude that there is no autocorrelation.

### 3.8.5 Model Stability test

The researcher plans to assess the stability of the model, as model stability is essential and useful for policy analysis and forecasting. If a model is unstable, its predictions may be unreliable, and its practical usefulness may be limited. To test the stability of the model, the researcher will employ the CUSUM of Squares test. The hypothesis underlying the CUSUM of Squares test is as follows:

H0: The model is stable (no structural change)

H1: The model is unstable (structural change has occurred)

If the CUSUM of Squares test statistic falls within the critical value bounds, the null hypothesis of model stability cannot be rejected, indicating that the model is stable. Conversely, if the CUSUM of Squares test statistic falls outside the critical value bounds, the null hypothesis is rejected, suggesting that the model is unstable and has experienced structural changes over the sample period.

## 3.9 Chapter Summary

This chapter provides a highlight of the research methodology that was used to study the effect of government agricultural expenditure on agricultural output in Zimbabwe. It provides information on the research design used, data sources, estimation method used as well as justification of the variables used in the model. The presentation and interpretation of all the conducted test are on the following chapter.

# CHAPTER 4 DATA PRESENTATION AND ANALYSES

## 4.0 Introduction

This chapter points discoveries from the preceding chapter within the impact of government rural consumption on agrarian yield in Zimbabwe. This chapter too centers on the show appraise and introduction of the show significance. E-views 10 was utilized to summarize and handle information.

**4.1 Descriptive Statistics**

This is where the raw data is converted to be in its simplest form, to make it clear for understanding the characteristics of each variable hence this part provides the measures of central tendency as well as the distribution shape and the presence of the outliers.

Table 1:Descriptive Statistics results

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | LAGOUT | LGEA | LCA | LFIV | LCPI | LLAB |
| Mean | -0.02262 | 3.51518 | 0.035513 | 2.475342 | 0.126737 | 0.019325 |
| Median | -0.05309 | 3.50255 | 0.005112 | 2.585266 | 0.01261 | 0.020089 |
| Maximum | 0.710384 | 4.020023 | 0.783426 | 3.164474 | 1.882833 | 0.062397 |
| Minimum | -0.69638 | 2.904165 | -0.44755 | 0.803869 | -1.29936 | 0.000857 |
| Std. Dev. | 0.255407 | 0.328641 | 0.232824 | 0.523147 | 0.574843 | 0.012609 |
| Skewness | 0.050527 | -0.01304 | 1.310123 | -1.21525 | 0.890472 | 1.016901 |
| Kurtosis | 4.964217 | 1.853414 | 6.238684 | 4.487088 | 5.2441 | 5.192261 |
| Jarque-Bera | 5.157812 | 1.753786 | 23.13968 | 10.82496 | 10.94366 | 11.92315 |
| Probability | 0.075857 | 0.416074 | 0.000009 | 0.004461 | 0.004204 | 0.002576 |
| Observations | 32 | 32 | 32 | 32 | 32 | 32 |

*Source : own computation E-views 10 appendix 2.1*

From the table 4.1 above the mean of the LAGOUT variable is -0.02262, indicating a relatively low average agricultural output whilst the standard deviation of 0.255407 suggests moderate dispersion in the LAGOUT values around the mean. The positive skewness of 0.050527 implies the distribution has a slightly longer right tail, with more observations above the mean. The Jarque-Bera test statistic of 5.157812, which is above the 0.1 p-value, suggests the LAGOUT variable is normally distributed. On the LGEA variable a mean of 3.51518, indicates a relatively high average government expenditure on agriculture. It has a standard deviation of 0.328641 which shows moderate variation in the data and the slightly negative skewness of -0.01304 implies a more symmetrical distribution, with a balance of observations above and below the mean. Jarque-Bera test statistic of 1.753786 is below 0.1, suggesting the LGEA variable is normally distributed.

The mean of the LCA variable is 0.035513, indicating a low average consumption of agricultural output and a standard deviation of 0.232824 suggests relatively low dispersion in the data. LFIV variable has a mean of 2.475342, indicating a relatively high average food import value (proxy for net exports on agricultural output). The standard deviation of 0.523147 shows moderate variation in the data. The negative skewness of -1.21525 suggests a longer left tail, with more observations below the mean and the variable is normally distributed. The LCPI variable has a mean of 0.126737, indicating a relatively low average consumer price index. The standard deviation of 0.574843 shows moderate variation in the data. The positive skewness of 0.890472 implies a longer right tail, with more observations above the mean. The Jarque-Bera test statistic of 10.94366 is above 0.1, so the LCPI variable is not normally distributed. The LLAB variable has a mean of 0.019325, indicating a relatively low average labor force in the agricultural sector. The standard deviation of 0.012609 suggests low dispersion in the data. The positive skewness of 1.016901 implies a longer right tail, with more observations above the mean. The Jarque-Bera test statistic of 11.92315 is above 0.1, so the LLAB variable is not normally distributed.

**4.2 Unit Root Test**

The results on the table below were obtained after performing an Argument-ed Dicky Fuller (ADF) test to check for stationarity of variables.

**Table 2****:ADF Results Summary**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variable | ADF test | Critical Value | P-value | Oder of integration |
| DLAGOUT | -6.92743 | 1% -3.66166  5% -2.96041  10% -2.61916 | 0.0000 | I(1) |
| LGEA | -2.31169 | 1% -3.65373  5% -2.95711  10% -2.61743 | 0.0146 | I(0) |
| DLCA | -6.56455 | 1% -3.66166  5% -2.96041  10% -2.61916 | 0.0000 | I(1) |
| LFIV | -3.83351 | 1% -3.65373  5% -2.95711  10% -2.61743 | 0.0064 | I(0) |
| DLCPI | -3.9425 | 1% -3.66166  5% -2.96041  10% -2.61916 | 0.005 | I(1) |
| DLLAB | -4.16787 | 1% -3.66166  5% -2.96041  10% -2.61916 | 0.0028 | I(1) |

*Source : own computation E-views 10 appendix 2.2*

The results from the ADF test statistics above shows that LGEA and LFIV are stationary at their level while on the other hand, LLAB, CPI, AGOUT and CA are stationery after first difference as indicate by their p-value which are less than 5% the level of significance. That is the results shows that the variables LGEA and LFIV are integrated of order zero I(0) and LLAB,CPI,AGOUT and CA are integrated of order one I(1) therefore there is no problem of unit root.

**4.3 Optimal Lag Selection**

**Table 3****:VAR Lag Order Selection Results**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Lag | LogL | LR | FPE | AIC | SC | HQ |
| 0 | 66.99731 | NA | 6.91E-10 | -4.06649 | -3.78625 | -3.97684 |
| 1 | 130.3029 | 97.06859\* | 1.18e-10\* | -5.886861\* | -3.925184\* | -5.259304\* |
| 2 | 161.2394 | 35.0614 | 2.26E-10 | -5.5493 | -1.90618 | -4.38383 |

*Source : own computation E-views 10 appendix 2.3*

After conducting the Vector Auto-regressive analysis the obtained results on the Akaike Information Criterion (AIC) which was used for lag length selection, the decision rule suggest to choose the Lag with the lowest AIC as it is the one that balances goodness of fit hence Lag 1 was selected for estimation on this model.

**4.4 ARDL Cointergration Test**

The ARDL Long run form and bound test was conducted to check for the existence of the long run relationship between variables and the following results were obtained.

**Table 4****:F-Bound test results Summary**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test Statistic | Value | Signif. Level | I(0) | I(1) |
| F-statistic | 13.82701 | 10% | 2.08 | 3 |
| k | 5 | 5% | 2.39 | 3.38 |
|  |  | 2.50% | 2.7 | 3.73 |
|  |  | 1% | 3.06 | 4.15 |

*Source : own computation E-views 10 appendix 2.4*

The F-Bound test results above shows that the computed F-Statistic is greater than the lower bound I(0) and the upper bound I(1) at all significance levels meaning that the null hypothesis is rejected and the conclusion is that there is a long run relationship among variables.

**4.5 Multicoliniarity Test**

Table 4.5 and 4.6 below shows the two test which were conducted for multicoliniarity test respectively the correlation matrix and the Variance Inflation Factor (VIF).

**Table 5****:Correlation Matrix Results**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | DLAGOUT | LGEA | DLCA | LFIV | DLCPI | DLLAB |
| DLAGOUT | 1.0000 |  |  |  |  |  |
| LGEA | 0.190612 | 1.0000 |  |  |  |  |
| DLCA | -0.28129 | -0.15992 | 1.0000 |  |  |  |
| LFIV | -0.07883 | -0.68499 | 0.07611 | 1.0000 |  |  |
| DLCPI | 0.008682 | -0.27442 | -0.10945 | 0.268381 | 1.0000 |  |
| DLLAB | -0.07558 | 0.344132 | -0.08079 | -0.48274 | 0.04648 | 1.0000 |

*Source : own computation E-views 10 appendix 2.5*

**Table 6****:Variance Inflation Factor (VIF) Results**

|  |  |
| --- | --- |
| Variable | Centred VIF |
| DLAGOUT(-1) | 1.69988 |
| LGEA | 3.537916 |
| LGEA(-1) | 3.839262 |
| LFIV | 2.99649 |
| LFIV(-1) | 2.298467 |
| DLCPI | 1.201765 |
| DLLAB | 3.340346 |
| DLLAB(-1) | 4.069633 |
| DLCA | 1.379037 |
| DLCA(-1) | 1.552376 |
| C | NA |

*Source : own computation E-views 10 appendix 2.6*

From the multicoliniarity tests above the correlation coefficients on the correlation matrix above are all less than 0.8 hence we fail to reject the null hypothesis and conclude that there is no multicoliniarity in the model. Also the VIF results confirms that there is no multicoliniarity in the model as the Centred VIF results are less than 10.

**4.6 Heteroscedasticity test**

**Table 7****:Breusch-Pagan test Results**

|  |  |  |  |
| --- | --- | --- | --- |
| F-statistic | 1.146168 | Prob. F(10,20) | 0.3791 |
| Obs\*R-squared | 11.29349 | Prob. Chi-Square(10) | 0.3351 |
| Scaled explained SS | 4.295233 | Prob. Chi-Square(10) | 0.933 |

*Source : own computation E-views 10 appendix 2.7*

The Breusch-Pagan tests results suggest the decision to fail to reject the null hypothesis and conclude the presence of homoscedasticity in the model as indicated by the probability values of the F-statistic and Obs\*R-squared which are less than 0.05 the level of significance.

**4.7 Autocorrelation test**

Besides the Breusch-Godfrey Serial Correlation LM Test autocorrelation can also be checked through the Durbin-Watson, but the table below shows that there is no autocorrelation in the model as the p-value of the F-statistic and Obs\*R-squared respectively are less than the level of significance (5%). The DW values both on the short run and the long run are closer to 2 thus confirming with the Serial Correlation LM Test.

**Table 8****:Breusch-Godfrey Serial Correlation LM Test**

|  |  |  |  |
| --- | --- | --- | --- |
| F-statistic | 0.226313 | Prob. F(2,18) | 0.7997 |
| Obs\*R-squared | 0.7604 | Prob. Chi-Square(2) | 0.6837 |

*Source : own computation E-views 10 appendix 2.8*

### 4.8 Normality Test

**Table 9****:Jarque-Bera Normality results**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Mean | Std. Dev. | Skewness | Kurtosis | Jarque-Bera | Probability |
| -1.70E-17 | 0.151982 | 0.480803 | 2.827478 | 1.232833 | 0.53987 |

*Source : own computation E-views 10 appendix 2.9*

The results shows that the data is normally distributed since the Jarque-Bera probability is greater than 0.05 with the value of 0.53987. This allowed the research to carry out other diagnostics test since the data is normally distributed.

**4.9 Model Specification**

**Table 10****:Ramsey Reset**

|  |  |  |  |
| --- | --- | --- | --- |
| t-statistic | 0.088794 | Probability | 0.9302 |
| F-statistic | 0.007884 | Probability | 0.9302 |

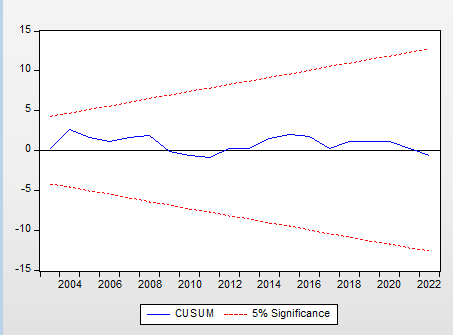
*Source : own computation E-views 10 appendix 2.10*

The probability values of both the t-statistic and F-statistic are less than 5% which is the level of significance hence meaning that the model is correctly specified.

**4.10 Parameter stability test**

Below is a cusum test which falls under the critical bounds or the significance levels hence we conclude that the model is structurally stable and good for policy implications.

**Figure 1Cusum test**

****

**4.12 ARDL Results**

Table 4.11 and 4.12 below shows the ARDL estimated results on the effects of government expenditure in agriculture to agricultural output in Zimbabwe from 1990-2022.

**Table 11****:ARDL Long run regression summary table**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| LGEA | 0.332957 | 0.174896 | 1.903746 | 0.0714 |
| DLCA | -0.65202 | 0.189308 | -3.44422 | 0.0026 |
| LFIV | 0.202979 | 0.138885 | 1.461488 | 0.1594 |
| DLCPI | 0.047424 | 0.045023 | 1.053312 | 0.3048 |
| DLLAB | -0.94645 | 2.63443 | -0.35926 | 0.7232 |
| C | -1.64484 | 0.931401 | -1.76598 | 0.0927 |

*Source : own computation E-views 10 appendix 3*

EC = DLAGOUT - (0.3330\*LGEA -0.6520\*DLCA + 0.2030\*LFIV + 0.0474 \*DLCPI -0.9465\*DLLAB -1.6448

**Table 4.12 ARDL Short run regression summary table**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| D(LGEA) | 0.190369 | 0.135251 | 1.407526 | 0.1746 |
| D(DLCA) | -0.61413 | 0.087352 | -7.03048 | 0.000 |
| D(LFIV) | -0.07905 | 0.059108 | -1.33744 | 0.1961 |
| D(DLLAB) | 9.267817 | 4.142351 | 2.237332 | 0.0368 |
| CointEq(-1)\* | -1.40839 | 0.125556 | -11.2172 | 0.0000 |

*Source : own computation E-views 10 appendix 4*

R-Squared = 0.86182

Adjusted R-Squared = 0.840562

Durban-Watson stat = 2.086124

F-Statistic = 3.82274

Prob(F-Statistic) = 0.005174

**4.13 Regression results interpretation**

The coefficient of each of the variables shows the magnitude and direction of each of the specified independent variable on the effects of government expenditure on agriculture on agricultural output. From the obtained r-squared on the short run or Error Correction Regression, it implies that 86% of the variation in AGOUT is explained by the specified variables D(LGEA), D(DLCA),D(LFIV) and D(DLLAB) whilst the remaining 24% is explained by the error term. Taking into consideration the degrees of freedom the adjusted R2  falls a little to 0.84 and this implies that the model has goodness of fit. In addition the F-Statistic ( 3.82274) is statically significant with a p-value of 0.005174 which is less than 0.05 level of significance therefore meaning that D(LGEA), D(DLCA),D(LFIV) and D(DLLAB) all together has a significant linear relationship with AGOUT or in other words the model is correctly specified. And the Durbin-Watson value as mentioned before shows that there is no autocorelation in the model as its value is closer to 2.

More over the coefficient of the error correction model (ECM) term is highly significant at 5% level with the appropriate negative sign, implying that the adjustment is in the right direction to restore long run relationship. The results suggest that the present value in AGOUT adjusts more rapidly to previous changes in D(LGEA), D(DLCA),D(LFIV) and D(DLLAB) by over 100%.

* **Government Expenditure on Agriculture (lnGEA)**

From the results findings it is shown that both in the short run and in the long run government expenditure has a positive impact on the agricultural output though the p-value of 0.0714 and 0.1746 for the long run and short run repetitively are greater than the 5% level of significance indicating that they are not statistically significant. The coefficients on GEA shows that both in the short run and in the long run increase in expenditure will results in increase in output, for example a 1% increase in GEA in the long run results in a 0.332957 increase in AGOUT. The obtained results confirms with the expected sign and to the Keynesian theory which suggests a multiplier effect of expenditure on agricultural output and it aligns with the Solow-Swan model expected sign of capital to output as it serves as the proxy to measure capital given invested in agriculture. Ngobeni & Muchopa, (2022), Emmanuel *et al,* (2020) and Iganiga & Unemhilin (2011) also found a positive effect supporting this research findings.

* **Consumption of Agricultural Output (lnCA)**

On the Consumption of agricultural output variable the obtained results suggest a stylistically negative results on AGOUT both in the short run and in the long-run as indicated by the negative coefficient and the respective p-values of 0.000 in short run and 0.0026 in the long run which are both less than 0.05 (level of significance). From the short run results a 1% increase in CA results in 0.61413 decrease in agricultural output and also it leads to a decline on AGOUT by 0.65202 in the long run. This result does not confirm with the expected sign and also it contradicts with the findings found by Matthew and Mordecai, (2016).

* **Food Import Value (lnFIV)**

The research findings suggested that in the long run food import value has a positive relationship with agricultural output, a 1% increase in FIV results in 0.202979 increase in AGOUT, however the effect is not statistically significant as the p-value on the coefficient is more than 5%. The results show a positive relationship between the value of food imports (lnFIV) and the value of agricultural production in the long run. This indicates that an increase in food imports leads to an increase in the value of agricultural production as the results confirms with findings by Ngobeni and Muchopa, (2022). However, these findings contradict the conclusions of a previous study by Sun et al. (2018), which found that food imports are detrimental to the agricultural land and ultimately agricultural production in the importing country.

While food imports can ensure food availability and allow for growth in the importing country, as noted by Porkka et al. (2017), this study found that in the short run, food imports have a negative relationship with the value of agricultural production. Specifically, a 1% increase in the value of food imports reduces the value of agricultural output by 0.07905. This is consistent with the findings of Iganiga and Unemhilin (2011) and also Ngobeni and Muchopa, (2022) , who agreed that food import value reduces the value of local agricultural production, meaning that importing food from other countries leads to a decline in domestic agricultural output.

* **Consumer Price Index (lnCPI)**

In the short run consumer price index has no effect on the agricultural output, meanwhile in the long run it shows a positive relationship of 0.047424 meaning that an increase in the CPI results in increase in agricultural output by the same magnitude. The impact is however not statistically significant that is, (p-value =0.3048) which is more than the level of significance. This result does not align with the expected sign as the Keynesian theory says inflationary environment results in declining output. The results conflict from the results by Ngobeni and Muchopa, (2022) who suggested that the inflation should always be controlled efficiently to avoid fluctuations in AGOUT.

* **Labour Force (lnLAB)**

The labour force has a positive and statistically significant impact on agricultural output in the short run, the p-value of 0.0368 is less than the level of significance. Assuming ceteris paribus a 1% increase in LAB result in a 9.267817 increase in agricultural output, hence confirms with the expected sign as well as the Solow model which says that labour plays an important role in the increase of output. However the findings contradicts with the results by Emmanuel *et al,* (2020) who obtained a negative relationship in the short run as they suggested that labour manifest in the AGOUT after harvest which usually takes time hence a positive significant effect was found in the long run. In this study, however LAB has a negative effect on the AGOUT in the long run as an increase in labour force results in 0.94645 decrease in agricultural output this could be because of 2 main reasons which are:

1. **Diminishing returns to labor:** In the short run, increasing the labor force can lead to higher agricultural output as more labor is available to work the land. However, in the long run, the law of diminishing returns may set in, where additional labor inputs yield smaller and smaller increases in output. This could lead to an overall negative relationship between labor force and agricultural output in the long run.

**2. Labor quality and skills:** The long-run relationship may be influenced by the quality and skills of the agricultural labor force. In Zimbabwe the labor force does not improve its skills and productivity over time, the positive short-run effects of adding more labor are now being offset by lower individual worker productivity in the long run.

**4.14 Conclusion**

In summary, this chapter explores the counter-intuitive findings that increased government agricultural expenditure is associated with a decrease in agricultural output in Zimbabwe, and emphasizes the need for a more nuanced understanding of the complex factors influencing agricultural performance beyond just the level of public funding. All important test to purify the data were conducted before estimation and it was seen that the variables where stationary and were free from econometrics problem thus in accordance to the CLRM assumptions. The following chapter provides the conclusion and policy recommendations as well as the suggestions for future study.

# CHAPTER 5: CONCLUSIONS AND POLICY RECOMMENDATIONS

# 5.0 Introduction

# This chapter summarizes research findings and conclusions regarding how government expenditure on agriculture affect the agricultural output. The chapter outlines the policy recommendations stemming from this research. Additionally, the chapter discusses the limitations of the study and provides suggestions for future research in this area.

## 

## 5.1 Summary of the study

## This particular study carried out an investigation on the effects of government expenditure on agriculture in relation with agricultural output, using time series secondary data from 1990 to 2022. The data source employed was obtained from different data source websites including the World Bank, Zimbabwe Agricultural Investment Plan (ZAIP), Food and Agricultural Organization (FAO) and from the IMF. Basing from the Solow-Swan model and adapting some variables from Ngobeni and Muchopa, (2022) an empirical model was built for the case of this study and agricultural output AGOUT, being the dependent variable. Therefor the ARDL model which was conducted in this research included Government expenditure on agriculture (GEA), (CA) Consumption of agricultural output, (FIV) Food import value, (CPI) consumer price index and (LAB) as the independent variables.

## All the necessary steps to utilize the ARDL model were conducted, the unit root test suggested that some variables were I(0) and some where I(1) which is necessary condition for the estimation method. The optimum lag was selected using the Akaike Information Criterion and Lag 1 was used, there was existence of cointergration in the model meaning a long run relationship among variables as indicated by the bound test, the test findings also shows the model was free from econometric problems and the residuals follows a normal distribution. The model is also correctly specified and structurally stable as indicated by the ramsey reset and the cusum tests.

## The research findings suggested that government expenditure on agriculture has a positive impact on agricultural output both in the short run and in the long run. Therefore an increase in GEA is associated with a corresponding increase in AGOUT as a 1% increase in GEA in the long run results in a 0.332957 increase in AGOUT and also 0.190369 increase in the short run. However the results were found not to be statistically significant meaning that even though GEA is important to increase AGOUT in Zimbabwe the relationship is not strong enough to support that. This could have been caused by the reason that the physical assets used for agriculture are probably depreciating faster meaning the productivity of the assets declines after a short period of time. Hence strong attention must be made on the maintenance of these assets.

## 5.2 Conclusions

Toanswer the question 1 on the research what is the relationship between government agricultural expenditure and agricultural output in Zimbabwe? The findings suggest that the government expenditure on agriculture has a positive relationship with agricultural output in Zimbabwe. In addition the findings on the error correction model showed that error coefficient term was negative and statistically significant, implying that the adjustment is in the right direction to restore long run relationship. Consumption of agricultural output (CA) portrayed a negative effect on AGOUT both in the short run and in the long run, food import value (FIV) had a negative effect on the short run but a positive relationship was obtained in the long run. More so Consumer price index had a negative effects on agricultural output and lastly labor force had a significant and positive effect on AGOUT in the short run in the long run it showed a negative sign due to diminishing returns to labor in the economy and also poor labour quality and skills. The estimation results also found that the model was a good fit and correctly specified making it suitable for policy making as shown by the r-squared and probability F-Statistic.

## 5.2 Policy Recommendations

Based on the results from the study on the effects of government expenditure on agriculture on agricultural output in Zimbabwe, the government should try to use following policy recommendations:

**1. Increase Government Expenditure on Agriculture:**

Although the impact of government expenditure on agriculture (GEA) was not statistically significant in both the short and long run, the results showed a positive relationship between GEA and agricultural output (AGOUT). Therefore policymakers should consider increasing government investment and expenditure in the agricultural sector, as this can have a positive multiplier effect on agricultural output, as suggested by the Keynesian theory. Targeted and efficient allocation of agricultural expenditure like incentives to farmers, providing fertilizers and also programes like command agriculture and pfumvudza showed be invested more on as they can help boost productivity, modernize farming techniques, and improve access to inputs and infrastructure.

**2. Manage Food Imports Strategically:**

The study found that food imports have a negative impact on agricultural output in the short run, but a positive impact in the long run, policies that strike a balance between ensuring food availability through imports and promoting domestic agricultural production should be implemented. Strategies such as tariffs, quotas, or other trade policies can be employed to protect the domestic agricultural sector while allowing for essential food imports. Also complementary policies that improve the competitiveness and productivity of the local agricultural sector should be implemented alongside trade policies for example promoting value addition as well as agro processing and developing agriculture infrastructure.

**3. Invest in Labor Productivity:**

A positive and significant impact of labor force (LAB) on agricultural output in the short run, but a negative impact in the long run was obtained from the study findings. This calls for focus on improving the quality and skills of the agricultural labor force through education, training, and access to modern farming techniques. Addressing the issue of diminishing returns to labor by enhancing labor productivity can help maintain a positive long-term relationship between the labor force and agricultural output.

**5. Promote Complementary Policies:**

The study highlighted the importance of various factors, such as government expenditure, food imports, labor force, and inflation, in influencing agricultural output. Policymakers should therefore adopt a holistic approach and implement a comprehensive set of policies that address these factors in a coordinated manner. Policies should be designed to create an enabling environment for the agricultural sector, including investments in infrastructure, access to credit, and technological advancements.

### 5.4 Recommendation for further study

This study considered government agricultural expenditure as one of the factors that influence agricultural output in Zimbabwe but however to get the whole picture of factors that influence agricultural output in Zimbabwe, further research needs to assess the impact of private agricultural expenditure on agricultural output in Zimbabwe.

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# LIST OF APPENDICES

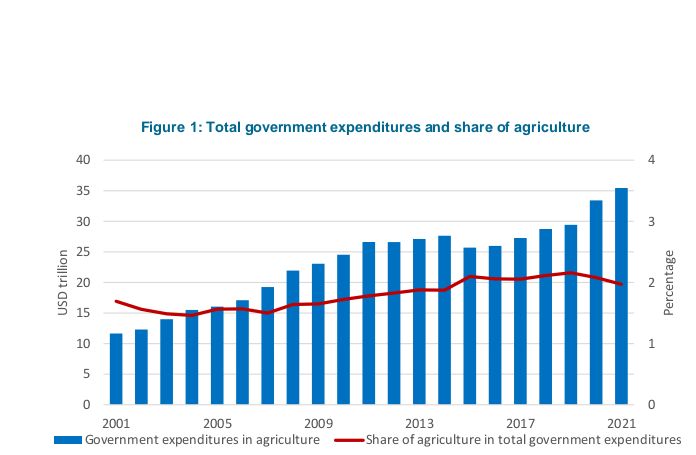
# APPENDIX 1 DATA SET

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **YEAR** | **AGOUT** | **GEA** | **CPI** | **FIV** | **LAB** | **CA** |
| 1990 | 14.83204676 | 57.62371134 | 154.421 | 3.680330991 | 3432494 | 8783816700 |
| 1991 | 13.54690597 | 55.70237288 | 134.125 | 2.23416862 | 3653494 | 8641481700 |
| 1992 | 6.75157042 | 37.99331104 | 130.104 | 17.77050235 | 3766152 | 6751472200 |
| 1993 | 13.73790751 | 52.61254125 | 130.594 | 11.14757394 | 3828446 | 6563813300 |
| 1994 | 17.08007706 | 55.06451613 | 126.988 | 4.827025459 | 3874415 | 6890675000 |
| 1995 | 13.46596889 | 46.62379421 | 146.324 | 5.976089296 | 3960873 | 7111270700 |
| 1996 | 19.34262298 | 49.41176471 | 155.112 | 10.34220476 | 4083952 | 8553146600 |
| 1997 | 16.69573065 | 50 | 153.614 | 7.150982531 | 4211605 | 8529571600 |
| 1998 | 18.89032032 | 51.47058824 | 110.566 | 7.690216776 | 4336765 | 6401968200 |
| 1999 | 15.48126672 | 52.11267606 | 95.716 | 8.792567325 | 4443547 | 6858013100 |
| 2000 | 15.66706342 | 45.91666667 | 100 | 7.690216776 | 4513388 | 6689957600 |
| 2001 | 15.62707072 | 42.27777778 | 62.802 | 5.142265795 | 4554502 | 6777384700 |
| 2002 | 12.56836756 | 35.70136986 | 41.17 | 13.20080083 | 4584189 | 6342116400 |
| 2003 | 14.79335521 | 40.00876712 | 37.644 | 21.01008525 | 4612494 | 5727591800 |
| 2004 | 18.06379683 | 22.72421053 | 80.396 | 23.676284 | 4628134 | 5805598400 |
| 2005 | 17.14823974 | 21.79948718 | 55.053 | 12.79544238 | 4632102 | 5755215200 |
| 2006 | 19.23011578 | 32.35634146 | 73.207 | 20.89149095 | 4655305 | 5443896500 |
| 2007 | 21.19768854 | 27.03525 | 19.964 | 11.37774666 | 4688640 | 5291950100 |
| 2008 | 19.02107406 | 21.99411765 | 51.3 | 19.46317242 | 4711073 | 4415702800 |
| 2009 | 10.74255023 | 28.77804878 | 54.489 | 13.21037138 | 4743786 | 9665793300 |
| 2010 | 9.609863269 | 34.083 | 56.148 | 17.91169454 | 4787016 | 12041655200 |
| 2011 | 8.665865173 | 26.54833333 | 58.097 | 14.69196638 | 4842381 | 14101920300 |
| 2012 | 8.044517527 | 18.25 | 60.258 | 18.38032599 | 4930871 | 17114849900 |
| 2013 | 7.144479446 | 25.625 | 61.241 | 14.62641314 | 5052130 | 19091020000 |
| 2014 | 8.745304229 | 25.775 | 61.111 | 15.36115349 | 5187402 | 19495519600 |
| 2015 | 8.284246903 | 19.65 | 59.638 | 17.0111458 | 5330837 | 19963120600 |
| 2016 | 7.873985821 | 32.575 | 58.709 | 19.94393176 | 5479855 | 20548678100 |
| 2017 | 8.340968872 | 36.6 | 59.242 | 14.89438393 | 5626689 | 17584890937 |
| 2018 | 7.319375146 | 33.2 | 65.526 | 11.88756905 | 5770751 | 34156069918 |
| 2019 | 9.819261595 | 33.2 | 232.807 | 8.060187546 | 5912685 | 21832234921 |
| 2020 | 8.772858753 | 25.975 | 1,530.03 | 19.49830161 | 6001349 | 21509698407 |
| 2021 | 8.849899249 | 25.975 | 3,037.82 | 14.2019955 | 6182422 | 28371238666 |
| 2022 | 7.191922166 | 25.975 | 8,912.93 | 13.3235088 | 6370612 | 27366627153 |

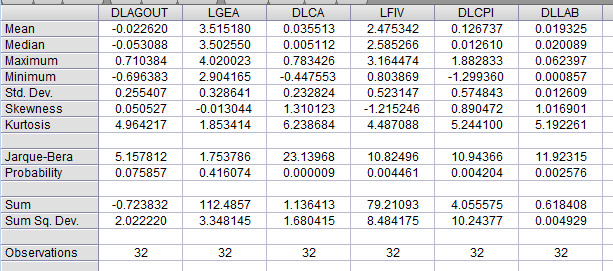
# APPENDIX :2Transformed Data Set

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Year | DLAGOUT | LGEA | DLCA | LFIV | DLCPI | DLLAB |
| 1990 | N/A | 4.053934138 | N/A | 1.303002691 | N/A | N/A |
| 1991 | -0.090631982 | 4.020022747 | -0.016336956 | 0.803869177 | -0.140910438 | 0.062396859 |
| 1992 | -0.696383047 | 3.637410119 | -0.246813476 | 2.877539911 | -0.03043807 | 0.030369821 |
| 1993 | 0.71038385 | 3.962954518 | -0.028188855 | 2.41122189 | 0.003759143 | 0.016405186 |
| 1994 | 0.217753717 | 4.008505518 | 0.048597318 | 1.574230431 | -0.02800068 | 0.011935707 |
| 1995 | -0.23774702 | 3.842111016 | 0.0315119 | 1.78776639 | 0.141730747 | 0.022069772 |
| 1996 | 0.362145426 | 3.900188548 | 0.184618291 | 2.336233073 | 0.058324096 | 0.030600692 |
| 1997 | -0.147158068 | 3.912023005 | -0.002760101 | 1.967249764 | -0.009704474 | 0.030778663 |
| 1998 | 0.123496602 | 3.941010542 | -0.286933663 | 2.039948973 | -0.328830335 | 0.029284868 |
| 1999 | -0.199018944 | 3.953408222 | 0.06881229 | 2.173906742 | -0.144227154 | 0.024324253 |
| 2000 | 0.011929943 | 3.826828159 | -0.024810228 | 2.039948973 | 0.043784712 | 0.01559516 |
| 2001 | -0.002555925 | 3.7442616 | 0.012983754 | 1.637493798 | -0.465183266 | 0.009068103 |
| 2002 | -0.217821567 | 3.57518906 | -0.06637876 | 2.580277497 | -0.422277084 | 0.006497015 |
| 2003 | 0.162994962 | 3.689098608 | -0.101917367 | 3.045002572 | -0.089536257 | 0.0061555 |
| 2004 | 0.199731653 | 3.123430899 | 0.01352753 | 3.164473872 | 0.758790845 | 0.003385055 |
| 2005 | -0.052014231 | 3.081886446 | -0.008716258 | 2.549089044 | -0.378668066 | 0.000856998 |
| 2006 | 0.114582051 | 3.476810028 | -0.055611362 | 3.039341945 | 0.284994687 | 0.004996669 |
| 2007 | 0.097414564 | 3.29714157 | -0.028308256 | 2.4316594 | -1.299360393 | 0.007135132 |
| 2008 | -0.108344619 | 3.090775038 | -0.181019811 | 2.968524086 | 0.943760101 | 0.004773134 |
| 2009 | -0.571335014 | 3.359612901 | 0.783426183 | 2.581002232 | 0.060308094 | 0.006919856 |
| 2010 | -0.111422517 | 3.528798726 | 0.219778717 | 2.885453826 | 0.029992215 | 0.009071702 |
| 2011 | -0.10339823 | 3.278966971 | 0.157939074 | 2.68730084 | 0.034122966 | 0.011499289 |
| 2012 | -0.074400958 | 2.90416508 | 0.193635522 | 2.911280853 | 0.036521316 | 0.018109104 |
| 2013 | -0.118650854 | 3.243568437 | 0.109271566 | 2.682829013 | 0.016181556 | 0.024294291 |
| 2014 | 0.202176944 | 3.24940503 | 0.020966608 | 2.731841822 | -0.002125017 | 0.026423057 |
| 2015 | -0.054161149 | 2.978077338 | 0.023701926 | 2.833868765 | -0.024398928 | 0.027275268 |
| 2016 | -0.050791356 | 3.483545123 | 0.028910011 | 2.992924925 | -0.015699918 | 0.027570379 |
| 2017 | 0.05761499 | 3.60004824 | -0.155756549 | 2.700984224 | 0.009037713 | 0.026442529 |
| 2018 | -0.13065442 | 3.502549876 | 0.663900249 | 2.475493236 | 0.100816261 | 0.025281058 |
| 2019 | 0.293820964 | 3.502549876 | -0.447552769 | 2.086936825 | 1.267762774 | 0.024297815 |
| 2020 | -0.112683203 | 3.257134537 | -0.014883622 | 2.970327365 | 1.882833491 | 0.014884234 |
| 2021 | 0.008743352 | 3.257134537 | 0.276871987 | 2.653382483 | 0.685851827 | 0.029725827 |
| 2022 | -0.2074476 | 3.257134537 | -0.036051625 | 2.589530054 | 1.076362871 | 0.029985436 |

**APPENDIX 3: Total government expenditures and share of agriculture**



**APPENDIX 4: Descriptive statistics**

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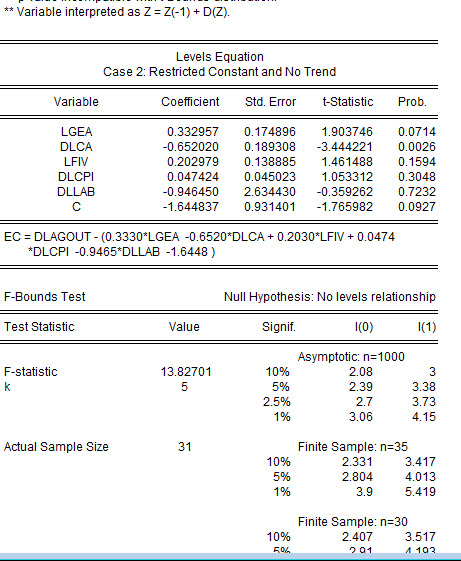
**APPENDIX: 5 Unit Root Test**

**ADF Results Summary**

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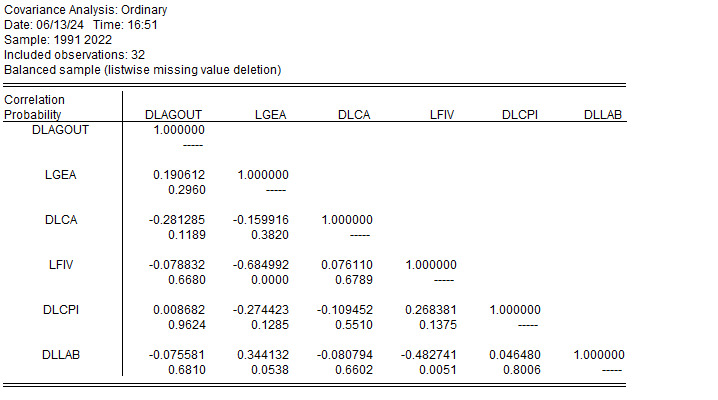
**APPENDIX: 6ARDL Cointergration Test**

**F-Bound test results summary**

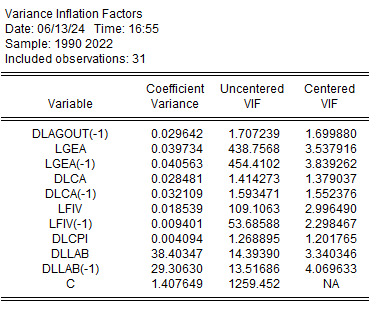
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**APPENDIX 7:** **Multicoliniarity Test**

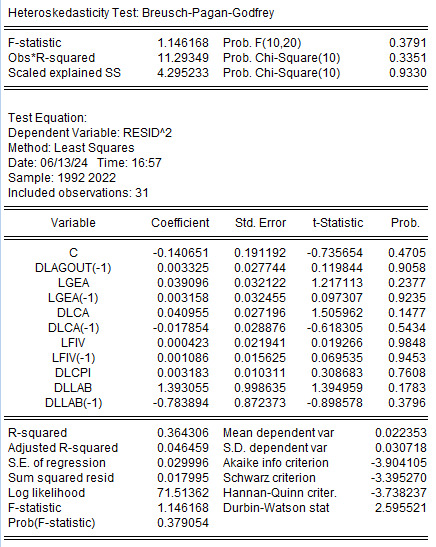
**Correlation Matrix results**

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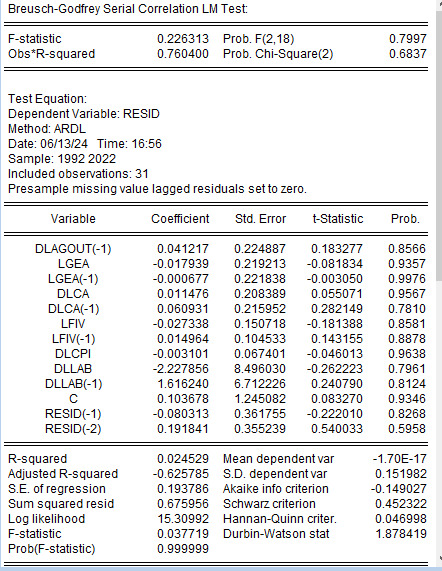
**APPENDIX 8: Variance Inflation Factor (VIF) Results**

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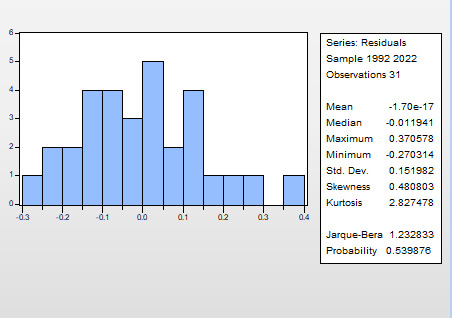
**APPENDIX 9: Heteroscedasticity test Breusch-Pagan test results**

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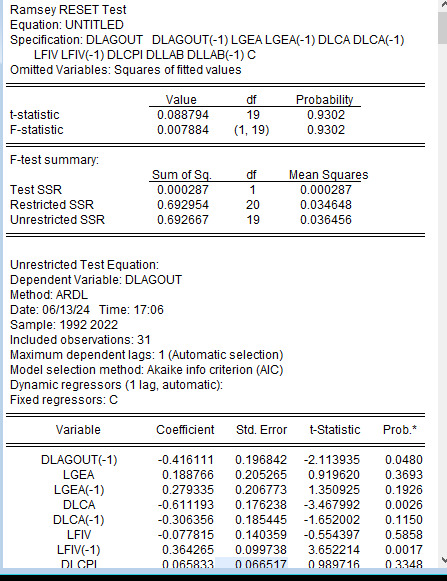
**APPENDIX 10: Breusch-Godfrey Serial Correlation LM Test**



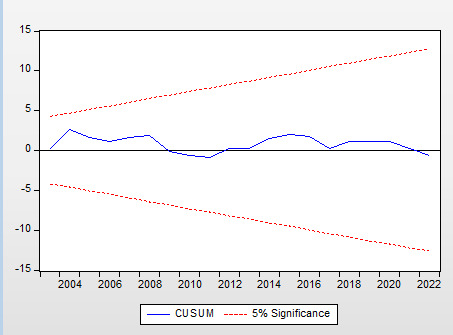
### APPENDIX 11: Normality Test Jarque-Bera Normality results

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**APPENDIX 12: Model Specification Ramsey Reset**

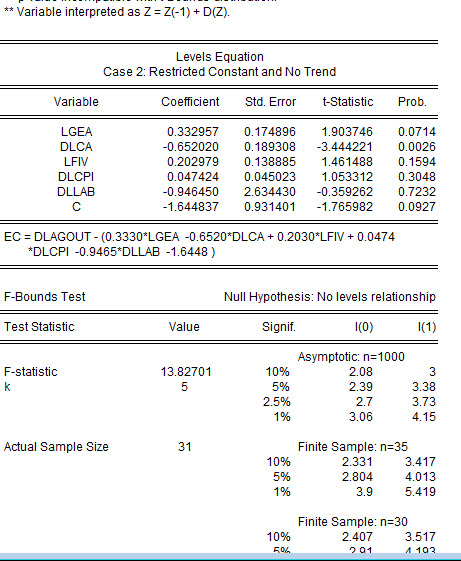


**APPENDIX: 13 Parameter stability test Cusum Test**



**APPENDIX 14**: **ARDL Results**

**ARDL Long run regression summary table**



**APPENDIX 15: ARDL Short run regression summary table**

