Impact Analysis of Disaggregated Government Spending Shocks on Unemployment: Evidence from South Africa

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This dissertation is submitted in fulfilment of the requirements of the Master of Commerce (CESM: Economics) degree in the Faculty of Economics, Development and Business Sciences, University of Mpumalanga.

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ABSTRACT

This study is motivated by the need to address the persistently high unemployment rate in South Africa. Empirical studies have shown that societies with high levels of unemployment are associated with challenges of poverty, inequality, crime rates, violence, political instability including mental and psychological health issues among others. This study examined the influence of disaggregated government spending on unemployment in South Africa using data spanning from 1990 to 2021. The linkage between unemployment and components of government spending and other control variables was therefore analysed through the utilisation of the autoregressive distributed lag (ARDL) technique. The ARDL cointegration test outcome suggested the existence of a long run relationship between unemployment and the variables under study. In addition, the error correction model revealed a negative and statistically significant speed of adjustment coefficient of -0.98 implying that 98 percent of the deviation in unemployment from its long run equilibrium level is corrected within a year. The study further revealed that government spending on economic services investments and social protection are essential for decreasing unemployment, while contrary to expectation, spending on health was found to be positively associated with unemployment. Further examination of results indicated that the influence of other various government expenditure components on unemployment were statistically insignificant despite carrying the expected signs. For instance, government spending on mining, manufacturing, and construction despite exhibiting a negative association with unemployment, turned out to be statistically insignificant. Similar findings of a negative but insignificant link with unemployment were reported for government spending on fuel and energy. The government spending components which emerged as more beneficial in alleviating unemployment in South Africa were economics services investment and social protection. Therefore, this study recommends that government expenditure focus more on those component areas that are vital for lessening unemployment.

Keywords: ARDL, disaggregated government expenditure, economic services investment, spending components, social protection, unemployment,

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ADF	Augmented Dickey-Fuller
AIC	Akaike Information Criterion
ANC	African National Congress
AR	Autoregressive
ARDL	Autoregressive Distributed Lag
ASGISA	Accelerated and Shared Growth Initiative for South Africa
BHS	Basic Health Services
CSG	Child Support Grant
CUSUM	Cumulative Sum
CUSUMQ	Cumulative Sum of Squares
DBE	Department of Basic Education
DHET	Department of Higher Education and Training
ECM	Error Correction Model
ECT	Error Correction Term
EDU	Education
EPWP	Expanded Public Works Programme
ESI	Economic Service Investment
FCG	Foster Child Grant
FDI	Foreign Direct Investment
FEN	Fuel and Energy
GDP	Gross Domestic Product
GEAR	Growth, Employment and Redistribution
GVA	Gross Value Added

HLT	Health
INEP	Integrated National Electrification Programme
JB	Jarque-Bera
LM	Lagrange Multiplier
LR	Likelihood Ratio
MMC	Mining, Manufacturing, and Construction
MTEF	Medium Term Expenditure Framework
NDP	National Development Plan
NGP	New Growth Path
NHI	National Health Insurance
NSNP	National School Nutrition Programme
OLS	Ordinary Least Square
PP	Phillips-Perron
QLFS	Quarterly Labour Force Survey
R&D	Research and Development
RDP	Redistribution and Development Programme
SA	South Africa
SAA	South African Airways
SARB	South African Reserve Bank
SASSA	South African Social Security Agency
SDG	Sustainable Development Goals
SII	Social Infrastructure Investment
SMME	Small, Medium and Micro Enterprises
SOE	State-Owned Enterprises

SOP	Social Protection
SRDG	Social Relief of Distress Grant
SSA	Sub-Saharan African
UNE	Unemployment
VECM	Vector Error Correction Model
VIF	Variance Inflation Factor
WHO	World Health Organisation

CHAPTER ONE – INTRODUCTION

1.1. Background of the study

Unemployment is a social issue that affects the global community; however, it affects the African continent more than the other continents. Unemployment occurs when a person seeking employment is not able to find work. According to classical economic theory, which was first put forth by Adam Smith, David Ricardo, and others in the late 18th century, the leading cause of unemployment is that net earnings are less than the market equilibrium wage. According to Fosu (2019) unemployment represents a loss in a country's Gross Domestic Product (GDP).

Public spending is a significant concern for economic development, especially in Sub-Saharan Africa's developing nations, as it plays an essential role in the overall economy across many dimensions. Public spending levels are vital for implementing public sector policies and are critical in many economies worldwide. Compelling evidence from economic literature shows that unemployment raises the likelihood of poverty and fuels inequality (Mansi, Hysa, Panait & Voica, 2020). Since the end of Apartheid and the country's first democratic elections in April 1994, SA's economy has experienced significant transformation. Unfortunately, these changes have not been evenly distributed throughout the population, so the per capita figures no longer accurately reflect the shift in the poorest population's standard of living (Leibbrandt, Woolard, McEwen & Kope, 2010). Governments, therefore, attempt to lower unemployment rates and lessen their effects using effective fiscal policy, which is required to promote adequate growth and lower unemployment. Government action in the economy has been the topic of numerous debates over the years (Onuoha & Agbede, 2019). Onuoha and Agbede (2019:2) view large government spending projects as inefficient and detrimental to growth and the attainment of social outcomes. Other theorists support large government expenditure, emphasising its importance on income redistribution and programmes that promote societal welfare (Keynes, 1936).

Lack of employment opportunities refers to when employable people in the labour force with the necessary knowledge and skills look for work but cannot find employment (Adawo, Essien & Ekpo, 2012). Most African countries still face rising unemployment rates; hence, policymakers have emphasised the importance of government expenditure to reduce inequality, poor living standards, and high unemployment rates. The government offers employment opportunities through its spending arm by providing services to the public and expanding infrastructure in the economy. Hence, this study focuses on examining the disaggregated components of the disbursing arm offered by the government and exploring the nature of its marginal effect on unemployment in SA.

Each element of government spending, such as health, education, defence, fuel and energy, and others, contributes to the country's employment rate in various ways. The South African economy has six key economic sectors: mining, transport, energy, manufacturing, tourism, and agriculture. The Quarterly Labour Force Survey (QLFS) 2023 Q2 showed a -0.7 percentage reduction in the unemployment rate in the transport industry and a -5.8 percentage reduction in the unemployment rate in the manufacturing industry.

Both the manufacturing and transport industries are considered key industries in the country. Nevertheless, 2023 Q2 showed that the unemployment rate in both industries increased. Spending on education is significant as it increases the number of skilled labourers, creates jobs, and fulfils labour requirements in the economic sector. Education is also regarded as a human capital investment that can boost labour productivity and minimise economic issues like unemployment and poverty. Onwuka (2021) stated that increased government spending has improved economic growth and development. For example, spending on education and health is thought to increase the country's production level by enhancing the quality and productivity of workers. The framework in which government expenditure is anticipated to influence overall productive growth depends upon the estimate of total government expenditure distribution to critical parts of the economy (Udoffia & Godson, 2016). Government spending in SA can be disaggregated into fixed capital and recurring expenditure. Recurring expenditure is government investment in an organisation, such as compensation, pay rates, credits,

maintenance, etc. In contrast, capital spending is financing capital ventures like roads, health, teaching, infrastructure, and so on (Muritala & Taiwo, 2011).

The South African labour market, which was already deteriorating before COVID-19, was severely worsened by the pandemic and the 2021 July unrest, resulting in even weaker economic growth. On June 29, 2021, Former South African President Jacob Zuma was convicted to serve 15 months in prison for denigration of court procedures. In July 7, 2021, Jacob Zuma handed himself over to the police and was jailed at the Estcourt Correctional Centre (Makonye, 2022). From 8 July 2021 to 17 July 2021, SA witnessed violent civil unrest, predominantly in areas within KwaZulu-Natal and Gauteng (The Presidency, 2021).

Severe looting, destruction, and violence erupted in SA when former President Jacob Zuma was arrested for denigration of the court (Makonye, 2022). At that moment, on June 11, 2021, the unrest persisted for eight days, causing intensive amounts of damage to property in the affected areas. During that violent spree, there were an estimated 345 fatalities, thousands of abrasions, and 50 billion Rand's worth of economic losses (The Presidency, 2021).

The Budget Review by the South African National Treasury (2021) reported that the July unrest resulted in 2,1 million fewer jobs in the third quarter of 2021 than in the final quarter of 2019. In addition, structural unemployment continues to exist today due to a mismatch between the available and required skills in the labour market. Recovery strategies were implemented for post-pandemic converge around job creation and income support.

During the past few years, economists (Fosu, 2019; Nyasha & Odhiambo, 2019) analysed government spending and economic growth. Researchers (Cortuk & Guler, 2015; Onuoha & Agbede, 2019) studied the correlation between economic growth and government expenditure and focused on the results of aggregated spending. This study researches the issues around unemployment in SA, especially post-Covid, focusing on

how the various components of government spending contribute to the country's employment rate (Rahman, 2023).

Fosu (2019) did a similar study disaggregating the different components of government spending and included SA in a panel study. While those studies are critical, this study only focuses on SA without comparing it with other countries. Economists (Olaoye, Orisadare, & Okorie, 2020) held divergent perspectives on the role of government in economic activity. Keynesian economists proposed that government spending improves economic growth, while classical and neoclassical economists argued that government spending harms economic growth (Lowenberg, 1990; Romer, 1986).

The drive towards unbiased and sustainable economic circumstances for SA's previously marginalised majority challenged the structure of government expenditure. SA is identified as a mixed economy in which there is a variety of private freedom combined with centralised economic planning and government regulation. However, the country still struggles to stimulate growth, and within both the private and public sectors, the unemployment rate is still high and continues to fluctuate at high rates.

Empirical studies on the South African economy, such as those conducted by Fedderke, Perkins, and Luiz (2006), Mosika and Matlwa (2014), and Odhiambo (2015), thoroughly examined the correlation between overall and detailed government spending and economic recovery and causality direction. Nevertheless, these studies do not address whether the South African government runs an efficient policy framework.

1.2 Statement of the research problem

The South African economy has been troubled during the past few years. Among the many challenges that the country faces is the high unemployment rate, which is a substantial socio-economic concern. Therefore, the research issues addressed in this study highlight that the labour market does not rapidly assimilate newcomers, causing a constant increase in the unemployment rate in the country. Structural variables such as

the length of time spent on unemployment and work maintainability show an impressive impact on an individual's perseverance in unemployment.

The QLFS (Statistics South Africa, 2022) shows that investigating youth unemployment is essential. For the first quarter of 2022, the unemployment rate was 75.1% for those aged 15 to 24 and 52.8% for those aged 25 to 34, whereas the official national rate stands at 34,5% (Statistics South Africa, 2022). The unemployment rate in the country continues to be a problem, as shown by the consistent increase from previous years. The South African unemployment rate in 2019 was 28.47%, a 1.56% increase from 2018. It continued to increase in 2020 to 29.22%, a 0.75% increase from 2019 (Statistics South Africa, 2020). In SA, even when the economy is doing well, high unemployment rates continue, suggesting that high unemployment rates are related more to structural factors than economic factors (Nonyana & Njuho, 2018). The main factors responsible for the high unemployment rate in SA are technological advancements and skills mismatch (Nonyana & Njuho, 2018).

There are over 10 million young people aged 15 to 24 in SA, and only 2,3 million are in the labour force, either employed or unemployed. The remaining 7.7 million, the largest group, are out of the labour force (i.e., inactive) (Statistics South Africa, 2022). Statistics South Africa (2022) explains that the main reason behind being inactive in the labour force is discouragement, as people in the labour force lose their aspirations of ever finding a job that corresponds to their skills or is located where they live.

In many African countries, the continued increase in higher education enrolment is said to be out of balance with the increase in economic growth. There was a notable increase in graduates between 2010 and 2014 in SA: a 21% increase in graduates with degrees or diplomas (from 153,000 to 185,000). Statistics South Africa shows that the number of unemployed people with tertiary education increased by 109,000 within the same period (Nonyana & Njuho, 2018).

Post-Apartheid in 1994, the ANC government implemented job creation strategies, such as The Redistribution and Development Programme (RDP), the Growth, Employment and Redistribution Strategy (GEAR), the Accelerated and Shared Growth Initiative for South Africa (ASGISA), and the New Growth Path (NGP). Patel (2019) stated that the policies mentioned above had to address the pessimistic repercussions of Apartheid, such as disparity, hardships, and unemployment. However, 29 years since their implementation, the unemployment rate statistics show that these policies failed. This study, therefore, reviews these policies and attempts to discover how their contribution affected issues around unemployment. As a social and economic problem, unemployment hampers economic growth and consistently reduces living standards. While the unemployment rate continues to increase, South African citizens are at risk of facing financial hardship, increased crime rates, homelessness, poverty, and loss of income.

At the same time, the government loses tax revenue, and many companies close down due to decreased economic growth in the country. With this consistent rise in unemployment, as presented by the statistics above, this study attempts to address the research problem by determining how the various components of government spending contribute to creating employment for the country's citizens.

1.2. Aim of the study

The main aim of this study is to address the unemployment problem in South Africa.

1.2.1 Main objectives

The main objective of the study is to analyse the impact of different components of government spending on the rate of unemployment in South Africa during the period 1990 – 2021.

1.2.2 Sub-objectives

The broader objective will be achieved through the following sub-objectives:

- To provide an overview of the trends of disaggregated government spending in South Africa since 1990.
- To investigate the impact of disaggregated government spending on unemployment in South Africa during the period 1990 – 2021.

1.3. Hypotheses of the study

To achieve the empirical objective of study the following hypothesis is tested:

H_0: Components of government expenditure does not significantly impact unemployment in South Africa

H_1: Components of government expenditure have a significant impact on unemployment in South Africa.

1.4. Significance of the study

Much economic research focused on government expenditure, economic growth (Onwuka, 2021; Nyasha & Odhiambo, 2019) and government spending and unemployment in Africa (Abouelfarag & Qutb, 2021). However, there is a notable gap in the literature in SA as studies discuss government spending shocks on income distribution (Nuru & Zeratsion, 2022) as well as the impact of government expenditure on economic growth (Buthelezi, 2023; Chimpaume, Ngirande & Ruswa, 2014). Therefore, this study closes the gap by focusing on the impact government spending has on unemployment and disaggregating government spending into significant sectors in the South African economy. This study was motivated by the constantly growing unemployment rate in SA.

There seems to be limited information regarding the influence of government spending, especially disaggregated spending, on unemployment and the labour market. An empirical investigation of Sub-Saharan African countries' government spending showed the effect unemployment has had on separating government spending into two categories: government investment expenditure and government consumption expenditure (Fosu, 2019). This study examines the effects of shocks on disaggregated government spending on unemployment in SA. It separates government expenditure into social infrastructure investment, economic services investment, and spending on social protection, education, health, fuel and energy, and mining, manufacturing, and construction.

The annual Medium Term Expenditure Framework states that the government disburses a sizeable sum of money on social protection, health, education, and defence (National Treasury, 2021). Barro (1991) categorised education, health care, and defence as constructive spending. While government expenditure on defence helps to support the protection of property rights, which increases the possibility of receiving the marginal output of capital, government spending on education is an investment in human capital.

This study is especially significant regarding the level of unemployment that the citizens of SA face. It is highly relevant to study and recognise how the components of government spending are assisting (or not assisting) with easing the high unemployment rate in the country. Makaringe and Khobai (2018) stated that a unit increase in unemployment would cause a decrease of 0.011% in economic growth. There is fluctuation in the rate of unemployment in the country, according to Statistics South Africa. Even though unemployment alone does not affect economic growth, its effects on the country's social and economic issues must be studied. Therefore, this study finds it essential to analyse the issue around unemployment as a high unemployment rate negatively affects the economic growth rate.

1.5. Ethical consideration

This section certifies that all sources used to conduct this study are properly referenced to avoid plagiarism. The research ethics of the University of Mpumalanga regarding ethical considerations were considered, and an ethical clearance was obtained. The researcher warrants that this study does not cause harm or reveal personal information about people.

1.6. Outline of the study

Chapter one introduces the background of unemployment and government spending in SA. It gives the reasons for this study and outlines its contributions to policymakers. Chapter two is an overview of unemployment and government expenditure in SA. It looks deeper into the issue surrounding unemployment and government expenditure and the

history of unemployment in the country. The chapter overviews the trends over the years relating to these two subheadings. Chapter three is the literature review, which discusses relevant theoretical and empirical literature. The theoretical literature discusses some theories regarding unemployment. The empirical literature reviews similar studies that were done before in developed countries, developing countries and SA. This part examines previous studies' methodologies, variables, and results.

Chapter four discusses the methodology. The chapter looks at the data used in the study, the estimation techniques, the definition and explanation of variables, and diagnostic tests. Chapter five comprises the estimation, reporting and discussion of results. Chapter five showcases the estimations and reporting done through EViews and discusses the econometric findings of the study. Chapter six summarises vital findings, policy recommendations and areas for future research. This chapter covers the study's conclusion and how the findings differed from those of earlier studies. It also gives recommendations for businesses, investors, and future research.

CHAPTER TWO – THE OVERVIEW OF UNEMPLOYMENT AND GOVERNMENT EXPENDITURE IN SOUTH AFRICA

2.1 Introduction

Unemployment is one of the main challenges causing social and economic difficulties in SA. The unemployment rate is forecasted to decrease to 6% by 2030. Achieving this will require rebalancing and realigning critical areas of government policy and some reprioritisation in economic policy (National Planning Commission, 2020). The chapter provides a general overview and context of the South African labour market and unemployment statistics. The chapter discusses government spending disaggregated into social protection, health, education, fuel and energy, and mining, manufacturing, and construction. It examines the policies implemented to combat poverty, inequality, and unemployment in post-Apartheid SA.

2.2 An overview of the South African labour market

SA’s economy has grown more slowly over the past year, and unemployment has increased significantly in all regions (Department of Employment and Labour, 2021). In the first quarter of 1994, the unemployment rate was 20%, and by the fourth quarter of 2016, it had increased to 26.5%, indicating that SA's unemployment problem is structural (Mavikela, 2019).

The QLFS by Statistics South Africa (2009) showed that the unemployment rate increased from 21.9% in the fourth quarter of 2008 to 24.5% in the second quarter of 2009. This increase was motivated by the global monetary crisis that many countries experienced in 2008/9. In response to worldwide financial and economic difficulties, the South African government increased funding for socio-economic initiatives to improve healthcare and education and reduce unemployment.

On the one hand, Economists Köhler and Bhorat (2020) stated that the South African lockdown restrictions reduced the prospect of employment for non-essential workers who were not allowed to work under the more severe lockdown by 8%. On the other hand, self-employed individuals, of whom the majority work in the informal sectors, experienced a nearly three times larger negative impact on employment than the average effect. Persistent unemployment, which hinders economic and human development, directly threatens any country's ability to maintain its social and economic stability.

The effects of the COVID-19 pandemic lockdown restrictions on the economy and labour market affected employment levels by cutting wages, reducing working hours, or increasing job losses. Between March 2020 and March 2021, approximately 1.4 million jobs were lost, bringing the number of employed individuals down to 14.9 million from 16.3 million in March 2020 (Department of Employment and Labour, 2021). The pandemic's negative consequences on the labour market are evident among young people (15 to 34 years old), long term unemployed individuals, and those who have completed secondary and university education.

Table 2.1 below shows the unemployment rate statistics in SA from 1994 to 1995 and 2017 to 2022. The data below reviews only the fourth quarter of every year. It is important to note that these numbers are based on the South African official unemployment rate definition, not the expanded one. As shown in the table below, the unemployment rate in the fourth quarter of 2019 was 29.1%, a 2.7% increase from 27.1% in 2018. The comparison between the 2021 and 2022 unemployment rates shows a percentage decrease of 3.5%, from 35.3% in 2021 to 32.7% in 2022. In the first quarter of 2022, the QLFS reported a reduction in the unemployment rate attributed to the addition of 370,000 jobs between the fourth quarter of 2021 and the first quarter of 2022. The most substantial job increases were observed in community and social services, adding 281,000 jobs, manufacturing with 263,000 jobs, and trade with 98,000 jobs.

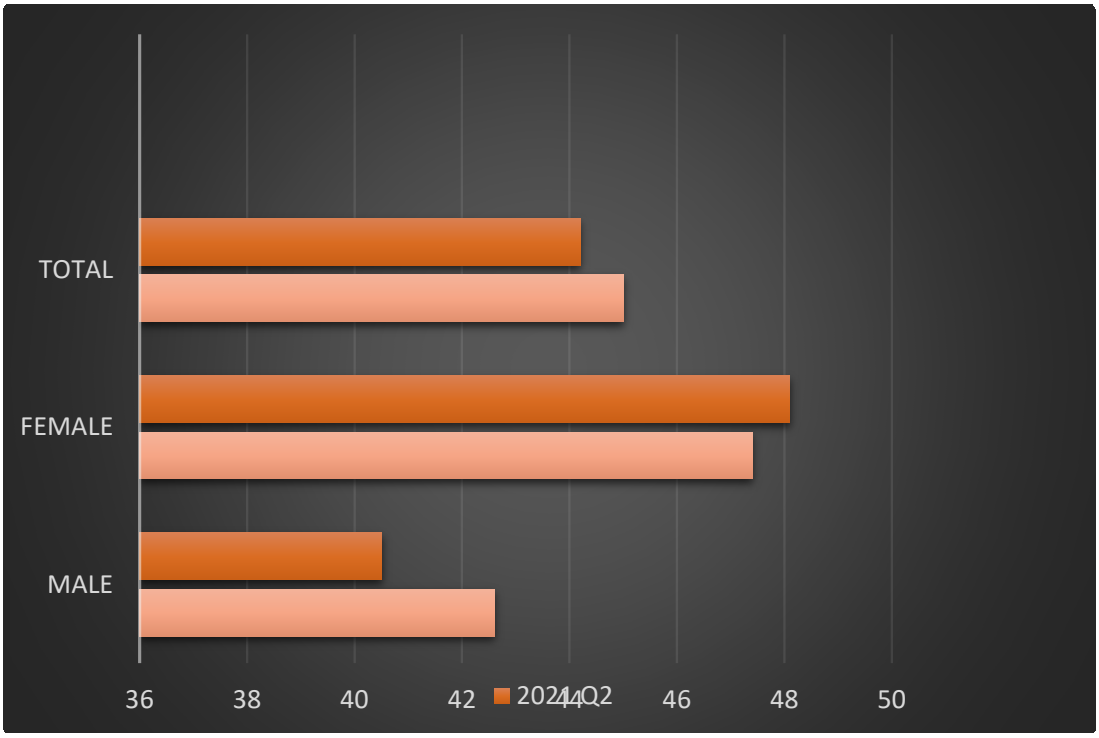
Table 2. 1: Unemployment rate (%)

1994	1995	2017	2018	2019	2020	2021	2022
20.0%	16.9%	26.1%	27.1%	29.1%	32.5%	35.3%	32.7%

Statistics South Africa (StatsSA)

Figure 2.1 below illustrates the unemployment rate in SA for the youth (15 to 34 years old). It demonstrates a comparison between 2021 quarter 2 and 2022 quarter 2. As shown in the figure, more females were unemployed in the youth category in 2021 than males. Females (15 to 34 years old) had an unemployment rate of 48.1%, while the rate of unemployment for males (15 to 34 years old) was 40.5%. The numbers in this chart show that female youth carry the burden of unemployment more than males in the country. SA's unemployment rate remains high, although it decreased slightly by 0.8% to 34.5% in quarter 1 of 2022, compared to Q4 2021 (Statistics South Africa, 2022).

Figure 2. 1: Youth unemployment rate



Statistics South Africa (StatsSA)

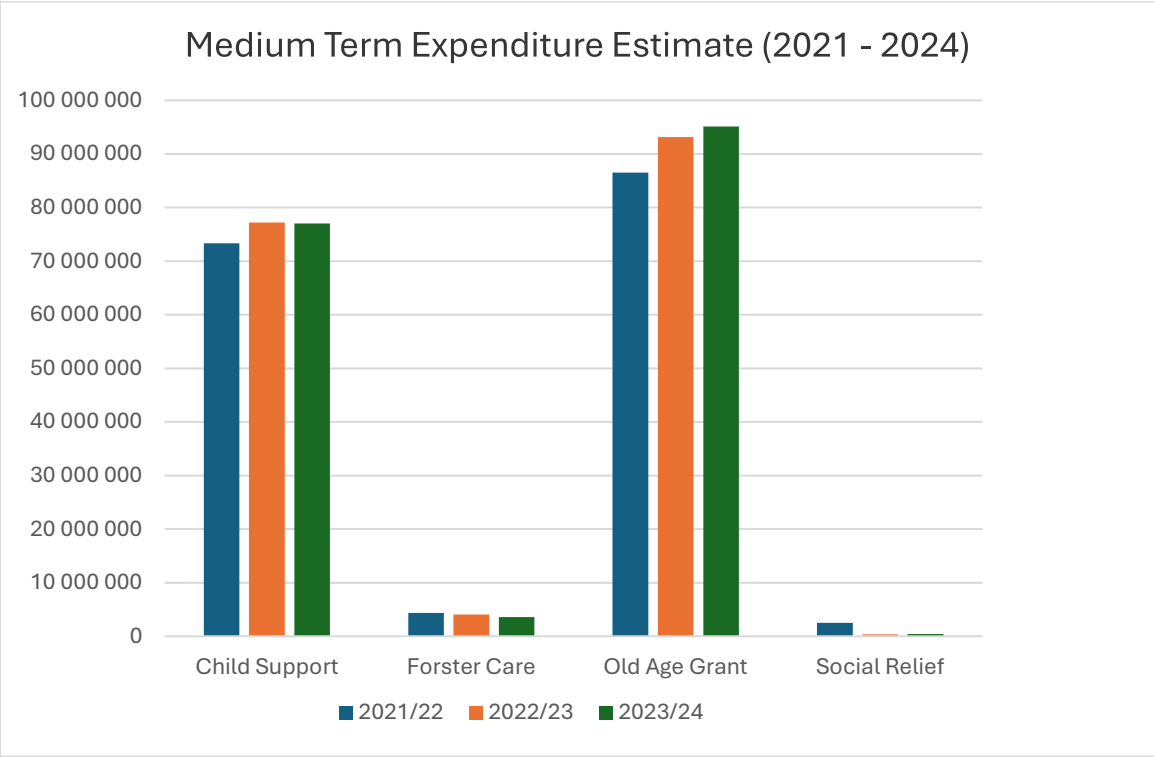
2.3 Trends of disaggregated government spending in South Africa

2.3.1. Spending on social protection

This government intervention component aims to lessen the effects of social risks on families and individuals. It includes the “Child Support Grant (CSG), the Foster Child Grant (FCG), the National School Nutrition Programme (NSNP), and the Old Age Pension and Social Relief of Distress Grant (SRDG)”, among others. The South African Social Security Agency (SASSA) administers social assistance transfers (National Treasury, 2010). The South African government implemented social protection programmes in 1980 to reduce racial barriers. As early as 1993, government social grants were given to low-income households (Maribe, 2020). In the 1993/94 budget, R521.5 million was allocated for a general increase of approximately 7.5% in social and other allowances, effective July 1, 1993, and R694.1 million for the compensation of allowances paid to social pensioners of various population groups, effective September 1, 1993.

During the 2008 recession, the social security system provided a safety net and played a vital role in cushioning the impact of job losses and lower household incomes. Before the 2008 monetary crisis, grants accounted for 3.2% of GDP; this percentage was expected to rise to 3.5% in 2010/11 (National Treasury, 2010). These grants are a worthwhile investment since they enable recipients to live better lives that they would have been unable to achieve without them. Maribe (2020) showed that social grants can reduce poverty in the country over the long term. This is accurate because families use social grants to enhance educational and health outcomes. Social grants are crucial tools in the battle against poverty in SA. They have grown dramatically since 1998 and served approximately 19 million people in 2022/23 (SASSA, 2023).

Figure 2.2: Trends in expected government spending on social protection (2021 to 2024)



Source: Statistics South Africa, Vote 19 (2021)

Based on Figure 2.2 above, the country has needed to institute a consistent decrease in the Social Relief grant since its introduction in 2020. The estimated spending on Social Relief grants from 2021/22 was R2 535 528, which decreased to R 388 266 for 2023/24 (National Treasury, 2021). The decrease in the spending for Social Relief is motivated by the fact that the grant was introduced as a temporary provision of assistance for persons unable to meet their family's basic needs, especially during the COVID-19 lockdown. The visual representation of Figure 2.2 above shows that the government spends more on Old Age grants for the periods shown in the figure. The Old Age grant spending estimate increased consistently from 2021 to 2024. Social spending in 2023/24 is projected to decline from R230.8 billion in 2020/21 to R216.1 billion, averaging a 2.2% yearly decrease (National Treasury, 2021). This is primarily due to budget cuts authorised by the Cabinet for social grants as well as the end of the COVID-19 Social Relief of Distress grant (SRD) in 2020/21, for which an additional R32.8 billion was allocated in the budget that year

(National Treasury, 2021). The number of households getting grants (other than the SRD grant), as Statistics South Africa (2022) reported in the General Household Survey, climbed from 45.5% in 2019 to 48.9% in 2020. The estimates for 2020 will rise to 52.4% if the SRD grant is included. By providing them with financial support during the medium term, the role of social protection will persist in diminishing poverty levels among the impoverished. The Sustainable Development Goals (SDG) agenda maintains a strong emphasis on the reduction of poverty.

2.3.2. Spending on health

Maribe (2020) elucidated that the National Department of Health oversees formulating policies and coordinating and supporting provincial health departments in their missions in SA. Provincial health departments play the role of providing a comprehensive public health service. The private health sector primarily treats middle-class and upper-class patients, whereas the public health sector dominates the South African health system.

The World Health Organisation (WHO) defines health expenditure as all costs related to providing health services, family planning, dietetics, and emergency help intended for health. It does not, however, encompass providing drinking water and sanitation (Tshabalala & Rispel, 2023). The health outcomes in SA have been consistently worse than in many lower-income countries, according to Schellack, Meyer, Gous and Winters (2011), who highlighted the country's high health expenditure. The country's awful social and political past is to blame for these poor outcomes and current health policy.

Basic health services (BHS) accounted for only a small portion of government health spending before 1994. Basic health care received just 12.0% of all government spending in 1992/3; by 1995/6, it had risen to 20.0% (Maribe, 2020). Between 2006 and 2013, the share of government health spending in total health expenditure increased from 39.9% to 48.4% (Health Policy Project, 2016). Before introducing the National Health Insurance (NHI) programme, the National Treasury allocated R121 billion to healthcare in the fiscal year 2012/13. This amount was used to upgrade hospitals and promote public health.

Throughout the medium term of 2021, the health department primarily concentrated on mitigating diseases and mortality from the COVID-19 pandemic. This meant implementing the government's vaccine strategy and preparing for potential future waves of infections (National Treasury, 2022). Total health expenditure is expected to decrease from R65.4 billion in 2021/22 to R62.2 billion in 2024/25, reflecting an average yearly decline of 1.7% (National Treasury, 2022). This reduction is attributed to one-time funding allocated for the COVID-19 response in 2021/22 and baseline cuts implemented over the 2021 Medium Term Expenditure Framework (MTEF) period.

2.3.3. Spending on education

The education system (public and private) serves children aged 5 to 17, with a reception year (before Grade 1) and a last formal schooling year (Grade 12). Nine provincial education agencies fund and carry out national policy, with the Department of Basic Education (DBE) serving as the federal body responsible for school policy and coordination. To bridge the gap between education and post-schooling, the Department of Higher Education and Training (DHET) provides adult education programmes, post-schooling alternatives at the tertiary level (universities), and technical and vocational credentials (UNICEF, 2019). In compliance with the South African Constitution, the national government is solely responsible for higher education, whereas both the national and provincial governments share responsibility for basic education.

Government spending on education entails improving school infrastructure, providing support to enhance the matric completion rate, providing high-quality learning material, facilitating employing more quality teachers, improving early childhood development services, and providing nutritious meals for learners. Typically, education accounts for the highest share of provincial spending. However, due to faster-growing expenditure in other sectors, including health and social development, education's share of provincial expenditure decreased from 38.5% in 2001/02 to 34.2% in 2004/05 (Maribe, 2020). The government spent R227 billion on education in 2013/14, or 19.7% of all government spending—or 6.5% of GDP. In addition, between 2012/13 and 2013/14, the Cabinet boosted spending on education by R20 billion (National Treasury, 2016). When analysing

spending on education by levels, pre-primary and primary education comprised most of the expenditure in 2013/14, accounting for R79 billion (32%) of the total general government education budget. Secondary and post-secondary education came in second at R71 billion (29%), followed by tertiary education at R60 billion (24%) and education not otherwise categorised at R38 billion (15%) (Statistics South Africa, 2015). Total expenditure for the Department of Education is projected to rise 7.2% annually, from R23.4 billion in 2020/21 to R28.8 billion in 2023/24. An estimated 82.6% of this sum comprises transfers and subsidies, which are expected to increase from R18.8 billion in 2020/21 to R24.2 billion in 2023/24 at an average annual rate of 8.9% (National Treasury, 2021). The DBE will continue prioritising school infrastructure improvements, high-quality support materials for students and instructors, and nutritional meals for students through the NSNP.

2.3.4. Spending on fuel and energy

Given that it is significant, energy plays a leading role in the South African economy. Fossil fuels supply over 80% of SA's primary energy requirements. The principal energy source is composed primarily of coal (62%), with crude oil and renewables coming in second and third, at roughly 17% and 11%, respectively (Department of Mineral Resources and Energy, 2021). Government spending on fuel and energy includes transforming mining and energy resources, rehabilitating mines and the surrounding environment, extending access to electricity, managing nuclear energy, and enhancing energy efficiency.

SA’s fiscal energy policies have historically been directed around distributive goals, especially post-Apartheid (Bridle, Muzondo, Schmidt, Laan, Viswamohanan & Geddes, 2022). Depending on the type of energy fiscal policy in place, these policies can be connected to stimulate domestic energy production, enhance energy security, and expand access to inexpensive energy (Bridle *et al.,* 2022). This might boost economic growth, thus benefiting industries like education and health. Total Department of Energy spending over the MTEF period is anticipated to decline at an average annual rate of 0.6%, from R8.1 billion in 2017/18 to R8 billion in 2020/21 (National Treasury, 2018). The

Cabinet-approved reductions are R1.4 billion in 2018/19, R2.4 billion in 2019/20, and R2.5 billion in 2020/21. Government spending, which is based on tax revenue or borrowing, is one element that might impact economic growth (Ketema, 2006).

2.3.5. Spending on mining, manufacturing, and construction

A long-established, highly developed mining sector makes SA one of the world's top nations for mining and processing minerals. The mining industry in 2021 directly contributed to a GDP of R480.0 billion, an increase of R127.7 billion from the 2021 contribution (Minerals Council South Africa, 2021). However, economic contribution keeps falling in the manufacturing sector as investment levels are deficient. Manufacturing contributes significantly to the country's GDP - with a gross value added (GVA) of R523 billion in 2021, the sector contributed 13% to GDP (Comins, 2022).

It is anticipated that total spending for the sector will increase from R9.2 billion in 2021/22 to R11.2 billion in 2024/2025 at an average annual rate of 6.6%. This is mainly because the integrated national electrification programme grant has seen more investment since its earlier reductions ended in 2022/2023. ‘The Integrated National Electrification Programme (INEP) is responsible for planning, project management and funding the bulk infrastructure (e.g. MV lines and substations), grid and non-grid new connections for households that cannot afford to pay on their own to receive access to electricity’ (Mineral Resources and Energy, 2021). Over the medium term, the department's budget will be allocated R3.2 billion, or 10.1%, towards employee remuneration. In 2024/25, the department's workforce is anticipated to reach 1,663 to stay under the government's employee pay spending cap (National Treasury, 2022). The department plans to do 3,825 environmental verification inspections, seal 120 shafts and renovate nine mines to safeguard the health and safety of mine workers and residents of the surrounding communities during the medium term. Spending on the Mine Health and Safety Inspectorate programme is anticipated to increase from R235.5 million in 2021/22 to R247.3 million in 2024/25, an average annual rate of 1.6%.

2.4 Spending inefficiencies and poor management of state-owned enterprises

SOEs are companies where the government directly or indirectly owns more than 50% of the shares. Experience worldwide demonstrates that when state-owned businesses are run well, and strong governance is in place, these businesses can offer the public reasonably priced necessary goods and services. State-owned businesses most directly impact the poor negatively when they are mismanaged. Generally, bad public service delivery, incompetence, and corruption are examples of poor performance (Mabugu, Chitiga, Fofona, Abidoye & Mbanda, 2014).

A few state-owned companies dominate the economy. For instance, Eskom oversees the transmission and distribution networks and generates almost 95% of the power produced in SA. Transnet oversees all non-passenger rail transportation and the nation's ports and pipelines. While making up a fifth of all capital stock, state firms only make up one-sixth of yearly investment and employ just 1% of the workforce (Trade and Industry Policy Strategies, 2020). The national state-owned companies reported R15 billion in losses in 2018/19, with a -0.7% rate of return on assets. By itself, Eskom lost R20 billion.

State-owned businesses in SA have been under pressure to increase the effectiveness of their operations and the quality of their services in recent years. Protests against the nation's service delivery system, allegations of fraud, corruption, collusion, fronting, bribery, and improper use of public funds all amplify these (Nzimakwe, 2023). Given the current dismal economic conditions in SA, the poor financial performances of the country's SOEs indicate that there may be issues with the corporate governance of these companies, thus casting doubt on their future.

The state has always provided annual subsidies for public firms to support low-income neighbourhoods and encourage inclusive industrialisation. Sanral received subsidies to maintain and upgrade non-toll roads, which were paid for by the petrol tax. Eskom's electrification initiative received an additional tenth of all public enterprise subsidies. Spending on the INEP subprogramme is expected to rise by an average annual rate of 8.3%, from R5.2 billion in 2021/22 to R6.6 billion in 2024/25. Transfers to Eskom are

predicted to increase at an average annual rate of 12.2%, from R2.8 billion in 2021/22 to R4 billion in 2024/25 (National Treasury, 2022). Furthermore, the state made significant lump sum payments regularly to cover unexpected losses or to aid with restructuring. It allocated R23 billion in nominal rands annually from 2019/20 to 2022/23 for Eskom's restructuring. In 2018/19, it spent R6 billion to boost equity in South African Airways (SAA) and South African Express. It also supplied resources to Sanral to compensate for losses caused by the deadlock over tolls on Gauteng freeways (TIPS, 2020).

2.5 Policies and strategies implemented to combat unemployment post-1994

The new South African government post-Apartheid in 1994 urgently needed to prioritise economic growth. The path to long-run economic growth was ensured by introducing macroeconomic policies in 1996 aimed at reducing taxes, which would improve the economy by boosting spending, lowering inflation and combating unemployment (Khamfula, 2004). These policies are not one documented policy but rather various policies discussing various aspects of unemployment. This section discusses the GEAR strategy, the National Development Plan (NDP) and the Accelerated and Shared Growth Initiative South Africa (ASGISA).

Growth, employment and redistribution (GEAR) strategy

Khamfula (2004) stated that the GEAR strategy's objectives were achieving macroeconomic balance in SA by reducing the budget deficit and inflation rate and getting the South African economy onto a 6% growth path by 2000. Finally, according to Mathe (2002), the GEAR strategy was created to create jobs through redistribution from economic development and labour market reform.

The GEAR plan was based on two scenarios: one that predicted how the economy would perform over the medium term if no significant policy changes were implemented, and another that predicted how it would perform if such changes were enacted. The worldwide economic crisis reached SA in 1998, vastly overshadowing GEAR's performance (Khamfula, 2004). The GEAR plan has been criticised for limiting economic growth to a level expected to have little bearing on the current unemployment, inequality, and poverty

(Standing, Sender & Weeks, 1996). The plan was viewed as hampering growth in this area since it reduced government spending without taking similar steps to encourage the expansion of investment or exports.

National development plan (NDP)

As a long term strategic plan, the NDP aims to ensure that all South Africans attain a decent standard of living by eliminating poverty and reducing inequality. The NDP states that by 2030, there should be a drop from 39% to 0% in the percentage of individuals living in homes with monthly incomes below R419 per person—a drop from 0.69 to 0.6 in the Gini index, which measures inequality. The NDP was introduced in mid-2013 as SA's long term socio-economic development guide. By 2030, the NDP intends to eliminate poverty and reduce disparities in SA (Noyoo, 2021).

SA still faces three crucial issues the NDP addresses: unemployment, poverty, and inequality. The NDP aimed to reduce disparities by reducing the Gini coefficient from 0.69 in 2010 to 0.6 in 2030 (National Planning Commission, 2023). SA continues to be the most unequal nation in the world, with highly divided earnings, according to a 2018 World Bank research report. Furthermore, the NDP set a target of reducing unemployment from 25.4% in 2010 to 6% in 2030, with interim targets of 20% by 2015 and 14% by 2020. However, these targets were not achieved as the official unemployment rate was 25.5% and 32.5% in 2015 and 2020, respectively.

Accelerated and Shared Growth Initiative of South Africa (ASGISA) Strategy

Initiated in February 2006, the ASGISA was developed in 2005. Its goals were to implement laws, programmes, and other measures to expand SA's economy enough to cut unemployment and poverty in half between 2004 and 2014. Low levels of investment in infrastructure and infrastructure services were one of six 'binding constraints' on growth and employment creation that were noted when ASGISA was introduced in February 2006. Strategies or interventions tailored to address these six areas were developed and implemented. It is commonly acknowledged that some of these strategies had a substantial influence. This led to a sharp decline in unemployment, from over 31% in 2003

to about 22% by late 2008 (Statistics South Africa, 2008). Like the previous example, poverty decreased significantly during this time due to the expansion of social grants and increasing employment rates. The goals appeared to be attainable if we had kept up the 5% or greater growth rate from 2004 to 2007.

However, although ASGISA had reached a certain level of success, unemployment continued to rise even as GDP growth slowed. Finally, the programme's future became uncertain because the government had not formally stated the future of the ASGISA strategy (Steenkamp, 2015).

2.6 Chapter summary

As observed from Table 2.1 above, the study shows that the unemployment rate in SA has been consistently increasing for the last six years. Looking at that table then, the study emphasises the research problem, which is the consistently high rise of the unemployment rate in the country. Furthermore, the study shows how the South African government prioritises health, education, and social protection spending. To address the economic meltdown in the country, the government increases its spending on welfare and financial initiatives to refine the calibre of education and healthcare while attenuating unemployment through the various departments. Poverty reduction remains essential to the SDG agenda. However, despite all the attempts to increase fiscal spending, the result has not yet translated into a constant decrease in the unemployment rate or more robust economic growth. The government intends to increase access to inexpensive, high-quality education and health care and eliminate extreme poverty by providing income support to low-income households.

CHAPTER THREE – THE LITERATURE REVIEW

3.1 Introduction

This section of the study focuses on the literature review, which provides a current knowledge overview and enables the identification of theories that are relevant to the study and current gaps that can be identified in existing research. The South African labour force has increased rapidly, but due to weak economic growth, the economy has been unable to create enough new jobs and absorb the growing labour force (Developmental Policy Research Unit, 2017).

Therefore, examining the trends and characteristics associated with unemployment is crucial since it may help with understand the prospects for more focused methods and inform policymakers about policy priorities. This chapter discusses the theoretical framework and empirical literature.

The section for theoretical framework shows that the topic being investigated is rooted in the literature. In contrast, empirical literature provides evidence from studies conducted in developed countries, developing countries, and SA. Before discussing the theoretical framework, the chapter starts by identifying distinct types of unemployment and concludes with a summary of the chapter.

3.2 Types of unemployment

Distinguishing between the four main types of unemployment is essential, as it indicates its causes and consequences and presents ideas for tackling the problem.

3.2.1 Structural unemployment

Ehrenberg and Smith (2017) defined structural unemployment as a mismatch between the skills demanded and the skills supplied in each area or an imbalance between the supply and demand for workers across areas. The unemployment faced by South African citizens is mainly structural rather than cyclical (Patel, 2019). Structural employment is strongly related to frictional unemployment but is differentiated because structural unemployment continues for longer.

3.2.2 Frictional unemployment

Frictional unemployment arises due to the duration it takes individuals to secure employment or transition from one job to another. Even though there are openings in the economy, those looking for their first job or those who have recently left one have trouble finding employment. Barker (1992:73) stated that frictional unemployment often lasts only briefly. It can be further decreased by enhancing information flows and placement services in the labour market, hence removing the time lags associated with the re-employment of labour.

3.2.3 Seasonal unemployment

When demand for labour declines, people with seasonal jobs experience seasonal unemployment. This usually happens when a particular season ends or a new one begins, for a holiday or because of weather changes; for example, people who work in the agricultural sector. Mafiri (2002) stated that seasonal unemployment results from expected and typical shifts in economic activity over a year.

3.2.4 Cyclical unemployment

A drop in aggregate demand, resulting in a decline in labour demand in the face of downward pay rigidity, is the primary cause of cyclical unemployment. Lindbeck (2015:738) also explains cyclical unemployment resulting from the labour market's disequilibrium, where the labour supply is deemed excessive at the going wage rates. This disparity between the number of jobs available on the market and the number of people looking for work will persist if certain economic factors remain the same.

3.3 Theoretical framework

This study's theoretical reviews on government expenditure are founded on Keynesian theory. Classical unemployment theory and Okun’s Law are also discussed.

3.3.1 Keynesian theory

Keynes advocated the idea that income equilibrium is determined by aggregate demand. According to Keynesian theory, aggregate effective demand for goods and services determines employment levels in the short term (Keynes, 1936). Businesses are motivated to produce more when an economy's demand for products and services rises (Keynes, 1936). A country's overall demand can be used to estimate its overall employment level. Therefore, employment increases in response to increasing aggregate effective demand and vice versa. To support this statement, this study refers to Keynesian economist Okun's (1962) findings, in which he demonstrated that a country's production will rise when unemployment falls.

According to Keynesian theory, government expenditure can shorten the economic cycle by boosting demand for goods and services and enhancing overall economic consumption. Businesses increase their output level in response to a rise in demand, leading to hiring more personnel. Keynes thought the government's role was vital because it might prevent depression by raising aggregate demand and re-igniting the economy through multiplier effects. Short term stability can be achieved through government spending, but it must be done cautiously because too much of it can cause inflation, and too little can cause unemployment (Onwuka, 2021). Patel (2019) also pointed out that Keynes' theory of employment depends on the short term. In the short term, Keynes predicted that the factors determining the degree of employment, such as capital goods, the availability of manual labour, technology, and the productivity of physical labour, would not change.

Government spending can support economic growth. According to Maribe's (2020) research, governments, following the Keynesian theory, can leverage the support of the business sector to stimulate economic growth. For instance, the government might borrow and use funds for various expenditure plans as a repayment strategy. Therefore, through multiplier effects on aggregate demand, a rise in government consumption was likely to increase employment, profitability, and investment. Government spending thereby boosts the overall market, which in turn causes an increase in output, depending

on the expenditure multiplier. Consequently, the Keynesian analysis of government spending will be the foundation of this research.

3.3.2 Classical unemployment theory

According to classical theory, which Harrod (1934) and Solow and McDonald (1981) analysed, the labour market comprises the supply and demand of labour. The diminishing portion of the marginal product of labour is used to drive the demand for labour. Total employment in the economy was viewed as the norm by classical economists. Furthermore, the classical theory predicted that there could never be a general overproduction or market surplus in the economy (Samuel, 1987). Any deviation from full employment was therefore regarded as odd. According to the classicists, unemployment in the economy would be temporary and full employment would be naturally restored through free market forces (Banda & Choga, 2015).

According to classical economic theory, unemployment is a symptom of the free-flowing operation of the labour market being interfered with in some way. The traditional method assumes that markets operate as the idealised supply and demand model predicts. The labour market is a static market with institutions for double-auction bidding, perfect competition, and spot transactions.

As per the classical theory, whatever unemployment existing in the economy will be temporary, and the action of the free market forces will naturally bring about the restoration of total employment. Patel (2019) stated that classical economists argue that the economy frequently achieves the natural level of actual GDP, which can be attained when all the economy's resources are used. This theory proposes that salaries should be decreased to combat unemployment. As a result, reducing wages would raise the demand for labour, reduce unemployment, and boost employment and economic activity.

The classical theory of unemployment based its argument on the assumptions that full employment and price and wage flexibility are remedies for any disequilibrium in the labour market. Philbert (2016) stated that unemployment results from higher real wages than the market equilibrium earnings demands rather than aggregate demand. In

classical economics, productivity and total employment may be attained without the government's involvement. Therefore, unemployment increases as government involvement in the economy grows. Thus, the theory proposed that unemployment in the economy would be temporary and that free market forces would automatically restore full employment.

3.3.3 Okun's law

Okun's law gives the relationship between cyclical unemployment and the output gap. In economics, it is widely believed that a country's GDP growth rate influences employment and unemployment rates. This theoretical proposition relating output and unemployment is called "Okun's Law", as suggested by Okun (1970). Although it seems logical that output should move roughly in unison with employment, Okun (1970) argued that measured unemployment is less unpredictable than output because changes in labour force participation and hours worked can hide some underemployment. The following equation gives Okun's Law:

$$\frac{y-y*}{y*} = -\beta\ (u - u*) \qquad (3.1)$$

Where on the left is the output gap, with the numerator being the actual output gap while the denominator is the potential GDP. On the right is cyclical unemployment, the difference between actual and natural unemployment rates. Then there is Beta (β), which is Okun's coefficient. This equation means that the output gap as a fraction of potential GDP is inversely proportional to cyclical unemployment. If cyclical unemployment goes up, the output goes down; if cyclical unemployment goes down, the output goes up.

Therefore, this means that if more people are working, there will be more production; if fewer people are working, production will be small. However, many economists criticised Okun's original law, stating that it ignored essential variables, such as the effect of technological innovation and investment activity on labour activity, as both impact unemployment and output (Khumalo, 2014). Furthermore, many dismissed Okun's law

merely as a theory, stating that it was a law built on observation rather than a result produced from theory (Mavikela, 2019).

Therefore, this study will employ the Keynesian argument that if government spending rises, society will be motivated to spend more since more money will circulate. The society would then be encouraged to make additional investments, and the economy would expand. According to the theory, government spending leads to economic growth in a direct causal relationship. Through the multiplier effects on aggregate demand, public spending can help spur growth (Keynes, 1936). Additionally, he thought that purposeful government action might promote full employment. Keynesian economists contended that by adjusting tax laws and public spending, the government could directly affect the demand for products and services.

3.4 Empirical literature review

Several studies have examined the relationship between disaggregated government expenditure and unemployment. However, there is limited research on disaggregated government spending and unemployment in SA, even though the country has a high unemployment rate. Therefore, this study reviews studies with related topics that are not limited to but include the relationship between government spending and economic growth, government spending and unemployment rate, and the impact of the unemployment rate on GDP. An empirical literature review aims to discover the knowledge gaps, methods used, limitations of previous studies, and recommendations for future research. In this section, the study reviews earlier studies from developed countries, developing countries and SA.

3.4.1. Findings in developed countries

Sáez, Álvarez-García and Rodríguez (2017) used data from 1994 to 2012 to examine the relationship between government spending and economic growth in the European Union nations. The study noted that depending on the countries included in the sample, the relationship between government spending and economic growth could be either positive

or negative. Using cross-section panel data analysis to estimate the size of the public sector, the study's findings showed that government spending negatively impacts economic growth in the European Union Countries.

In their Fiscal Stimulus and Unemployment Dynamics study, Kuo and Miyamoto (2019) studied the impact of a shock in government spending in the United States labour market. They discovered that the more government spending increases the employment rate and decreases the separation rate, the more it lowers the unemployment rate. Similarly, Unal (2015) and Holden and Sparrman (2016) studied the effect of government spending on unemployment in the Netherlands and a panel of 20 OECD nations; both studies indicated that Keynesian impact is dominant as unemployment decreases in response to increased government spending.

In their study titled *Effects of Fiscal Stimulus on the Labour Market*, Kato and Mayimoto (2015) concluded that increasing aggregate government spending decreased unemployment in the Japanese economy. Furthermore, in a study from 1985 to 2013, Bova, Kolerus and Tapsoba (2015) looked at the short term impact of government spending on employment in a panel of OECD nations. The analysis showed that, compared to subsidies, free market expenditure on goods and services had a relatively higher beneficial impact on employment.

Schaltegger and Torgler (2006) empirically analysed the link between public expenditure and economic growth in Switzerland using data from 1981 to 2001. They also put the relationship between government spending and economic development to the test. The breakdown of public spending was further divided into two parts: operating budgets and capital budgets. State and municipal government expenditure was also taken into account. According to time series analysis techniques, the results showed that using capital budget spending had no significant impact on economic growth in Switzerland in contrast to the operating budget.

3.4.2. Findings in developing countries

Studies conducted in African countries and other developing countries measuring the impact government expenditure has on education, health, and security on economic growth showed the following results: Using the ARDL cointegration test from 1990 to 2019, Saraireh (2020) found a negative and statistically significant long-run relationship between government expenditures and the unemployment rate in Jordan. The study also noticed that government spending positively and significantly impacted unemployment in the short-run. Moreover, Dear and Saeidi (2017), in their research with mixed data spanning from 1998 to 2013, found that government development expenditures significantly negatively impacted the unemployment rate in the province of Iran.

In Egypt, Abouelfarag and Qutb (2021) conducted a study employing the Johansen Cointegration Test to ensure the long term equilibrium relationship between government spending and unemployment. Furthermore, they used the VECM to explore the dynamic short-run and long-run effects. The study's empirical findings found that increasing government expenditures would cause an increase in the unemployment rate in the long-run.

Shighwedwa (2020) investigated the effects of government expenditure and money supply on unemployment in Namibia using the ARDL bounds test. The results indicated that government spending and money supply impacted unemployment in the country. A negative and statistically significant relationship was observed between government expenditure and unemployment at a 5% significance level. In comparison, the negative relationship between money supply and the unemployment rate was significant at 10%.

Ali, Rabbi, Hayat and Ali (2013) investigated the effect of public spending on economic growth in Pakistan from 1972 to 2009. They further disaggregated government spending into components for current and development spending. The results of the ARDL model revealed that coefficients of development expenditure positively affected economic growth, while the results for current spending in Pakistan did not contribute to economic growth. Based on annual time series data from 1970 to 2010, Egbetunde and Fasaya

(2013) empirically examined the effects of public spending on economic growth in Nigeria. Capital and recurring spending were the two disaggregated components of government expenditure that were investigated.

Based on empirical findings, this study hypothesised that public spending in Nigeria did not promote economic growth. That could be because of expenditure fungibility or spending more on recurrent than capital expenses, which is evident in Nigeria, where recurrent expenses are three times the amount budgeted for capital expenses.

Abdieva, Baigonushova and Ganiev (2017) examined short and long term relationships between public spending and GDP. The study used quarterly data from 2001:1 to 2013:4 and applied the Granger causality and Eagle Granger cointegration to two emerging economies in Kyrgyzstan and Tajikistan. The Eagle and Granger cointegration test results demonstrated that GDP and public spending in both nations had a long term relationship (Mohamed & Alibuhtto, 2023). The Granger causality test results showed a one way causal relationship between government spending and GDP in Kyrgyzstan. These findings confirmed the Keynesian hypothesis that public spending cause's growth (Olaoye *et al.,* 2020). However, the study failed to prove a correlation between public expenditure and the increase in Tajikistan. Fosu (2019) examined the relationship between government spending and unemployment in 34 Sub-Saharan African (SSA) nations from 1990 to 2017 to determine whether rising public spending cause's unemployment, reduces it, or has no effect on it. The report further categorises government spending into government consumption and investment spending.

The pooled Ordinary Least Square (OLS), the fixed effect, and the random effect models are used to analyse the link between government spending and unemployment in the chosen SSA nations, using the panel data estimation technique on annual series data. According to the fixed effect model chosen using the Hausman test, government consumption and investment expenditure impacted unemployment in the SSA nations.

The study concluded that when all other factors are equal, increasing government consumption spending causes unemployment to rise. In contrast, an increase in government investment spending causes unemployment to decline. In other words, increased government investment spending creates more jobs in Sub-Saharan Africa. Employment growth in the SSA region was also a result of Foreign Direct Investment (FDI). The study suggested that governments in the area concentrate more on investment expenditures, which tend to create jobs for the population more frequently than consumption expenditures.

3.4.3. Findings in South Africa

Chirwa and Odhiambo (2016) conducted a study to empirically investigate the long term causes of SA's economic growth between 1970 and 2013. Using the ARDL technique, the study's findings showed that government expenditures hurt economic growth in SA over both the long and short-run.

Using quarterly data from 1994 Q1 to 2016 Q4, Makaringe and Khobai (2018) attempted to examine the trends and effects of unemployment on economic growth in SA using the ARDL limits test method to ascertain whether there was a long term relationship between the variables. According to the ARDL model's findings, unemployment and economic growth may be related over the long term. The empirical findings indicated a long term and short term inverse link between unemployment and economic growth. Molefe and Choga (2017) reexamined the relationship between government spending and economic growth in SA from 1990 to 2015 using the Vector Error Correction Model and Granger Causality methods. The time series variables used in the model were GDP, government spending, national savings, government debt, and consumer price index or inflation. The findings revealed a long term inverse link between SA's government spending and economic growth. A year is needed to correct 49% of the deviation in GDP from its equilibrium level, according to the estimate of the speed of adjustment coefficient found in their study.

Fedderke, Perkins and Luiz (2006) investigated the impact of public sector spending on infrastructure on economic growth in SA using time series data from 1976 to 2002 and the Vector Error Correction Model (VECM). The study proved that increasing government spending might boost the country's GDP and employment. The results are consistent with Nwosa's (2014) results, in which the study looked at the effects of government spending from 1981 to 2011 on unemployment and poverty rates in Nigeria. The study determined that public expenditure positively and considerably impacts the unemployment rate but does not affect the poverty rate using the OLS estimation technique (Omodero, 2019). Maribe's (2020) research employs the ARDL approach and ECM to evaluate the influence of disaggregated public investment and consumption spending on economic recovery in SA. It was done using annual time series data from 1983 to 2017. The outcome of the ARDL cointegration test shows that there is a long term link connecting the variables. According to the calculated ECM model, each explanatory variable's short term effect is substantial in elucidating fluctuations in SA’s economic recovery.

3.5 The Literature gap

There has been a lot of prior research on the effects of SA's aggregated or disaggregated government spending. Several investigations, including those by Molefe and Choga (2017), Mosikari and Matlwa (2014), and Odhiambo (2015), explored the effects of both aggregate and disaggregated government spending on the South African economy, emphasising the importance of domain expertise. Studies by Chirwa and Odhiambo (2016), Makaringe and Khobai (2018), and Nwosa, Ehinomen and Ugwu (2020) report on economic growth and unemployment and government spending and economic growth.

This study seeks to fill the gap in the literature by reporting on the disaggregated government spending shocks and their impact on the unemployment rate in SA. Annual time series data from 1990 through 2021 will be used to achieve the study objectives. As a result, the goal of the current study is to add to the continuing discussion of this issue. Earlier studies carried out in SA used a variety of approaches, including estimating procedures, model parameters, and time frames, to quantify the effect of aggregated government spending on economic growth. This report examines how government total

spending is affected when broken down for the South African economy. This study examines government spending on social protection, defence, and health separately from other control variables.

3.6 Chapter summary

This study reviewed previous studies that have examined the impact of government spending on unemployment and economic growth in different nations. Some studies found that government spending hurts economic growth in the long run. However, the results from the studies in developed and developing countries found that government spending significantly impacts unemployment. Researchers and government agencies can use these study findings to rework public policies that can spur the necessary economic growth in line with initiatives for radical economic change. These academic studies demonstrate the potential for positive and negative effects of government spending on unemployment.

CHAPTER FOUR – RESEARCH METHODOLOGY

4.1. Introduction

This chapter presents the methodology used to evaluate the impact of disaggregated government spending on SA's unemployment. It includes the research design and model specification and explains the study's variables, estimation technique, and procedure. The data source and estimation technique highlight econometric techniques in the research.

4.2. Research design

The research uses an econometric technique to analyse the impact disaggregated government spending shocks have on unemployment. Quantitative research methodologies that follow descriptive research methods are employed to achieve the study goals. Quantitative research methodology is often regarded as more scientific. Thus, emphasis is placed on using accurate definitions and considering operating principles and factors (Tewksbury, 2009).

Descriptive research is an appropriate choice for this study as it enables the collection of diverse data types about disaggregated government expenditure and unemployment rates. In descriptive research, a study does not begin with a hypothesis. However, a theory will likely be developed after data collection and analysis. While this study is quantitative and descriptive, it is also empirical. Calfee and Chambliss (2005) described empirical research as a systematic approach to answering specific questions by collecting evidence under carefully prescribed conditions. This evidence is referred to as “data”. Using the quantitative research approach to explain the occurrence, numerical data is gathered and examined using mathematically based methods. EViews 12 is used to run and compute the data obtained.

4.3. Data source and sampling

The data used in this study is a time series of secondary data collected annually between 1990 and 2021. Secondary data is data that already exists; using secondary data in research allows the researcher to gain insights and draw conclusions without having to collect new data, thus saving research time and resources while allowing the researcher to build upon existing knowledge and expertise. The period of the data is necessary, and the robustness of the estimation improves as the number of observations (*n)* gets larger. The duration of the data is needed to demonstrate variations in SA's unemployment rate concerning government spending. Secondary data for variables is available on the South African Reserve Bank (SARB) database.

4.4. Model specification

The study analyses unemployment as a function of fiscal policy tools to explore the effect of government spending on unemployment. The study model is adopted from that of Maribe (2020) expressed as follows: GDP = *f* (EDU, HLTH, DEF, SP, INV and INFL). In this study, government spending is not considered as total GDP, but government expenditure is disaggregated into the relevant control variables, namely Social Protection (SOP), Education (EDU), Health (HLT), Fuel and Energy (FEN), and Mining, Manufacturing, and Construction (MMC).

The functional model indicating that unemployment is a function of disaggregated government expenditure is expressed as follows:

UNE = f (SII, ESI, SOP, EDU, HLT, FEN, MMC) (4.1)

To estimate the β parameters, the functional model is transformed into the specific equation below:

$$UNE_t = \beta_0 + \beta_1 SSI_t + \beta_2 ESI_t + \beta_3 SOP_t + \beta_4 EDU_t + \beta_5 HLT_t + \beta_6 FEN_t + \beta_7 MMC_t + \mu_t \quad (4.2)$$

Where the variables incorporated are defined below:

UNE = Unemployment (Total % of the labour force)

SII = Social Infrastructure Investment

ESI = Economic Service Investment

SOP = Social Protection (Total expenditure)

EDU = Education (Total expenditure)

HLT = Health (Total expenditure)

FEN = Fuel and Energy (Total expenditure)

MMC = Mining, Manufacturing, and Construction (Total expenditure)

β_0 = Intercept of the model, and β_1, β_2, β_3, β_4, and β_5 are the coefficients of the independent variable with prior expectations.

μ = error term, which represents the omitted variables in the model.

4.4.1 Definition of variables and their expected impact

4.4.1.1 Unemployment

Statistics South Africa (2019) stated that 'unemployed is those people within the economically active population who want to work, are available to start work, and have taken active steps to seek some work or start some sort of self-employment.' Oniore, Bernard and Gyang (2015) stated that unemployment is characterised by the absence of a job or the proportion of individuals capable of working who are actively seeking employment but cannot secure it. The official unemployment rate is calculated as the percentage of the economically active unemployed population.

4.4.1.2 Social protection

This refers to government consumption expenditure, encompassing spending on children, the elderly, orphaned children, and unemployed individuals. By offering social welfare programmes and funding, the Social Protection Department seeks to eliminate

poverty and inequality while empowering women, young people, and people with disabilities (National Treasury, 2021). According to the budget review, SOP is the second largest spending priority in billions of rands, accounting for 18.9% of the consolidated government expenditure. In addition to grappling with a high unemployment rate, SA has to contend with the impoverished population's increased reliance on social assistance. In SA, 17.6 million beneficiaries got monthly grants in 2018/19, and 18.7 million are anticipated to continue receiving them in 2021/22 (National Treasury, 2019). The results of a study by Zhou, Ayandibu, Chimucheka and Masuku (2023) demonstrate that SOP provided by the government significantly lowers the likelihood of a decline in household income or consumption. Significant factors sustaining household income and consumption include the COVID-19 grant/social relief of distress grant, unemployment insurance, tax relief, and job protection and creation (Zhou *et al.,* 2023).

4.4.1.3 Health

All government spending on health services, including hospital services, public health services, ambulatory services, medical equipment, and research and development (R&D) services, is included in this category of government investment spending. The health function ensures fair access to compassionate, high-quality healthcare services while promoting health. The COVID-19 outbreak severely impacted the South African health system. According to the South African Medical Research Council (2021), the nation had 1.5 million confirmed COVID-19 cases as of 16 February 2021 and more than 137,000 excess deaths. The government responded by giving over R20 billion to the health sector in 2020/21, allowing it to increase capacity for hospital beds, screening, testing, and prevention (National Department of Health, 2021). Empirical research by Ndaguba and Hlotywa (2021) showed a positive relationship between SA's human development index and public healthcare spending. Additionally, health investments may boost the salaries of healthcare professionals and offer improved working environments and facilities to help save lives. However, a negative association between health spending and unemployment is anticipated.

4.4.1.4 Education

Education refers to basic and post-school education and training, as well as sports, arts, and culture. The largest share of the function's spending—50%—goes toward paying staff in basic education, which consumes, on average, 77% of provincial education expenditure (National Treasury, 2019). The basic education baseline is expected to rise by R3.7 billion over the next few years when the early childhood development function is moved from the social development sector to the basic education sector, beginning in 2022 or 2023 (National Treasury, 2021). Regardless of the rotational school schedule, 9 million students received meals through the national nutrition programme grant, which received R26.7 billion over the medium term (National Treasury, 2019). The study posited the possibility of a positive correlation between government spending on education and the unemployment rate.

4.4.1.5 Fuel and energy

Fuels are concentrated energy reserves that provide electricity, heat transportation, and other energy-related activities. Even though most fuels derive their energy from the sun, they are frequently regarded as a primary energy source. When individuals discuss energy conservation, they typically refer to utilising less fuel. To accomplish several goals, the South African government has entered the energy market (National Treasury, 2021). These goals include securing affordable access to energy, encouraging the decarbonisation of the energy system, enhancing energy security, and fostering economic development. Intervention often consists of a mix of fiscal policies, including spending, subsidies, and tax collection by the government. Khobai, Kolisi, Moyo, Anyikwa and Dingela (2020) conducted a study on renewable energy consumption expenditures and their impact on unemployment in SA. The results revealed that renewable energy consumption has a negative and significant long term effect on unemployment. Thus, spending on fuel and energy is expected to have a negative relationship with the unemployment rate. This variable is expressed in billions of rands.

4.4.1.6 Mining, manufacturing and construction

While the mining industry's contribution to the country's GDP was 9.6% in 2011, it fell to 8.1% in 2018 and under 8% in 2019 (PwC, 2019). It also contributes to the nation's exports, collecting the required foreign income. The SA mining industry is transitioning from a deep-level, labour-intensive, conventional mining environment to a mechanised, shallower, technologically advanced industry (PwC, 2019). The mining sector in 2021 employed 458,954 people, contributed R78.1 billion in taxes in SA and contributed R480.9 billion to GDP (Mineral Council South Africa, 2021). In 2019, 514 859 people were employed by the mining industry in SA; according to the report's employment statistics, the mining workforce increased by 3,737 people between 2015 and 2019 (Statistics South Africa, 2019). Habanabakize, Meyer and Muzindutsi (2017) discovered a long term relationship between government spending and job creation in the mining sector. Still, they found no evidence of such a relationship in the construction, financial, manufacturing, or retail sectors. Therefore, a prior expectation can take on either a negative or a positive sign.

4.5. Estimation technique

4.5.1 The ARDL approach

An econometric data analysis technique is employed to achieve this study's objectives. This study used ARDL as its estimation technique to estimate the impact of disaggregated government spending on unemployment. The reason behind choosing the ARDL is that it is more efficient in estimating long-run relationships and minimises the problem of endogeneity since it is free from residual correlation. ARDL also enables the estimated standard errors to be unbiased and fixes the autocorrelation problem.

Odhiambo (2015) expounded that the first step in the ARDL cointegration approach is determining whether a long-run relationship between the variables exists using the bound F-statistic test. The ARDL error correction representation becomes comparatively more efficient if the sample data size is limited or finite and the F-statistics (Wald test) indicate

a single long-run connection. If the F-value is more significant than (I1) bound values at all levels (1%, 5% and 10%), then that reveals that the variables are cointegrated, and then the short-run and long-run tests are conducted. The ARDL bounds test technique for cointegration, recommended by Pesaran, Shin and Smith (2001), is used to determine whether there is a long term relationship among the variables, given that they are all integrated with order one, I(1). Due to its advantages compared to traditional cointegration methods, the ARDL bounds test for cointegration was chosen. This technique is particularly well-suited for scenarios involving variables with different orders of integration, such as I(0), I(1), or fractional integration.

Using this method, the cointegration of the underlying variables is checked using the F-statistics. Suppose the estimated F-statistic is greater than the upper bound of the crucial values. In that case, the null hypothesis of no long term link between the underlying variables can be rejected. For example, the null hypothesis cannot be dismissed if the estimated F-statistic is less than the critical values. The test is considered inconclusive if the F-statistics are between the lower and higher bounds. The computed F-statistics generate two sets of essential values: lower and upper bound critical values (Atinafu, 2020). The critical values for the lower bound assume that the explanatory variables are integrated with order zero, denoted as I(0), indicating no cointegration among the underlying variables. The upper bound critical values were based on the assumption that the underlying variables are cointegrated and that the explanatory variables are integrated with order one, or I(1). The null and alternative hypotheses are as follows:

Null Hypothesis: H_0 = No long-run relationship exists.

Alternative hypothesis: H_1 = A long-run relationship exists.

4.6. The estimation procedure

4.6.1 Descriptive statistics and pairwise correlation

Descriptive statistics organise data by describing the connection between variables in a sample or population. Calculating descriptive statistics is an essential initial step in

research and should always be done before making inferential statistical comparisons (Kaur, Stoltzfus & Yellapu, 2018). Correlation is a relationship between two variables in both directions. The correlation coefficient indicates the intensity of the association or relationship between the two variables—their magnitude and whether it is positive or negative. To further emphasise significant research study findings, this study also employs graphic representations, which convey some results through descriptive statistics, tables, and graphs.

4.6.2 Unit root test

Unit root tests decide the degree of integration between factors and stationarity. The Dicker-Fuller test comes in three assortments: captured, drift and captured, and no drift and no captured (Selamolela, 2018:35). All three models reach the same conclusion on whether the factors beneath have a unit root or not. The unit root test for this study is performed utilising the Augmented Dickey-Fuller (ADF) test (Dickey & Fuller, 1979, 1981) and the Phillips-Perron (PP) test (Phillips & Perron, 1988).

Augmented Dickey-Fuller (ADF) test

Dickey and Fuller (1979, 1981) created a rigorous test for stationarity. The main result of their investigation was that testing for the presence of a unit root is quite like testing for non-stationarity. The ADF expands its test by considering additional lags in terms of the dependent variables to get rid of the issue of autocorrelation (Mushtaq, 2011:9). Stationarity is examined in ADF at three distinct levels: level, first difference, and second difference. A further criticism of Dickey and Fuller's test asserts that it has a meagre power, with only about 30% of accurate choices being made. It is not considered a suitable test, and the unit root tests have low power (Mushtaq, 2011:3).

Phillips-Perron (PP) test

The strength and correctness of the unit root results are assessed using a second unit root test by Phillips and Perron (1988). The strategy uses a nonparametric method to

regulate the serial relationship within the error term. The unit root test developed by Phillips and Perron in 1988 is frequently used in related econometric studies. Since no show-for-time arrangement needs to be created, this method has the advantage of being nonparametric. Since the Dickey-Fuller and ADF tests are said to ignore occurrences of heteroscedasticity and non-normality that are typically seen in raw data for financial time arrangement elements, the PP test has been widely used in experimental evaluation. EViews performs the PP test on a variable to determine if it has a unit root. The incorrect hypothesis is that the variable contains a unit root, while the preferred hypothesis is that it is produced by stationary preparation. EViews selects the appropriate slack length when PP is used (Gardachew, 2010).

Compared to the ADF test, the PP test has the following advantages: it is robust to standard forms of heteroskedasticity inside the error term. It does not require the user to provide a slack time for the test relapse. The primary distinction between the unit root tests PP and ADF is how they treat serial relationships and heteroskedasticity within the errors. The PP technique measures the non-ADF test condition and adjusts for serial relationship and heteroskedasticity within the test regression errors by explicitly modifying the coefficient's extent (Asteriou & Hall, 2011).

4.6.3 Cointegration

The concept of cointegration was originally formally defined by Engle and Granger (1987) and Granger (1988) and, who offered tests and an estimating method to assess whether a group of variables had a long term relationship inside a dynamic specification framework. The concept of cointegration is used to test and measure long-run equilibrium. The results of cointegration tests reveal situations in which two or more non-stationary time series are combined so that they cannot depart from equilibrium over the long term.

The ARDL approach was suggested by Pesaran and Shin (1999) and Pesaran *et al.* (1996b) for cointegration or bound process for a long-run connection, regardless of whether the underlying variables are I(0), I(1), or a combination of both (Nkoro & Uko,

2016). Granger and Engle (1988) formalised the cointegration vector approach in their article. Their theory claimed that two or more non-stationary time series data could be integrated so they could not deviate from an equilibrium over the long-run. However, since a small sample size would result in incorrect results, it is subject to asymptotic properties (big sample size). The problems brought on by errors being passed over to the next stage are avoided when using the test to determine the cointegration of multiple time series.

4.6.4 Error correction model (ECM)

The accepted method for modelling time series equations is to use ECM. The ECM divides the long and short-run, allowing one to work with non-stationary data series. A long-run equilibrium and shared stochastic patterns are implied when many series are cointegrated. Random shocks with short term or temporary impacts lead to this long term equilibrium. As a result, the series finally makes these adjustments. For this reason, the process of short term adjustment is called an error correction method.

The ECM is specified as follows:

$$\Delta U_t = \beta_0 + \Sigma_{i=1}^{p} \alpha_{1i}\Delta U_{t-i} + \Sigma_{i=1}^{q1} \alpha_{2i}\Delta EDU_{t-i} + + \Sigma_{i=1}^{q2} \alpha_{3i}\Delta FEN_{t-i} + \Sigma_{i=1}^{q3} \alpha_{4i}\Delta MMC_{t-i} + \Sigma_{i=1}^{q4} \alpha_{5i}\Delta SOP_{t-i} + \Sigma_{i=1}^{q5} \alpha_{6i}\Delta HLT_{t-i} + \Sigma_{i=1}^{q6} \alpha_{7i}\Delta ESI_{t-i} + \Sigma_{i=1}^{q7} \alpha_{8i}\Delta SII_{t-i} + \lambda_1 ECT_{t-1} + \varepsilon_t \quad (4.3)$$

Where the speed of adjustment parameter is represented by λ, it is anticipated that the error correction coefficient, λ, will have a value lower than zero, indicating a cointegration relationship. The ECT suggests the amount of the disequilibrium being corrected. ECT indicates how much any imbalance from the prior period is corrected in Ut. A high ECT coefficient indicates divergence from equilibrium, and convergence to equilibrium is shown by a negative value.

4.6.5 Lag length criteria

Estimating the lag length of an autoregressive process for a time series is a crucial econometric exercise for most economic studies. Liew (2004) suggested that the Akaike

Information Criterion (AIC) is superior to other criteria in that it minimises the chance of underestimating while maximising the possibility of recovering the true lag length. Therefore, this study adopts the AIC for lag length on that basis.

4.7. Diagnostic test

The OLS model evaluates the long term relationship and integration between the variables. According to Kamel and Abonazel (2023) and Abonazel and Taha (2023), regression analysis is frequently used to determine the relationship between a dataset's dependent and independent variables. OLS determines whether the relationship between the dependent and independent variables is statistically significant. This is accomplished by examining the probability value or p-value. The R-squared test is also used to evaluate the model's degree of goodness of fit. How much of the variation in the dependent variable is explained by each dependent variable is referred to as the goodness of fit. This study presents diagnostic tests for the Jarque-Bera (JB) normality test, heteroscedasticity, Breusch-Godfrey Serial Correlation LM Test, the Variance Inflation Factor (VIF) test for multicollinearity, and the stability test using the cumulative sum (CUSUM) of recursive residuals and cumulative sum of squares of recursive residuals (CUSUMQ). Diagnostic tests are carried out to validate the estimated model's parameter estimation outputs (Kilinc-Ata & Proskuryakova, 2023).

4.7.1 The serial correlation (LM test)

The LM test determines whether the errors corresponding to several observations are uncorrelated. This entails checking the error term's unpredictability. The Breusch (1978) and Godfrey (1978) technique examines the null hypothesis, which posits the absence of serial correlation. This method is preferred over the Durbin-Watson test when including a lagged dependent variable among the explanatory factors, which leads to an unreliable estimate. The Durbin-Watson serial correlation test does not consider higher-order tests (Asteriou & Hall, 2007).

4.7.2 Heteroskedasticity

This test determines whether the error term's variance is constant. Outliers, wrong data transformation, incorrect functional form, incorrect regression model specification, etc., can lead to heteroscedasticity. For this reason, the White heteroscedasticity test is used. The classical linear regression model makes the homoscedasticity assumption, which states that the variances and standard deviations are equal and independent. One way to present the homoscedasticity assumption is as follows:

$$var(\mu_i) = \sigma^2 \tag{4.4}$$

This suggests that the residual variances or disturbances are equally distributed. They are homoscedastic, in other words. However, if this presumption is broken, the variances of the error turn into a function of each observation in the sample, as follows:

$$var(\mu_i) = \sigma_i^2 \quad \textit{For i = 1,2,3…n} \tag{4.5}$$

4.7.3 Normality test

Analysing the descriptive statistics provides a historical context for the pattern and behaviour of the data series, which also affects the distribution's normality. The JB test gives information about the series' normality status. This test is called a goodness of fit, examining sample data to determine the significance of measures such as skewness and kurtosis in the OLS residuals. The alternative claims that the series is not regularly distributed, contrary to the null hypothesis. The P-value of the JB statistics is used to evaluate the test's outcome. At a 10% significance level, a p-value of less than 0.01 indicates the rejection of the normal distribution. To prevent misleading results, it is crucial to satisfy the normality assumption. The stationarity test is required to determine other aspects of the series in cases where the normality assumption is broken.

The JB model is given below.

$$JB = \frac{n}{6}\left[s^2 + \frac{1}{4}(k-3)^2\right] \tag{4.6}$$

Where JB is the Jarque-Bera statistic and n is the sample size, S is the skewness, and K is kurtosis. The JB test matches the skewness and kurtosis of data to see if it matches a normal distribution.

4.7.4 VIF test for multicollinearity

The VIF estimates the intensity of multicollinearity in regression analysis. It is a statistical concept that describes how collinearity causes a regression coefficient's variance to grow. Multicollinearity occurs in OLS regression analysis when two or more independent variables have a linear connection. Perfect multicollinearity occurs when the independent variables in a regression model have an entirely predictable linear relation. For example, this study assumes that government spending on education and health has a linear connection. Therefore, a VIF test needs to be performed to assess the degree of correlation between these variables. VIF can be calculated using the following formula:

$$VIF_i = \frac{1}{1-R_i^2} = \frac{1}{TOLERENCE} \quad (4.7)$$

Where R_i^2 is the uncorrected coefficient of determination when the i^{th} independent variable is regressed on the other independent variables, depending on personal choice, multicollinearity can be found using either VIF or tolerance. Tolerance is the reciprocal of VIF. The variance of the subsequent independent variables cannot be predicted from the i^{th} independent variable if R_i^2 is equal to 0. Because the i^{th} independent variable is not associated with other independent variables when VIF is equal to 1, multicollinearity is absent in the regression model. The variance of the i^{th} regression coefficient is not increased in this instance. In general, multicollinearity may exist, and more research is needed if the VIF is greater than 4 or the tolerance is less than 0.25. Significant multicollinearity must be adjusted when VIF is greater than 10 or tolerance is less than 0.1. VIF values of 10 or even greater do not invalidate the significance of the regression study results, require the combination of independent variables into a single index, or indicate that one or more independent variables be removed from the analysis. Instead, they point to the possibility of using ridge regression.

4.7.5 Ramsey test

The Ramsey test is required to assess the model's stability over time. Specifically, this includes the effectiveness, objectivity, validity, and suitability of the autoregressive (AR) model. The model is stable if all the unit roots have absolute values smaller than one and their lines fall inside the unit circle. If not, the model shows indicators of instability. The stability of the estimated model is further investigated using the stability test proposed by Brown, Durbin and Evans (1975), which rests its test on the recursive residuals. This method is suitable for time series data, mainly when it is unclear when structural changes may have happened. The alternative hypothesis contends that the coefficient vector differs from the null hypothesis, which states that it always does so.

4.7.6 Stability tests

A stability test is required to determine how stable the model is over time. Notably, the effectiveness, objectivity, validity, and suitability of the autoregressive (AR) model. The model is said to be stable if all the variables have absolute values smaller than one and their lines fall inside the unit circle. If not, the model shows indicators of instability. The stability of the estimated model is further investigated using the stability test proposed by Brown *et al.* (1975), which focuses its test on the standardised residuals. This method is suitable for time series data, mainly when it is unclear when structural changes may have happened. The null hypothesis is that the coefficient vector of β for all the periods remains the same, whereas the alternative hypothesis suggests that it differs.

The model's breakpoints are displayed against the CUSUM and CUSUMSQ statistics and updated continuously. As a result, Pao and Fu (2013) say the model is stable if the plots of the statistics for the regression coefficients fall within the critical boundaries of a 5% significance level; otherwise, the model is unstable. Specifically, graphical representation is used to perform the CUSUM and CUSUMSQ tests. The CUSUM and CUSUMSQ tests are chosen over other stability test types in the study because they get around the restrictions of the different stability tests.

4.8. Chapter summary

This chapter discussed the research design and methods to achieve the study's objectives. It also mentioned the data span and data source. Moreover, the study defined the variables of interest, and these variables contribute to achieving the objectives outlined in Chapter One. Following the research approach, Chapter Five illustrates the estimates, presentation, and analysis of the estimating techniques used in this study.

CHAPTER FIVE – REPORTING, INTERPRETATION AND DISCUSSION OF RESULTS

5.1 Introduction

According to Mncayi (2016), a person affected by unemployment usually has attended school or is prepared to become employable. Unfortunately, due to the state of the economy, the person remains unemployed. Because the unemployed must rely on society for their welfare, this problem is linked to other societal issues. This chapter presents and discusses the study's empirical analysis using the ARDL regression model. Firstly, descriptive statistics and correlation analysis are used to analyse the variables, followed by the informal and formal unit root tests. Furthermore, the study will investigate the model's long-run and short-run ECM results and conclude by running the stability test to assess whether the model is stable over time.

5.2 Descriptive statistics

The study employs descriptive statistics to describe the essential characteristics of the data. It measured the central tendency, maximum, minimum, and dispersion using actual data from the variables. Table 5.1 below summarises the descriptive statistics of the variables used in the analysis.

Table 5. 1: Descriptive statistics of variables (1990 to 2021)

Variables	LEDU	LESI	LFEN	LHLT	LMMC	LSII	LSOP	LUNE
Mean	2.97	10.30	-0.59	2.35	-0.41	10.15	2.55	3.20
Median	2.97	10.39	-0.69	2.33	-0.51	10.15	2.58	3.21
Maximum	3.09	10.62	1.50	2.48	0.09	10.52	2.86	3.53
Minimum	2.89	9.73	-1.60	2.18	-0.91	9.54	2.21	2.82
Std. Dev.	0.05	0.26	0.78	0.09	0.25	0.25	0.14	0.13
Observations	28	28	28	28	28	28	28	28

Analysis by author, using EViews 12

Table 5.1 above displays the descriptive statistics results for each variable. The results show that ESI has the highest mean, median, and maximum values compared to all the other variables. This result may be associated with the level of spending that the government puts into economic services infrastructure. This means that ESI has more tremendous values than the other variables. EDU recorded the lowest standard deviation value at 0.05.

5.3 Correlation analysis

The correlation coefficient extends from -1 to 1. A score of 1 signifies that a linear equation precisely predicts the interaction uniting variables, with all data points aligning on a line where the dependent variable rises as the independent variables increase. A value of -1 advocates that the data points lie on a line where the dependent variable decreases as the independent variables decrease. A value of 0 stipulates the absence of a linear relationship between the variables.

Table 5. 2: Correlation analysis

	LEDU	LESI	LFEN	LHLT	LMMC	LSII	LSOP	LUNE
LEDU	1							
LESI	-0.54	1						
LFEN	-0.31	0.32	1					
LHLT	-0.03	0.67	0.24	1				
LMMC	-0.10	-0.38	-0.05	-0.66	1			
LSII	-0.30	0.75	0.29	0.72	-0.22	1		
LSOP	-0.66	0.74	0.29	0.56	-0.40	0.51	1	
LUNE	-0.11	0.53	0.07	0.65	-0.74	0.30	0.69	1

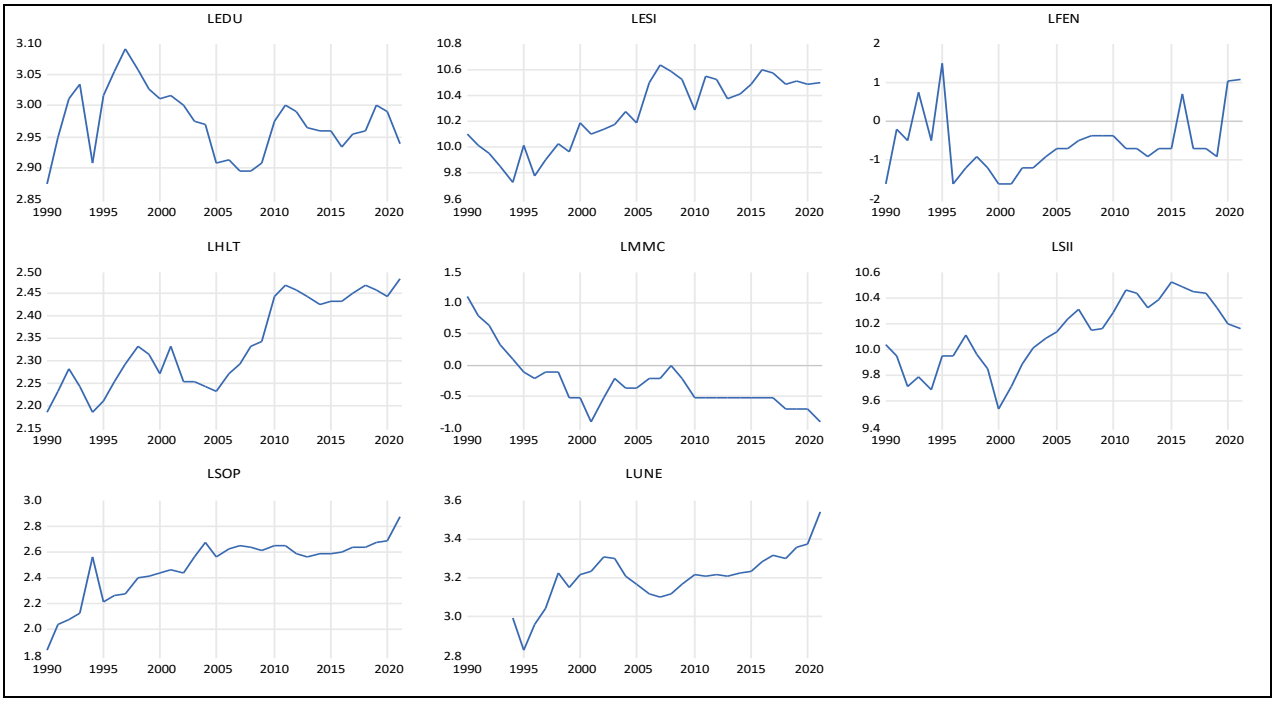
Analysis by author, using EViews 12

The results from the correlation show that some variables are positively correlated, and some are negatively correlated. EDU and MMC show a negative correlation with UNE. Hence, by increasing government spending on education, MMC in SA is expected to decrease unemployment. These findings align with those of Marimbe (2020), who found a positive relationship between education and GDP.

This study posits that, under constant conditions, a reduction in the unemployment rate resulting from an upsurge in government spending on education will lead to an increase in GDP. The other variables all show positive correlations with the dependent variables. The results also show a strong positive correlation between SOP and UNE, meaning that if the government increases spending on social protection, the unemployment rate will also increase.

5.4 Unit root test results

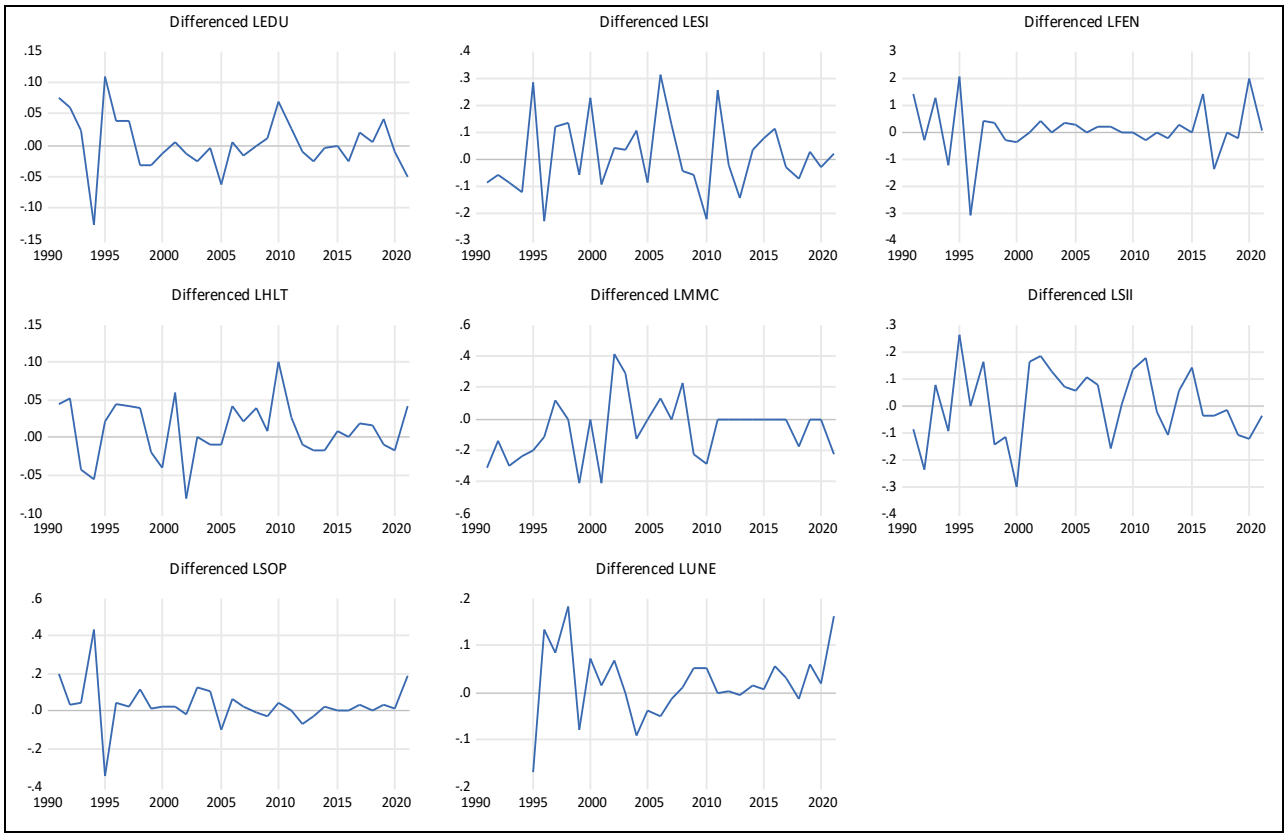
Figure 5. 1: Graphical representation at level series



Analysis by author, using EViews12

Upon visual inspection, the variables trend upwards and downwards, which may indicate non-stationary behaviour. In particular, Figure 5.1 above initially shows that LUNE rose until 2002. The downturns are brief, but starting in 2010, the rise will continue steadily until 2020.

Figure 5. 2: Graphical representation at first difference



Analysis by author, using EViews 12

5.4.1. Formal unit root test

Table 5. 3: ADF & PP results at level series

		ADF TEST		PP TEST	
Variables	**Model Specification**	**ADF T-Statistic Value**	**ADF Probability Value**	**PP T-Statistics Value**	**PP Probability Value**
UNE	Intercept	-0.7470	0.8179	-0.6660	0.8390
	Trend & Inter	-1.7077	0.7198	-1.8956	0.6290
	None	1.3650	0.9529	1.4268	0.9580
MMC	Intercept	-3.1533	0.0328**	-3.4210	0.0178**
EDU	Intercept	-2.9782	0.0481**	-2.9782	0.0481**
	Trend & Inter	-3.3962	0.0703*	-3.4415	0.0641*
	None	0.2156	0.7422	0.3633	0.7834
SOP	Intercept	-2.7241	0.0814*	-2.8503	0.0630*
	Trend & Inter	-4.0268	0.0182**	-4.0268	0.0182**
	None	1.3180	0.9493	1.3180	0.9493
HLT	Intercept	-1.0830	0.7097	-1.1136	0.6977
	Trend & Inter	-2.2837	0.4299	-2.2837	0.4299
	None	1.3753	0.9544	1.5578	0.9678
FEN	Intercept	-4.0256	0.0040***	-4.0082	0.0042***
	Trend & Inter	-4.1002	0.0154**	-4.0902	0.0157**
	None	-3.2862	0.0018***	-3.3028	0.0017***
SII	Intercept	-1.4050	0.5670	-1.3510	0.5929
	Trend & Inter	-2.7392	0.2292	-2.3594	0.3920
	None	0.1158	0.7121	0.1590	0.7253
ESI	Intercept	-1.3357	0.6001	-1.1469	0.6841

	Trend & Inter	-3.2001	0.1029	-3.2461	0.0943*
	None	0.4814	0.8134	0.6655	0.8545

Computation by author, using EViews 12

(***) [**] and {*} denotes statistically significant at 1%, 5%, and 10% respectively

Every variable is tested by the ADF and PP in three different scenarios: (1) intercepts, (2) trends and intercepts, and (3) no trend and no intercept. Table 5.3's findings demonstrate that UNE, HLT, and SII are non-stationary since all variable values exceed the significance levels of 10%, 5%, and 1% at the level form. The study cannot reject the null hypothesis at the 10%, 5%, and 1% significance levels. Therefore, to obtain robust results indicating that all variables are stable at all levels, the variables should be evaluated for stationarity at the first difference, which is integrated into order 1 or I (1).

Table 5. 4: ADF & PP results at first difference

		ADF TEST		PP TEST	
Variables	**Model Specification**	**ADF T-Statistic Value**	**ADF Probability Value**	**PP T-Statistics Value**	**PP Probability Value**
UNE	Intercept	-5.7240	0.0001***	-5.6374	0.0001***
	Trend & Inter	-5.6143	0.0001***	-5.5440	0.0007***
	None	-5.0504	0.0000***	-5.1757	0.0000***
SOP	Intercept	-8.0089	0.0000***	-8.6221	0.0000***
	Trend & Inter	-7.9484	0.0000***	-9.6955	0.0000***
	None	-7.4745	0.0000***	-7.6094	0.0000***
HLT	Intercept	-5.1690	0.0002***	-5.1616	0.0002***
	Trend & Inter	-5.0606	0.0016***	-5.0480	0.0016***
	None	-5.0117	0.0000***	-5.0117	0.0000***
SII	Intercept	-4.8376	0.0005***	-6.2196	0.0000***
	Trend & Inter	-4.7574	0.0033***	-6.2679	0.0000***
	None	-4.9119	0.0000***	-5.3170	0.0000***
ESI	Intercept	-7.5024	0.0000***	-8.0702	0.0000***
	Trend & Inter	-7.3637	0.0000***	-7.9044	0.0000***
	None	-7.4986	0.0000***	-7.6789	0.0000***

Authors own computation, using EViews12.

(***) [**] and {*} denotes statistically significant at 1%, 5%, and 10% respectively

Following the initial differenced form, all of the series are stationary. To prevent misleading findings, all the factors must be differenced. As a result, the series are said to be integrated of order 1 or I(1).

5.5 Lag Length Selection Criteria

Table 5.5 below confirms the lag lengths carefully chosen by various information criteria. This study will use the AIC to select the leg length.

Table 5. 5: Lag length selection results

Lag	LogL	LR	FPE	AIC	SC	HQ
0	173.6244	NA	4.05e-16	-12.74034	-12.35323	-12.62886
1	301.6686	167.4424	3.73e-18	-17.66681	-14.18285	-16.66356
2	435.6198	92.73546*	1.05e-19*	-23.04768*	-16.46686*	-21.15264*

*Indicates lag order selected by criteria

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.

The results from Table 5.5 above show that this study will use AIC lag 2 for further analyses.

5.6 ARDL Bound Tests for Cointegration

Table 5. 6: F-Bound test results

Significance	Model	F-Statistics	Critical Value Bounds			Cointegration Status
			Significance	Lower Bound	Upper Bound	
UNE = c {EDU, FEN, HLT, ESI, MMC, SII, SOP}	**Critical Values for K = 7**					
	(1, 1, 0, 0, 0, 0, 0, 0)	7.5002***	1%	2.96	4.26	Cointegration
			2.5%	2.6	3.84	
			5%	2.32	3.5	
			10%	2.03	3.13	

Analysis by author, using EViews 12

(***) [**] and {*} denotes statistically significant at 1%, 5%, and 10% respectively

Table 5.6 above displays the outcomes of the ARDL bound test. AIC was used to determine the most appropriate lag length for the estimated ARDL equation. The computed F-statistics are 7.5002, more significant than the lower and upper bounds at a 5% significance level.

The study concludes that a long-run (cointegration) relationship exists when the F-statistic exceeds the upper critical bounds value. Therefore, when the computed F-statistic is greater than the I(0) and I(1), it shows a long-run equivalent relationship between the dependent and independent variables. The null hypothesis is, therefore, accepted. These results are in line with those of a study carried out by Saraireh (2020) and Hammad, Hadi Shallal, Ata Allah, Faisal and Abdullah (2023) in Jordan and Iraq, respectively, for the periods 1990 to 2019 and 2004 to 2021. The studies applied the ARDL bounds test and

concluded that a long-run relationship between the dependent and independent variables occurs.

5.7 Long-run and short-run ECM Results

Table 5. 7: Long-run ECM bound test

Long-Run Coefficients				
Dependent Variable: UNE				
Variable	**Coefficient**	**Standard Error**	**T-statistic**	**Prob. Value**
LESI	-0.1303**	0.0459	-2.8352	0.0110
LFEN	-0.0084	0.0070	-1.2013	0.2452
LHLT	0.3530***	0.1195	2.9531	0.0085
LMMC	-0.0092	0.0362	-0.2542	0.8022
LSII	0.0046	0.0381	0.1219	0.9043
LSOP	-0.2552***	0.0817	-3.1233	0.0059
LUNE	0.1099	0.0797	1.3789	0.1848

Analysis by author, using EViews 12

(***) [**] and {*} denotes statistically significant at 1%, 5%, and 10% respectively

Table 5.7 above presents the ARDL model's long-run coefficients. The government spending coefficients show a negative relationship between LESI and UNE with a value of -0.1303, which is statistically significant at a probability value less than 0.05. This implies that a 1% increase in government spending on economic services investment will decrease unemployment by 0.13 in the long-run.

The results for HLT show that the variable has a positive relationship with unemployment with a government spending coefficient value of 0.35, and it was found to be statistically significant as the probability value is less than 0.05. These results imply that a 1% increase in government spending is associated with a 0.35% increase in unemployment in South Africa. These results align with those of Obisike, Okoli, Onwuka and Mba (2020). Their study used the OLS regression method and secondary data from 1981 to 2016 to assess government expenditure's impact on Nigeria's unemployment (Uremadu, Orikara & Uremadu, 2019). The economic results of their study found that increased recurring spending on health and increased capital spending on health within the study period contributed to an increase in the unemployment rate of 0.03 and 0.08, respectively.

There is a negative relationship between fuel and energy and unemployment, with the government spending coefficient at -0.0084. The results are also not statistically significant, as the probability value exceeds 0.05. However, the SOP results show a significant statistical correlation between SOP and unemployment. The government spending coefficient is -0.2552. These results disagree with those of Maribe (2020), who found a positive relationship between social security and government expenditure in his study.

Furthermore, the results show a negative relationship between unemployment, economic services investment, and MMC, with a government spending coefficient of -0.1303 and -0.0092, respectively. However, for economic service investment, the results are statistically significant, while for MMC, they are not statistically significant as the probability value exceeds 0.05.

Additionally, the empirical results show that government spending on SOP negatively correlates with UNE, with a coefficient of -0.2552. This was statistically significant as the probability value was less than 0.05. Therefore, on average, there is a negative association between government consumption expenditure on SOP and long term unemployment at a significance level of 1%.

Table 5. 8: Short-run ECM bound test

Short-Run Coefficients				
Dependent Variable: UNE				
Variable	**Coefficient**	**Standard Error**	**T-statistic**	**Prob. Value**
C	3.6669	0.4022	9.1165	0.0000***
D(LESI)	-0.0181	0.0299	-0.6049	0.5528
CointEq(-1)*	-0.9835	0.1077	-9.1288	0.0000***

Analysis by author, using EViews 12.

(***) [**] and {*} denotes statistically significant at 1%, 5%, and 10% respectively

Table 5.8 above shows the ARDL ECM results. The table shows CointEq(-1)*, a negative error correction coefficient, and statistical significance at a 1% significance level displayed in the short-run dynamic adjustment results. The ECM value, which falls between 0 and -1, shows that the variables converge toward equilibrium. The statistical significance of the error correction term (ECT), according to Iyoboyi (2013), attests to the cointegration or long term link of all the variables under investigation. Additionally, it suggests that equilibrium will be reached slowly and that the long term equilibrium will be reached at a rate of 98% yearly. As a result, the system recovers from its previous year's disequilibrium at a rate of 98% every year. In other words, around 98% of the disequilibrium of the last year has been addressed in the current year, indicating a decent adjustment rate. A highly significant ECT indicates a solid, long term relationship (Banerjee, Dolado & Mestre, 1998). Furthermore, independent variables account for the variance in the dependent variable because both R^2 and modified R^2 are greater than 50%. The short-run coefficients of government spending show that government economic services investment negatively affects unemployment. The results show that LESI is not statistically significant as the probability value exceeds 0.05. The result could not find any significant impact in the short-run on unemployment by all the other variables.

5.8 Diagnostic Test

Various tests were run to determine whether the regression model adheres to the linear regression model's properties. After the ECM long-run and short-run coefficient results, the model was evaluated for the JB normality test, heteroscedasticity, Breusch-Godfrey Serial Correlation LM Test, VIF test for multicollinearity and the stability test using cumulative sum of recursive residuals (CUSUM) and cumulative sum of squares of recursive residuals (CUSUMQ). To be assessed for robustness, the model must be free of correlation and heteroscedasticity (Pesaran, Shin & Smith, 2001).

Table 5. 9: Diagnostic test results

Test	Null Hypothesis	T-statistics	Prob. Value	Conclusion
Jarque-Bera	Ho: Residuals are normally distributed	0.7478	0.6880	The residuals of the model are normally distributed.
Heteroscedasticity	Ho: Residuals are homoscedastic	0.9098	0.5377	The residuals of the model are homoscedastic.
Serial Correlation LM Test	Ho: Residuals are not serially correlated	1.4905	0.2549	There is no evidence of serial correlation in the model.

Analysis by author, using EViews 12

The JB test was used to conduct tests for normality. This test determines whether a data set or residuals are evenly distributed. According to economic theory, the assumption that the residuals are normally distributed is expected to conduct tests for normality. The assumption that the residuals are normally distributed is expected, according to economic theory (Buthelezi, 2023). Given that the probability value of Jarque-Bera is greater than 5%, the model's residuals are normally distributed based on the results from Table 5.9

above. A null hypothesis in the heteroscedasticity test indicates the homoscedasticity of the model's residuals. Reject the hypothesis whenever the probability value is less than the 5% significant level. According to Table 5.9, the White test for heteroscedasticity yielded a Chi-Square of 0.4602 at a probability value of 0.5377. Given that the Chi-Square probability value is more than 5%, this indicates no heteroscedasticity among the variables. As a result, we reject the alternative hypothesis and adopt the null hypothesis, which states that there will be heteroscedasticity.

The Serial Correlation LM test was employed to check for serial correlation between the variables. The autocorrelation test's null hypothesis affirms the absence of serial correlation. We reject the null hypothesis and infer that the residuals exhibit serial correlation if the p-value is below the significance level of 5%. The results in Table 5.9 above demonstrate that the probability value of the LM test (0.2549) is greater than 5%, indicating acceptance of the null hypothesis and the conclusion that there is no serial correlation among the residuals.

5.9 VIF Multicollinearity

Table 5. 10: Variance inflation factor results

Variables	**Coefficients**	**Centred VIF**
LEDU (-1)	0.040224	4.745806
LESI	0.002350	7.086620
LESI (-1)	0.002135	6.939535
LFEN	5.39E-05	1.456273
LHLT	0.016389	6.607312
LMMC	0.001234	3.486100

LSII	0.001403	4.139118
LSOP	0.004845	4.343511
LUNE	0.007945	6.591727

Author's calculations, using EViews 12

The VIF results require further investigation, as most variables have a VIF value greater than 4, indicating that multicollinearity might exist. The high VIF between ESI and SII is because they are similar variables (both investments). To fix the issue of multicollinearity, the study considers removing ESI as a highly correlated variable. FEN and MMC VIF values are not a cause for concern.

5.10 Ramsey RESET Test

Table 5. 11: Ramsey RESET test results

	Value	**Probability**
T-statistics	1.47	0.15
F-statistics	2.17	0.15
Likelihood Ratio	3.37	0.06

Author's calculation, using EViews 12.

The model is free from specification errors as the probability values are not statistically significant and are far better than 0.05.

5.11 Stability Tests

The study employs stability tests to examine the model's consistency and assess any structural alterations. These tests encompass the cumulative sum of recursive residuals (CUSUM) and the sum of squares of recursive residuals (CUSUMSQ).

Figure 5. 3: CUSUM plot

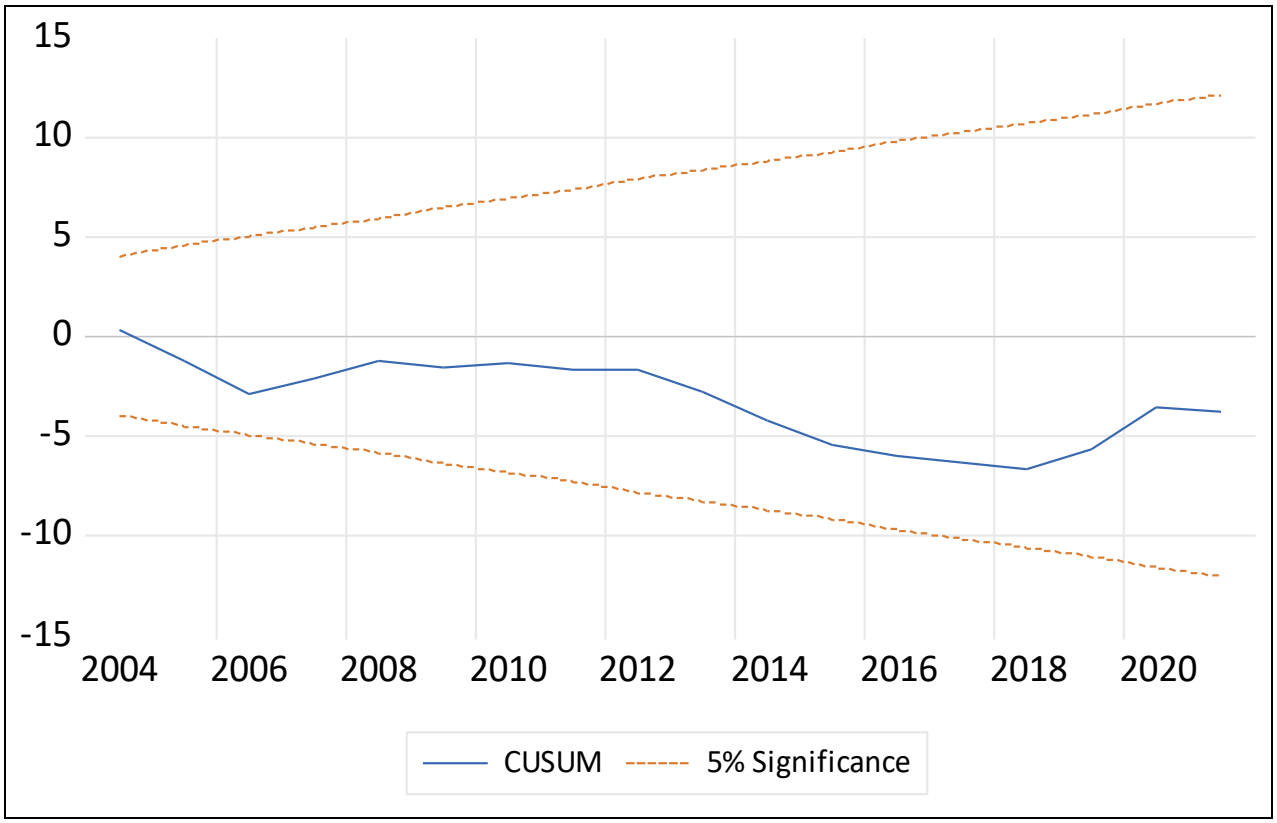
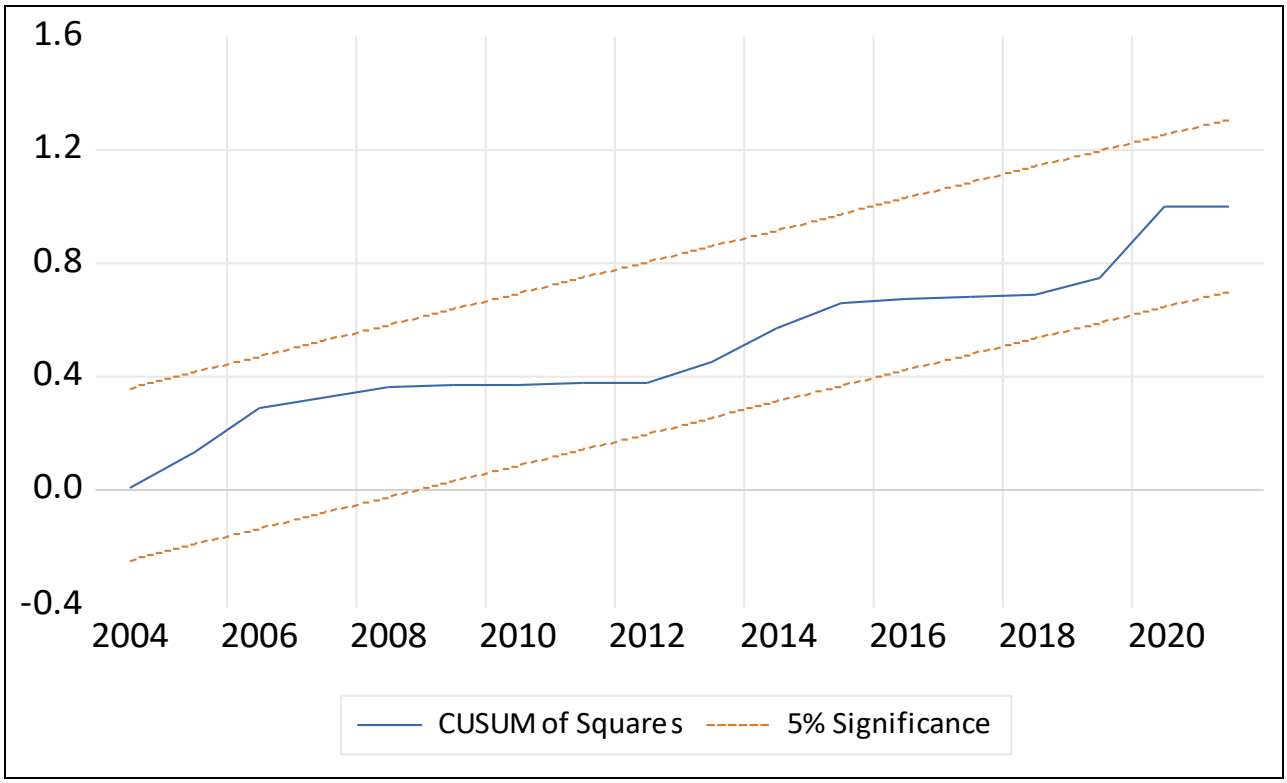


Figure 5. 4: CUSUMQ plot



Figures 5.3 and 5.4 show that the model is stable over time, as the plots are between the critical values. The linear representation indicates crucial limits at a significance level of 5%. The outcomes of the CUSUM and CUSUMSQ tests fall within the 5% threshold, validating the model's effective performance.

5.12 Chapter Summary

The study aimed to investigate how broken down government spending affected SA's unemployment rate. It furthered research by empirically assessing the effects of more disaggregated government investment and consumption spending components on SA's unemployment rate. The conclusion validates a sturdy and significant positive correlation between certain independent variables and the dependent variable and a high negative correlation between other variables and the dependent variable. Therefore, unemployment will rise along with increases in government spending on social security and health care. Furthermore, evidence for a long term association between the variables was discovered by the ARDL bounds test results for cointegration analysis. The

conclusion is consistent with Keynesian theory, which states that government expenditure raises the national income. Diagnostic tests such as heteroscedasticity, stability, and normalcy were used to guarantee the accuracy of obtained results. CUSUM and CUSUMQ, the graphical evidence, show that the model is sturdy.

CHAPTER SIX – SUMMARY, RECOMMENDATIONS AND CONCLUSION

6.1. Introduction

This study analysed the impact of government disaggregated spending on SA's unemployment from 1990 to 2021. Drawing from the analysed data in the preceding chapter, this chapter presents a synopsis of the findings, conclusions, and potential policy recommendations for future research. Additionally, it outlines the study's limitations and proposes specific focus areas for future researchers.

6.2. Summary of Findings

There is disagreement concerning the relationship between components of disaggregated government spending and unemployment, even though there is a more significant body of research on the subject. As a result, debates about whether some of the components of disaggregated government spending are beneficial or detrimental to the unemployment rate may carry on. Empirical research on developed and developing nations supports the idea that some components of disaggregated government spending and unemployment are related. The study shows that some components of disaggregated government spending have a significant, positive, negative, or insignificant effect on unemployment in the respective countries.

The primary goal of the research was to examine the influence of various government spending components, including education, health, SOP, fuel and energy, mining, manufacturing and construction, social services investment, and economic services investment, on the unemployment rate in SA throughout the study period from 1990 to 2021. The first sub-objective of the study was to critically review government policies implemented to combat unemployment from 1990 to date. The study in Chapter Two reviewed three national policies implemented by the African National Congress (ANC) government since 1994 and reviewed their performance. The chapter's main conclusions were that, since 1994, SA has faced several micro and macroeconomic policy challenges, including slow growth, low investments, productivity, competitiveness, and issues with

state capacity. These challenges have impacted the country's ability to create sustainable jobs. The chapter also discovered that most of these adopted policies fell short of their goals.

Chapter Three analysed the empirical literature on this research topic, reviewing studies from developing and developed countries. The empirical studies showed that increasing government spending would decrease unemployment in developed countries. Conversely, for developing countries, the results showed that increasing government spending will, in return, increase the unemployment rate. The findings regarding SA indicated a long term sustained relationship between government spending and unemployment.

The study's annual data, covering all variables from 1990 to 2021, was sourced from the SARB database. Unemployment was the study's dependent variable, while government spending on SOP, health, education, fuel and energy, and MMC were the independent variables. This research employed various time series methods to accomplish its objectives, including the stationarity test (ADF and PP), ARDL methodology, ECM technique, and stability and diagnostic tests. The ECM dispensed guideline estimates for the long-run and error correction aspects, while the ARDL approach illustrated a lasting connection between the variables.

The study could not find any consequential link between the study's variables in the short-run except for the economic services investment variable. The relationship between economic services investment and unemployment in the short-run was negative and not statistically significant. This implies that unemployment will decrease as government spending on economic services increases. When economic activity is high, more production happens, and more people are needed to produce more goods and services. Hence, unemployment will decrease when the government spends more on economic services. Furthermore, the study found a statistically consequential relationship linking unemployment and economic services investment in the long-run and the results for health show that the variable has a positive relationship with unemployment with a

government spending coefficient value of 0.3530, and it was found to be statistically significant as the probability value is less than 0.05. These results imply that an increase in government spending of 0.85% will cause an increase in unemployment of 0.35%. These results align with those of Obisike *et al.* (2020) and (Uremadu *et al.*, 2019). Their study used the OLS regression method and secondary data from 1981 to 2016 to assess government expenditure's impact on Nigeria's unemployment. The economic results of their research found that increased recurring spending on health and increased capital spending on health within the study period contributed to an increase in the unemployment rate of 0.03 and 0.08, respectively. Furthermore, the empirical findings demonstrated that, over the long term, government spending on SOP has a substantial and adverse impact.

6.3. Policy Recommendations

Several policy conclusions can be made based on the study's findings. The primary concern of all researchers and policymakers is the unemployment issue. Increases in violence, suicide, and poverty rates are all caused by unemployment. The South African government post-Apartheid introduced various policies such as the NDP, GEAR AND ASGISA to assist in reducing the unemployment problem in the country; these policies have not achieved their objectives, and policymakers continue to recommend new labour-specific policies to combat unemployment, such as the Expanded Public Works Programme (EPWP) and promotion of Small, Medium and Micro Enterprises (SMME's).

The SMME industry is essential for accelerating economic expansion and generating job opportunities. However, because of the sector's ongoing legal obstacles and access to financing issues, the SMME sector is still comparatively underdeveloped. This problem of underdevelopment can be corrected if the government invests more in economic services to develop the industry. Furthermore, another recommended policy is increasing the supply of highly educated workers through government spending more on education and encouraging young people to study post-matric.

The results reveal a long-run negative relationship between government spending on fuel and energy and unemployment. These results show that when the government continues to spend on fuel and energy, more jobs are created in the energy sector, and the unemployment rate decreases. Thus, this study recommends that the government focus more on spending on the energy sector through employment promotion programmes. According to the survey, government spending in a few South African sectors has reduced sector unemployment. Therefore, the study suggests that the government should spend more on employment related programmes in sectors such as the mining, manufacturing and construction, fuel and energy, and health. The government should also enhance expenditure to boost the effectiveness of new and ongoing job investment programmes and guarantee that funds are allocated to priority and strategic industries deemed essential for economic transformation.

6.4. Limitations of the Study and Recommendations for Future Research

This study will not consider any period outside of 1990 to 2021 and will be restricted only to the SA economy. However, the empirical literature will reference studies from developed and developing countries. The study also notes that the secondary data that will be used was collected for some other purpose and may not accurately answer the research question, but it may assist in giving direction. However, the secondary data is reliable as it is sourced from a trusted website (the SARB). Considering the above results, the study recommends that future research should be conducted to cover more of the variables in the study, such as the impact that government spending on fuel and energy, mining, manufacturing, construction, and social services investment has on unemployment, not just in SA but in other Southern African Development Countries as well. This study is not a conclusive one; therefore, there is a need for further research.

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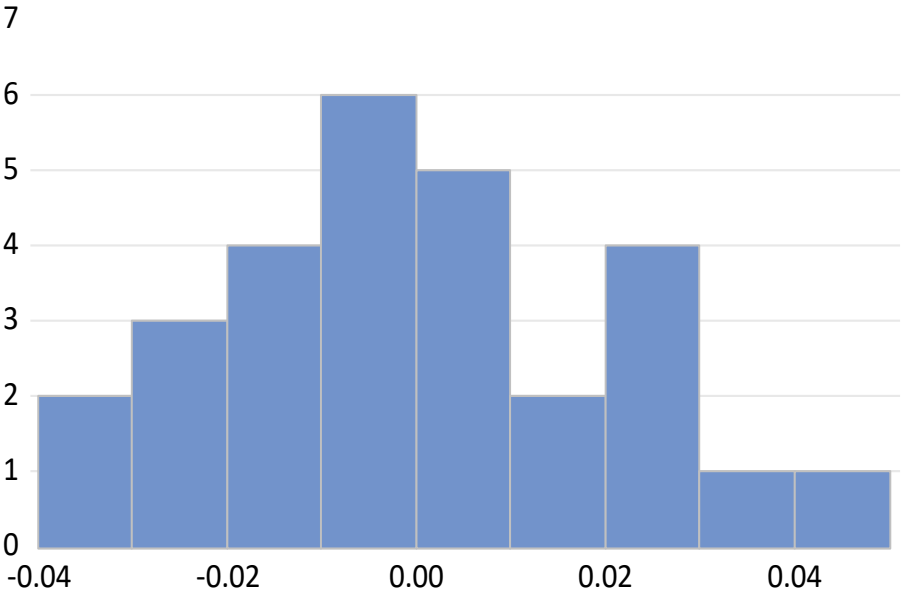
APPENDICES

Dependent Variable: LEDU				
Method: ARDL				
Date: 11/27/23 Time: 10:53				
Sample (adjusted): 1994 2021				
Included observations: 28 after adjustments				
Maximum dependent lags: 1 (Automatic selection)				
Model selection method: Akaike info criterion (AIC)				
Dynamic regressors (1 lag, automatic): LESI LFEN LHLT LMMC LSII LSOP				
LUNE				
Fixed regressors: C				
Number of models evaluated: 128				
Selected Model: ARDL (1, 1, 0, 0, 0, 0, 0, 0)				
Note: final equation sample is larger than selection sample				
Variable	Coefficient	Std. Error	T-Statistic	Prob.*
LEDU(-1)	0.016420	0.200559	0.081871	0.9357
LESI	-0.018135	0.048482	-0.374067	0.7127
LESI(-1)	-0.110059	0.046209	-2.381794	0.0285
LFEN	-0.008325	0.007340	-1.134087	0.2716
LHLT	0.347292	0.128020	2.712783	0.0143
LMMC	-0.009078	0.035121	-0.258483	0.7990
LSII	0.004577	0.037451	0.122220	0.9041
LSOP	-0.251099	0.069602	-3.607622	0.0020
LUNE	0.108173	0.089135	1.213584	0.2406
C	3.666933	0.850388	4.312071	0.0004
R-squared	0.842783	Mean dependent var		2.974079
Adjusted R-squared	0.764174	S.D. dependent var		0.051194
S.E. of regression	0.024861	Akaike info criterion		-4.278591
Sum squared resid	0.011125	Schwarz criterion		-3.802803
Log likelihood	69.90027	Hannan-Quinn criter.		-4.133138
F-statistic	10.72125	Durbin-Watson stat		1.405967
Prob (F-statistic)	0.000014			
*Note: p-values and any subsequent tests do not account for the model				
Selection				
ARDL Error Correction Regression				
Dependent Variable: D (LEDU)				
Selected Model: ARDL (1, 1, 0, 0, 0, 0, 0, 0)				
Case 3: Unrestricted Constant and No Trend				
Date: 11/22/23 Time: 13:53				
Sample: 1990 2021				
Included observations: 28				

ECM regression				
Case 3: Unrestricted constant and no trend				
Variable	Coefficient	Std. Error	T-Statistic	Prob.
C	3.666933	0.402230	9.116503	0.0000
D(LESI)	-0.018135	0.029978	-0.604952	0.5528
CointEq(-1)*	-0.983580	0.107744	-9.128866	0.0000
R-squared	0.778139	Mean dependent var		-0.003421
Adjusted R-squared	0.760390	S.D. dependent var		0.043095
S.E. of regression	0.021095	Akaike info criterion		-4.778591
Sum squared resid	0.011125	Schwarz criterion		-4.635855
Log-likelihood	69.90027	Hannan-Quinn criteria		-4.734955
F-statistic	43.84166	Durbin-Watson stat		1.405967
Prob (F-statistic)	0.000000			
* p-value incompatible with t-bounds distribution.				
F-Bounds Test		Null Hypothesis: No levels of relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	7.500258	10%	2.03	3.13
k	7	5%	2.32	3.5
		2.5%	2.6	3.84
		1%	2.96	4.26
T-Bounds Test		Null Hypothesis: No levels of relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
T-statistic	-9.128866	10%	-2.57	-4.23
		5%	-2.86	-4.57
		2.5%	-3.13	-4.85
		1%	-3.43	-5.19
Breusch-Godfrey Serial Correlation LM Test:				
Null hypothesis: No serial correlation at up to 2 lags				
F-statistic	1.490547	Prob. F(2,16)		0.2549
Obs*R-squared	4.397567	Prob. Chi-Square(2)		0.1109
Heteroskedasticity Test: White				
Null hypothesis: Homoskedasticity				
F-statistic	0.909868	Prob. F(9,18)		0.5377
Obs*R-squared	8.755140	Prob. Chi-Square(9)		0.4602
Scaled explained SS	3.111711	Prob. Chi-Square(9)		0.9597



Series: Residuals	
Sample 1994 2021	
Observations 28	
Mean	-1.11e-16
Median	-0.004219
Maximum	0.048553
Minimum	-0.035287
Std. Dev.	0.020299
Skewness	0.375052
Kurtosis	2.720035
Jarque-Bera	0.747876
Probability	0.688019

Variance Inflation Factors
Date: 11/22/23 Time: 14:31
Sample: 1990 2021
Included observations: 28

Variable	Coefficient Variance	Uncentered VIF	Centred VIF
LEDU(-1)	0.040224	16160.06	4.745806
LESI	0.002350	11310.85	7.086620
LESI(-1)	0.002135	10230.24	6.939535
LFEN	5.39E-05	2.319886	1.456273
LHLT	0.016389	4108.118	6.607312
LMMC	0.001234	13.04566	3.486100
LSII	0.001403	6551.341	4.139118
LSOP	0.004845	1434.662	4.343511
LUNE	0.007945	3692.571	6.591727
C	0.723160	32761.19	NA

Ramsey RESET Test
Equation: UNTITLED
Omitted Variables: Squares of fitted values
Specification: LEDU LEDU(-1) LESI LESI(-1) LFEN LHLT LMMC LSII LSOP LUNE C

	Value	df	Probability	
T-statistic	1.475987	17	0.1582	
F-statistic	2.178539	(1, 17)	0.1582	
Likelihood ratio	3.376199	1	0.0661	

F-test summary:

	The sum of Sq.	df	Mean Squares	

Test SSR	0.001264	1	0.001264	
Restricted SSR	0.011125	18	0.000618	
Unrestricted SSR	0.009861	17	0.000580	

LR test summary:

	Value			
Restricted LogL	69.90027			
Unrestricted LogL	71.58837			

Unrestricted Test Equation:
Dependent Variable: LEDU
Method: Least Squares
Date: 12/05/23 Time: 11:55
Sample: 1994 2021
Included observations: 28

Variable	Coefficient	Std. Error	T-Statistic	Prob.
LEDU(-1)	-0.383686	0.333519	-1.150417	0.2659
LESI	0.331201	0.241295	1.372597	0.1877
LESI(-1)	2.145439	1.528784	1.403363	0.1785
LFEN	0.163590	0.116691	1.401905	0.1789
LHLT	-6.793248	4.839395	-1.403739	0.1784
LMMC	0.154385	0.115857	1.332545	0.2003
LSII	-0.074744	0.064842	-1.152710	0.2650
LSOP	4.929492	3.510563	1.404188	0.1783
LUNE	-2.107876	1.503882	-1.401623	0.1790
C	-40.87879	30.19153	-1.353982	0.1935
FITTED^2	3.455781	2.341335	1.475987	0.1582

R-squared	0.860641	Mean dependent var	2.974079
Adjusted R-squared	0.778666	S.D. dependent var	0.051194
S.E. of regression	0.024085	Akaike info criterion	-4.327741
Sum squared resid	0.009861	Schwarz criterion	-3.804375
Log-likelihood	71.58837	Hannan-Quinn criteria	-4.167743
F-statistic	10.49875	Durbin-Watson stat	1.518081
Prob (F-statistic)	0.000019		