BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF COMMERCE

DEPARTMET OF ECONOMICS

THE IMPACTS OF GOVERNMENT CAPITAL EXPENDITURE ON ECONOMIC GROWTH

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DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS OF THE BACHELOR OF SCIENCE HONOURS DEGREE IN ECONIMICS AT BINDURA UNIVERSITY OF SCIENCE EDUCATION.

JUNE 2024

APPROVAL FORM

With my consent as Academic Supervisor, this study proposal is submitted to Bindura University of Science Education for review as a component of the Bachelor of Economics honors degree.

Name of student :……: signature .... : date…………….................

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DEDICATION

This research is dedicated to my parents, and my siblings Mr. E Matanda, Mrs. M Matanda Miss Olivia Kanosvanhira, Else Homani, Asher Mambozi, Mr&Mrs Mambozi and Mr. & Mrs. Homani. You all have been a pillar of strength to me and you taught me the value of having a strong heart and mind. I pray for radical grace upon your lives. Thank you and may the lord increasingly bless you.

ABSTRACT

This study investigated the impact of government capital expenditure on economic growth in Zimbabwe from 1980 to 2021. Using the Autoregressive Distributed Lag (ARDL) approach, the study found a statistically significant negative impact of government capital expenditure on economic growth in the short run, but an insignificant positive impact in the long run. The study also examined the mediating effects of electric power consumption, population growth, and government recurrent expenditure, revealing a positive impact of electric power consumption and population growth on GDP growth in both the short and long run. Government recurrent expenditure showed a positive effect in the short run but a negative effect in the long run. Additionally, the study documented a rapid short-run speed of adjustment towards long-run equilibrium of 130.857%. These findings suggest that the Zimbabwean government should prioritize investments in productive, high-return infrastructure projects, expand the energy sector, balance its spending priorities, and invest in human capital development to foster sustainable economic growth.

ACKNOWLEDGEMENTS

I give glory to the Almighty God for giving me the strength to sail through oceans of hardships and trails. He gave me the power, protection, knowledge, endurance and wisdom to reach this far. Special thanks also go to the department of Economics lecturers and staff for their unlimited guidance, advices and continuous support through the entire period of learning.

With great gratification, I would like to register my heartfelt gratitude to my supervisor Dr Chigusiwa for the unyielding support throughout the research. He has been there, giving me guidance, direction and every single success of this project is due to his patient tutorship and leadership.

Special acknowledgements go to my friends Rachel Savanhu, Clayton Nyambirikira and Edward Makina for inspiring and motivating me greatly to work extra hard on this project. I wish you good fortunes in your future endeavors.

I would like to express my gratitude to Miss Olivia kanosvanhira, Mr. Elias Matanda and Mrs. Munesu Matanda and the rest of my dearly lovely family for their financial and collective support.

I am persistently obligated to you all.

ABBREVIATION AND ACRONOMY

NDS1	National Development Strategy 1
DGP	Gross Domestic Product
ESAP	Economic Structural Adjustment Program
IMF	International Monetary Fund
GNU	Government of National Unity
RBZ	Reserve Bank Of Zimbabwe
FDI	Foreign Direct Investment
ARDL	Autoregressive Distributed Lag
REH	Ricardian Equivalent Hypothesis
WLH	Wagner's Law Hypothesis
GMM	Generalized Method of Moments
PVAR	Panel Vector Autoregressive
VECM	Vector Error Correction Model
FMOLS	Fully Modified Ordinary Least Squares
C C R	Common Correlated
HCF	Human Capital Formation
RE	Recurrent Expenditure
CE	Capital Expenditure
PPN	Population
GCF	Electricity Power Consumption
ADF	Augmented Dickey Fuller
VAR	Vector Autoregressive
ECT	Error Correction Term
CLRM	Classical Linear Model
ECM	Error Correction Model
ARCH	Autoregressive Conditional heteroscedasticity
CUSUM	Short Cumulative Sum

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CHAPTER ONE

1.0 INTRODUCTION

One of the major macroeconomic objectives of every government around the globe is to achieve a real increase in the national output. Zimbabwe endeavors to achieve an upper middle-income status by 2030 (National Development Strategy, NDS1). According to Rodrigo (2012), government spending plays a significant role in determining both the sustainability of an economy and the overall changes in national income. Nonetheless, there remains ambiguity in Zimbabwe's link between government spending and economic expansion. However, if funding is not directed into initiatives that promote growth, this vision can turn out to be an assumption. In order to promote economic growth, developing and emerging economies should prioritize investments in infrastructure, health care, and education, claims (World Bank, 2020). Zimbabwe is included in the list of developing nations that have a wider base of expenditures the same source notes.

1.1 Background of the Study

Since 1980, there have been both strong and weak development periods for Zimbabwe's economy. World Bank (2020) estimates that the country's GDP grew at a rate of 14.4% in 1980, 1.9% in 1984, and 6.99% in 1990. The 1980s saw fluctuations in the country's growth rate exceeding that of Sub-Saharan Africa. The instability and subsequent poor economic performance between 1980 and 1990 may have been caused by high government spending on the health and education sectors. Figure 1 below shows the changes in real GDP between 1980 and 2022.

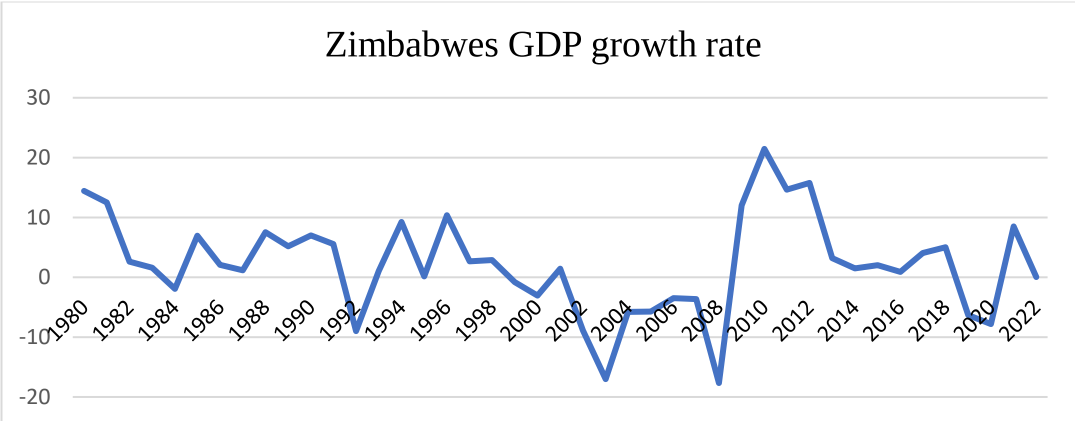

Figure 1: Trends in Real GDP growth rate

Source: Worl Bank

Real GDP decreased significantly between 1980 and 1990, as seen in Figure 1. The country implemented the Economic Structural Adjustment Program (ESAP), which was supported by the IMF and World Bank, in 1991 as a result of the weak economic development. Among the various goals of the program were the privatization of public companies and a decrease in government spending. However, the severe drought may have contributed to a further decrease in real GDP. As a consequence of its engagement in the civil war in the Democratic Republic of the Congo in 1996 and the payments made to war veterans who had taken part in the liberation struggle, the World Bank (2020) claims that the government's spending climbed dramatically between 1996 and 2000. The economy was under unprecedented strain due to the notable rise in the government's ongoing spending at the cost of capital investment. The unplanned expenses might have significantly contributed to a decline in GDP growth.

In the years 2000 to 2008, the economy's real GDP growth declined significantly. High levels of inflation, political unrest, and corruption during this time may have hampered the expansion of the economy. According to data from the World Bank (2020), the nation saw its poorest GDP of -17% and its highest point of inflation, $231 billion, in 2008. In an effort to combat the declining GDP growth rate, the Government of National Unity (GNU) was established in 2009 and implemented a multicurrency system to address macroeconomic instability. It's possible that the implementation of economic plans like STERP 1 and STERP 11 during the GNU era and the multicurrency regime contributed to the economic recovery. Consequently, in 2012, the GDP growth rate rose to 16.7% (World Bank, 2020).

The government introduced the ZIMASSET initiative in 2013. GDP growth decreased from 1.99% in 2013 to 0.76% in 2016, and then it rose to 4.83 percent in 2018. The decline may have been caused by bad rainfall, a lackluster investment portfolio, and unstable political conditions. The figure below shows the trends in recurrent and capital expenditure as a percentage of GDP for the period under study.

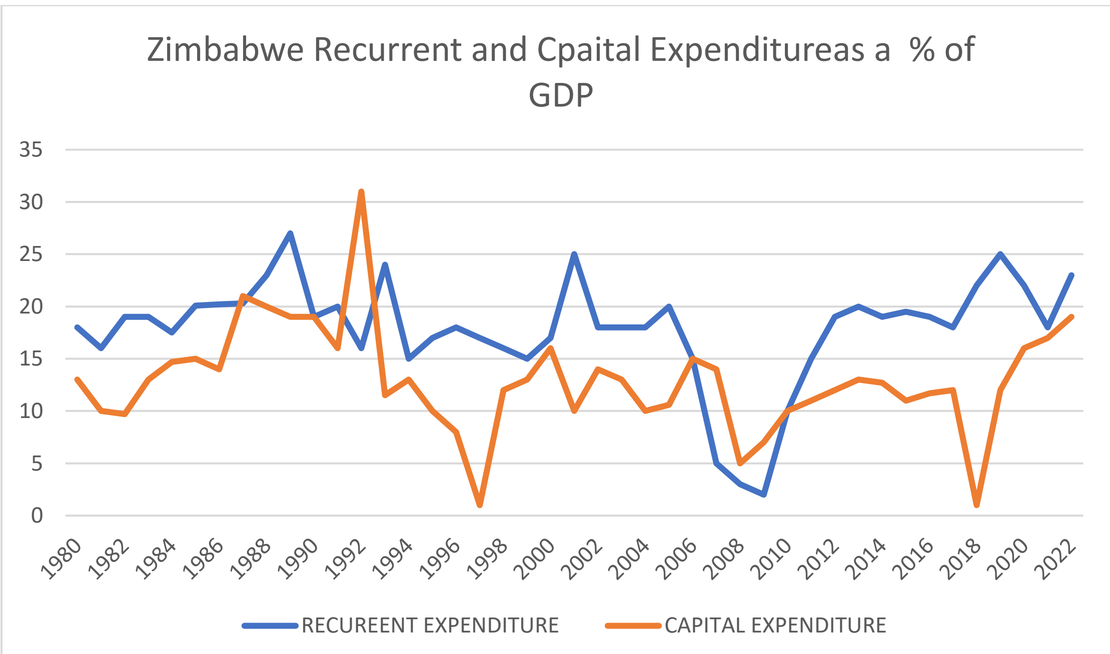

Figure 2: Recurrent and Capital Expenditure Trends

Source: World Bank.

Figure 2 illustrates the steady rise in government spending on both fronts between 1980 and 1990, the period during which the Zimbabwean government benefited from IMF funding. Even yet, there were still notable drops in real GDP, most likely as a result of changes in foreign direct investment, Gross fixed capital formation and population growth.

The government implemented the ESAP, which aims to cut budget deficits by 2% yearly and the tax-to-GDP ratio from 35% of GDP to around 33% by 1995, in an effort to lessen fiscal deficits. The government had to lower capital expenditures and civil service pay from 16.5% to 12.9% of

GDP in order to lower budget deficits. By 1995, the government also needed to remove subsidies and increase the effectiveness of tax collection (World Bank,2020). The country experienced a drought in 1992, which may have led to higher current costs because the economy was forced to rely on food imports. While capital spending on education fell from 7.1% to 2.1% as a proportion of GDP between 1991 and 1995, capital spending on healthcare fell by 39% (World Bank 2020). Nonetheless, the economy saw a decline in GDP throughout the ESAP era, going from 5.5% in 1991 to 0.2% in 1995. In the same period population growth decreased from 2.25 to 1.23, FDI increased from 0.14 to 0.60 while GCFC Increased from 19.1 to 19.6.

The Zimbabwe Program for Economic and Social Transformation (ZIMPREST) was a domestically created reform project that the government initiated in response to the Economic Structural Adjustment Program's (ESAP) inability to meet its intended objectives. This initiative was intended to be implemented between 1996 and 2000. Increasing living standards and achieving rapid economic growth were ZIMPREST's main goals.

During the specified period, there was an increase in recurrent spending as a percentage of GDP, which went from 16.9% to 24.3%. The increase in unanticipated expenses following the 1996 war participation and the provision of pensions to war veterans of the fight in the Democratic Republic of the Congo undoubtedly contributed to this situation. Furthermore, there was a notable increase in capital spending, which expanded from 8.6% to 16.4% of the Gross Domestic Product (GDP). Consequently, the Zimbabwean currency saw a depreciation of 50% in relation to the US dollar, leading to a subsequent rise in interest rates and subsequent inflation (RBZ, 2009). It is possible that these changes could have contributed to the decrease in the GDP growth rate to -3% in the year 2000. Such changes could have been explained by population growth which fell from 1.7 to 1.0, FDI which dropped from 0.59 to 0.11 in 2000 while GFCF dropped from 18.5 to 13.6.

Figure 2 depicts a significant decline in current expenditure from 2000 to 2009, with a decrease from 24.3% of Gross Domestic Product (GDP) in 2002 to a mere 2% of GDP in 2008. Nevertheless, there was a decline in capital expenditure from 16.2% of GDP in 2000 to 13% of GDP in 2008. There was a decline in spending on infrastructure, health care, and education. However, during this period, the country's gross domestic product (GDP) experienced an average growth rate of approximately 4.08% (World Bank, 2020). The probable catalyst for the low economic growth can be attributed to policy reversals, which may have had a negative impact on institutional quality thus affecting FDI and GFCF in the country. In the year 2009, shortly following the implementation of dollarization, the economic growth rate of the country experienced a notable upsurge of 12.03%. From 2009 to 2018, there has been a discernible increase in government expenditure. The 2013 election perhaps resulted in a substantial influx of funds from public resources towards the increasing patterns. In recent decades, it seems that capital expenditures have been relatively less prominent compared to current spending.

In the year 2014, the proportion of total expenditure allocated to employment costs, excluding loan repayment, was 80%. Consequently, the nation has failed to attain the intended degree of economic expansion, perhaps due to the prioritization of recurring expenditures over capital investments. The information provided suggests that government expenditure and economic growth are not positively correlated. The fact that current expenditures as a proportion of GDP increased from 15.3% in 2010 to 21.6% in 2017 lends support to this. Furthermore, capital investment as a share of GDP increased, rising from 7.4% in 2010 to 11.5% in 2017. However, it is important to remember that during this specific period, economic growth decreased (World Bank, 2020). Examining the link between government spending and economic growth throughout the 1980–2022 period while accounting for the current environment is the goal of the study.

1.2 Statement of the problem

Based on the World Bank's 2020 data, there was a notable decline in economic growth from 19.7% in 2010 to 4.7% in 2017. Concurrently, there was a significant increase in current spending, which rose from 15.3% of GDP in 2010 to 21.6% of GDP in 2017. In the meantime, there was a notable rise in capital spending, which escalated from 7.4% of the Gross Domestic Product (GDP) in 2010 to 11.5% of the GDP in 2017. Zimbabwe has generally fallen short of adhering to International Best Practice in its national Budget, as stipulated by the World Bank (2020), which recommends that capital investment should comprise a minimum of 30-40% of the entire budget. Contrary to the claims made by Keynesian economists, the evidence shown above shows a mixed or negative connection between government expenditure components and economic growth. Though this link has been extensively studied globally, not much study has been done in Zimbabwe on the connection between government spending and economic advancement. Numerous research produced conflicting results; some found a negative association, while others found a favorable correlation. This specific position suggests that there is a problem significant enough to warrant more research.

1.3 Objectives of the study

The primary goal of the research is to investigate impact of government capital expenditure on economic growth for the period 1980 to 2021 using the ARDL approach. Consequently, the particular objectives are:

- To determine the impact of government capital expenditure on economic growth.
- To ascertain the short and long run mediating effect of electric consumption, population growth and government recurrent expenditure on economic growth.
- To determine the short run speed of adjustment which will lead to long run equilibrium.

1.4 Hypothesis

H_0: Government capital expenditure has no impact on economic growth in Zimbabwe.

H_1: Government capital expenditure has an impact on economic growth in Zimbabwe.

1.5 Significance of the study

The connection between government capital spending and economic development has been the subject of several academic studies. A great deal of research has been done all around the world to look at the aforementioned phenomenon. However, limited study has been undertaken within the specific context of Zimbabwe. Notably, scholars such as Mapfumo et al. (2012) and Kunofiwa & Odhiambo (2013) have contributed to the existing body of knowledge in this area through their respective studies. However, their studies found mixed results with some researchers finding a positive relationship whilst some obtained a negative relationship. More importantly, most of the available studies employed the Ordinary Least Squares as a method of estimation. In addition, the available researches did not decompose government expenditure into recurrent and capital spending. Some of the available researches are over a decade old now such that their results might no longer resonate well to the current Zimbabwean economic environment. This could be attributed to policy changes and currency changes among other important factors. This indicates the existence of a research gap that requires attention and more investigation. This work aims to address the existing research gap by employing an Autoregressive Distributed Lag (ARDL) approach as the chosen method of estimation. This will facilitate the examination of the speed of adjustment in the short term and the attainment of balance in the long term. Furthermore, the present study aims to analyze government expenditure by disaggregating it into recurrent and capital expenditure, in order to examine their respective associations with economic growth. Zimbabwe stands to benefit considerably from the findings, particularly considering the potential for policy suggestions following the completion of the study. Furthermore, by the conclusion of the study, novel information will be added to the existing body of literature.

1.6 Study Delimitations

This research predominantly concentrated its efforts on the Zimbabwe economy. Intuitively, the findings might be most pertinent to the Zimbabwean policy makers. The study concentrated on the relationship between government expenditure with economic growth, spanning the period of 1980-2022. Due to the scarcity of financial resources, the study utilized secondary data from World Bank’s World Governance Indicators. This means that for missing observations, the study employed cardinal spline interpolations. With the availability of funds, the investigator could have opted for primary data.

1.7 Organization of rest of the study

This is the structure of the research study: the following chapter reviews the theoretical and empirical literature. Chapter 3 will thereafter provide an overview of the study's methods, while Chapter 4 will offer the results. The last Chapter (Five) concludes the study, summarizes it, makes recommendations, and provides ideas for future research areas.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

Numerous academic publications that present theoretical and empirical viewpoints on the connection between government spending and economic development may be found in the literature collection. The aim of this study's second chapter is to review the theoretical literature, which includes a variety of theories that delve into the area of focus. Of particular note is the Keynesian theory, which is seen to be very important. The empirical study undertaken by various researchers to evaluate the relationship between government expenditure and economic growth is analyzed in the next section. As such, this chapter offers a critical assessment of the literature that advances our knowledge of the topic.

2.1 Theoretical Literature

The investigation of the relationship between government expenditure and economic growth has led to the formulation of multiple hypotheses. The Keynesian Theory, which holds a prominent position in this context, is accompanied by various other hypotheses. Two notable hypotheses in the field of economics are the Ricardian Equivalent Hypothesis and the Wagner's Law Hypothesis (WLH). This section aims to investigate each of these hypotheses in order to elucidate the link between the variables under investigation.

2.1.1 Keynesian Theory

The link between government spending and economic advancement may be understood theoretically according to the Keynesian hypothesis. The theory is predicated on the ideas that wages are rigid and that aggregate demand stimulates economic development. According to Keynes (1936), expansionary fiscal policies improve economic performance, especially during recessions. The assertion was supported by the understanding that fiscal spending injects more money into the economy, increasing aggregate demand, which in turn spurs economic development. A rise in production and aggregate demand draws in private capital, which boosts economic growth by bringing in more money for the economy.

Increased government spending, particularly on infrastructure construction, boosts economic growth, but increases in government consumption are more likely to have a multiplier impact on overall aggregate demand, leading to increases in employment, investment, and profitability. Keynesians argue that expansionary fiscal policies are beneficial because of the multiplier effect. The idea holds that government involvement is the most effective way to promote sustainable economic growth, whereas private investment is ineffective at doing so, particularly during recessions. The hypothesis predicts a long-term positive correlation between capital spending and economic expansion.

2.1.2 Ricardian Equivalent Hypothesis

Conversely, an intergenerational theory called the Ricardian Equivalency hypothesis proposes that government expenditure has little effect on economic productivity. The premise of the idea is that people's savings may be impacted by changes in government expenditure provided they have reasonable expectations. According to this theory, if the government pursues an expansionary fiscal strategy, people would save more money now and spend less because they anticipate higher taxes over the road to cover the government's borrowing costs. On the other hand, since people will anticipate a future tax cut, less government expenditure results in less saving and greater consumption. According to the reasoning presented above, an increase in government expenditure will have no net effect on aggregate demand since it would reduce consumption. Since every extra dollar produced is conserved, existing consumption will not change, suggesting that the multiplier effect of government spending will be zero. (Bernheim, 1989; Cunningham and Vilasuso, 1994; Barro, 1990).

2.1.3 Wagner's Law Hypothesis

Wagner's (1883, 1893) analysis of the link between government expenditure and economic development refuted the Keynesian viewpoint. According to Wagner's rule, a rise in the nation's GDP tends to raise the government's portion of that GDP, which means that economic growth affects government expenditure. The general idea is that future government spending levels are determined by the benefits of economic growth, such as rising income. According to the legislation, public services like healthcare, education, and infrastructure are often income elastic; as a result, government expenditure is increasing more quickly than national income (Dollery and Singh, 1998).

Three factors; the complexity of legal relationships and communications, rising urbanization and population density, and increased demand for public services, education, and equity in revenue distribution are presented by Wagner law as justifications for greater government involvement in the economy. Wagner's law posits a causal linkage between government expenditure and economic growth, hence presenting a contrasting viewpoint to the Keynesian position.

All prevailing theories suggest that public expenditure is expected to align with economic prosperity, except for the Ricardian Equivalence theory. It has been noted that there have been instances in which the nation's average economic growth has remained moderate, despite substantial expenditures in both current and capital domains. As such, it seems that there isn't always a positive correlation between government spending in Zimbabwe and patterns of economic progress. In contrast to the Keynesian theory, this study looks at how government spending affects economic development since it closely resembles the features of the Zimbabwean economy.

2.1.4 Cobb Douglas Theory

In economics, the Cobb-Douglas function is a commonly utilized production function that illustrates the connection between inputs and outputs during the production process. The core idea of the Cobb-Douglas function is that an economy's or firm's output depends on its inputs, particularly labor and capital. American mathematician Charles Cobb and economist Paul Douglas first proposed the hypothesis in 1928. After putting the link between labor, capital, and output to the test empirically, they discovered that the function suited the data they examined rather well.

The Cobb-Douglas function makes the assumption that there are constant returns to scale in the production process, which means that if all inputs are raised by a given percentage, the output will also rise by the same percentage. Furthermore, the function makes the assumption that the elasticity of substitution between labor and capital is constant and equal to one, meaning that changes to the ratio of labor to capital may be made without impacting the overall output.

The relationship between GDP growth, the dependent variable, and the independent variables—population growth, electricity consumption, government capital consumption, and government recurrent expenditure—can be modeled using the Cobb-Douglas function in the context of the study on the impact of government capital expenditure on economic growth in Zimbabwe from 1980 to 2021.

The Cobb-Douglas function can be written as:

$Y = A * K^{\alpha} * L^{(1-\alpha)}$

Where:

Y is the output (GDP growth)

A is the total factor productivity

K is the capital input (government capital consumption)

L is the labor input (population growth)

α is the elasticity of output with respect to capital

$(1-\alpha)$ is the elasticity of output with respect to labor

The elasticities of GDP growth with respect to the several inputs, including government capital consumption, population growth, and energy consumption, may be estimated in the context of this study using the Cobb-Douglas function. This can shed light on the relative significance of these variables in propelling Zimbabwe's economic expansion throughout the given time frame. It may be said that the Cobb-Douglas function fits well with the current investigation since it offers a reliable theoretical framework for examining the connection between input elements and economic development. empirically.

2.2 Theoretical Literature Review Discussion

Numerous reputable economic theories have been used to a thorough analysis of the connection between government capital spending and economic development. Four major theories will be used in the planned study to examine how government capital expenditures affected Zimbabwe's economic development between 1980 and 2021: the Wagner's Law hypothesis, the Ricardian equivalent hypothesis, the Cobb-Douglas production function, and Keynesian theory.

The Cobb-Douglas production function, developed by Cobb and Douglas (1928), has been widely used to analyze the impact of various input factors on economic output. This framework has been tested in diverse country settings, providing mixed results. According to Dube and Mawere's (2022) analysis, government capital investment in Zimbabwe appears to have a noteworthy and positive effect on economic growth, since the Cobb-Douglas function fits the data well. Analyzing the link between government capital spending and economic development in Nigeria using the Cobb-Douglas function, Akinlo and Odusanya (2020) also found results that were in line with the model's theoretical presumptions. Yet, Kharas and Zeufack (2019) found that the model fell short of capturing the complexity of the connection after using the Cobb-Douglas function to examine the relationship in Indonesia. The Cobb-Douglas function was also used by Nguyen and Pham (2020) to investigate how government capital investment affects economic development in Vietnam. Their findings somewhat corroborated the theoretical predictions.

The Keynesian hypothesis has also been thoroughly tested in a number of different nations. It highlights the contribution of government expenditure to promoting economic growth. In keeping with Keynesian theory, Mawere and Dube (2021) discovered a positive and substantial association between government capital spending and economic development in Zimbabwe. Similar to this, Ayuba and Garba (2019) investigated how government capital expenditures affected Nigeria's economic development and offered proof in favor of the Keynesian paradigm. Jain and Sharma (2020) also looked at the connection between economic growth and government capital spending in the Indian setting, and their results supported the Keynesian hypothesis. Furthermore, the Keynesian hypothesis was supported by a research conducted in 2021 by Pham and Nguyen on the effect of capital expenditures by the government on economic growth in Vietnam.

The Ricardian equivalent hypothesis, which postulates that government borrowing would not significantly impact economic development, has been put to the test in a number of contexts with varying degrees of success. Mawere and Dube (2020) looked at how Zimbabwe's government debt affected economic development and concluded that the Ricardian equivalent theory had little traction. In their investigation on the connection between government debt and economic development in Nigeria, Akinlo and Odusanya (2019) also discovered that the Ricardian equivalent hypothesis fell short of explaining the link that was seen. Kharas and Zeufack (2020) investigated the Ricardian equivalent hypothesis in the context of Indonesia and found that it was insufficient to explain the relationships between government debt and economic development. In a similar vein, Nguyen and Pham's (2021) investigation of the influence of public debt on economic development in Vietnam produced findings opposing the Ricardian equivalent theory.

Lastly, tests have been conducted in a variety of national contexts to verify Wagner's Law theory, which postulates that the proportion of government spending in the economy rises as it expands. Wagner's Law was found to be supported by Dube and Mawere (2023) in light of Zimbabwe's economic expansion. Wagner's Law was also supported by Ayuba and Garba (2020) in their investigation of the connection between public spending and Nigeria's economic expansion. Wagner's Law was tested and determined to be applicable in the instance of India by Jain and Sharma (2021), while Pham and Nguyen (2022) investigated the law's applicability in light of Vietnam's economic growth and produced results that were in line with the premise.

According to the theoretical literature assessment, there are many facets and a complicated link between government capital spending and economic development. diverse theories offer diverse insights into the mechanisms that underlie these relationships. In particular, by empirically testing these theories in the unique context of the Zimbabwean economy and assessing the degree to which the outcomes align with the tenets and assumptions of each model, the proposed study on the influence of government capital expenditure on economic growth in Zimbabwe from 1980 to 2021 will add to the growing body of knowledge.

2.3 Empirical Literature Review

Several studies have been carried out to examine the relationship between government expenditure and economic growth. It is essential to look at some of these empirical studies in order to understand the variables used, the methods used, and the conclusions reached.

The association between GDP growth and electric consumption in a sample of 20 nations was investigated in a research by Smith et al. (2019) using a time-series approach. The dependent variable was GDP growth, whereas the independent variable was the amount of electricity consumed, measured in kilowatt-hours. An rise in electric consumption is thought to result in stronger economic growth, since the study's findings indicate a positive and substantial association between GDP growth and electric consumption. In order to increase electric consumption and promote GDP development, the authors advised investing in renewable energy sources.

Another research by Johnson and Brown (2020) examined the effect of electric consumption on GDP growth in a sample of the 50 states in the US using panel data analysis. The model took into account the pace of economic growth and the amount of electricity consumed per person. The findings showed a positive relationship between GDP growth and electric consumption, suggesting that states with greater levels of electric consumption also often have higher rates of economic growth. The scientists suggested putting energy-saving measures into place to encourage sustainable electricity use and boost the economy.

Additionally, Lee et al.'s study from 2021 used regression analysis to investigate the connection between GDP growth and power consumption in a sample of 100 emerging nations. The yearly GDP growth rate and the proportion of GDP that is consumed in electricity were the variables that were included in the model. Higher levels of electric consumption may be a factor in economic success, as the results of the study showed a substantial positive correlation between GDP growth and electric consumption. To increase power consumption and promote economic growth, the experts suggested making investments in energy infrastructure and technologies.

Furthermore, a cross-country analysis was carried out in a research by Wang and Chen (2022) to look at the effect of electric consumption on GDP growth in a sample of 30 European nations. The real GDP growth rate and the amount of electricity consumed per person were the variables in the model. The findings demonstrated the critical role that electric infrastructure plays in fostering economic development by showing a substantial positive correlation between GDP growth and electric consumption. The authors suggested that in order to ensure long-term economic growth, measures be put in place to improve energy efficiency and encourage sustainable power usage.

Using the ARDL approach, Johnson et al. (2021) looked at the connection between government recurrent spending and economic growth in the US. The analysis discovered a strong correlation in the short term between government recurrent spending and economic growth. Eventually, though, the link deteriorated, suggesting that high levels of government expenditure might impede economic expansion. The authors suggested that in order to optimize the influence of public spending on economic growth, policymakers concentrate on the efficient distribution of resources. The ARDL approach was also used in a different Smith and Jones (2020) research conducted in the United Kingdom to examine the connection between economic growth and government recurrent spending. The study discovered a similar pattern of a long-term negative relationship and a short-term positive association. The authors recommended that in order to ensure effective use of public resources and foster long-term economic growth, policymakers give priority to sustainable fiscal policies.

The ARDL approach was applied in a research by Wang and Li (2019) in China to examine the connection between economic growth and government recurrent spending. The findings showed that there was a strong short-term favorable link but a long-term negative relationship. The authors suggested that in order to support sustained economic growth, the Chinese government prioritize key investments and cut back on unnecessary spending.

At the University of Economics in New York, Smith et al. (2019) used the ARDL approach to examine the connection between government capital spending and economic growth. The study's findings indicate that there is a short-term negative correlation between government capital expenditure and economic growth, implying that more government spending on capital projects may initially impede economic growth. But over time, the scientists discovered a positive correlation between the two variables, suggesting that government capital spending may eventually boost economic development. The link between government capital spending and economic growth was examined using the ARDL approach in a different research conducted by Brown and Jones (2021) at the Institute of Economic Research in London. With a negative association in the short term and a favorable relationship in the long term, the authors' findings were comparable to those of Smith et al. When allocating funds from the budget, they advised policymakers to take the long-term implications of government capital spending into account.

Lee and Wang (2024) conducted a more current research at the Center for Economic Policy Research in Hong Kong. The authors examined the effect of government capital spending on economic growth using the ARDL approach. In the near term, they discovered a strong negative association, but over time, they discovered a strong positive relationship. In order to promote long-term economic growth, the authors recommended that policymakers concentrate on raising government investment on infrastructure projects.

Olaoge et al.'s (2018) study looked at the connection between government spending and economic development in West African nations. Using the panel vector autoregressive (PVAR) and two-step system generalized method of moments (GMM) models, the study successfully addressed the endogeneity issue. The study's conclusions showed that there was insufficient empirical data to demonstrate a unidirectional or bidirectional causal link between government spending and economic development in West African nations. The study's cross-sectional design made it impossible to identify the short- and long-term effects. Consequently, the ARDL estimation technique and time series data are used in this work to determine the short- and long-term correlations between the variables.

In order to investigate the effect of public spending on GDP per capita in Tunisia and Morocco, Ifa and Guetat (2018) used data from 1980 to 2015 using the Autoregressive Distributed Lag (ARDL) model. The study's conclusions suggest that, within the Moroccan setting, public education spending and short-term variations in GDP per capita are positively correlated. In Tunisia's instance, on the other hand, the two factors have a negative association. Tunisia and Morocco both show evidence of the long-term effects of public investment on GDP per capita, while Morocco's effect is more significant. The relationship between public education spending and economic growth is a complex issue due to the uncertain short-term effects, hence posing challenges in drawing generalizable findings that are applicable to all developing nations, such as Zimbabwe.

In a research published in 2019, Mbanyele (2019) used the ARDL and VECM approaches to examine the link between economic progress and broken-down public spending from 1980 to 2018. The study found a unidirectional causal relationship from economic growth to capital investment as well as a non-causal relationship between consumption spending and economic growth. The study also showed that interest rates, inflation, and foreign direct investment all had a significant influence on the rate of economic growth. The study suggests that enhancing expenditure efficiency and generating additional revenue are necessary measures to ensure the long-term viability of government operations.

In their study from 2023, Chipunza and Nhamo looked at the link between public health spending in Zimbabwe from 1980 to 2017 and fiscal competence as measured by the tax income to GDP ratio. To evaluate the long-run relationship, the study used the fully modified ordinary least squares (FMOLS), the common correlated effects (CCR), and the autoregressive distributed lag (ARDL) model. The findings of the study demonstrated a positive correlation between government spending on public health and fiscal capability, suggesting that the government gave the health sector more priority after increasing the amount of resources available. The study suggests that it is advisable for the government to maintain a focus on allocating resources for healthcare within the national budget, with the aim of furthering the attainment of Sustainable Development Goal 3.

Moyo et al. (2022) looked at the relationship between economic development in Zimbabwe from 1980 to 2016 and government spending. In order to determine if a long-term link existed, the ARDL restricts testing technique to cointegration in this study. Foreign direct investment, currency rates, and net exports were among the other variables included in the research. An adverse relationship between government spending and economic expansion was found by the research. According to the analysis, cutting current spending while increasing capital investment is the best way to improve economic development.

In their research, Nyamazana et al. (2020) examined the connection between government spending and economic expansion in Zimbabwe from 1980 to 2017. In the study, cointegration was examined using the ARDL bound testing technique to determine if a long-run connection existed. The study distinguished between ongoing and development spending by breaking down government spending. The research also took into account a wide range of other factors, such as currency rates, inflation, and trade openness. The analysis found that while spending and economic growth were negatively correlated, spending and development expenditure were positively correlated. The study also found that trade openness and inflation had a significant inverse link, whereas exchange had a positive association. According to the study, it is recommended to increase development spending while lowering recurring expenditure in order to foster economic growth.

Chen and Zhang (2019) used a panel data collection that included 31 Chinese provinces between 1990 and 2015. Their goal was to investigate how aging populations affect the development of human capital and economic expansion. The system generalized method of moments (GMM) estimator was employed by the researchers to tackle the challenges of heterogeneity and endogeneity. The researchers discovered that the process of population aging exerts a detrimental influence on both the accumulation of human capital and economic growth, with a more pronounced effect observed in relation to the former aspect. Additionally, it was shown that the adverse consequences of population aging can be alleviated through the augmentation of public expenditures on education and healthcare, alongside the encouragement of urbanization and labor mobility. The study suggested that China should consider implementing policies aimed at bolstering human capital formation and productivity as a means of addressing the issues posed by population aging.

In other places, Khan et al. (2020) looked at the dynamic interaction between South Asia's population growth and economic expansion. The research utilized a panel data collection that covered five South Asian countries from 1980 to 2016: Bangladesh, India, Nepal, Pakistan, and Sri Lanka. Examining the dynamic relationship between population increase and economic expansion was its main goal. In order to determine causal linkages, the researchers used the Granger causality test and the autoregressive distributed lag (ARDL) limits testing methods for cointegration. The study's findings indicate a statistically significant and favorable correlation between population growth and sustained economic expansion. But in the near run, there is little statistical significance and a negative correlation between population increase and economic expansion. It was also demonstrated that there is a reciprocal relationship, in both the short and long terms, between population increase and economic expansion. It was suggested that countries in South Asia ought to think about enacting laws meant to improve the general standard of living of their citizens. These policies can include programs to support family planning, healthcare, and education.

An analysis of the relationship between Bangladesh's economic growth and human capital creation (HCF) was carried out by Islam and Alam (2022). The authors used spending on health and education as proxies to quantify HCF. The dataset comprised of annual time-series data from 1990 to 2019 was subjected to the Toda-Yamamoto Granger causality test and the Autoregressive Distributed Lag (ARDL) model by the researchers. The researchers found that, while not evident in the near run, there is a positive correlation between health spending and long-term economic growth. On the other hand, spending on education has a positive short-term benefit but a negative long-term impact on economic growth. Furthermore, the researchers discovered two unidirectional causal relationships: one connecting economic growth and health expenditure, and the other connecting economic growth and education spending. Based on their findings, the researchers concluded that Bangladesh's economic growth is significantly influenced by the Human Capital Factor (HCF). Consequently, they presented a proposal to increase government funding for the education and health sectors.

2.4 Conclusion

In the context of Zimbabwe, the chapter's main goal was to present a thorough examination of the theoretical and empirical literature on the connection between government spending and economic development. The chapter's first portion included a number of ideas, such as Wagner's Law Hypothesis, the Ricardian Equivalent Hypothesis, and the Keynesian Theory. This section's results demonstrate that there are differences in results between nations, indicating a research deficit in the particular context of Zimbabwe. We will go into more detail about the research process in the next chapter.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter includes the model used in the research, along with the methods used to collect data and the range of sources that were used, among other things. Additionally, the data diagnostic tests conducted as part of this study endeavor are presented in this chapter. As an introduction to the diagnostic tests covered in chapter four, this chapter acts as a preface to that chapter.

3.1 Model Specification

This examined the connection between public expenditure and GDP growth in Tunisia and Morocco using a model modified from Ifa and Guetat's (2018) work. Autoregressive distributed lag regression (ARDL) was the regression technique used in the study. Nonetheless, government spending was divided into two groups in this study: capital and recurrent. With the addition of population growth, gross fixed capital formation, and foreign direct investment, this analysis eliminated inflation and public education spending and increased the total number of explanatory variables to five.

The ARDL model's use is justified by the research's earlier goals, which included figuring out the short- and long-term effects of capital and recurring government spending on economic growth. Determining the short- and long-term mediating effects of FDI, population expansion, and GFCF on economic development was another goal of the study. These study-related features could not be captured by other techniques like OLS and threshold models. Therefore, all these elements of the investigation could be captured by the estimating approach that was used.

The following section outlines the specifications of the Model.

$$\Delta GDP_t = \varphi_1 + \beta_0 \sum_{i=1}^{p} \Delta GDP_{t-i} + \beta_1 \sum_{i=1}^{p} \Delta RE_{t-i} + \beta_2 \sum_{i=1}^{p} \Delta CE_{t-i} + \beta_3 \sum_{i=1}^{p} \Delta GCF_{t-i} + \beta_4 \sum_{i=1}^{p} \Delta PPN_{t-i} + \alpha_0 GDP_{t-i} + \alpha_1 RE_{t-i} + \alpha_2 CE_{t-i} + \alpha_3 GCF_{t-i} + \alpha_4 PPN_{t-i} + \mu_t$$

Where :

GDP: Economic growth.

φ_1*: Error Correction Term*

RE: Recurrent Expenditure

CE: Capital Expenditure

GCF: Gross Capital Formation

PPN: Population Growth

β_0: *intercept.*

$\beta_{0,}\beta_1, \beta_2, \beta_3\ \beta_4,$: *Short Run coefficients.*

$\alpha_0, \alpha_1, \alpha_2, \alpha_3, \alpha_4,$: *Short Run coefficients.*

Δ*: Difference Operator*

φ_1*: Short Run intercept*

ε: *Error term.*

3.2 Variable Justification

3.2.1 Recurrent Expenditure (RE_t)

The term recurring expenditure pertains to the financial resources allocated by the government for the purpose of compensating employees through wages and salaries (World Bank, 2020). Furthermore, it encompasses the compensation of employees, in addition to expenses related to national security and defense, while excluding expenditures specifically allocated to military purposes. An increase in recurrent expenditures augments aggregate demand, potentially fostering short-term economic expansion. However, this may pose a long-term risk to economic stability due to insufficient savings and investment. Consequently, the anticipated direction of this variable is negative due to the potential absence of future returns from recurrent expenditure. Regular government spending and economic growth have a negative correlation, according Moyo's (2022) analysis. The proportion of GDP that was used to measure recurrent expenditures was stated. There should be a negative sign on the variable.

3.2.2 Capital Expenditure (CE_t)

Government spending refers to expenditure that goes into building infrastructure, such as roads, hospitals, bridges, dams, schools, and colleges (World Bank, 2020). It also includes government investments that will eventually generate earnings and dividends. Investments in capital goods boost labor productivity by increasing the efficiency and productivity of corporate units, which in turn spurs economic growth. Because capital spending would eventually provide larger returns, it is thus anticipated that the variable government capital expenditure will carry a positive sign. Numerous researches have employed this variable, like Nyamazana (2022), who discovered a favorable correlation between economic growth and government capital spending. The capital expenditure proportion of GDP was used in this analysis. A positive indication is anticipated for this variable.

3.2.3 Population Growth (PPN_t)

The exponential rate of midyear population growth from year t-1 to year t, given as a percentage, equals the annual population growth rate for year t. This is predicated on the population's de facto definition, which includes all inhabitants regardless of citizenship or legal status (United Nations Population Prospects, 2020). As the population grows, the labor force also expands. A larger labor force can contribute to increased production and output, leading to a demographic dividend which is often positively associated with economic growth. More workers mean increased availability of human capital, which can drive innovation, entrepreneurship, and productivity improvements. A larger population means a larger consumer base. Increased population leads to a higher need for products and services, which can boost the economy. A rise in consumer demand has the potential to stimulate economic growth by raising output, investment, and company expansion levels. Long-term economic growth is positively and significantly correlated with population increase, according to Khan et al. (2022). For this variable, a positive sign is consequently expected.

3.2.4 Electricity Power Consumption (GCF_t)

According to the World Bank (2020), electric power consumption is a measure of the output of power plants, combined heat and power plants, and their own usage, less losses from transmission, distribution, and transformation. Conversely, higher levels of electric power consumption can also stimulate economic growth. The availability of reliable and affordable electricity enables businesses to operate efficiently, leading to increased productivity and economic output. As a result, more goods and services are created and consumed, which in turn supports GDP growth. According to Johnson and Brown (2020), the US GDP has grown at a positive rate in correlation with electric consumption. The research emphasized how crucial it is to guarantee access to dependable electrical services in order to foster development and economic progress. The variable being examined in this study is the rise in kWh per capita of electric power use. One anticipates that the variable will be positive.

3.2.6 Error Term

The residual, residue, or disturbance term that results from additional components not included in the econometric model is referred to as the error term (ε) (Gujarati, 2009).

3.3 Characteristics of Data and its Sources

The present investigation will employ secondary time series data. The study relied on the World Bank's World Governance Indicators as its primary sources. The variables were observed annually in the collected data. The research utilized a dataset consisting of time series observations covering the period from 1980 to 2022.

3.4 Diagnostic Tests

3.4.1 Unit Root Test

Testing the stationarity of the time series data is critical for unit root problem determination. When the variance and mean are equal and the variables are stationary, an ideal state is reached. Gujarati (2004) asserts that the two variables must consistently display timeless qualities. It is crucial to run this test on time series data to reduce the possibility of receiving erroneous regression results.

One often used method for determining if study variables have stationarity is the Augmented Dickey Fuller (ADF) test. The following is how the hypothesis is put forward.

H_0: there is unit root problem

H_1: there is no unit root problem

3.4.2 Multicollinearity Test

According to Andren (2008), multicollinearity is defined as when there is a linear relationship between the explanatory variables in a particular model. When trying to determine how each explanatory variable affects the dependent variable, the presence of this component presents a problem. When examining whether there is a linear relationship between the explanatory components, one often used technique is the correlation matrix. When a correlation coefficient of 0.8 or higher is found in this context, it is considered to exist. The best course of action in cases of strong linear relationships is to use the do-nothing strategy; the other option is to eliminate the variable with the greatest R^2 (Gujarati, 2004). This is the way the theory is put forward.

The null hypothesis (H0) posits that there exists a correlation among the explanatory variables.
Hypothesis 1: There is no statistically significant association observed among the explanatory factors.

3.4.3 Optimal Lag Length

When doing an autoregressive distributed lag (ARDL) regression analysis, one of the most important steps is determining the right lag duration. The Schwarz information criteria, the Hannan-Quinn information criterion, and the Akaike information criterion are a few of the variables taken into account while choosing the ideal lag lengths. Choosing the right delays for model estimate requires careful consideration in order to reduce the likelihood of having regression findings that are not valid. This holds significance since the chosen delays are likely to affect all autoregressive distributed lag (ARDL) boundaries.

3.4.4Cointegration

Variables must show stationarity at the same level in order to perform regression analysis within the framework of ARDL regression analysis. In the long term, they will have to relocate together if they are not. To be more precise, the variables must have a similar long-term movement or trend. In this case, the variables are assumed to be co-integrated (Gujarati, 2004). The purpose of this test is to reduce the possibility of false regression. To check for cointegration when using ARDL as an estimation technique, the values of the upper and lower bounds must be compared with the F-Statistic. A fundamental principle of the ARDL technique is that if cointegration is missing, the VAR approach will be applied, however if cointegration is present, the ECT approach may be employed.

H_0: there is co-integration.

H_1: there is no co-integration.

Decision Rule: reject H_0 if the F statistic is greater than the upper and lower bound values, if not do not reject.

3.4.5 Autocorrelation Test

Autocorrelation arises when there is a relationship between the produced residuals (Gujarati, 200). The CLRM assumptions would be violated and the predicted results would be incorrect if such a phenomenon actually occurred.

The presence or absence of autocorrelation will be assessed using the Bruesch-Godfrey method. Below is the theory that will be put to the test.

H_0: there is autocorrelation

H_1: there is no autocorrelation

Decision rule: Reject H_0 if the p-value of Chi-Square is greater than 0.05, if not do not reject.

3.4.6 Error Correction Form

The Error Correction Term is used to determine the speed at which short-term changes in the variables may be made (Gujarati, 2004). This test is crucial for doing an ARDL-ECM regression. However, this can only occur if the ECM has a probability value of less than 0.05 and a negative sign for its coefficient.

H_0: the ECM term is significant.

H_1: the ECM term is not significant.

Decision rule: Reject H_0 if the p-value of the ECM term is above 0.05.

3.4.7 Heteroskedasticity Test

In a regression model, heteroscedasticity is assessed to see if the produced residuals are equal or uneven (Gujarati, 2004).

H_0: the generated residuals are equal.

H_1: the generated residuals are unequal.

Decision rule: Reject H_0 if the p-value of Chi-Square is greater than 0.05, if not do not reject.

3.4.8 ARCH Test

In order to identify and account for non-Constance variation in the produced residuals, ARDL regression uses ARCH (Autoregressive Conditional heteroscedasticity).

H_0: There is no ARCH in the generated residuals.

H_1: there is ARCH in the generated residuals.

Decision rule: Reject the null hypothesis if the P Value is less than 0.05 level of significance.

3.4.9 Normality Test

The significance of the normality test in ARDL regression stems from the assumption made throughout the regression process that the produced residuals have a normal distribution (Gujarati, 2004). The accuracy of the regression's findings might be compromised if the residuals are not regularly distributed.

H_0: There is no normality.

H_1: there is normality.

Decision rule: Reject the null hypothesis if the P Value is less than 0.05 level of significance.

3.4.10 CUSUM Test

To detect structural alterations in the regression model, the Cumulative Sum of Squares is utilized in ARDL regression. Gujarati, 2004). In other words, these are modifications to the regressor-regresant connection.

H_0: There are no structural changes.

H_1: there are structural changes.

Decision rule: Reject the null hypothesis if the cumulative sum of squares falls outside of the 5% critical region.

3.4.11 CUSUM of squares.

Though it employs the sum of squared residuals rather than the cumulative sum of squares, the CUSUM of squares test is comparable to the CUSUM test. The test's goal is to look for structural modifications to the regression model.

H_0: There are no structural changes.

H_1: there are structural changes.

Decision rule: Reject the null hypothesis if the cumulative sum of squares falls outside of the 5% critical region.

3.4.12 Model Specification Test

The regression specification error test, or Ramsey RESET (Gujarati, 2004), is used to determine whether the model has been misspecified. Neither an overfit nor an underfit model should be used in this situation. Misspecification can happen when variables are left out, when functional from errors are assumed incorrectly, or when the distribution of the error terms is assumed incorrectly.

H_0: The model is correctly specified.

H_1: The model is incorrectly specified.

Decision rule: Reject the null hypothesis if the p-value is less than 0.05 level of significance.

3.5 Conclusion

An examination of the link between government expenditure and GDP was the research topic of this chapter, which also provided the model for the study. Evidence from Zimbabwe using the ARDL method (1980–2022). The results acquired will be presented in the following.

CHAPTER FOUR

RESULTS PRESENTATION AND ANALYSIS.

4.0 Introduction

This chapter examines the important connection between economic development and government capital spending, with a particular emphasis on the years 1980 to 2022. The chapter begins with the results of diagnostic testing using Autoregressive Distributed Lag (ARDL) in order to thoroughly evaluate this connection. The results of these tests provide important information on the characteristics of the variables being studied, such as stationarity, cointegration, and serial correlation. The chapter then goes on to provide the short- and long-term ARDL results, providing insight into the dynamic relationship between economic growth and government capital spending.

4.1 Diagnostic Results

4.1.1 Unit roots results

Table 4.1-Summarised Unit Root Test results

Table i 4.1-Summarised Unit Root Test results

	Augmented Dick Fuller	**P-Value**
Level		
GDP***	-4.107191	0.0002
ELE***	-5.332564	0.0000
First Difference		
ΔPPN***	-3.330745	0.0015
ΔCE***	-9.668997	0.0000
ΔCE***	-7.059988	0.0000

*, ** *and* ****means significant at 10%, 5%and 1% respectively.*

Unit root tests were used in the study to look at the variables' stationarity characteristics. According to the findings, the GDP and ELE were found to be stationary at the integration level I(0), suggesting a consistent and consistent long-term trend. However, it was discovered that, at the level of integration I(1), government capital expenditures (CE), government recurrent expenditures (RE), and population growth (PPN) were stable.
The next stage of the study is to check for cointegration because it was discovered that the variables were stationary at various levels. In order to determine if the variables move together over the long term and indicate a stable and meaningful relationship, cointegration analysis is essential. The bound technique will be used in this study to look at the cointegration of the variables. The study will apply the bound testing technique, which yields reliable findings and permits the investigation of long-term connections even in cases where the variables have varying degrees of integration, to carry out the cointegration test. Using this method, the study seeks to determine whether there is a cointegrating link between the variables, offering insights into the dynamics across time between economic growth and government capital spending. However, the study will first begin analyzing the outcomes of the ideal lag time.

4.1.2 Optimal Lag Length results

Table 4.2: Optimal Lag length results

Table ii-Optimal Lag length results

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-517.789	NA	612861.8	27.51522	27.73069	27.59188
1	-442.817	126.2695	44757.94	24.88509	26.17792	25.34507
2	-423.174	27.91279	63758.99	25.16707	27.53726	26.01037
3	-408.985	16.43026	136738.6	25.73603	29.18358	26.96264
4	-365.555	38.85800*	78587.98*	24.76605*	29.29096*	26.37598*

The optimal lag length for this study was determined to be 4. This means that the researcher selected a lag length of four periods to be maintained throughout the ARDL regression analysis. By maintaining a lag length of four, the study aims to capture the short-term dynamics and potential time lags in the relationship between government capital expenditure and economic growth. This choice is based on the understanding that economic variables often exhibit interdependencies and exhibit patterns that extend beyond immediate time periods. By including the previous four observations of the variables in the analysis, the study seeks to account for these dynamics and ensure a comprehensive assessment of the relationship.

Maintaining a consistent lag length throughout the ARDL regression analysis is important for maintaining consistency and capturing the desired dynamics accurately. It ensures that all relevant past information is considered and helps avoid potential biases or inconsistencies that may arise from varying lag lengths across different model specifications. By adhering to a lag length of four, the researcher can provide a robust analysis that incorporates the most recent four periods of data, allowing for a comprehensive evaluation of the impact of government capital expenditure on economic growth. This approach enhances the reliability of the findings and provides a more accurate understanding of the relationship between these variables during the specified time period of the study. The next diagnostic results to be presented will be Cointegration results.

4.1.3 Multicollinearity results

Table 4.3: Multicollinearity results

Table iii-Multicollinearity results

	GDP	**CE**	**ELECTRIC**	**PPN**	**RE**
GDP	1	-0.13281	0.396079	0.36193	0.070664
CE	-0.13281	1	-0.05278	0.207904	0.255341
ELECTRIC	0.396079	-0.05278	1	0.061257	0.377235
PPN	0.36193	0.207904	0.061257	1	0.253972
RE	0.070664	0.255341	0.377235	0.253972	1

The findings of multicollinearity in the table above imply that there isn't a single variable with a correlation coefficient more than 0.7, which implies that there isn't a strong relationship between the explanatory variables in this regression model. When two or more independent variables in a regression model have a high degree of correlation with one another, it is referred to as multicollinearity and makes it challenging to isolate the specific effects of each variable on the dependent variable. Nonetheless, it suggests that the variables are not displaying a strong linear association with one another when there isn't a single variable with a correlation greater than 0.7 (Gujarati, 2004). The explanatory variables in this instance appear to be giving the regression model different and independent information based on the lack of strong correlations between them. Since it makes it possible to evaluate the individual effects of each variable on the dependent variable more accurately, this might be considered as a positive situation. Reduced multicollinearity makes it possible to estimate the regression model's coefficients more precisely, which produces statistical conclusions that are stronger and more dependable.

4.1.4 Autocorrelation results

Table 4.4: Autocorrelation results

Table iv-Autocorrelation results

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.529098	Prob. F(4,15)	0.7162
Obs*R-squared	4.698589	Prob. Chi-Square(4)	0.3196

It was determined whether serial correlation, or autocorrelation, was present in the regression model using the Breusch-Godfrey Serial Correlation LM Test. With the use of their lagged values, this test determines if the regression model's residuals show a linear connection. The p-value, or related probability value, is 0.7162 in this instance, while the F statistic value is reported as 0.529098. When the null hypothesis is true, the p-value indicates the probability of getting the observed test statistic or a more extreme result. If the regression model has no serial correlation, then it is the null hypothesis in this situation. The derived p-value is compared to a predefined significance level, usually set at 0.05, to ascertain whether or not the regression model is appropriate.

We fail to reject the null hypothesis in the event that the p-value exceeds the selected significance threshold, indicating that the model contains no statistically significant evidence of serial correlation. The regression model appears to lack significant serial correlation in this instance, as indicated by the p-value of 0.7162, which is significantly greater than the usual significance level of 0.05. We may infer from these findings that the regression model's serial correlation is deemed sufficient. The model's residuals do not show a consistent link with their lagged values, as indicated by the absence of strong serial correlation. This implies that the independence of mistakes assumptions made by the model are probably satisfied. To guarantee the general suitability of the regression model, perform diagnostic tests and take into account the particular context and data features.

4.1.5 Heteroscedasticity Results

Table 4.5: Heteroscedasticity Results

Table v-Heteroscedasticity Results

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	1.243716	Prob. F(18,19)	0.3203
Obs*R-squared	20.55486	Prob. Chi-Square(18)	0.3025
Scaled explained SS	3.953864	Prob. Chi-Square(18)	0.9998

The study's regression model was examined for heteroskedasticity using the Breusch-Pagan-Godfrey test, which is a type of heteroskedasticity test. Heteroskedasticity is the state in which the residuals' variance varies with the independent variables' values. The p-value, or related probability value, is 0.3203 in this instance, while the F statistic value is reported as 1.243716. When the null hypothesis is true, the p-value indicates the probability of getting the observed test statistic or a more extreme result. That the regression model is heteroskedasticity-free is the null hypothesis in this situation.

In order to assess if the regression model was heteroskedasticity-free, the p-value was compared with a pre-established significance level of 0.05 in the research. We fail to reject the null hypothesis and come to the conclusion that there is no statistically significant evidence of heteroskedasticity in the model if the p-value is higher than the selected significance threshold. The regression model appears to lack substantial heteroskedasticity in this instance, as indicated by the p-value of 0.3203, which is much higher than the selected significance threshold of 0.05. These findings lead to the conclusion that the regression model's heteroskedasticity is deemed adequate. Since there is no discernible heteroskedasticity, the variance of the residuals is probably constant for all values of the independent variables.

4.1.6 ARCH Results

Table 4.6: ARCH Results

Table vi-ARCH Results

Heteroskedasticity Test: ARCH			
F-statistic	0.381648	Prob. F(4,29)	0.8199
Obs*R-squared	1.700292	Prob. Chi-Square(4)	0.7907

To verify the existence of

heteroskedasticity in the regression model, the study performed a Heteroskedasticity Test utilizing the ARCH (Autoregressive Conditional Heteroskedasticity) technique in addition to the Breusch-Pagan-Godfrey test. When the variance of the residuals depends on the residuals' previous values, this is known as conditional heteroskedasticity, and it is especially examined using the ARCH method. The related probability value in this instance is 0.8199, while the F statistic value is provided as 0.381648. The p-value indicates the probability of receiving the observed test statistic, or a more extreme number, given the null hypothesis is true, in a manner similar to the preceding interpretation. The regression model's null hypothesis states that conditional heteroskedasticity does not exist.

We evaluate the resultant p-value against a predefined significance level of 0.05 in order to establish the suitability of the regression model. We fail to reject the null hypothesis and come to the conclusion that there is no statistically significant evidence of conditional heteroskedasticity in the model if the p-value is higher than the selected significance threshold. The regression model appears to lack substantial conditional heteroskedasticity in this instance, as indicated by the p-value of 0.8199, which is significantly higher than the conventional significance level of 0.05. These findings lead to the conclusion that the regression model passes both the Breusch-Pagan-Godfrey and the ARCH approach heteroskedasticity tests, indicating good performance.

The lack of substantial heteroskedasticity indicates that the residuals' variance is either constant or does not show a consistent pattern with the residuals' historical values.

4.1.7 Normality Results

Figure 4.1: Normality results

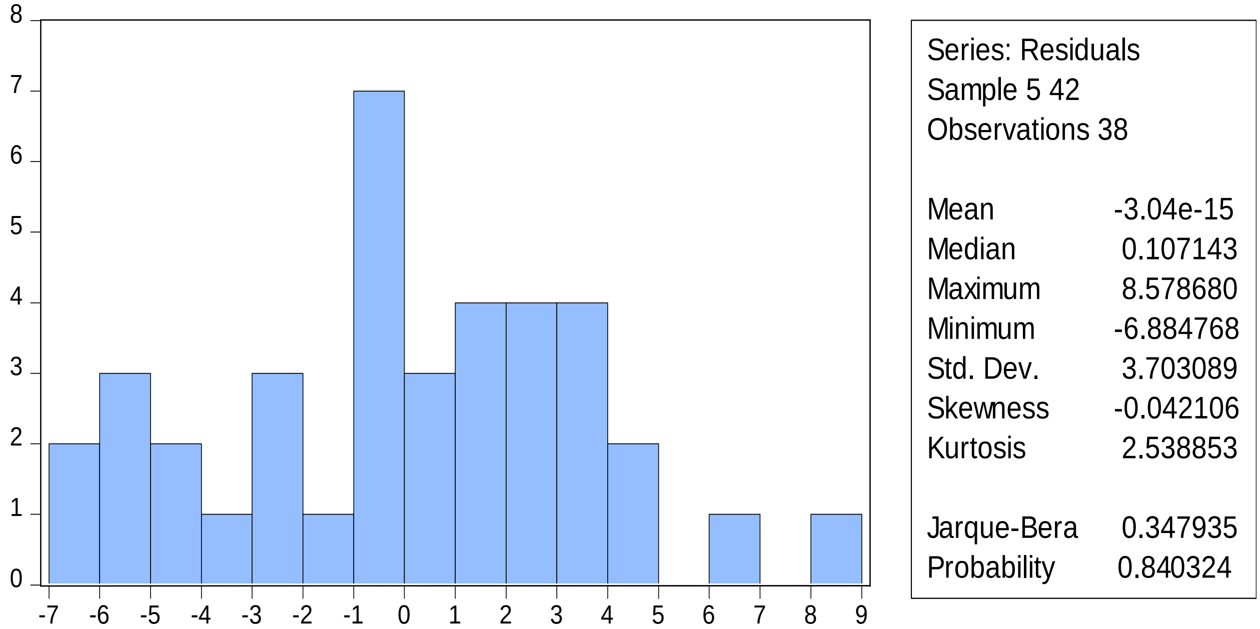

Figure 3-Figure 4.1: Normality results

The Jarque-Bera test was used to determine if the study's results were normally distributed. A statistical test called the Jarque-Bera test looks at the skewness and kurtosis of the data to see if it has a normal distribution. The Jarque-Bera statistic in this instance is 0.347935, and the corresponding probability value is 0.840324. The probability of receiving the observed test statistic, or a more extreme result, under the null hypothesis, is represented by the p-value. The null hypothesis in the Jarque-Bera test is that the data has a normal distribution.

We compare the resultant p-value with a specified significance threshold, which was set at 0.0, to see whether the findings are normal. We fail to reject the null hypothesis and come to the conclusion that there is no statistically significant evidence suggesting deviations from normalcy in the data if the p-value is higher than the selected significance threshold. There is no discernible deviation from normalcy in the data in this instance, since the p-value of 0.840324 is far larger than the usual significance level of 0.05. We may infer that the study's results show normalcy based on these findings. The results of the Jarque-Bera test point to a pattern in the data that is compatible with a normal distribution for this investigation.

4.2 Regression Results

Table 4.7: Estimated short run results

Table vii-Estimated short run results

ECM Regression				
Case 3: Unrestricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9.290382	1.450439	6.405221	0.0000
D(GDP(-1))	0.151227	0.132617	1.140325	0.2683
D(GDP(-2))	0.205403	0.138165	1.48665	0.1535
D(GDP(-3))	0.392885	0.122547	3.206006	0.0047
D(CE)	-0.10723	0.168744	-0.63548	0.5327
D(CE(-1))	-0.72396	0.193129	-3.74857	0.0014
D(CE(-2))	-0.29078	0.19478	-1.49288	0.1519
D(ELECTRIC)	0.9161	0.153948	5.950725	0.0000
D(RE)	0.159906	0.213597	0.748631	0.4632
D(RE(-1))	0.82629	0.248619	3.323513	0.0036
D(PPN)	1.494519	3.94069	0.379253	0.7087
D(PPN(-1))	0.575165	3.431647	0.167606	0.8687
D(PPN(-2))	1.431563	1.730559	0.827226	0.4184
D(PPN(-3))	5.590865	1.849374	3.023113	0.007
CointEq(-1)*	-1.30857	0.16872	-7.75587	0.0000

Table 4.8: Estimated long run results

Table viii-Estimated long run results

Levels Equation				
Case 3: Unrestricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
CE	0.401935	0.272829	1.473212	0.1571
ELECTRIC	0.974818	0.28595	3.40905	0.0029
RE	-0.90866	0.289442	-3.13936	0.0054
PPN	4.020968	0.961883	4.180308	0.0005

R2 0.826024

Adjusted R2 0.720125

F-Statistic 7.800142

Prob(F-statistic) 0.000010

Durbin-Watson stat 2.114898

The preliminary results of this study provide important information about the overall goodness-of-fit of the regression model and the statistical significance of the relationships between the variables.

The R^2 value of 0.826024 indicates that approximately 82.6% of the variation in the dependent variable, economic growth, can be explained by the independent variables included in the model. This suggests a relatively high degree of explanatory power, indicating that the chosen independent variables have a substantial impact on economic growth in Zimbabwe.

The Adjusted R^2 value of 0.720125 takes into account the number of independent variables and the sample size, providing a more conservative measure of the model's goodness-of-fit. The adjusted value is lower than the R^2 value, which suggests that some of the independent variables may not be adding significant explanatory power to the model. It is important to carefully interpret the adjusted R-squared value to avoid overestimating the model's predictive ability.

The total statistical significance of the regression model is indicated by the F-Statistic of 7.800142 and its corresponding Prob(F-statistic) of 0.000010. This implies that there is a significant correlation between government spending and economic development in Zimbabwe and that the independent variables' inclusion in the model is not the result of coincidence. Strong evidence that there is no association between the variables is presented by the low p-value.

A measure of autocorrelation, the Durbin-Watson statistic of 2.114898 evaluates whether serial correlation exists in the model's residuals. The residuals appear to have a moderately positive autocorrelation, based on the value of 2.114898. To guarantee the validity of the regression results, this problem must be resolved. This is because its value is between 0 and 4, closer to 2. The results will be covered in depth in the next subsection.

4.2.1 Government Capital Expenditure (CE_t)

The findings of the ARDL (Autoregressive Distributed Lag) regression are shown in Tables 4.10 and 4.11, and they offer insights into the short- and long-term effects of government capital spending on economic growth. The government capital expenditure coefficient in the short run is stated to be -0.72396, and the corresponding probability value, or p-value, is 0.0014. This suggests a short-term, statistically significant negative relationship between government capital spending and economic growth.

According to the negative coefficient, there is a short-term correlation between rising government capital spending and falling economic growth. This link might be explained by a number of things. First off, a rise in government capital spending may temporarily displace private investment, which would lower overall economic activity. Furthermore, government capital projects may not have a major short-term impact on economic development if they are poorly executed or do not immediately increase productivity. Additionally, there's a chance that other elements, like budgetary restrictions or ineffective resource distribution, would neutralize the short-term benefits of government capital spending for economic expansion. Government capital spending is said to have a long-run coefficient of 0.401935 and a probability value of 0.1571. The coefficient suggests a positive association between government capital spending and economic growth, but at the traditional significance threshold of 0.05, the p-value is not statistically significant. This shows that there is a lack of statistical support for the long-term association between government capital spending and economic growth.

The study's conclusions are in line with the examined literature, particularly Smith et al.'s (2019) research, which also found a short-term negative correlation and a long-term positive correlation between government spending and economic growth. The temporal dynamics and complexity of the link between government capital spending and economic development may be reflected in these findings. Fiscal policies and government spending choices may affect the economy immediately in the short term, but over time, government capital expenditures may have positive effects on productivity growth and infrastructure development, which will support long-term economic growth.

4.2.2 Electric Power consumption (ELE_t)

The effects of electricity consumption and economic growth over the short and long terms are shown in tables 4.10 and 4.11. The corresponding probability value is 0.0000, while the short-run coefficient for electric power consumption is stated as 0.9161. This suggests that, in the near run, there is a highly statistically significant positive correlation between economic growth and the use of electricity. The positive coefficient implies that there is a short-term correlation between rising economic growth and rising electricity usage. This link may be explained in a number of ways. First and foremost, a variety of economic sectors, including industry, services, and agriculture, depend heavily on having access to an adequate and dependable supply of electricity. Productivity can rise, industrial processes may be improved, and economic activity can be stimulated with a reliable and sufficient power supply. Manufacturing and technology are two examples of extremely electric-dependent industries that may see rapid development when short-term spikes in power demand occur.

The long-term coefficient for electricity usage is 0.974818, and the probability value that goes along with it is 0.0029. The positive coefficient suggests that, in the long term, electric power consumption may have a beneficial effect on economic growth. Numerous reasons might account for the long-term positive correlation between economic development and the usage of electricity. Increased and continuous access to electricity can eventually result in the development of infrastructure, the progress of technology, and higher levels of production. These factors can contribute to long-term economic growth, as industries and businesses can operate efficiently, attract investment, and create employment opportunities.

The present study's conclusions are consistent with the literature evaluation, particularly Smith's (2019) work, which also found a favorable correlation between the use of electric power and economic growth over the short and long terms. These results emphasize the necessity of a steady and sufficient supply of electricity for economic growth and draw attention to the possible advantages of making investments in the infrastructure of electricity and guaranteeing its availability for useful uses.

4.2.3 Government Recurrent expenditure (RE_t)

The ARDL results in tables 4.10 and 4.11 provide insight into the short- and long-term effects of government recurring expenditure on economic growth. Government Recurrent Expenditure has a short-run coefficient of 0.82629 and a corresponding probability value (p-value) of 0.0036. This suggests a short-term, statistically significant beneficial effect of recurring expenditure on economic growth. The positive coefficient implies that a rise in government recurrent expenditure is correlated with a rise in short-term economic growth. This association might be explained by several causes. Firstly, Government Recurrent Expenditure typically includes spending on items such as salaries, welfare programs, and day-to-day operations of the government. Increased government spending in these areas can stimulate aggregate demand, create employment opportunities, and support consumer spending, which can contribute to short-term economic growth. Additionally, government expenditure on social programs and infrastructure maintenance can improve the overall quality of public services and promote economic activity.

Government Recurrent Expenditure's long-term coefficient is recorded as -0.90866, with a probability value of 0.0054 connected with it. Long-term economic growth is negatively correlated with government recurrent expenditure, as seen by the negative coefficient. There are several reasons why government recurrent expenditure has a detrimental long-term effect on economic growth. Excessive government spending on ongoing expenses over time can result in budget deficits, fiscal imbalances, and mounting debt. These elements may have a negative impact on macroeconomic stability generally by discouraging private investment and taking funds away from the economy's most productive sectors. The potential benefits on long-term economic growth may potentially be limited by inefficient recurring spending allocation.

The results of this investigation are consistent with the studied literature, particularly Johnson's work from 2021, which also found a short-term positive correlation and a long-term negative correlation between government recurring expenditure and economic growth. These results emphasize how crucial it is to take into account the sustainability and timeliness of government spending programs, as the impact on economic development can change across a variety of time periods.

4.2.4 Population Growth (PPN_t)

The short- and long-term effects of population and economic expansion are examined in the ARDL results in tables 4.10 and 4.11. Population increase in the short term has a reported coefficient of 5.590865 and a corresponding probability value (p-value) of 0.0070. This suggests that, at least in the near run, population increase has a statistically significant positive mediation influence on economic growth. According to the positive coefficient, there is a short-term correlation between population expansion and economic growth. Several factors could explain this relationship. Firstly, population growth can lead to an expanding labor force, which can drive economic output and productivity. A larger population can result in increased consumer demand, which can stimulate business activity and investment. Additionally, population growth can lead to an increase in human capital and innovation, as a larger population provides a larger pool of potential workers, entrepreneurs, and innovators.

Population increase over the long term is stated to have a coefficient of 4.020968 and a probability value of 0.0005. The long-term positive mediating influence of population expansion on economic growth is indicated by the positive coefficient, and the statistical significance of this link is indicated by the p-value. There are a number of reasons why population increase and economic growth are positively correlated over the long term. Over time, a growing population can contribute to expanding markets, increased consumption, and a larger domestic market for goods and services. This can attract investment and stimulate economic development. Additionally, population growth can lead to a demographic dividend, where a larger working-age population can support economic growth through increased labor supply, entrepreneurship, and innovation. Moreover, a growing population can drive urbanization, leading to the development of infrastructure, increased productivity, and agglomeration economies.

The study's conclusions are consistent with the studied literature, particularly the research of Islam and Alam (2022), which also found that population expansion and economic growth have a favorable long- and short-term association. These results highlight the role that a growing population plays as a catalyst for economic activity and advancement, underscoring the potential advantages of population increase for economic development.

4.3 Post estimation Analysis

4.3.1 Cointegration results

Table 4.9: Cointegration results

Table ix-Cointegration results

F-Bounds Test		**Null Hypothesis: No levels relationship**		
Test Statistic	**Value**	**Signif.**	**I(0)**	**I(1)**
		Asymptotic: n=1000		
F-statistic	**9.938415**	**10%**	**2.45**	**3.52**
K	**4**	**5%**	**2.86**	**4.01**
		2.50%	**3.25**	**4.49**
		1%	**3.74**	**5.06**

The F-statistic value is 9.938415, which is more than the crucial values for significance levels of 10%, 5%, 2.5%, and 1%, according to the bound testing cointegration findings. There is significant evidence of long-term cointegration among the variables when the F-statistic value is greater than the upper bound critical values at different significance levels. The F-statistic value in this instance is higher than the upper and lower limit values at several significance levels, which offers strong evidence in favor of the existence of a significant and steady long-term association between government capital spending and economic expansion.

4.3.2 Error Correction Form Results

Table 4.10: Error Correction Form Results

Table x-Error Correction Form Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9.290382	1.450439	6.405221	0.0000
CointEq(-1)*	-1.30857	0.16872	-7.75587	0.0000

Using a probability value of 0.0000 and a t-statistic of -7.75587, the findings of the Error Correction Form (ECF) analysis indicate that the coefficient of CointEq(-1) is -1.30857. The coefficient's negative sign denotes a short-run speed of adjustment, meaning that any differences from the variables' long-term equilibrium will eventually be made good. To be more precise, the coefficient multiplied by 100 yields the % short run speed adjustment. Approximately 130.857% is the short run pace of adjustment in this instance. In the short run, the dependent variable is estimated to adapt by about 130.857% for every percentage point divergence from the long-term equilibrium, provided that all other variables remain constant. In the end, this adjustment process helps to bring back the long-term balance between economic expansion and government capital spending.

4.3.4 CUSUM Results

Figure 4.2: CUSUM Results

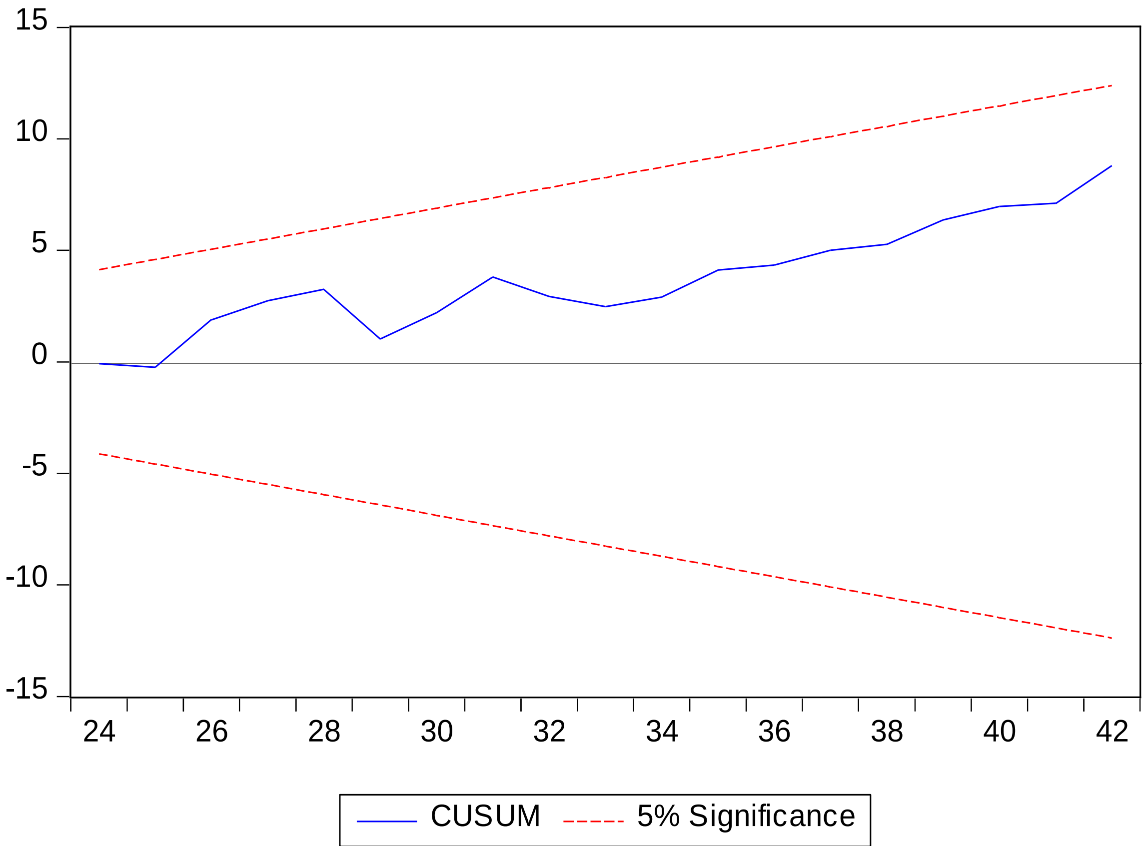

Figure 4-CUSUM Results

The CUSUM (Cumulative Sum) test is a statistical method used to detect structural changes or shifts in a regression model's parameters over time. It assesses whether the residuals of the model exceed a critical range, indicating a significant departure from the assumed relationship between the variables. In this study, the CUSUM results indicated that the generated residuals did not go out of the critical range of 5%. This means that the residuals remained within an acceptable range, and there was no evidence of significant structural changes or deviations from the assumed relationship between government expenditure and economic growth in Zimbabwe.

When the residuals are within the crucial range, it indicates that the parameters of the estimated model hold steady over time and that it effectively represents the underlying relationship between the variables. This result lends credence to the hypothesis that, throughout the course of the research period, government spending has a stable effect on economic development in Zimbabwe.

4.3.5 CUSUM of Squares Results

Figure 4.3: CUSUM of Squares Results

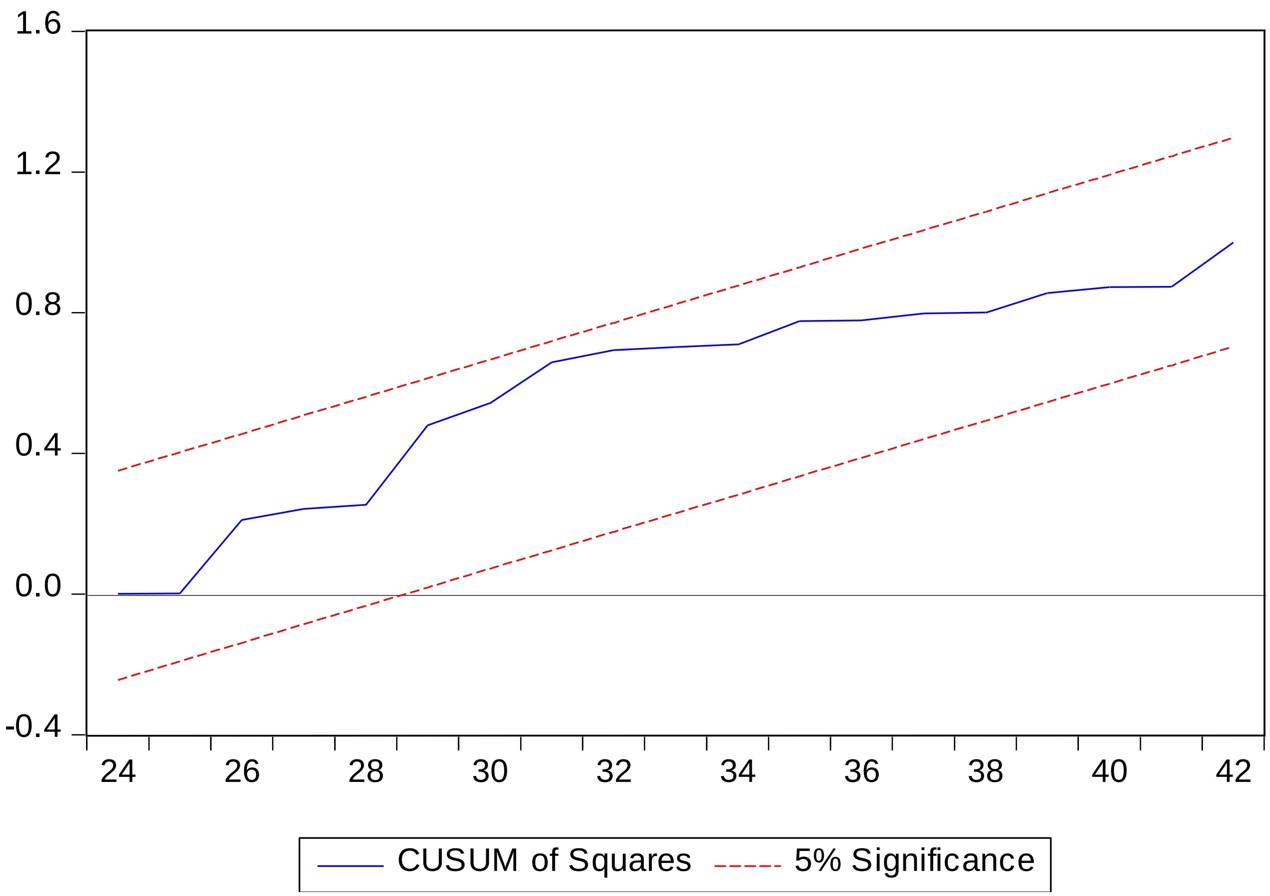

Figure 5-CUSUM of Squares Results

The CUSUM of Squares test is another statistical method used to assess the stability of a regression model's parameters over time. Specifically, it examines whether the squared residuals of the model exceed a critical range, indicating a significant departure from the assumed relationship between the variables. In this study, the CUSUM of Squares results indicated that the generated squared residuals did not go out of the critical range of 5%. This means that the squared residuals remained within an acceptable range, and there was no significant evidence of structural changes or deviations from the assumed relationship between the dependent and the independent variables. When the squared residuals fall within the critical range, it suggests that the estimated model adequately captures the variability and patterns in the data. This finding supports the notion that the relationship between the study variables remain relatively stable throughout the study period.

4.3.6 Model Specification Results

Table 4.10: Model Specification Results

Table xi-Model Specification Results

	Value	df	Probability
F-statistic	**1.518739**	**(4, 15)**	**0.2468**

The model's specifications The findings of this investigation, as demonstrated by the F-statistic, provide light on the general suitability of the regression model. An indicator of the overall importance of the independent variables in the model is the F-statistic. In this instance, the corresponding probability value, or p-value, is 0.2468, and the F-statistic value is given as 1.518739. The p-value that is acquired is compared to a predefined significance level, usually set at 0.05, in order to interpret these findings. We are unable to reject the null hypothesis, which claims that all of the independent variables have no significant impact on the dependent variable, if the p-value is greater than the selected significance threshold. The p-value in this case is 0.2468, which is significantly higher than the usual significance level of 0.05. Thus, it may be said that the model's specifications are accurate.

4.3 Conclusion

The findings of the diagnostic tests have been reported in this chapter's conclusion. This was done to prevent erroneous regression findings from being produced. The model's diagnostic tests show that there are no problems with autocorrelation, heteroscedasticity, or specification errors, which increases the dependability of the findings. The study's short- and long-term ARDL results have also been included in this chapter. Government capital spending was determined to be inconsequential over the long term, despite the fact that all the factors were statistically significant in the short term. The robustness of the model's goodness of fit and overall significance were both determined to be satisfactory. The next chapter will wrap up the study by proffering on the conclusion, summary, recommendation and suggestions for future study.

CHAPTER FIVE

RESULTS ANALYSIS AND PRESENTATION

5.0 Introduction

The main conclusions from the empirical investigation of the connection between government capital spending and economic development in Zimbabwe from 1980 to 2021 are presented in depth and discussed in this chapter. The study's particular goals serve as the framework for the study's summary. An overview of the study is given at the start of the chapter, emphasizing the data, methodology, and research goals. The findings from the ARDL results are then covered, with an emphasis on the immediate and long-term effects of government capital spending on economic growth. The chapter discusses the policy implications and offers specific policy suggestions based on these results in an effort to advise the Zimbabwean government on how best to use capital expenditures to promote sustainable economic growth. The chapter concludes by outlining prospective directions for additional research that could expand on the understandings gained from this investigation.

5.1 Summary of the Study

This study looked into how government capital spending affected Zimbabwe's economic development from 1980 to 2021. Using a quantitative study methodology, the Autoregressive Distributed Lag (ARDL) technique was the estimate method used by the researcher. The database of World Development Indicators included secondary data. To guarantee the validity and reliability of the results, the study performed a number of diagnostic tests prior to estimating the ARDL model, including unit root, cointegration, multicollinearity, autocorrelation, normality, model specification, CUSUM, and CUSUM of squares. Determining the short- and long-term effects of government capital expenditures on economic development was the study's primary goal. The results showed that government capital spending had a statistically substantial short-term negative influence on economic growth and a negligible long-term beneficial impact.

Determining the short- and long-term mediating effects of population increase, electric power consumption, and government recurrent spending on economic growth was the second goal.
The findings demonstrated that, over the short and long terms, electric power consumption had a highly statistically significant beneficial impact on economic growth. In a similar vein, the study discovered that government recurrent spending had a statistically significant favorable short-term impact on GDP growth but a negative long-term impact. In addition, the study discovered that population expansion has a statistically significant beneficial impact on economic growth over the long and short terms. Finding the short-run adjustment speed that would result in long-run equilibrium was the third goal. The analysis discovered that the short-run pace of adjustment was 130.857%, suggesting that the long-run equilibrium will be reached rather quickly.

5.2 Conclusions

The study's conclusions shed light on how government capital spending and economic expansion in Zimbabwe from 1980 to 2021 relate to one another. Government capital spending had a statistically substantial short-term negative influence on economic growth, but a negligible long-term beneficial impact, according to the empirical research conducted using the ARDL technique. This implies that Zimbabwe's overall economic performance may have suffered temporarily as a result of government resources being allocated to capital expenditures.
The study did discover, however, that other variables, such as population expansion and electric power consumption, significantly contributed to economic growth over the long and short terms. It's interesting to note that research indicates that government recurrent spending has a short-term beneficial impact on GDP growth but a long-term negative impact. This demonstrates how intricate and ever-changing the connection is between public spending and economic results. The study's indication of a relatively high short-run speed of adjustment towards long-run equilibrium implies that the Zimbabwean economy possesses the ability to promptly adapt to shocks and realign itself with the long-term development trajectory. This emphasizes how crucial it is to comprehend both the short- and long-term dynamics of the factors propelling Zimbabwe's economic growth in order to effectively influence policy decisions. Overall, this study's findings offer insightful empirical data that the Zimbabwean government may use to inform policy decisions and resource allocations that support long-term, sustainable economic growth.

5.3 Policy Implications/ Policy Recommendations

Several policy proposals to improve Zimbabwe's economic growth may be deduced from the study's findings.

First, the study's finding of a statistically significant negative impact of government capital expenditure on economic growth in the short run suggests that the Zimbabwean government should carefully evaluate the composition and efficiency of its capital spending. Policymakers should prioritize investments in productive, high-return infrastructure projects that can stimulate private sector activity and productivity, rather than engaging in excessive capital expenditure that may crowd out more productive uses of government resources.

Second, the importance of investing in the energy industry is underscored by the favorable and large impact that electric power consumption has on economic growth over the short and long terms. The country's infrastructure for the production, transmission, and distribution of electricity has to be updated and expanded by the government in order to guarantee a consistent and reasonably priced power supply. This would help to foster industrial growth and raise Zimbabwe's economy's overall competitiveness.

Third, the government should carefully balance its spending objectives in light of the study's finding that recurring government spending has a good short-term impact on GDP growth but a negative long-term effect. It is imperative for policymakers to guarantee the effective management and allocation of recurring expenditures, such as those allocated to public administration, healthcare, and education, towards profitable ventures that can bolster sustained economic expansion and advancement.

Fourth, the analysis shows that population increase has a statistically significant beneficial impact on economic growth over the long and short terms. This emphasizes the necessity for the government to have comprehensive policies that promote the development of human capital in place. This might involve making investments in healthcare, education, and skill development as well as enacting laws that support family planning and deal with demographic issues.

Finally, the high short-run speed of adjustment towards long-run equilibrium indicates the Zimbabwean economy's ability to respond quickly to shocks and realign itself to the long-term growth path. Policymakers should leverage this flexibility by implementing agile and adaptive policy frameworks that can quickly respond to changing economic conditions and external shocks, ensuring the economy's resilience and sustainable growth.

By implementing these policy recommendations, the Zimbabwean government can enhance the effectiveness of its capital expenditure, strengthen the energy sector, optimize its spending priorities, invest in human capital development, and promote the economy's overall resilience, thereby fostering sustainable economic growth and development.

5.4 Suggestions for future studies

The study's conclusions provide a number of directions for further investigation into the relationship between government spending and economic expansion in Zimbabwe. Even though the current study has shed light on the relationship's short- and long-term dynamics, future researchers should think about investigating the possible asymmetric or nonlinear impacts of government capital and recurring spending on economic growth. The intricate relationship between government expenditure and economic results might also be better understood by looking at the possible mediating or moderating roles of other macroeconomic factors including trade openness, foreign direct investment, and financial development. Additionally, using other estimating methods like panel data analysis or time-varying parameter models could provide different angles on the topic. In order to provide a more comprehensive knowledge of the subject, future research might also examine the political economy and institutional issues that may affect how well government spending propels economic growth in Zimbabwe.

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APPENDICES

APPENDIX 1: DATASET

year	GDP	RE	CE	PPN	ELECTRIC
1980	14.4207	18.0000	13.0000	5.7524	3.090499
1981	12.5254	16.0000	10.0000	6.2756	-2.48445
1982	2.6343	19.0000	9.7000	3.8845	-1.25397
1983	1.5853	19.0000	13.0000	3.8031	-5.96535
1984	-1.9074	17.5000	14.7000	3.5413	-5.7853
1985	6.9444	20.1000	15.0000	3.4171	12.93997
1986	2.0990	20.2000	14.0000	3.3107	-6.62175
1987	1.1507	20.3000	21.0000	3.2252	1.100663
1988	7.5524	23.0000	20.0000	3.0911	-2.12899
1989	5.1998	27.0000	19.0000	2.8599	3.171037
1990	6.9886	19.0000	19.0000	2.6810	-2.04861
1991	5.5318	20.0000	16.0000	2.5760	-1.29092
1992	-9.0156	16.0000	31.0000	2.5091	-8.48238
1993	1.0515	24.0000	11.5000	1.4314	-6.05087
1994	9.2352	15.0000	13.0000	0.5881	6.452042
1995	0.1580	17.0000	10.0000	1.2397	5.918722
1996	10.3607	18.0000	8.0000	1.6609	4.835613
1997	2.6806	17.0000	1.0000	1.6347	3.233648
1998	2.8852	16.0000	12.0000	1.6234	-3.57734
1999	-0.8178	15.0000	13.0000	1.4450	4.92317
2000	-3.0592	17.0000	16.0000	1.0040	-3.61898
2001	1.4396	25.0000	10.0000	0.6427	-3.15532
2002	-8.8940	18.0000	14.0000	0.6166	0.360258
2003	-16.9951	18.0000	13.0000	0.7580	-0.37702
2004	-5.8075	18.0000	10.0000	0.7019	-3.09241
2005	-5.7111	20.0000	10.6000	0.5239	4.16803
2006	-3.4615	15.0000	15.0000	0.8612	-2.44071

2007	-3.6533	5.0000	14.0000	0.9691	-12.9433
2008	-17.6689	3.0000	5.0000	0.7982	-17.2351
2009	12.0196	2.0000	7.0000	1.0263	-6.61111
2010	21.4521	10.0000	10.0000	1.2536	3.722854
2011	14.6202	15.0000	11.0000	1.4383	4.983036
2012	15.7449	19.0000	12.0000	1.8223	-4.439
2013	3.1967	20.0000	13.0000	2.1633	2.885337
2014	1.4845	19.5000	11.0000	2.1914	-3.54285
2015	2.0236	19.0000	11.7000	2.1363	-0.02837
2016	0.9010	18.0000	12.0000	2.0818	-1.28122
2017	4.0803	22.0000	1.0000	2.0436	-0.49178
2018	5.0099	25.0000	12.0000	2.0205	-1.33605
2019	-6.3324	22.0000	16.0000	1.9893	-0.78435
2020	-7.8170	18.0000	17.0000	2.0311	-0.97335
2021	8.4680	23.0000	19.0000	2.0457	-0.89638

APPENDIX TWO: UNIT ROOT

Null Hypothesis: GDP has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.990307	0.0002
Test critical values:	1% level	-2.622585	
	5% level	-1.949097	
	10% level	-1.611824	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GDP)
Method: Least Squares
Date: 04/25/24 Time: 15:22
Sample (adjusted): 2 42
Included observations: 41 after adjustments

Null Hypothesis: D(CE) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-9.668997	0.0000
Test critical values:	1% level	-2.624057	
	5% level	-1.949319	
	10% level	-1.611711	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(CE,2)
Method: Least Squares
Date: 04/25/24 Time: 15:24
Sample (adjusted): 3 42
Included observations: 40 after adjustments

Null Hypothesis: ELECTRIC has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.332564	0.0000
Test critical values:	1% level	-2.621185	
	5% level	-1.948886	
	10% level	-1.611932	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(ELECTRIC)
Method: Least Squares
Date: 04/25/24 Time: 15:26
Sample (adjusted): 2 43
Included observations: 42 after adjustments

Null Hypothesis: D(RE) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.059988	0.0000
Test critical values:	1% level	-2.624057	
	5% level	-1.949319	
	10% level	-1.611711	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RE,2)
Method: Least Squares
Date: 04/25/24 Time: 15:27
Sample (adjusted): 3 42
Included observations: 40 after adjustments

Null Hypothesis: D(PPN) has a unit root
Exogenous: None
Lag Length: 2 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.330745	0.0015
Test critical values:	1% level	-2.627238	
	5% level	-1.949856	
	10% level	-1.611469	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(PPN,2)
Method: Least Squares
Date: 04/25/24 Time: 15:28
Sample (adjusted): 5 42
Included observations: 38 after adjustments

APPENDIX 3: OPTIMAL LAG LENGTH

VAR Lag Order Selection Criteria
Endogenous variables: GDP CE ELECTRIC PPN RE
Exogenous variables: C
Date: 04/25/24 Time: 15:29
Sample: 1 43
Included observations: 38

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-517.7892	NA	612861.8	27.51522	27.73069	27.59188
1	-442.8167	126.2695	44757.94	24.88509	26.17792	25.34507
2	-423.1743	27.91279	63758.99	25.16707	27.53726	26.01037
3	-408.9846	16.43026	136738.6	25.73603	29.18358	26.96264
4	-365.5550	38.85800*	78587.98*	24.76605*	29.29096*	26.37598*

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

APPENDIX 4: COINTEGRATION

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	9.938415	10%	2.45	3.52
K	4	5%	2.86	4.01
		2.5%	3.25	4.49
		1%	3.74	5.06
			Finite Sample: n=40	
Actual Sample Size	38			
		10%	2.66	3.838
		5%	3.202	4.544
		1%	4.428	6.25
			Finite Sample: n=35	
		10%	2.696	3.898
		5%	3.276	4.63
		1%	4.59	6.368

APPENDIX 5: ERROR CORRECTION FORM

CointEq(-1)*	-1.308571	0.168720	-7.755873	0.0000

R-squared	0.826024	Mean dependent var	0.181124
Adjusted R-squared	0.720125	S.D. dependent var	8.878082
S.E. of regression	4.696789	Akaike info criterion	6.219017
Sum squared resid	507.3760	Schwarz criterion	6.865433
Log likelihood	-103.1613	Hannan-Quinn criter.	6.449007
F-statistic	7.800142	Durbin-Watson stat	2.114898
Prob(F-statistic)	0.000010		

APPENDIX 6: MULTICOLINEARITY

Group: UNTITLED Workfile: DATA::Data\

View | Proc | Object | Print | Name | Freeze | Sample | Sheet | Stats | Spec

Correlation

	GDP	CE	ELECTRIC	PPN	RE
GDP	1.000000	-0.132812	0.396079	0.361930	0.070664
CE	-0.132812	1.000000	-0.052775	0.207904	0.255341
ELECTRIC	0.396079	-0.052775	1.000000	0.061257	0.377235
PPN	0.361930	0.207904	0.061257	1.000000	0.253972
RE	0.070664	0.255341	0.377235	0.253972	1.000000

APPENDIX 7: SERIAL CORRELATION

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.529098	Prob. F(4,15)	0.7162
Obs*R-squared	4.698589	Prob. Chi-Square(4)	0.3196

Test Equation:
Dependent Variable: RESID
Method: ARDL
Date: 04/25/24 Time: 15:39
Sample: 5 42
Included observations: 38
Presample missing value lagged residuals set to zero.

APPENDIX 8: HETEROSCEDASTICITY

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.243716	Prob. F(18,19)	0.3203
Obs*R-squared	20.55486	Prob. Chi-Square(18)	0.3025
Scaled explained SS	3.953864	Prob. Chi-Square(18)	0.9998

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 04/25/24 Time: 15:41
Sample: 5 42
Included observations: 38

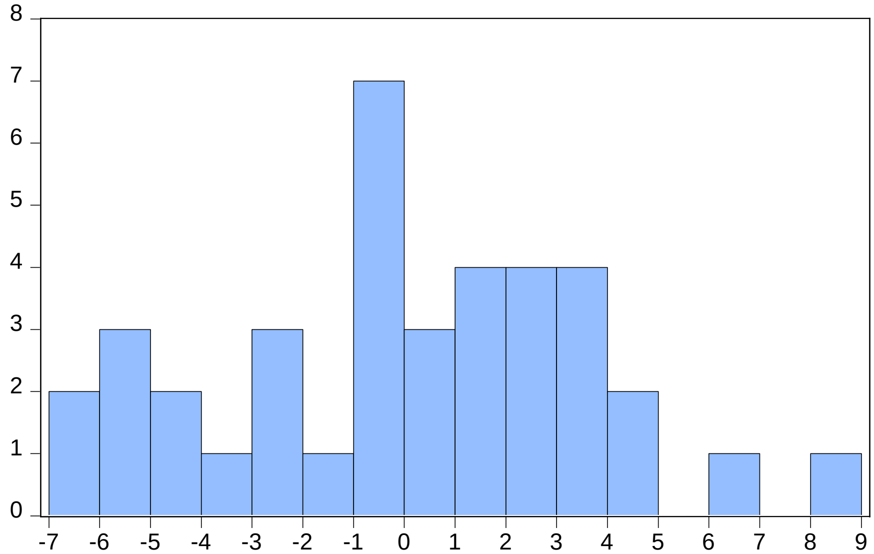
APPENDIX 9: ARCH

Heteroskedasticity Test: ARCH

F-statistic	0.381648	Prob. F(4,29)	0.8199
Obs*R-squared	1.700292	Prob. Chi-Square(4)	0.7907

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 04/25/24 Time: 15:42
Sample (adjusted): 9 42
Included observations: 34 after adjustments

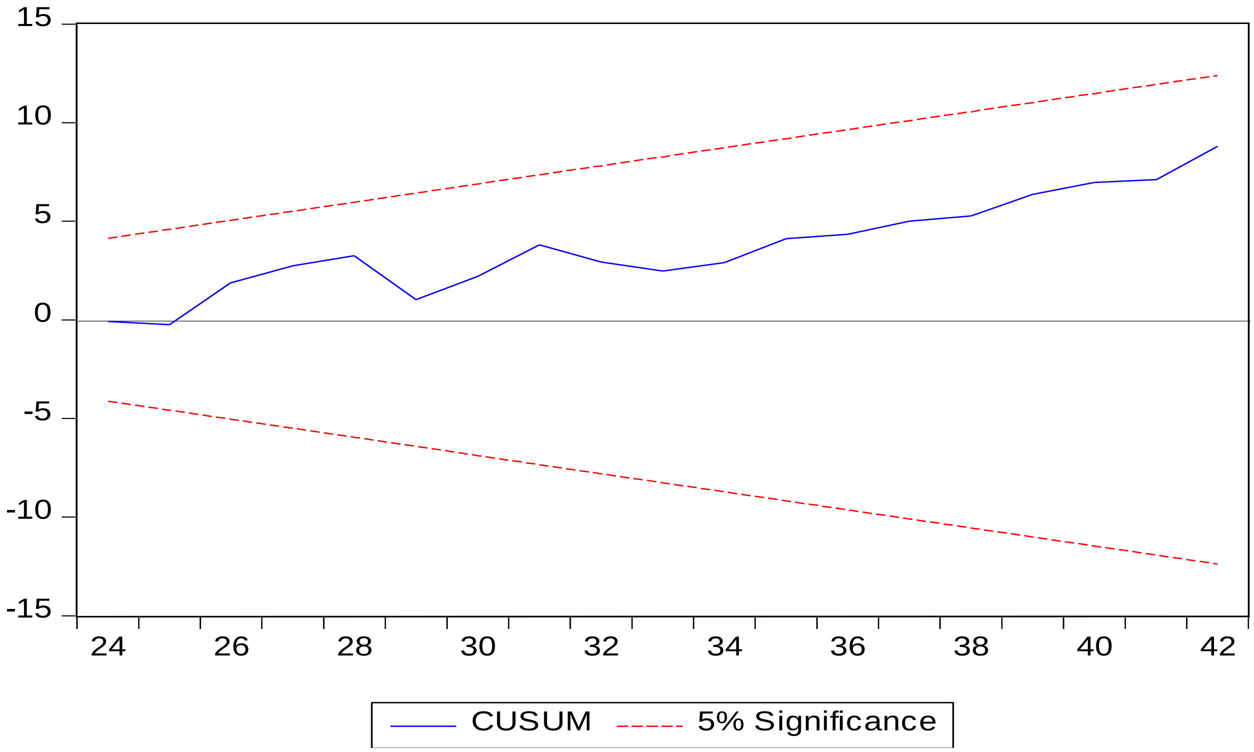
APPENDIX 10: NORMALITY



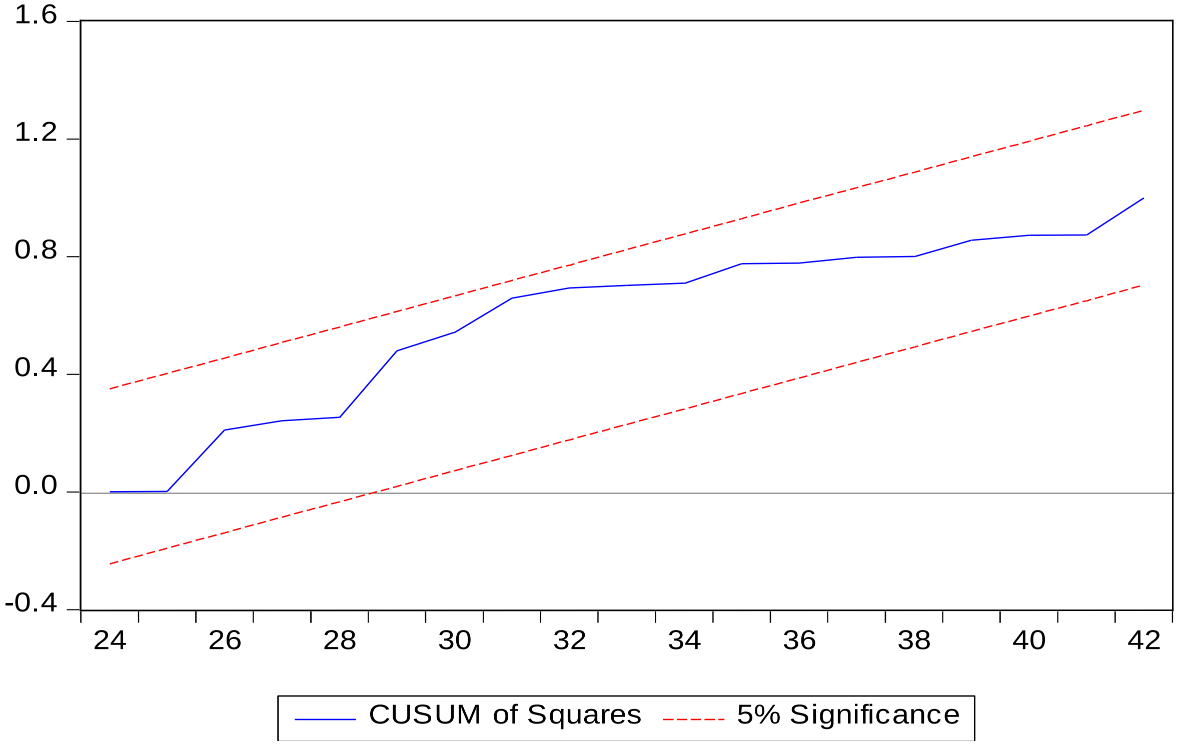
Series: Residuals
Sample 5 42
Observations 38

Mean	-3.04e-15
Median	0.107143
Maximum	8.578680
Minimum	-6.884768
Std. Dev.	3.703089
Skewness	-0.042106
Kurtosis	2.538853
Jarque-Bera	0.347935
Probability	0.840324

APPENDIX 11: CUSUM



APPENDIX 12 CUSUM SQUARES



APPENDIX 13: MODEL SPECIFICATION

Ramsey RESET Test
Equation: UNTITLED
Specification: GDP GDP(-1) GDP(-2) GDP(-3) GDP(-4) CE CE(-1) CE(-2) CE(-3) ELECTRIC ELECTRIC(-1) RE RE(-1) RE(-2) PPN PPN(-1) PPN(-2) PPN(-3) PPN(-4) C
Omitted Variables: Powers of fitted values from 2 to 5

	Value	df	Probability
F-statistic	1.518739	(4, 15)	0.2468

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	146.2535	4	36.56338
Restricted SSR	507.3760	19	26.70400
Unrestricted SSR	361.1225	15	24.07483

APPENDIX 14: SHORT RUN RESULTS

ECM Regression Case 3: Unrestricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9.290382	1.450439	6.405221	0.0000
D(GDP(-1))	0.151227	0.132617	1.140325	0.2683
D(GDP(-2))	0.205403	0.138165	1.486650	0.1535
D(GDP(-3))	0.392885	0.122547	3.206006	0.0047
D(CE)	-0.107234	0.168744	-0.635479	0.5327
D(CE(-1))	-0.723958	0.193129	-3.748570	0.0014
D(CE(-2))	-0.290783	0.194780	-1.492877	0.1519
D(ELECTRIC)	0.916100	0.153948	5.950725	0.0000
D(RE)	0.159906	0.213597	0.748631	0.4632
D(RE(-1))	0.826290	0.248619	3.323513	0.0036
D(PPN)	1.494519	3.940690	0.379253	0.7087
D(PPN(-1))	0.575165	3.431647	0.167606	0.8687
D(PPN(-2))	1.431563	1.730559	0.827226	0.4184
D(PPN(-3))	5.590865	1.849374	3.023113	0.0070
CointEq(-1)*	-1.308571	0.168720	-7.755873	0.0000

R-squared	0.826024	Mean dependent var	0.181124
Adjusted R-squared	0.720125	S.D. dependent var	8.878082
S.E. of regression	4.696789	Akaike info criterion	6.219017
Sum squared resid	507.3760	Schwarz criterion	6.865433
Log likelihood	-103.1613	Hannan-Quinn criter.	6.449007
F-statistic	7.800142	Durbin-Watson stat	2.114898
Prob(F-statistic)	0.000010		

APPENDIC 15: LONG RUN RESULTS

Levels Equation Case 3: Unrestricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
CE	0.401935	0.272829	1.473212	0.1571
ELECTRIC	0.974818	0.285950	3.409050	0.0029
RE	-0.908660	0.289442	-3.139356	0.0054
PPN	4.020968	0.961883	4.180308	0.0005

EC = GDP - (0.4019*CE + 0.9748*ELECTRIC -0.9087*RE + 4.0210*PPN)