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Government Expenditure and Health, Education and Housing Outcomes: Empirical Analysis from South Africa

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By

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ABSTRACT

This study analyses the relationship between government expenditure on health, education, and housing and their corresponding outcomes across nine provinces in South Africa. Notwithstanding considerable public investment in these vital areas, South Africa persists in confronting serious difficulties, such as elevated infant and TB mortality rates, enduring HIV prevalence, inadequate educational achievement, and a substantial housing deficit. These challenges prompt enquiries into the efficiency and efficacy of public expenditure and its congruence with developmental aims. The study utilised panel data from nine provinces between 2004 and 2019, employing fixed and random effects models to examine the influence of government expenditure on sector-specific outcomes.

The findings indicate that health expenditure has a positive, statistically insignificant impact on health outcomes, such as infant mortality, TB mortality, and HIV prevalence. Conversely, education expenditure had a negative and statistically significant correlation with educational outcomes, as indicated by senior certificate results, learner-school ratios, and educator-school ratios, underscoring potential inefficiencies and mismatched fiscal objectives. Housing expenditure was determined to have a positive and statistically significant effect on housing outcomes, particularly the total quantity of housing units supplied. The findings indicate that although government investment in housing produces concrete advantages, inefficiencies in health and education funding obstruct the achievement of intended objectives. The study findings highlight the necessity for improved resource allocation, focused interventions, and enhanced monitoring systems to ensure public spending result in substantial advancements in societal well-being.

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GLOSSARY OF TERMS

AIDS	Acquired Immune Deficiency Syndrome
ARDL	Autoregressive Distributed Lag Model
COVID-19	Corona virus disease
EPF	Education Production Function
FE	Fixed Effects
GDP	Gross Domestic Products
GMM	Generalised Method of Moments
HIV	Human Immune Virus
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Squares
POLS	Pooled Ordinary Least Squares
RE	Random Effects
RMSE	Root Mean Square Error
SSA	Sub Saharan Africa
TB	Tuberculosis disease
UNESCO	United Nations Educational, Scientific and Cultural Organisation

CHAPTER ONE: INTRODUCTION

1.1 Introduction and Background of the Study

Government expenditure plays a crucial role in influencing health, education, and housing results, essential for promoting socio-economic development and enhancing the quality of life in South Africa. As a developing nation, South Africa confronts substantial obstacles in these sectors, notwithstanding its constitutional obligation to ensure access to fundamental services. Public expenditure on health, education, and housing serves not only to meet current requirements but also as a long-term strategy for sustainable growth. This study seeks to examine the correlation between government spending in these vital sectors and their resultant consequences, elucidating the efficiency of resource utilisation and the degree to which they tackle urgent societal issues.

Government expenditure on healthcare is crucial for enhancing public health and economic productivity. Alhassan et al (2021) assert that investments in healthcare produce substantial returns by preserving lives and fortifying economic systems, especially during health crises like COVID-19. South Africa, akin to other developing countries, confronts an increased disease burden and restricted per capita health expenditure, hence intensifying health inequities (Khan et al., 2020). Notwithstanding the nation's endeavours, healthcare results continue to be affected by socio-economic determinants, such as income disparity, educational access, and living conditions (van den Heuvel & Olaroiu, 2017). Increased healthcare expenditure does not necessarily ensure improved health outcomes due to inefficiencies and conflicting goals (Galvani-Townsend et al., 2022). A comprehensive investigation of the effects of government investment on health indicators, including infant mortality rates, life expectancy, and the incidence of diseases such as tuberculosis and HIV/AIDS, is essential.

In education, governmental spending is fundamental for human capital development, economic progress, and the mitigation of inequality (Hajebi et al 2023). Although education systems in Africa have the potential to foster socio-economic advancement, they frequently exhibit inefficiencies, and South Africa is no exception. Barro and Lee (2016) reported that the average years of schooling completed in African countries from 2000 to 2016 were significantly low: 3.37% for elementary education, 1.27% for secondary education, and 0.08% for university education. Despite South Africa's substantial investment in education, difficulties including low enrolment rates, elevated dropout rates, and inequitable access continue to prevail.

Research demonstrates that government expenditure on education is associated with favourable results, such as increased personal income and enhanced community benefits (Psacharopoulos, 1994). Nonetheless, inefficiencies in resource allocation and discrepancies in expenditure across educational tiers prompt enquiries over the efficacy of governmental interventions (Hanushek, 2020). This study will examine if heightened educational expenditure results in enhanced enrolment rates, literacy levels, and overall educational achievement.

Housing represents a crucial domain in which government spending exerts a transformative influence. Notwithstanding the South African Constitution's assurance of the right to adequate housing, the nation has a significant housing issue. In 2011, 12.1% of South African households resided in informal settlements, with Gauteng and North-West provinces exhibiting the highest percentages at 20.4% and 18.5%, respectively (Statistics South Africa, 2017). The housing backlog currently totals 2.1 million units, underscoring the magnitude of the problem (Gerber, 2018). Government interventions have sought to mitigate these difficulties via subsidies, social housing initiatives, and infrastructural improvements. The enduring presence of informal settlements and the absence of essential utilities like piped water and sanitation cast doubt on the efficacy of public expenditure in enhancing living conditions.

More so, the focus of the study on the effectiveness of government expenditure in the key social sectors of health, education, and housing in South Africa was due to the sectors foundational role in improving human capital, reducing inequality, and fostering inclusive growth objectives that remain critical in a country marked by stark socioeconomic disparities. South Africa continues to face persistent challenges such as inadequate healthcare access, poor educational outcomes, and a growing housing backlog, which are compounded by fiscal constraints and structural inefficiencies in public service delivery (World Bank, 2022). These realities underscore the urgent need to evaluate how public resources are allocated and utilized within these sectors.

While there is a growing body of literature examining the relationship between government spending and social outcomes in South Africa, significant gaps still remain. Much of it focuses either on individual sectors in isolation or employs cross-country analyses that may overlook contextual specificities (Gupta & Verhoeven, 2001; Baldacci et al., 2008). Furthermore, Bonga and Phiri (2021) investigated the impact of health expenditure on public health outcomes and found that while spending has increased, outcomes remain uneven due to inefficiencies in resource allocation. Similarly, Van der Berg et al. (2019) examined education expenditure and

argued that although South Africa allocates a substantial portion of its budget to education, learning outcomes remain poor due to systemic challenges such as the quality of teachers and school infrastructure. In the housing sector, studies such as by Charlton and Meth (2020) highlighted progress in subsidized housing delivery but also pointed out persistent issues related to the quality of housing and service provision. Despite these sector-specific contributions, a holistic assessment of how government spending across these three sectors jointly affects outcomes remains limited. Moreover, few studies incorporate provincial-level analysis to capture spatial disparities in expenditure efficiency. This study therefore addresses this gap by conducting an integrated evaluation of government spending in health, education, and housing, both nationally and provincially, providing a more comprehensive and policy-relevant understanding of public expenditure effectiveness in South Africa. This contributes to the academic literature by not only evaluating spending levels but also investigating efficiency variations across provinces, thus informing more targeted policy interventions.

Therefore, this study aims to assess the impact of government spending on health, education, and housing on socio-economic development results. The study seeks to elucidate the efficiency of resource allocation by examining expenditure trends and their correlation with critical indicators, including life expectancy, literacy rates, and housing adequacy.

1.2 Problem Definition

South Africa encounters considerable obstacles in attaining optimal results in health, education, and housing, despite large governmental investment in these domains. The ongoing inequities and inefficiencies in these vital sectors prompt concern over the appropriate allocation and use of public monies and requires a thorough investigation of the underlying issues.

South Africa's health system continues to face a significant burden of disease, characterised by a high prevalence of HIV/AIDS, tuberculosis, and issues related to maternity and child health. Notwithstanding augmented healthcare expenditures, disparities in health outcomes endure. Although healthcare investment is associated with reduced mortality rates and increased life expectancy worldwide (Galvani-Townsend et al., 2022; Bein et al., 2017), in South Africa, inefficiencies and socio-economic inequality hinder these results. The healthcare system grapples with unequal access to excellent care, as rural and marginalised regions encounter substantial obstacles. Therefore, it is essential to investigate whether government healthcare expenditure effectively mitigates these problems and results in enhanced health indicators.

South Africa continues to contend with low enrolment and completion rates in the education sector at all levels. Despite an increase in government expenditure on education, its efficiency continues to rank among the lowest in the area (Africa Development Bank, 2020). Disparities in access to quality education, especially in rural and historically marginalised populations, intensify the issue. Despite the favourable correlation between educational expenditure and enhanced individual and societal outcomes (Psacharopoulos, 1994), South Africa's education system fails to achieve its objectives and as a result this prompts enquiries regarding the alignment of financial priorities with essential requirements such as teacher training, infrastructure, and curriculum development.

The housing sector is a significant challenge with millions of South Africans residing in substandard conditions. Statistical analysis in the 2017 South Africa Household Survey indicated that 12.1% of households reside in informal housing, with the highest frequency observed in the Gauteng and North-West provinces. Furthermore, 1.3 million households are deprived of piped water, and roughly 750,000 families lack sanitation facilities. The existing housing deficit of 2.1 million units (Gerber, 2018) underscores the severity of the situation. Notwithstanding constitutional assurances of the right to sufficient housing, the increasing prevalence of informal settlements and inadequate access to essential services highlights the ineffectiveness of public housing initiatives and resource distribution. Furthermore, the housing deficiency affects other areas which includes health and education, and which exacerbates the socio-economic issues encountered by the population.

Consequently, this study aims to investigate the correlation between government spending on health, education, and housing and their corresponding outcomes.

1.3 Research Questions

The research sought to address the subsequent research questions:

1. Does health expenditure correlate with health outcomes in South Africa?
2. Does education expenditure correlate with education outcomes in South Africa?
3. Does housing expenditure correlate with housing outcomes in South Africa?

1.4 Research Objectives

The primary objective of this study is to investigate the impact of government spending on social outcomes in South Africa. The specific objectives are as follows:

1. To examine the effect of health expenditure on health outcomes in South Africa.
2. To examine the effect of education expenditure on education outcomes in South Africa
3. To examine the effect of housing expenditure on housing delivery in South Africa

1.5 Justification of the Study

The study contributes to the existing body of knowledge as it offers an empirical analysis of the correlation between government expenditure and outcomes in the health, education and the housing sectors in South Africa. This research examines the impact of budgetary allocations on sector-specific outcomes, elucidating how financial resources lead to measurable changes, like decreased infant mortality, increased literacy rates, and better housing circumstances. The study provides critical insights on budget utilisation and efficiency for the health, education, and housing sectors, allowing them to detect resource allocation gaps and rectify inefficiencies that may obstruct the attainment of intended goals. For example, the Departments of Health, Education, and Human Settlement (2015) can utilise the data to reallocate resources to essential areas that directly affect outcomes, such as infectious disease treatment, educator training, or infrastructure enhancement in economically disadvantaged communities.

Policymakers can greatly benefit from the findings as the study offers evidence-based suggestions to guide fiscal policy and sectoral initiatives. The insights obtained can inform decision-making about the prioritisation of spending, ensuring that scarce resources are allocated to programs with the greatest potential benefit. Furthermore, the study elucidates the problem of underspending and its ramifications, urging policymakers to rectify systemic obstacles and inefficiencies. The research provides a basis for future investigations, enhancing comprehension of the relationship between public finance and socio-economic outcomes. Furthermore, non-governmental organisations can utilise the data to promote accountability and enhance service delivery, ensuring that unallocated funds are reallocated to urgent needs. The study possesses considerable potential to impact policies and practices, aiding in the progress of equitable and effective resource allocation within South Africa's public sectors.

1.6 Outline of the Study

This dissertation is divided into five chapters. Chapter One provides the introduction and background to the study and includes the statement of the research problem, questions and objectives, the justification, and outline of the study. Chapter Two presents a review of the theoretical and empirical literature on government expenditure and health, education, and

housing outcomes both at the international and local level. Chapter Three focuses on the research methodology that was used in the study, while Chapter Four relates to the presentation of research findings. Chapter Five outlines the conclusion and recommendations for further study.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This section of the study outlines both theoretical and empirical literature on the nexus between government expenditure on health, education, housing and their respective outcomes. The chapter presents an overview of government expenditure specifically in the health, education, and housing portfolios. It further highlights the theoretical framework governing the study on the nexus between government expenditure and outcomes. The empirical literature was presented in three parts. First the relationship between health expenditure and health outcomes; then between education expenditure and education outcomes; and finally, between housing expenditure and housing outcomes. The chapter summary was outlined in the conclusion.

2.2 Overview of Government Expenditure

Government expenditure is an essential element of public sector management, indicating a nation's priorities and dedication to tackling its developmental issues. In South Africa, government expenditure is crucial for enhancing social welfare, stimulating economic growth, and advancing infrastructural development. Throughout the years, the South African government has allocated substantial resources to critical sectors including health, education, and housing to mitigate inequality, enhance living standards, and promote sustainable development. This investment embodies the nation's socio-economic requirements and strategic objectives in alleviating poverty, improving service accessibility, and fostering economic prospects. Examining government expenditure patterns in these areas provides critical insights into fiscal policy, resource allocation, and the efficacy of efforts designed to alter the socio-economic environment. Consequently, the subsequent sections provide an overview of the South African government's expenditure in the sectors under examination: health, education, and housing.

2.2.1 Overview of Health Expenditure in South Africa

Table 2.1 delineates health expenditure statistics in South Africa from 2004 to 2019 by describing the distribution and variations in expenditure during the specified period. The "Health Expenditure Appropriation" demonstrates a consistent increase in absolute values, escalating from around 41.5 million in 2004 to nearly 197.3 million in 2019. This expansion signifies substantial investment in the healthcare sector throughout the 15-year period. The proportion of "Change in Health Expenditure Appropriation" reflects annual variations in

growth rates. For example, the years 2008 and 2009 recorded elevated growth rates of 13.9% and 14.5%, respectively, potentially attributable to heightened healthcare demands or reforms. Nevertheless, growth decelerated in subsequent years, notably in 2014 (6.3%) and 2015 (6.2%), signifying a stabilisation or reallocation of budgetary priorities.

Table 2.1: Distribution of Health Expenditure in South Africa

Year	Health Expenditure Appropriation	Change in Health Expenditure Appropriation	Health Expenditure to Salaries	Health Expenditure to Goods & Services	Health Expenditure to Capital	Health Expenditure to Transfers & Aid	Variance in Health Expenditure
2004	41506195		50.60%	29.80%	4.80%	12.60%	2.20%
2005	45360252	8.5%	51.80%	29.40%	4.90%	12.20%	1.70%
2006	51182444	11.4%	50.40%	30.40%	7.60%	11.60%	0.10%
2007	56787138	9.9%	51.40%	30.00%	7.80%	10.40%	0.40%
2008	65504615	13.3%	53.60%	31.00%	7.80%	9.50%	-1.90%
2009	76571400	14.5%	54.50%	30.50%	6.80%	8.50%	-0.30%
2010	87546911	12.5%	56.40%	31.30%	7.40%	8.00%	-3.10%
2011	104426566	16.2%	54.90%	27.60%	6.30%	8.10%	3.10%
2012	115688924	9.7%	57.40%	27.10%	6.80%	7.70%	1.00%
2013	125391180	7.7%	57.20%	27.40%	6.50%	7.30%	1.60%
2014	133763754	6.3%	61.20%	27.30%	5.80%	3.40%	2.20%
2015	142626254	6.2%	62.20%	28.20%	4.90%	3.10%	1.60%
2016	157070700	9.2%	48.70%	27.40%	4.30%	4.50%	15.10%
2017	168799509	6.9%	48.90%	25.10%	3.80%	23.70%	-1.50%
2018	183693331	8.1%	42.50%	23.00%	4.10%	23.90%	6.40%
2019	197341438	6.9%	61.30%	22.00%	4.40%	3.50%	8.70%

Source: Author compilation

Table 2.1 also illustrates the allocation of health expenditure among different groups. The allocation for salaries was consistently the highest, beginning at 50.6% in 2004 and reaching a maximum of 62.2% in 2015. This signifies the emphasis placed on human resources within the healthcare sector. Simultaneously, expenditure on goods and services fluctuated between 22% and 31.8%, indicating a degree of regularity in this allocation. Capital spending, indicative of infrastructure investment, received modest allocations, generally under 8%. Transfers and aid allocations varied between years, with significant increases of 23.7% in 2016 and 23% in 2017. The "Variance in Health Expenditure" offered insight into fiscal performance. Positive variations, exemplified by 3.1% in 2011 and 8.7% in 2019, implies surpluses or supplementary funds, whereas negative variances, such as -3.1% in 2010, may signify overspending or financial deficiencies.

The data indicates a persistent increased trajectory in health expenditure with a notable focus on salaries and rather stable allocations for the other categories. The annual fluctuations and discrepancies underscore the fluidity of budget management. This could possibly indicate alterations in governmental goals, economic circumstances, or healthcare need during the timeframe.

2.2.2 Overview of Education Expenditure in South Africa

Table 2.2 presents a comprehensive analysis of educational expenditure in South Africa from 2004 to 2019, emphasising overall trends, distribution, and annual fluctuations in funding allocation. During this 15-year span, the total "Education Expenditure Appropriation" consistently rose from 62.1 million in 2004 to 242.1 million in 2019, demonstrating a robust commitment to educational expenditure. The yearly "Change in Education Expenditure Appropriation" demonstrates fluctuating growth rates, including significant rises in the initial years, including 12.6% in 2009 and 12.2% in 2010. Nevertheless, growth rates have diminished in subsequent years and reached a significant low of 3.5% in 2015 which indicates a plateau or decelerated budget expansion in the education sector.

Table 2.2: Distribution of Education Expenditure in South Africa

Year	Education Expenditure Appropriation	Change in Education Expenditure Appropriation	Education Expenditure to Salaries	Education Expenditure to Goods & Services	Education Expenditure to Capital	Education Expenditure to Transfers & Aid	Variance in Education Expenditure
2004	62150674		81.9%	8.3%	18.9%	4.9%	-14.0%
2005	68602140	9.4%	80.8%	7.8%	19.0%	5.7%	-13.3%
2006	76534409	10.4%	79.4%	9.3%	19.8%	5.9%	-14.6%
2007	85431849	10.4%	78.7%	9.6%	20.4%	6.0%	-14.8%
2008	96107176	11.1%	78.8%	10.0%	20.5%	6.1%	-15.4%
2009	109976916	12.6%	78.9%	9.8%	21.0%	6.4%	-16.1%
2010	125246293	12.2%	79.3%	9.5%	4.4%	7.0%	-0.2%
2011	140343621	10.8%	78.0%	8.2%	4.2%	7.2%	2.5%
2012	157004926	10.6%	77.5%	8.1%	5.2%	8.2%	1.1%
2013	168397759	6.8%	78.5%	8.5%	4.3%	8.1%	0.6%
2014	181851906	7.4%	76.9%	8.2%	5.1%	8.3%	1.6%
2015	188365737	3.5%	77.4%	8.1%	4.6%	8.7%	1.1%
2016	200212208	5.9%	76.5%	8.8%	5.3%	7.7%	1.7%
2017	213089045	6.0%	77.4%	9.0%	5.0%	7.9%	0.7%
2018	226470896	5.9%	78.4%	9.0%	4.6%	7.4%	0.6%
2019	242085483	6.5%	78.2%	9.1%	4.0%	7.6%	1.1%

Source: Author compilation

A substantial portion of educational expenditure has consistently been allocated to salaries, ranging from 81.9% in 2004 to approximately 76% to 78% in subsequent years. This reflects a continual emphasis on human resources which includes teachers and administrative personnel. The proportion of expenditure designated for goods and services was relatively modest and varied between 7.8% and 10.0%. While capital expenditure consistently represented a minor share by beginning at 18.9% in 2004 and diminishing to merely 4.0% by 2019. This decline indicates a constrained investment in infrastructure, such as school buildings and facilities, in the later years.

Transfers and aid, however very minor in proportion, saw progressive rises, peaking at 8.7% in 2015 before stabilising between 7% and 8% in the following years. This indicates the continued support for educational initiatives or subsidies. The "Variance in Education Expenditure" indicates significant negative values in prior years, shown by -16.1% in 2009 and which suggests possible underspending or unachieved budget objectives. Nonetheless, variances progressively enhanced in subsequent years, nearing positive or near-zero levels, shown by 1.1% in 2019, indicate greater budgetary control.

In summary, South Africa has shown a consistent dedication to augmenting education expenditure. But even so, the allocation patterns indicate a predominant emphasis on salaries and a very little investment in capital development. The decreasing growth rates in recent years and variable fluctuations indicate the necessity for strategic planning to guarantee equitable and significant investments throughout the education system.

2.2.3 Overview of Housing Expenditure in South Africa

Table 2.3 explains the housing expenditure patterns in South Africa from 2004 to 2019 by illustrating annual allocations, increases, and the distribution across several categories. The entire "Housing Expenditure Appropriation" consistently rose from roughly 8 million in 2004 to 24.5 million in 2019, which indicates the government's ongoing commitment to addressing housing requirements. The percentage of "Change in Housing Expenditure Appropriation" exhibits significant annual variability. In 2007, there was a notable increase of 21.1% which reflects substantial investment while other years like 2013 (5.7%) and 2019 (1.0%) have exhibited somewhat lower growth rates.

A major portion of housing expenditure was designated for transfers and aid and constantly comprises the majority by fluctuating from 69.4% in 2004 to a maximum of 81.1% in 2014.

This indicates that financial assistance programs, which include housing grants or subsidies, was a primary emphasis of governmental expenditure. The proportion of expenditure allocated to salaries varied between 12.2% and 13.3% which tends to underscore the distribution towards administrative and labour-related expenses in the housing sector. Expenditure on products, services, and capital continuously diminished allocations. Capital expenditure was notably low by commencing at 0.7% in 2004 and gradually diminishing to 0.6% in 2019. This signifies a constrained investment in infrastructural development and construction endeavours over the years. The "Variance in Housing Expenditure" indicates favourable outcomes with all figures over zero fluctuating from 3.0% in 2016, to a peak of 13.6% in 2012. This indicates proficient budgeting with spending typically surpassing initial allocations.

The data indicates a steady rise in housing expenses, and it highlights transfers and assistance. The limited allocation for capital expenditure raises concerns regarding potential underinvestment in long-term housing infrastructure, which may affect the sustainability and quality of housing solutions. The consistent increase in allocations underscores the government's dedication to tackling housing issues. But the allocation priorities indicate an emphasis on immediate financial aid rather than infrastructural advancement.

Table 2.3: Distribution of Housing Expenditure in South Africa

Year	Housing Expenditure Appropriation	Change in Housing Expenditure Appropriation	Housing Expenditure to Salaries	Housing Expenditure to Goods & Services	Housing Expenditure to Capital	Housing Expenditure to Transfers & Aid	Variance in Housing Expenditure
2004	8041151		12.7%	7.8%	0.7%	69.4%	9.4%
2005	8184707	1.8%	12.3%	7.6%	1.3%	69.4%	9.4%
2006	8812055	7.1%	12.2%	6.9%	1.9%	72.8%	6.3%
2007	11166021	21.1%	10.5%	5.0%	1.7%	75.3%	7.5%
2008	12110497	7.8%	10.4%	5.0%	1.8%	76.5%	6.3%
2009	13013505	6.9%	9.3%	4.4%	1.9%	81.1%	3.2%
2010	14491160	10.2%	9.6%	4.1%	1.8%	79.6%	4.9%
2011	16036986	9.6%	9.0%	3.9%	1.7%	75.6%	9.8%
2012	18191860	11.8%	9.5%	3.8%	1.0%	72.1%	13.6%
2013	19284035	5.7%	10.2%	3.8%	1.0%	73.1%	11.8%
2014	19864907	2.9%	10.1%	3.5%	1.0%	81.7%	3.8%
2015	20463397	2.9%	10.8%	3.5%	1.4%	81.4%	3.0%
2016	22764759	10.1%	10.6%	3.4%	1.0%	80.4%	4.6%
2017	23408889	2.8%	12.2%	4.1%	1.6%	80.1%	2.1%
2018	24747634	5.4%	12.3%	4.4%	1.1%	80.4%	1.9%
2019	24527267	-0.9%	13.3%	4.4%	0.6%	77.4%	4.3%

Source: Author compilation

Government spending on health, education, and housing in South Africa demonstrates both congruities and disparities in prioritisation of them and the allocation trends over time. All three sectors witnessed steady growth in appropriations between 2004 to 2019, which indicates the government's dedication of tackling urgent socio-economic issues. Nevertheless, the allocation of resources among different sectors differs substantially. Both the health and education sectors dedicate a significant amount of their budgets towards salaries which highlights the critical role of human resources in service provision. Conversely, housing expenditure emphasises transfers and aid as more than 70% is continuously designated for financial support programs. Capital expenditure, indicative of infrastructure investment, is significantly low across all three sectors, with health and housing exhibiting modest allocations which are relative to education, and which, while marginally higher, remain constrained. Expenditure management varies with health and education occasionally exhibiting negative variances. This signifies underspending or unachieved budget targets, whereas housing consistently demonstrates positive variances. These developments underscore the government's divergent strategies in tackling difficulties across sectors, with health and education sectors prioritising personnel requirements and service provision, as opposed to housing prioritising financial assistance rather than long-term infrastructural advancement.

2.3 Overview of Health, Education and Housing outcomes in South Africa

Table 2.4 displays statistics on health, education, and housing results in South Africa for the years 2004, 2011, and 2019. These indicators offer a thorough assessment of the nation's social and economic development advancements in critical sectors. Table 2.4 exhibits the changes in infant mortality, HIV prevalence, tuberculosis mortality, educational performance, and housing delivery, by providing insights into the government's endeavours and obstacles in enhancing quality of life.

The health outcomes indicate substantial advancement over time. The infant mortality rate decreased from 43.333 in 2004 to 27.556 in 2019 which signifies enhanced healthcare services and maternal care. The HIV prevalence rate indicates a troubling trend. Although it decreased to 11.7% in 2011, it increased to 13.1% by 2019, indicating the persistent public health issue of managing the epidemic. The tuberculosis mortality rate significantly declined from 12.3% in 2004 to 6.6% in 2019, indicating progress in tuberculosis prevention and treatment initiatives.

Table 2.4: Health, Education and Housing Outcomes in South Africa

	2004	2011	2019
	Health Outcomes		
Infant mortality rate	43.333	33.000	27.556
HIV prevalence rate (%)	9.778	11.667	13.111
Tuberculosis mortality rate (%)	12.333	10.333	6.556
	Education Outcomes		
Senior Certificate results	72.078	71.244	81.389
Learner-Educator ratio	33.444	29.222	34.356
Learner-School ratio	479.889	504.000	614.000
Educator-School ratio	14.400	17.311	19.967
	Housing Outcome		
Total residential units delivered	21513	8876	13958

Source: Author compilation

The Senior Certificate results in the education sector increased from 72.078 in 2004 to 81.389 in 2019. This indicates an improvement in educational goals and an improvement in access to quality education. The learner-educator ratio also improved from 33.444 in 2004 to 29.222 in 2011, but then it increased to 34.356 in 2019 which possibly signifies a heightened student enrolment without a corresponding increase in teaching personnel. The learner-school ratio increased markedly, from 479.889 in 2004 to 614.000 in 2019, indicating that a greater number of students are enrolled in fewer institutions. The educator-to-school ratio rose from 14.400 to 19.967 which indicates the need for additional schools to accommodate the growing demand.

Housing delivery exhibited significant variability. In 2004, 21,513 residential units were completed, which significantly decreased to 8,876 in 2011. By 2019, the figure had risen to 13,958, and that reflects ongoing initiatives to tackle the housing deficit while remaining below the 2004 level.

The results reveal a combination of developmental constraints. Although health indices such as infant and TB mortality rates demonstrate progress, the increase in HIV prevalence necessitates ongoing intervention in this area. Educational outcomes indicate advancements in student performance while underscoring the strain on infrastructure and staffing. In the housing sector, variable delivery figures highlight the persistent demand for affordable housing alternatives. The statistics indicate the need for focused strategies and resource distribution to rectify these deficiencies.

2.4 Theories on Government Expenditure and Outcomes

The relationship between government expenditure and socio-economic outcomes is underpinned by various economic theories that provide frameworks for understanding the rationale, mechanisms, and impacts of public spending. These theoretical perspectives help to explain how investments in sectors such as health, education, and housing contribute to broader development goals, particularly in contexts marked by inequality and market failures.

2.4.1 Public Goods Theory

Public Goods Theory, pioneered by Paul Samuelson (1954), posits that some goods and services—such as health care, education, and public housing are non-rivalrous (consumption by one person does not reduce availability for others) and non-excludable (no one can be effectively excluded from using them). These characteristics make public goods prone to market failure, as private markets lack incentives to produce them efficiently or equitably. Therefore, government intervention through public spending becomes essential to ensure adequate provision. Assumptions of the theory include rational agents, perfect information, and the inability of the private market to internalize externalities or provide socially optimal levels of public goods. It assumes that public provision enhances societal welfare and addresses collective needs not met by the private sector (Musgrave & Musgrave, 1989).

In the South African context where significant disparities in access to education, health care, and housing persist due to historical inequities. Government expenditure in these sectors acts as a corrective mechanism to promote social justice and equal opportunity (Atkinson, 2020; National Treasury, 2023). This theory justifies the need for sustained and targeted public investment to meet universal service obligations and improve human welfare.

2.4.2 Human Capital Theory

Human Capital Theory, formalized by Gary Becker (1964), views investment in education, health, and training as essential for enhancing the individuals' productivity and earnings potential. The theory posits that just like physical capital, human capabilities can be improved through investment, leading to better economic outcomes for individuals and society. Assumptions include the rational decision-making of individuals who seek to maximize returns from their educational and health-related investments, and the belief that such investments lead

to greater productivity, innovation, and income generation (Schultz, 1961). It also assumes a positive linear relationship between investment in human capital and economic growth.

In a country like South Africa, addressing the skills gap, reducing poverty, and improving health indicators are necessary for achieving inclusive development. Public investment in education and health is not just a social imperative but an economic strategy to enhance workforce quality and stimulate long-term productivity (Burger et al., 2015; Van Broekhuizen & Spaull, 2017). Thus, the theory provides a foundational explanation for the socio-economic benefits of government expenditure in these sectors.

2.4.3 Keynesian Theory

Keynesian economic theory, proposed by John Maynard Keynes (1936), argues that aggregate demand is the primary driver of economic performance, especially in times of economic downturns. Government spending is seen as a tool for stimulating demand, creating jobs, and stabilizing the economy. Public investment in infrastructure, health care, and education boosts employment and income, which in turn increases consumption and investment. Assumptions of the theory include price stickiness in the short term, underemployment equilibrium, and the inability of the market to self-correct during recessions. It presupposes that government intervention is necessary to offset cyclical fluctuations and boost aggregate demand (Blanchard & Johnson, 2022).

Persistent unemployment, inequality, and infrastructure backlogs make counter-cyclical fiscal policies, including government spending in health, education, and housing, necessary to stimulate growth and reduce socio-economic disparities justifies the Keynesian theory. Empirical studies, such as Turok and Borel-Saladin (2016), show how housing investments have multiplier effects on employment and income, reinforcing the Keynesian premise that public expenditure fuels economic expansion.

2.4.4 Welfare Economics

Welfare economics, as developed by Arthur Pigou (1920) and furthered by Bergson (1938), evaluates resource allocation based on the maximization of social welfare. It advocates for government intervention in cases where market outcomes result in inefficiency or inequity, particularly through redistribution and public service provision. Key assumptions include measurable and comparable utilities, the possibility of social welfare improvement through

redistribution, and the government's role in addressing externalities and income disparities (Boadway & Bruce, 1984). It assumes that public expenditure can increase total societal welfare, even if it involves trade-offs among different groups.

As evident in South Africa's efforts to redress apartheid-era socio-economic inequalities through redistributive policies makes the welfare economics theory relevant. Welfare economics supports state-funded education, health care, and housing as a means to promote equity and fairness. Empirical studies, such as Woolard and Klasen (2005) and Coetzee (2020), demonstrate that social grants and public services significantly reduce poverty and inequality, aligning with the theory's tenets.

2.4.5 Endogenous Growth Theory

Endogenous Growth Theory, developed by Romer (1990) and Lucas (1988), emphasizes the role of internal factors—such as human capital, innovation, and knowledge in driving long-term economic growth. Unlike neoclassical models, which attribute growth to exogenous technological progress, this theory places public policies, especially in education and health, at the center of growth dynamics. Assumptions include increasing returns to scale in knowledge and human capital accumulation, positive spillovers from education and innovation, and the idea that government investment can have a permanent effect on growth rates (Aghion & Howitt, 2009).

The theory relevance to this research lies in the South African government's prioritization of education and health as growth-enhancing sectors. Du Plessis and Smit (2021) argue that improving the quality of public education and investing in health systems are essential for unlocking the country's demographic dividend and advancing innovation-led growth. This theory justifies not only the quantity but the quality and efficiency of public spending in driving sustainable development.

2.5 Theoretical Framework: Government Expenditure and Outcomes

The study focuses on three key aspects: health expenditure and health outcomes; education expenditure and education outcomes; and housing expenditure and housing outcomes. It aims to explore the relationship between expenditure in these areas and the resulting outcomes. However, the theoretical framework governing the study was explained using the nexus between education expenditure and education outcomes. This framework was then generalised

to the other aspects under study, namely health expenditure and health outcomes; and housing expenditure and housing outcomes, in order to provide a comprehensive understanding of the impact of expenditure on the outcomes across the different sectors.

This research is anchored in the education production function (EPF), which is derived from neoclassical growth theory as proposed by Solow (1957). The EPF provides a framework that links various composite inputs, including educational expenditure, to the maximum achievable level of student achievement and educational outcomes (Harris, 2010). This framework highlights the significance of understanding how financial investments in education can lead to measurable improvements in student performance. Additionally, it is crucial to examine how these expenditures impact the educational outcomes reflected in the recent recommendations by Hanushek (2020) for providing a thorough analysis of resource allocation within education. The basic EPF for an individual student *i* at time *t* is defined as O_{it}, a function of government educational expenditure *M*, fixed student contribution *K*, and an error term u_t, as follows:

$$O_{it} = g(M_{it}, M_{t-1}, K_i, u_{it}) \qquad (1)$$

Equation (1) illustrates how various factor inputs in a production framework influence a student's educational outcomes. However, if these input assumptions are modified, different versions of equation (1) can arise. For example, under the assumption of additive separability, the EPF can be expressed as additively separable, indicating that the impacts of inputs do not interact with each other (Harris, 2010). This assumption would result in:

$$O_{it} = \alpha_1 M_{it} + \alpha_2 M_{it-1} + \ldots + K_i + u_{it} \qquad (2)$$

In equation (2), α denotes the contributions made by both current and past school inputs. This reflects the marginal effect of these inputs, specifically the change in output resulting from a slight change in input levels. Alternatively, if we consider the influence of all preceding school inputs that decrease geometrically over time since their application where $\alpha_2 = \lambda\alpha_1$, and so forth, with λ being a constant, the revised equation for educational outcomes is expressed as:

$$O_{it} = \alpha_1 M_{it} + \lambda O_{it-1} + K_i + \varepsilon_{it} \qquad (3)$$

Where $\varepsilon_{it} = \mu_{it} - \lambda\mu_{it-1}$, this error term is crucial for calculating the value-added EPF, which captures the unobserved variations among students. While the basic EPF has a microeconomic basis, insights from the school production function can be applied in a

macroeconomic context to evaluate the effectiveness of government spending on education. Since educational outcomes cannot be mandated directly, it is essential to focus on input factors within the school production function, particularly regarding education policies related to funding and the quality of teachers (Hanushek, 2020).

2.6 Empirical Literature on Government Expenditure and Outcomes

This section of the study presents the empirical literature on health expenditure and health outcomes; and education expenditure and education outcomes; and housing expenditure and housing outcome.

2.6.1 Relationship between Health Expenditure and Health Outcomes

Comprehensive studies have examined the correlation between governmental health spending and public health outcomes which have produced a variety of conclusions across different contexts. Singh (2014) emphasised a significant body of research by evaluating the impact of government expenditure on public health worldwide. McCullough and Leider (2016) identified a positive relationship between public expenditure and health outcomes in the United States through a lagged longitudinal model. While Stubbs et al. (2017) identified a positive correlation between governmental expenditure and health outcomes in developing countries. Ray and Linden (2020) conducted an analysis of data from 195 countries to investigate the impact of public and private health expenditures on life expectancy and infant mortality rates. Their findings indicate that public health investment generally yields superior health outcomes when compared to private spending.

Region-specific studies also yield significant findings. Odior (2011) employed a Computable General Equilibrium model and disaggregated data between 1970 to 2008 in order to illustrate that public health investment positively influences health outcomes and economic growth in Nigeria. Nwani and Kelikume (2019) reported analogous conclusions. Boachie and Ramu (2016) discovered that substantial healthcare expenditure in Ghana and the Caribbean was associated with enhanced life expectancy and diminished death rates, as evidenced by panel OLS analysis. In Lebanon, Saad and Kalakech (2009) found no significant link between public health expenditure and health outcomes from 1962 to 2007, in both the short and long term. This difference underscores the unpredictability of results across circumstances.

Sultana et al. (2024) examined 30 years of health sector data in Bangladesh (1990–2019) utilising a Vector Autoregression with Exogenous Variables model. The per capita health expenditure and the number of physicians considerably enhanced life expectancy, maternal and child health, while decreasing mortality from diseases such as diphtheria, cholera, tuberculosis, and malaria rates. Arthur and Oiakhenan (2017) similarly examined Sub-Saharan Africa (SSA) by employing the Grossman Human Capital Model and fixed effects analysis. Their research showed that health expenditure considerably – but inelastically – affected health outcomes by decreasing death and enhancing life expectancy at birth. They observed a synergistic link between public and private health expenditures noticing that public expenditure exerted a more significant influence.

Nwakanman and Ibe (2014) employed OLS and Granger causality analysis in Nigeria to ascertain a long-term positive correlation between government health expenditure and health outcomes. Arvas and Torusdağ (2017) analysed Turkey's healthcare expenditures between 1975 to 2015 and determined that there is no causal association between health spending and life expectancy, as evidenced by the Granger causality test. Rajkumar and Swaroop (2008) indicated that public health expenditure significantly reduced child mortality in low-income countries and especially under conditions of effective administration. Although numerous research validates the positive effects of government health expenditure on life expectancy and the reduction of mortality, the degree to which and the mechanisms of this association differs between locations, economic conditions, and government contexts.

2.6.2 Relationship between Education Expenditure and Education Outcomes

Numerous studies have examined the correlation between governmental spending on education and academic results which haveyielded inconsistent outcomes across many countries and settings. These studies seek to empirically substantiate human capital-based growth theories by concentrating on metrics such as enrolment rates and educational attainment levels (Ogbu & Gallagher, 1991; Anyanwu & Erhijakpor, 2007; Bohlmark & Lindahl, 2015). Hajebi et al. (2023) examined the influence of governmental education expenditure on enrolment rates at basic, secondary, and postsecondary levels in selected OECD nations between 2010 and 2019, which revealed a significant positive effect at all levels. Idrees and Omar-Fauzee (2021) analysed data from 2000 to 2017 in Pakistan and discovered that national income and government expenditure positively affected school enrolment rates.

Farayibi and Folarin (2021) employed a Generalised Method of Moments (GMM) technique to analyse the effects of government education expenditure from 2000 to 2019 across 31 nations in Sub-Saharan Africa (SSA). Their findings indicated that, although expenditure enhanced primary and secondary education outcomes, the university education was deprioritized due to institutional inflexibilities and political factors, which constrained its adaptability for the global demands for advanced skills. Nenbee and Danielle (2021) emphasised the necessity for strategic governmental interventions, including enrolment drives and alternative learning programs, while pushing for enhanced financial allocations in accordance with UNESCO's proposal of 26%. This was completed utilising an ARDL model for the period of 1987–2017 in Nigeria. Simultaneously, Okezie et al. (2019) employed ARDL to analyse primary school enrolment in Nigeria from 1970 to 2017. They discovered a negligible correlation between government spending and enrolment, ascribing more significant impact to remittances and parental contributions in funding primary education.

Shafuda and Utpal (2020) analysed time series data from 1980 to 2015 in Namibia in order to investigate the correlation between governmental expenditure and human capital development. A substantial long-term positive impact of education expenditure on primary net enrolment and tertiary gross enrolment rates was identified. Although no cointegration was observed with primary and secondary gross enrolment rates. The conflicting outcomes indicate the necessity for focused allocation strategies to enhance the efficacy of government spending for education. This research collectively highlights the necessity of equal and strategic spending in education to attain enduring enhancements in worldwide educational results.

2.6.3 Relationship between Housing Expenditure and Housing Outcomes

Evidence on empirical agreement regarding the impact of government expenditure on housing prices and residential investment in SA could not be found. The findings of Agnello and Sousa (2013), Andrés et al. (2015), and Miles (2021) indicate that heightened government expenditure adversely impacts housing values. Afonso and Sousa (2009) and Khan and Reza (2017) see a growth in housing prices, while Afonso and Sousa (2012) indicate that home prices escalate in certain nations (e.g., the United Kingdom) but decline in others (e.g., Germany). Aye et al. (2014) and Ruiz and Vargas-Silva (2016) determined that government spending shocks have no substantial effect on residential property values. Gupta et al. (2014) noted a time-varying effect that was negative during the 1970s and 1980s, and positive in the early 2000s.

Moreover, Ferri and Herranz-Baez (2024) revealed that after a fiscal shock, an escalation in governmental consumption can mitigate the detrimental impacts that result from a decline in the demand for housing. In contrast to the overall output, the reaction of residential investment and housing prices to the fiscal shock can be substantially affected by labour market characteristics, household debt levels, and the existence of adjustment costs in housing demand, which significantly amplifies the impact of private indebtedness. Furthermore, an escalation in government consumption may exacerbate the negative welfare consequences of a housing shock. Egan and Bergin (2023) analysed the influence of government expenditure on housing supply through a structural econometric model of the Irish economy by incorporating a dedicated building component. Egan and Bergin's simulations indicate that to attain social and economic objectives like augmenting housing availability and enhancing affordability by curbing house price inflation then a focused policy, such as the Irish Government's Housing for All plan, may be more advantageous than a broad economic stimulus.

Shang et al. (2023) demonstrated that government housing assistance significantly impacts the overall consumer expenditure of urban inhabitants which indicates that such assistance can enhance their total expenditure levels. If housing prices remain unregulated and unadjusted, then the impact of government housing assistance on urban inhabitants' consumer spending will significantly diminish which adversely affects their long-term quality of life. Zhuchenko (2023) determined that government spending on housing within social protection affects GDP per capita growth in 14 countries, with the most significant impact observed in Greece and Spain, and that government expenditure on housing development influences 17 countries, most notably in Romania, the Slovak Republic, Ireland, and Lithuania. Government expenditure on housing development exerts a more substantial and pronounced impact on economic growth than government expenditure on housing within the realm of social protection.

Ginsad (2021) examined the impact of productive government expenditures (defence, economic affairs, housing, education, health) and non-productive government expenditures (recreation, culture, religion, and social protection) on housing prices in emerging markets, developing economies, and advanced economies. The findings indicated that the total government expenditure significantly influenced housing prices in industrialised nations, but it was inconsequential in emerging and developing markets. In emerging economies, education is the sole productive government expenditure that significantly affects housing costs, whereas

no productive government expenditures in mature nations demonstrate a notable influence on housing prices.

A study by Li (2018) demonstrated that expenditures on public education and public transport substantially affect housing prices via capitalisation effects. Among various local public spending increases, public education investment is the most beneficial in enhancing the capitalisation of commercial housing. Martínez (2005) analysed the distributive dimensions of public housing expenditure in Spain, focussing on the equity objective that housing policy should aim to achieve to provide access to housing for all inhabitants. The findings indicated that the overall effects of direct public expenditure on housing are beneficial by contributing to a reduction in inequality (albeit small it is significant) and which incorporates a pronounced progressive aspect regarding vertical equity.

The above literature review highlighted that there is a knowledge gap on the nexus between housing expenditure and the housing outcome in the South African context. Therefore, this study contributes to the body of knowledge by examining the effect of housing expenditure on housing outcome in South Africa.

2.7 Empirical Literature Gap

The current study offers a valuable incremental contribution to the empirical literature by contextualizing the impact of government expenditure on social outcomes specifically health, education, and housing—within the South African setting. While global and regional studies have yielded mixed results on the efficacy of public spending in improving social indicators (e.g., Ray & Linden, 2020; Farayibi & Folarin, 2021; Afonso & Sousa, 2012), there remains a noticeable paucity of country-specific analyses that holistically assess the interlinkages among various sectors in South Africa. This study bridges that gap by offering a consolidated empirical investigation into how public investments in health, education, and housing simultaneously affect respective sectoral outcomes within a single national context.

Notably, much of the existing literature has focused on cross-country comparisons or region-specific studies that may not account for the socio-economic, institutional, and policy peculiarities of South Africa. For instance, while McCullough and Leider (2016) and Stubbs et al. (2017) report positive health outcomes from public expenditure in developed and developing contexts respectively, such conclusions cannot be seamlessly transferred to South Africa without empirical validation given its unique post-apartheid socio-political dynamics

and health burden profile, including high HIV/AIDS and tuberculosis prevalence. Similarly, education-related studies such as those by Ogbu and Gallagher (1991) and Shafuda and Utpal (2020) highlight positive spending effects in various African nations, yet the effectiveness of such expenditure in South Africa's historically unequal and resource-disparate education system warrants dedicated scrutiny.

Furthermore, the study makes a significant contribution in the housing domain where existing empirical literature—particularly in the South African context—is notably sparse and often inconclusive. While international studies by Egan and Bergin (2023), and Ferri and Herranz-Baez (2024) illustrate nuanced fiscal effects on housing prices and supply under different macroeconomic and policy environments, these findings do not directly translate into insights on public housing delivery in South Africa's context of persistent urban housing backlogs, informal settlements, and socio-economic inequality. By focusing on housing expenditure's tangible outcomes in South Africa an area previously understudied the research not only addresses a crucial knowledge gap but also informs more effective policy formulation and fiscal prioritisation.

In sum, this study's incremental contribution lies in its triangulated, country-specific analysis of government spending across three vital social sectors, offering a contextualised understanding of how public expenditure translates into real-world outcomes in South Africa. It provides empirical evidence necessary for policymakers to make informed decisions on the allocation and strategic management of limited fiscal resources in pursuit of inclusive socio-economic development. Through this focused national lens, the study adds substantial depth to the broader discourse on public finance and development outcomes, particularly within the Global South.

2.8 Chapter Summary

The chapter provides an extensive literature analysis on governmental expenditure throughout three provinces in South Africa by concentrating on the sectors of health, education, and housing. It commenced with a review of historical trends, budgetary allocations, and expenditure patterns in various areas. The chapter subsequently examines the theoretical framework that supports government expenditure and its effects on various outcomes while referencing established economic theories. It conducted a critical analysis of existing empirical studies that have investigated the correlation between government investment in various sectors

and their corresponding outcomes, considering both domestic and international research. The following chapter outlines the research design and methods employed in the study to empirically examine the relationship between provincial government spending and results.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

The current chapter presents the research design and methodology adopted in the study to examine the impact of government expenditure on health, education, and housing on their respective outcomes over the period of 2004 to 2019 by covering nine provinces in South Africa. The chapter presents data characteristics, model specification, and econometric estimation technique adopted by the study.

3.2 Research Approach

This research adopts a positivist perspective, positing that real-world phenomena may be scientifically and empirically examined (Aliyu et al., 2014). This methodology is grounded in the ontological principle that reality exists independently of the researcher's perspective, as articulated by Inanga and Schneider (2005). This methodology guarantees that real-world issues are articulated as they exist. Empirical studies entail data collection, hypothesis formulation, and independent testing, ensuring the problem remains unaffected by researcher bias (Inanga & Schneider, 2005; Guba & Lincoln, 1994).

The research employs a deductive quantitative methodology to analyse the correlation between government spending on health, education, and housing, and their corresponding outcomes across nine provinces in South Africa. It gathers quantitative data and employs statistical analytical instruments for data analysis. The quantitative methodology is appropriate for extensive numerical datasets and time limitations because it facilitates more precise and dependable outcomes (Leacock et al., 2015) which is exemplified in the results.

This deductive research assesses and examines established beliefs regarding the influence of government investment on health, education, and housing outcomes inside a host nation. Quantitative research utilises deductive reasoning to test hypotheses, in contrast to inductive research, which focuses on developing new theories and begins from a minimal bias standpoint to generate new hypotheses (Leacock et al., 2015). Chapter Two, the literature review, presented a theoretical framework about the relationship between government expenditure and results thereby justifying a deductive analysis.

3.3 Data, Data Sources and Variables Measurement

The current research utilised annual time series data to interrogate the relationship between government expenditure and outcomes in the health, education, and housing sector across nine provinces in South Africa. The annual data covered 15 years spanning from 2004 to 2019. The annual data was sourced from various sources which included Statistics South Africa and relevant government reports.

3.3.1 Health Expenditure and Health Outcomes Variables

The analysis of the correlation between health expenditure and outcomes across South African provinces employs several health and expenditure metrics to encapsulate the sector's complexity. Health outcomes are represented by three primary indicators: infant mortality rate (IMR), HIV prevalence rate (HIVPR), and tuberculosis mortality rate (TMR). The IMR is the number of new-born deaths per 1000 live births, offering insight into the overall efficacy of healthcare services for the youngest demographic. HIVPR quantifies the percentage of the population affected by HIV, a significant health concern in South Africa where the disease prevalence continues to be elevated. TMR quantifies the mortality rate attributable to tuberculosis which is a considerable health issue in the nation. These health indicators collectively represent the overall health outcomes in South Africa which facilitate an assessment of the efficacy of governmental health expenditures in addressing these concerns.

Health spend is represented by total government expenditure on health (HEXPR), reflecting the government's overall financial commitment to healthcare services. Furthermore, ratios are employed to evaluate resource allocation: health salaries to appropriation ratio (HSAL), health goods and services to appropriation ratio (HGS), and health capital expenditure to appropriation ratio (HCAPEX). HSAL indicates the percentage of the health budget designated for compensating healthcare personnel, which is essential for maintaining sufficient staffing levels and delivering quality services. HGS denotes the percentage allocated to medical supplies, pharmaceuticals, and critical services, thereby illustrating the operational efficacy of the healthcare system. HCAPEX quantifies the government's investment in infrastructure, including hospitals and medical facilities, which is essential for the sustainability of long-term health services.

The expected findings for the suggested interactions indicate that heightened health expenditure, especially in salaries, goods and services, and capital investment, will enhance

health outcomes. Increased expenditure on wages (HSAL) is anticipated to enhance healthcare quality via improved staffing, potentially decreasing IMR and the prevalence of diseases such as HIVPR and TMR. Increased expenditure on health goods and services (HGS) is expected to enhance access to important medications and treatments, potentially resulting in a reduction in death rates and HIV prevalence. Ultimately, augmented capital spending (HCAPEX) is expected to enhance healthcare infrastructure, resulting in more accessible and efficient healthcare services, and as a result improving health outcomes throughout the provinces.

3.3.2 Education Expenditure and Education Outcomes Variables

The investigation of the correlation between educational expenditure and outcomes in South African provinces employs many important metrics to assess both educational performance and resource allocation. Educational outcomes are represented by four primary indicators: senior certificate results (SCR), learner-educator ratio (LER), learner-school ratio (LSR), and educator-school ratio (ESR). SCR indicates the pass rate of students in the senior certificate test by functioning as a direct metric of academic performance and the efficacy of the education system. LER quantifies the number of learners per educator, offering insight into instructional quality and teacher effort, with a lower ratio generally signifying enhanced educational focus. LSR and ESR quantify the learner-to-school and educator-to-school ratios, respectively, emphasising the infrastructure and allocation of educational resources among schools. These metrics jointly represent the quality and accessibility of education in South Africa.

Education expenditure is assessed through several key indicators: total government expenditure on education (EDUEXPR), reflecting the overall financial commitment to the education sector; the education salaries to appropriation ratio (EDUSAL), which quantifies the proportion of the education budget allocated to teacher salaries, crucial for sustaining a motivated and competent teaching workforce; the education goods and services to appropriation ratio (EDUGS), indicating expenditure on educational resources such as textbooks, teaching materials, and technology, which directly influence the learning environment; and the education capital expenditure to appropriation ratio (EDUCAPEX), which measures investment in school infrastructure, encompassing the construction and maintenance of educational facilities.

It is anticipated that increased investment in higher education, namely in teacher wages (EDUSAL), educational resources (EDUGS), and infrastructure (EDUCAPEX), will enhance educational outcomes. A higher EDUSAL ratio is anticipated to yield improved teaching

quality, thus resulting in enhanced senior certificate results (SCR) and a more advantageous learner-educator ratio (LER).

3.3.3 Housing Expenditure and Housing Outcomes Variables

The present study investigates the correlation between housing expenditure and outcomes across South African provinces, emphasizing the provision of residential units as the principal outcome indicator, represented by the total number of residential units delivered (HOUNITS). This indicator demonstrates the efficacy of governmental initiatives to meet the housing demand and enhance living standards through the provision of additional housing units. This assesses the government's capacity to fulfil its housing development commitments and aid in mitigating housing shortages, especially in neglected regions.

Housing expenditure is indicated by several key proxies: total government expenditure on housing (HOEXPR), which reflects the overall financial commitment to housing development and programs; housing salaries to appropriation ratio (HOSAL), which assesses the proportion of the housing budget designated for staff salaries, crucial for effective management and implementation of housing projects; housing goods and services to appropriation ratio (HOGS), which denotes spending on essential goods and

The anticipated outcome is that heightened housing spending, especially in categories such as personnel compensation (HOSAL), commodities and services (HOGS), and capital investment (HOCAPEX), will provide a more effective and extensive provision of residential units (HOUNITS).

3.4 Model Specification

The study sought to investigate the impact of government health expenditure on health outcomes, government education expenditure on educational outcomes, and government housing expenditure on housing outcomes. As a result, the following sections outline the model specifications for the various relationships outlined in the current study.

a) Health expenditure on health outcomes in South Africa

To examine the relationship between health expenditure and outcomes in South African provinces, the following equations were estimated:

$$IMR_{it} = \alpha + \beta_1 HEXPR_{it} + \mu_{it} \quad (1a)$$

$$HIVPR_{it} = \alpha + \beta_1 HEXPR_{it} + \mu_{it} \quad (1b)$$

$$TMR_{it} = \alpha + \beta_1 HEXPR_{it} + \mu_{it} \quad (1c)$$

The equations 1(a) to 1(b) is also expanded to replace health expenditure its dimensions HSAL; HGS and HCAPEX.

b) Education expenditure and education outcomes in South Africa

To ascertain the interaction between provincial educational expenditure and educational outcomes in South Africa, the estimated equation is expressed as follows:

$$SCR_{it} = \alpha + \beta_1 EDUEXPR_{it} + \mu_{it} \quad (2a)$$

$$LER_{it} = \alpha + \beta_1 EDUEXPR_{it} + \mu_{it} \quad (2b)$$

$$LSR_{it} = \alpha + \beta_1 EDUEXPR_{it} + \mu_{it} \quad (2c)$$

$$ESR_{it} = \alpha + \beta_1 EDUEXPR_{it} + \mu_{it} \quad (2d)$$

After the regression analysis assessing the correlation between education spending and outcomes, a multiple regression analysis was conducted on educational outcomes in connection to several components of education expenditure, including EDUSAL, EDUGS, and EDUCAPEX.

c) Housing expenditure and housing outcomes in South Africa

To investigate the relationship between provincial housing expenditure and housing outcomes in South Africa, housing outcomes was proxied by one indicator namely, total residential units delivered (HOUNITS). The estimated equation is expressed as follows:

$$HOUNITS_{it} = \alpha + \beta_1 HOEXPR_{it} + \mu_{it} \quad (3a)$$

Prior to the evaluation of the correlation between housing expenditure and outcomes, a multiple regression analysis was conducted on housing outcomes in relation to various dimensions of housing expenditure, specifically HOSAL, HOGS, and HOCAPEX.

3.5 Econometric Estimation Approach

Conventional linear regression such as panel ordinary least squares (POLS) is ineffective when unaccounted group-level characteristics influence an outcome variable (Dieleman & Templin, 2014). Ordinary Least Squares (OLS) was considered inappropriate for this study due to its inability to account for the unobserved heterogeneity that exists across provinces in South

Africa. OLS assumes homogeneity and independence across observational units, which often results in biased and inconsistent estimates in the context of panel data (Wooldridge, 2010). Since the study examines the impact of government expenditure across multiple provinces over time, failing to account for province-specific effects would ignore potential variations arising from unique structural, economic, or governance characteristics. Similarly, the Generalized Method of Moments (GMM), while useful in addressing issues of endogeneity and dynamic panel structures, was deemed less suitable for this study due to the structure and size of the dataset. GMM is more appropriate for panels with a large number of cross-sectional units (N) and a relatively short time period (T), as commonly seen in firm-level or microeconomic studies (Roodman, 2009). In contrast, this study's panel comprises a moderate number of provinces over a longer time horizon, which does not meet the optimal conditions for GMM application. Moreover, the inclusion of lagged dependent variables in GMM estimation can lead to instrument proliferation and weak identification in smaller panels, reducing the reliability of the estimates (Bun & Windmeijer, 2010). Therefore, fixed and random effects models were more appropriate as they allowed for controlling time-invariant characteristics and assessing within- and between-province variations in a more robust and interpretable manner.

As such, employing fixed effects (FE) and random effects (RE) models is crucial for analysing the correlation between government expenditure and outcomes in sectors like health, education, and housing in South Africa. These models are especially beneficial for clustered or panel data, where the data is structured into groups or units (such as provinces or districts) that may exhibit unobserved heterogeneity potentially affecting the dependent variables. FE models are appropriate for analysing the effects of time-varying factors, as they account for unobserved heterogeneity by concentrating only on within-unit variation (Dieleman & Templin, 2014). For example, in examining health outcomes in South Africa, FE can be employed to discern the impact of government expenditure on health while accounting for province-specific variables such as hospital infrastructure or socio-economic conditions that are stable across time (Torres-Reyna, 2007). Conversely, RE models presume that unobserved individual-specific effects are uncorrelated with the explanatory variables, rendering them more efficient when this assumption is valid (Diggle et al., 2002). A Hausman Specification test can be performed to ascertain the most suitable model; the RE model is preferred in the absence of correlation between individual-specific effects and explanatory variables, while the FE model is favoured if such a correlation is present (Torres-Reyna, 2007).

In the estimation of the regressions on health and education expenditure and outcomes, the Seemingly Unrelated Regression (SUR) technique of (Zellner 1962; Zellner 1963) to improve the efficiency of the coefficients. This approach involves the joint estimation of the multiple regression models with different dependent variables and the same explanatory variables (Cameron and Trivedi, 2010).

CHAPTER FOUR: DISCUSSION OF FINDINGS

4.1 Introduction

The chapter presents the study findings focusing on the research objectives of the study which sought to examine the relationship between health, education, housing expenditure, and their respective outcomes in South Africa. The descriptive statistics which entail the measures of central tendency (mean) and dispersion (standard deviation), as well as correlation analysis were outlined, followed by the regression analysis results for the specified econometric models.

4.2 Descriptive Statistics

The descriptive statistics for health expenditure, health outcomes, education expenditure, education outcomes, housing expenditure, and housing outcomes were investigated, and the results are presented in Table 4.1. From Table 4.1 results, it can be noted that the average infant mortality rate (IMR) averaged 34.462 for every 1 000 births suggesting low levels of IMR in South Africa. Additionally, the HIV prevalence (HIVPR) rate averaged 11.667%; whereas the tuberculosis mortality rate (TMR) had a mean of 9.708% while the mean for health expenditure (HEXPR), health salaries (HSAL), health goods and services (HGS) and health capital expenditure (HCAPEX) to appropriation ratio were 0.989, 0.549, 0.287, and 0.068 respectively. These results highlight that the South African government has high health expenditure budget as well as favourable health outcomes such as low IMR, HIV prevalence, and tuberculosis mortality rate.

Furthermore, the education outcome descriptive results highlighted that the senior certificate results (SCR); learner-educator ratio (LER); learner-school ratio (LSR); educator-school ratio (ESR) had average scores of 72.633, 31.094, 521.292, and 17.241 which are relatively high suggesting moderate educational quality in South Africa. As for the educational expenditure (EDUEXPR), it averaged 1.030, whilst education salaries to appropriation ratio (EDUSAL); education goods and services to appropriation ratio (EDUGS); education capital expenditure to appropriation ratio (EDUCAPEX) had a mean of 0.781, 0.087, and 0.085 correspondingly indicate high educational expenditure. Also, the 1.030 mean for EDUEXPR entail that the EDUEXPR is slightly higher than the amount appropriated for education.

Table 4.1: Descriptive Statistics

	Mean	SD	Min	Max	N
Health					
IMR	34.462	11.553	16.000	68.000	143
HIVPR	11.667	3.554	3.000	18.000	144
TMR	9.708	2.973	4.000	17.000	144
HEXP	0.989	0.103	0.187	1.417	144
HSAL	0.549	0.134	0.020	0.732	144
HGS	0.287	0.084	0.005	0.660	144
HCAPEX	0.068	0.036	0.008	0.172	144
Education					
SCR	72.633	9.989	47.900	88.400	144
LER	31.094	2.344	26.900	40.800	144
LSR	521.292	142.068	323.000	1039.000	144
ESR	17.241	5.093	10.300	34.000	144
EDUEXPR	1.030	0.202	0.862	1.985	144
EDUSAL	0.781	0.038	0.704	1.000	144
EDUGS	0.087	0.023	0.041	0.179	144
EDUCAPEX	0.085	0.202	0.005	1.048	144
Housing					
HOUNITS	15497.440	9566.896	1177.000	66738.000	144
HOEXPR	0.928	0.128	0.225	1.050	144
HOSAL	0.129	0.095	0.039	0.439	144
HOGS	0.052	0.036	0.019	0.254	144
HOCAPEX	0.012	0.016	0.000	0.067	144

Note: IMR=Infant mortality rate; HIVPR=HIV prevalence rate (%); TMR=Tuberculosis mortality rate (%); HEXPR=Health expenditure to appropriation ratio; HSAL=Health salaries to appropriation ratio; HGS=Health goods and services to appropriation ratio; HCAPEX= Health capital expenditure to appropriation ratio; SCR=Senior Certificate results; LER= Learner-educator ratio; LSR=Learner-School ratio; ESR= Educator-School ratio; EDUEXPR=Education expenditure to appropriation ratio; EDUSAL= Education salaries to appropriation ratio; EDUGS= Education goods and services to appropriation ratio; EDUCAPEX= Education capital expenditure to appropriation ratio; HOEXPR=Housing expenditure to appropriation ratio; HOUNITS=Total residential units delivered; HOSAL= Housing salaries to appropriation ratio; HOGS= Housing goods and services to appropriation ratio; HOCAPEX= Housing capital expenditure to appropriation ratio.

With regards to housing expenditure, the results presented in Table 4.1 highlighted that housing expenditure to appropriation ratio (HOEXPR) had a mean of 0.928, whilst housing salaries to appropriation ratio (HOSAL) mean was 0.129, whilst mean of 0.052 and 0.012 were recorded for housing goods and services to appropriation ratio (HOGS) and housing capital expenditure to appropriation ratio (HOCAPEX). However, the total residential units delivered (HOUNITS) mean was 15497.44. These results suggest that there is a significant outcome in terms of housing provision despite the slightly lower expenditure which translates to the possibility of the efficient allocation of housing expenditure in South Africa.

4.3 Correlation Analysis Results

The econometric models in Chapter 3 were first assessed for potential multicollinearity prior to the regression analysis. This study adheres to the standard criterion of a correlation coefficient of 0.8 or higher, signifying the presence of multicollinearity that may significantly distort the estimates derived from the regression analysis (Kennedy, 2008; Dormann et al., 2013). The correlation matrix in Table 4.2 reveals that the correlation coefficients for EDUEXPR, EDUSAL, EDUGS, and EDUCAPEX fell below the 0.800 threshold, except for EDUEXPR and EDUCAPEX (r = 0.988), indicating the presence of multicollinearity. The occurrence of multicollinearity among these variables was negated, as they were not incorporated into the same regression model during estimation.

Table 4.2: Correlation Matrix Results

Variables	1	2	3	4
Education				
1. Education expenditure	1.000			
2. Education Salaries	0.197 (0.018)	1.000		
3. Education Goods & Services	-0.150 (0.073)	-0.236 (0.005)	1.000	
4. Education CAPEX	0.988 (0.000)	0.092 (0.271)	-0.179 (0.032)	1.000
Health				
1. Health expenditure	1.000			
2. Health Salaries	0.379 (0.000)	1.000		
3. Health Goods & Services	0.633 (0.000)	0.410 (0.000)	1.000	
4. Health CAPEX	0.241 (0.004)	0.163 (0.051)	0.348 (0.000)	1.000
Housing				
1.Housing Expenditure	1.000			
2.Housing Salaries	-0.055 (0.511)	1.000		
3.Housing Goods & Services	-0.044 (0.601)	0.520 (0.000)	1.000	
4.Housing CAPEX	-0.190 (0.023)	-0.002 (0.981)	-0.029 (0.733)	1.000

Note: CAPEX= capital expenditure. Source: Author own computation, in parenthesis are p-values

The correlation examination indicated that the correlation values for HEXPR, HSAL, HGS, and HCAPEX were below the 0.8 threshold for multicollinearity, showing that these variables were not affected by multicollinearity issues. Moreover, HOEXPR, HOSAL, HOGS, and HOCAPEX exhibited correlation values beneath the threshold for multicollinearity, signifying the absence of multicollinearity concerns among the variables. Consequently, the study progressed with the regression analysis as multicollinearity was not a concern.

4.4 Expenditures and Outcomes in South Africa

4.4.1 Health Expenditure and Health Outcomes

The results of the regression analysis on the effect of health expenditure on health outcomes, made up of infant mortality rate (IMR), HIV prevalence rate (HIVPR) and Tuberculosis mortality rate (TMR), across South African provinces are summarised in Table 4.3. The models are estimated with using aggregate health expenditure (Model 1) and components (Model 2) of health expenditure made up of health salaries (HSAL), health goods and services (HGS), and health capital expenditure (HCAPEX). The model fit of the regression analysis was determined based on the R^2 which ranged from 0. 0.323 to 0.714 indicating moderate to substantial predictive power of the model whereas the RMSE ranged between 0.019 and 6.766 which are close to zero signifying relatively good model fit.

The results in Table 4.3 indicate a positive effect of HEXP on all health outcomes (IMR, HIVPR and TMR) although statistically insignificant. The coefficients of HSAL, HGS, and HCAPEX on IMR, HIVPR, and TMR provides insights on the separate effects of HEXP dimensions. Specifically, coefficient of health salaries (HSAL) is negative and statistically significant for infant mortality rate (IMR) and Tuberculosis mortality rate (TMR) at 1% whereas a statistically positive effect was found on HIV prevalence rate (HIVPR) at 5%. The results infer that as health salaries increase, IMR and TMR decreases whilst HIVPR increases. This is possibly because higher health salaries attract more qualified and skilled healthcare professionals, leading to better healthcare services and ultimately lower IMR, and TMR. As for the positive relationship between HSAL and HIVPR suggest that as the HSAL are high it attracts skilled healthcare professionals, resulting to better detection and reporting of HIV cases. The study findings contradict those of Hlafa, Sibanda, and Hompashe (2019) who found out that there exists a significant relationship between public health expenditure and health outcomes in South Africa varying across provinces depending on provincial management and infrastructure availability. They found that the increased health

expenditure reduced the under-five life mortality rate in better resourced and equipped provinces. Under resourced provinces yielded indifferent results. They also found that life expectancy at birth was positively impacted in better-equipped provinces, while in poverty-stricken and ill-equipped provinces of Mpumalanga and the Eastern Cape the results were the exact opposite.

Additionally, the coefficient for health goods services (HGS) is positive and statistically significant for IMR and TMR at 5%, whilst a statistically insignificant and negative effect was found for HIVPR. The results show that when HGS increases, IMR and TMR increase while HIVPR declines, therefore more access to medical equipment, facilities, and treatments does not necessarily lower IMR and TMR. The results indicate healthcare system inefficiencies, including delivery concerns, quality of care affecting infant health outcomes, and public health intervention gaps. In addition, boosting HSAL alone does not significantly affect HIVPR, hence broader public health measures are needed to improve health outcomes. Further, HCAPEX had a statistically insignificant negative effect on IMR while having a positive and statistically insignificant impact on HIVPR and TMR. The results indicate that as HCAPEX increases, IMR decreases while HIVPR and TMR decrease, despite the statistical insignificance of the relationship. The results infer that simply increasing HCAPEX is not sufficient to address health outcomes; therefore, a more all-inclusive approach to healthcare policy and intervention is necessary.

Lastly, at provincial level in terms of HSAL, HGS and HCAPEX allocations, the study reached similar conclusions as those of overall HEXP, which is that provincial allocations of HSAL have a negative effect on IMR whereas mixed findings are found for HIVPR and TMR. These results imply that in the various provinces of South Africa, health expenditure plays a significant role in improving health outcomes. The findings conclude that health expenditure is compulsory in order to develop health facilities, and it yields improved health system operations in South Africa as a whole, as well as at provincial level. The study findings refute those of Hlafa, Sibanda, and Hompashe (2019) who found that the increased health expenditure reduced the under-five life mortality rate in better resourced and equipped provinces. Under resourced provinces yielded indifferent results. They also found that life expectancy at birth was positively impacted in better-equipped provinces while in the poverty-stricken and ill-equipped provinces of Mpumalanga and the Eastern Cape, the results were the exact opposite. Similarly, Anyanwu and Erhijakpor (2009) reported a more positive link between public health spending and child mortality across Africa. The divergence may be due to the former's provincial focus, which uncovers variations that broader national or cross-country analyses might obscure. Gupta et al. (2002) further support the

current study's findings by emphasizing that countries with stronger governance experience a more direct relationship between health spending and outcomes. Therefore, the observed differences in findings appear to be rooted in South Africa's dual health system, inter-provincial disparities, and inefficiencies in health system administration.

Moreover, earlier studies such as Ataguba and Alaba (2022) and Mayosi et al. (2023) indicate that although government spending on health has risen significantly—particularly after the introduction of the National Health Insurance (NHI) framework inefficiencies in service delivery, workforce shortages, and infrastructure gaps continue to constrain outcomes, especially in rural areas. These findings contrast with earlier optimism from studies such as Blecher et al. (2011), which suggested a more direct and positive correlation between spending and health improvement, primarily focused on urban contexts. Further comparative analysis shows that provinces like the Western Cape and Gauteng, with more effective fiscal management and infrastructure investment, report better health indicators compared to underperforming provinces such as Eastern Cape and Limpopo. This supports the argument by Goudge et al. (2021) that institutional capacity and governance quality significantly mediate the expenditure-outcome relationship. Additionally, while the increased health expenditure has expanded access to essential services, inequities in the quality and continuity of care persist, suggesting that spending alone cannot guarantee improved health outcomes. Van den Heever (2024) emphasizes the importance of cost-effectiveness, transparency, and health system integration in maximizing the return on investment in health. In summary, although health expenditure in South Africa has yielded measurable gains, the translation into equitable and sustainable health outcomes is hampered by systemic inefficiencies. The findings underscore the need for targeted investments, governance reform, and capacity building to enhance the effectiveness of health spending.

Tables 4.3: Health Expenditure and Health Outcomes

	Model 1			Model 2		
	IMR	**HIVPR**	**TMR**	**IMR**	**HIVPR**	**TMR**
	Coefficient	*Coefficient*	*Coefficient*	*Coefficient*	*Coefficient*	*Coefficient*
Constant	0.4394***	0.1093***	0.0839***	0.5580***	0.0919***	0.1306***
HEXP	0.0502	0.0020	0.0271			
HSAL				-0.2079***	0.0424**	-0.0813***
HGS				0.2075**	-0.0236	0.0734**
HCAPEX				-0.0544	0.0118	0.1403*
Province (REF_EC)						
FS	-0.0607**	0.0230***	-0.0186**	-0.0595**	0.0227***	-0.0201**
GP	-0.2260***	0.0051	-0.0319***	-0.2605***	0.0116	-0.0445***
KZN	-0.0441*	0.0568***	0.0170*	-0.0470**	0.0571***	0.0155*
LP	-0.2005***	-0.0150**	-0.0327***	-0.1828***	-0.0180***	-0.0286***
MP	-0.0970***	0.0281***	0.0008	-0.1338***	0.0366***	-0.0114
NC	-0.2381***	-0.0225***	-0.0156*	-0.2644***	-0.0182**	-0.0379***
NW	-0.1607***	0.0231***	-0.0100	-0.1605***	0.0229***	-0.0127
WC	-0.2810***	-0.0506***	-0.0321***	-0.2968***	-0.0480***	-0.0369***
R-squared	0.6546	0.7135	0.3231	0.6818		
χ^2	271.04	356.14	68.25	306.45	377.38	93.96
P>χ^2	0.000	0.000	0.000	0.000	0.000	0.000
Params	9	9	9	11	11	11
RMSE	6.765543	1.890584	2.443018	0.0649353	0.018516	0.0230669
Number of Provinces	9	9	9	9	9	9
Observations	143	143	143	143	143	143

Note: IMR=Infant mortality rate; HIVPR=HIV prevalence rate (%); TMR=Tuberculosis mortality rate (%); HEXPR=Health expenditure to appropriation ratio; HSAL=Health salaries to appropriation ratio; HGS=Health goods and services to appropriation ratio; HCAPEX= Health capital expenditure to appropriation ratio. ***, ** & * denote significance at 1%, 5% and 10% respectively.

4.4.2 Education Expenditure and Education Outcomes

The study examined the relationship between education expenditure (EEXP), its dimensions (ESAL, EGS, and ECAPEX) and education outcomes namely, SCR, LER, LSR, and ESR. The results relating to the relationship between EEXP and education outcomes are shown in Table 4.4. The EEXP and education outcome regression model R^2 ranged from 0.1032 to 0.9068 indicating moderate to substantial predictive power of the estimated model whilst the RMSE for the fitted models ranged between 0.015 and 0.475 which are close to zero signifying perfect model fit.

The study findings revealed that EEXP had a negative and statistically significant impact on SCR, ESR and LSR at 5% whereas a negative and statistically insignificant effect on LER. The negative relationship implies that as EEXP increases, SCR, ESR, and LSR decreases. This is possibly because of the inefficiencies and/or misallocation of resources within the South African education system, hence, increasing EEXP is not translating into improved outcomes or better resource distribution. The results reflect issues such as ineffective spending, lack of proper resource management, or structural problems within the education system that need addressing. The study findings are supported by Gupta and Verhoeven's (2001) argument that government expenditure of African countries is less efficient than Asian countries.

Interestingly, the effect of provincial EEXP and educational outcomes is positive and statistically significant as compared to the negative effect at country level. The results are aligned to those of Idrees et al. (2021) who indicated that government expenditure have positive effects on school enrolment rate. An increase in provincial EEXP had the largest effect on SCR in GP ($\beta = 0.237$), followed by WC ($\beta = 0.218$), FS ($\beta = 0.188$), NW ($\beta = 0.156$), NC ($\beta = 0.137$), KZN ($\beta = 0.091$), MP ($\beta = 0.074$), and LP ($\beta = 0.036$). Furthermore, the effect of provincial EEXP on LER was insignificant for all the provinces except for FS ($\beta = - 0.021$) which had a negative significant effect suggesting that in FS province EEXP reduces LER thereby stimulating education outcomes. Moreover, provincial EEXP had a positive significant effect on LSR for all South African provinces under the study, with GP province ($\beta = 5.023$) having the largest coefficient size whilst LP ($\beta = 0.849$) had the least coefficient size. These results infer that GP EEXP has the most influence on LSR whilst LP EEXP has the least impact on LSR in South Africa. Additionally, considering the relationship between provincial EEXP and ESR, significant positive relationship was found confirming that at provincial level EEXP strengthens ESR, that is, as education spending increases, there are more resources to hire educators which leads to lower student to teacher ratio.

Tables 4.4: Education expenditure and education outcomes

	SCR	LER	LSR	ESR	SCR	LER	LSR	ESR
	Coefficient	**Coefficient**	**Coefficient**	**Coefficient**	**Coefficient**	**Coefficient**	**Coefficient**	**Coefficient**
Constant	0.681***	0.317***	4.069***	0.145***	0.8294***	0.3045***	4.4787***	0.1785
EEXP	-0.079**	-0.003	-0.613**	-0.033***				
ESAL					-0.0842	0.0026	-0.6116	-0.0550
EGS					-1.8954***	0.0899	-6.1025**	-0.2512
ECAPEX					-0.1514***	0.0004	-0.8454***	-0.0399
Province (REF_EC)								
FS	0.188***	-0.021***	1.180***	0.050***	0.1456***	-0.0186**	1.0413***	0.0435
GP	0.237***	-0.008	5.023***	0.184***	0.2841***	-0.0103	5.1616***	0.1876
KZN	0.091***	0.005	1.225***	0.036***	0.1171***	0.0040	1.3105***	0.0396
LP	0.036	0.002	0.849***	0.024***	0.0426**	0.0021	0.8735***	0.0249
MP	0.074***	0.001	2.037***	0.063***	0.1452***	-0.0019	2.2572***	0.0714
NC	0.137***	-0.004	1.215***	0.042***	0.1468***	-0.0041	1.2365***	0.0424
NW	0.156***	-0.004	1.402***	0.047***	0.1462***	-0.0037	1.3623***	0.0442
WC	0.218***	0.002	3.048***	0.105***	0.2356***	0.0015	3.0860***	0.1049
R-squared	0.5581	0.1032	0.8874	0.9003	0.6462	0.1068	0.8922	0.9068
Wald χ^2	181.87	16.57	1134.84	1300.79	262.99	17.22	1191.45	1400.6
P>χ^2	0.0000	0.0558	0.0000	0.0000	0.0000	0.1015	0.000	0.000
Params	9	9	9	9	11	11	11	11
RMSE	0.066	0.022	0.475	0.016	0.059	0.022	0.464	0.015
Number of Provinces	9	9	9	9	9	9	9	9
Observations	144	144	144	144	144	144	144	144

Note: SCR=Senior Certificate results; LER= Learner-educator ratio; LSR=Learner-School ratio; ESR= Educator-School ratio; EDUEXP=Education expenditure to appropriation ratio; EDUSAL= Education salaries to appropriation ratio; EDUGS= Education goods and services to appropriation ratio; EDUCAPEX= Education capital expenditure to appropriation ratio. ***, ** & * denote significance at 1%, 5% and 10% respectively.

Furthermore, the interaction between education salaries (ESAL), education goods and services (EGS), and education capital expenditure (ECAPEX) with SCR, LER, LSR, and ESR were examined. The results highlighted that ESAL had a negative and statistically insignificant effect on SCR, LSR, ESR whilst a positive and insignificant effect on LER. The results imply that improving education quality requires addressing various systemic issues other than just increasing salaries, for instance, teacher training, curriculum development and educational policies.

In addition, the study found that EGS had a significant and negative impact on SCR and LSR at 5% whilst an insignificant positive and negative effect on LER and ESR respectively. The results highlight that an increase in EGS results in a decrease in SCR, LSR and ESR whilst an increase in LER. The study findings affirm that spending more on education goods and services does not necessarily guarantee better education outcomes, hence, there is need for targeted investments and effective resource management in education.

This study reveals that the relationship between education expenditure and educational outcomes in South Africa is inconsistent and varies across provinces. While some provinces like Gauteng and Western Cape show relatively strong correlations between spending and improved outcomes (such as higher matric pass rates), others like Limpopo and Eastern Cape demonstrate weak or negligible links, suggesting inefficiencies in resource utilization. Recent studies support this nuanced picture, for instance, Muzekenyi et al. (2023) found a short-term positive but long-term insignificant impact of education expenditure on literacy rates in South Africa, highlighting temporal and structural constraints. Similarly, Spaull (2022) pointed out that despite high levels of spending, poor learning outcomes persist due to weak foundational education and systemic inefficiencies. In contrast, earlier literature such as Fedderke et al. (2000) and Clements et al. (2015) offered more optimistic views, arguing for generally positive impacts of public education investment, albeit without adequately accounting for governance and institutional quality. The comparative analysis suggests that increased expenditure alone is insufficient to drive educational improvement. Instead, the efficiency of spending, quality of governance, and capacity of provincial administrations are critical mediating factors. This aligns with Tondani

and Moeti (2022), who emphasize that institutional weaknesses often undermine the effectiveness of education funding in developing countries.

Further, Gupta and Verhoeven (2001) found that African countries often exhibit low returns on education spending due to inefficiencies. Similarly, Idrees et al. (2021) stressed that the effectiveness of education expenditure is conditional on institutional quality. These insights correspond with Pritchett's (2001) argument that education systems in many developing countries often fail to convert schooling inputs into meaningful learning outcomes a phenomenon he described as "missing learning." This study's findings reinforce these views by showing that merely increasing spending is insufficient without concurrent improvements in governance, accountability, and resource allocation. The positive provincial outcomes observed suggest that when these conditions are met, spending can indeed lead to improved educational results. In conclusion, while financial investment in education is necessary, its impact is contingent on complementary factors such as accountability, infrastructure, teacher quality, and systemic support, underscoring the need for a more targeted and results-based approach to education financing in South Africa.

4.4.3 Relationship between Housing Expenditure and Housing Outcomes

This section of the study presents the results (Table 4.5) related to the relationship between housing expenditure and housing outcomes. The Wald $chi^2(9)$ value of 207.92 ($p < 0.001$) indicate that the model was correctly specified hence model fit was attained. Further, the R^2 of 0.608 imply that HOEXP has a 60.8% predictive power on housing outcome (HOUNITS).

The association between HOEXP and HOUNITS is statistically significant and positive at 1%. This means that an increase in HOEXP results in an increase in HOUNITS. Therefore, spending more on housing improves the housing outcome in South Africa. Likewise, HOGS has a positive and statistically significant effect on HOUNITS whereas HSAL, and HOCAPEX have a negative and statistically insignificant impact on HOUNITS. An increase in HSAL increases HOUNITS whilst an increase in HSAL and HOCAPEX, decreases HOUNITS. The results detail that spending more on housing goods and services improves house outcomes whilst increasing housing salaries and capital expenditure does not necessarily result in an increase in the housing outcome in South Africa. The study findings are aligned to those of Shang et al. (2023) who

revealed that government housing support has a certain degree of influence on the total level of urban residents' consumption expenditure and that the government's support of housing support is conducive to improving the total level of urban residents' consumption expenditure.

Tables 4.5: Housing Expenditure and Housing Outcome

HOUNITS=Total residential units delivered;		
	Coefficient	**Coefficient**
Constant	9.329***	10.128***
HOEXP	0.615***	
HOSAL		-3.028*
HOGS		3.483**
HOCAPEX		-2.496
Province (REF_EC)		
FS	-0.567***	-0.765***
GP	0.242***	0.143
KZN	0.022***	-0.183
LP	-0.808***	-0.398
MP	-0.359***	-0.379**
NC	-1.755***	-1.351***
NW	-0.838***	-0.844***
WC	-0.203***	-0.365**
Wald χ^2	207.92	215.52
Prob > χ^2	0.000	0.000
R-squared	0.6081	0.6202
Hausman χ^2 (p-value)	0.01 (0.9107)	2.20(0.5314)
Number of Provinces	9	9
Observations	144	144

Notes: HOEXPR=Housing expenditure to appropriation ratio; HOSAL= Housing salaries to appropriation ratio; HOGS= Housing goods and services to appropriation ratio; HOCAPEX= Housing capital expenditure to appropriation ratio. ***, ** & * denote significance at 1%, 5% and 10% respectively.

Additionally, the impact on provincial HOEXP on housing outcome was evaluated and the results highlighted that there are mixed findings, in some provincial areas there exists a negative relationship whilst in others there exists a positive relationship. Accordingly, in FS (β = -0.567), LP (β = -0.808), MP (β = -0.359), NC (β = -1.755), NW (β = -0.838), and WC (β = -0.203) provinces increasing spending in housing will result in a decrease in housing outcome which might be possibly due to inefficiencies and/or misallocations in housing expenditure. In contrast, in GP (β = 0.242), and KZN (β = 0.022) provinces, an increase in housing expenditure results in an increase in housing outcomes.

Therefore, different forms of housing support spending have different impact outcomes in different regions (Shang et al., 2023). Additionally, Nyasulu and Bua (2023) found that while government housing programmes have reduced the quantitative backlog of housing units, issues of infrastructure quality and service delivery persist, undermining long-term housing security. Turok and Scheba (2022) argue that although expenditure has expanded access, it has often failed to promote spatial integration and economic inclusion, particularly in urban peripheries. In contrast, earlier studies such as Charlton and Kihato (2006) and Tomlinson (2007) were more optimistic, emphasizing the scale of delivery achieved through the Reconstruction and Development Programme (RDP), albeit with limited focus on quality and sustainability.

The comparative analysis highlights that fiscal commitment alone is insufficient. Housing outcomes are strongly influenced by institutional coordination, urban planning, community participation, and monitoring mechanisms. This finding aligns with Mphambukeli and Geyer (2021), who emphasize the need for integrated human settlement approaches and context-sensitive planning to enhance the impact of expenditure on housing outcomes. In conclusion, while government investment in housing has enabled widespread access to shelter, the unequal quality and limited socio-spatial transformation reveal a need for more strategic, coordinated, and outcome-oriented housing policies in South Africa.

4.5 Chapter Summary

The emphasis of this chapter was on presenting the results derived from the analysis of data collected for provincial government expenditure and outcomes in South Africa. The results commenced with exploring the descriptive statistics related to the provincial health, education, and housing government expenditure, and their respective outcomes. Results of the relationship between provincial health expenditure and outcomes; education expenditure and outcomes; and housing expenditure and housing outcomes were discussed. The forthcoming chapter presents the conclusion and recommendations for the study.

CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The chapter provides a thorough summary of the research findings, synthesising the insights derived from the data analysis. It offers a succinct overview of the study's aims and principal discoveries. Furthermore, the chapter provides a critical analysis of the research's limitations and identifies prospective avenues for future investigation. Based on these observations, the chapter concludes with a series of practical recommendations designed to enhance the correlation between provincial government expenditure and their corresponding outcomes.

5.2 Summary and conclusions

The study results offer a detailed comprehension of the effects of provincial spending on critical outcomes in health, education, and housing using provincial level data from 2004 to 2019 in South Africa. The summary of the findings is summarized below.

5.2.1 Health expenditure and health outcomes in South Africa

The research indicated that health expenditure in South Africa had a positive albeit statistically insignificant correlation with critical health outcomes, including the infant mortality rate, HIV prevalence, and tuberculosis mortality rate. This indicates that although heightened health expenditure may enhance some health indicators, the effect is constrained and not statistically significant. The results suggest that factors such as health infrastructure, service efficiency, and social determinants may considerably influence health outcomes beyond simply financial expenditure. The study contradicts Hlafa et al.'s (2019) findings that public health expenditure significantly impacts health outcomes in South Africa. That research further revealed that increased health expenditure reduces under-five life mortality rates in better-equipped provinces, while under-resourced provinces yield indifferent results. Life expectancy at birth is positively impacted in better-equipped provinces, while in poverty-stricken and ill-equipped provinces, the results are the opposite.

5.2.2. Education expenditure and education outcomes in South Africa

The study demonstrated a negative and statistically significant correlation between education expenditure and several educational outcomes, notably senior certificate results, learner-school ratio, and educator-school ratio in South Africa. This suggests that increased expenditure on education did not lead to enhanced performance or improved learning environments in schools. Furthermore, the correlation between educational spending and the learner-educator ratio, although negative, was statistically insignificant. The findings indicate that merely augmenting education funding is inadequate for improving educational outcomes; more extensive reforms addressing teaching quality, resource distribution, and school infrastructure may be necessary. The study's findings corroborate Gupta and Verhoeven (2001), who argue that government expenditure in African countries is less efficient than that in Asian countries.

5.2.3 Housing expenditure and housing delivery in South Africa

The research demonstrates a positive and statistically-significant correlation between housing expenditure and the total number of residential units provided in South Africa. This suggests that increased expenditure on housing positively influence housing delivery rates. The results underscore the effectiveness of financial investment in alleviating housing shortages, indicating that housing expenditure significantly influences the fulfilment of housing needs in the region. The study's findings correspond with those of Shang et al. (2023), who demonstrated that government housing assistance significantly impacts the overall consumption expenditure of urban residents, indicating that such support enhances their total consumption expenditure.

In conclusion, the study emphasises the differential impact of expenditure across sectors. While housing expenditure has a beneficial influence on housing delivery, health and education outcomes suggest that financial inputs alone are insufficient to improve these outcomes. As a result, significant changes and improved resource management are required to transform spending into actual gains in public services.

5.3 Policy Implications

The findings of this study carry critical policy implications for enhancing the effectiveness of government expenditure in the health, education, and housing sectors in South Africa. The sector-

specific analysis reveals differentiated impacts of provincial spending, which require tailored policy responses to improve public service delivery and social outcomes.

The positive yet statistically insignificant relationship between health expenditure and health outcomes such as infant mortality, HIV prevalence, and tuberculosis mortality suggests that increased financial inputs alone are insufficient to produce substantial improvements in public health. This implies a need for policies that go beyond budgeting to address systemic bottlenecks affecting healthcare delivery. Specifically, resource allocation must be linked to improvements in health system efficiency, including the distribution of medical personnel, quality of health infrastructure, and access to essential medicines. Additionally, investment in preventive care and public health awareness programs should be prioritized to reduce disease burdens at the community level. The government should also enhance data-driven monitoring mechanisms to evaluate the effectiveness of health expenditure and identify areas where resource misallocation or inefficiency persist.

The study revealed a negative and statistically significant correlation between education expenditure and outcomes such as senior certificate results, learner-school ratio, and educator-school ratio. This paradox suggests that increasing educational budgets without reforming delivery mechanisms may be ineffective or even counterproductive. Policymakers must shift from a purely input-based funding approach to an outcomes-based education financing model. This requires the establishment of performance benchmarks and accountability systems to ensure that funds are channelled into areas that directly improve learning outcomes—such as teacher training, learner support services, infrastructure development, and curriculum relevance. Additionally, the government should address inequalities in resource distribution among provinces and schools to close the gap in education quality. Policy emphasis must also be placed on strengthening school governance and management capacity to ensure that increased funding leads to tangible improvements in learner achievement and school environments.

In contrast to the health and education sectors, the study found a positive and statistically significant correlation between housing expenditure and the number of residential units delivered. This indicates that spending in the housing sector has been relatively effective and suggests that continued and possibly expanded investment in housing can yield substantial social and economic

returns. Policymakers should build on this momentum by scaling up housing programs, especially in urban and peri-urban areas where the demand is highest. Efforts should also focus on improving the efficiency of housing delivery mechanisms, including streamlined procurement processes, reduced bureaucratic delays, and enhanced oversight to curb mismanagement and corruption. Furthermore, integrating housing development with complementary services such as water, sanitation, transportation, and energy infrastructure can magnify the developmental impact of housing investments and contribute to more liveable and inclusive communities.

In summary, the study underscores that while public expenditure is a vital tool for development, its impact is contingent on the quality of spending, institutional efficiency, and alignment with measurable performance outcomes. Policymakers must adopt a sector-specific, evidence-based approach that focuses not just on how much is spent, but on how effectively resources are used to improve citizens' lives.

5.4 Recommendations

The policy recommendations derived from the study findings are as follows:

Enhance housing investment - Augment governmental and private sector investment in housing initiatives to enhance the provision of residential units. Formulate strategies that encourage construction to address the increasing need for housing.

Focus on education quality - Re-evaluate and distribute educational funding in South Africa to guarantee that resources are effectively improving learning outcomes. Develop specialised initiatives that cater to the distinct requirements of institutions exhibiting poor senior certificate outcomes.

Optimize teacher-to-student ratios - Formulate methods to enhance the learner-to-educator ratio in South African schools, including the recruitment of additional qualified teachers and the improvement of teacher training programs, to promote superior educational outcomes.

Monitor and evaluate education funding - Develop a thorough assessment system to evaluate the influence of educational funding on academic achievement indicators. This will facilitate the effective use of funds and permit required modifications.

Increase Community Health Programs - Establish community outreach initiatives in South Africa that emphasise preventative healthcare strategies, education, and accessibility, especially for at-risk communities, to enhance overall health indicators.

Foster inter-sectoral collaboration - Promote collaboration across the housing, education, and health sectors to establish integrated community development initiatives. This comprehensive strategy can tackle the interconnections between housing quality, educational achievement, and health results.

Establish accountability metrics for education spending - Establish a comprehensive accountability structure to monitor the impact of educational expenditures on academic performance. Systematic audits and assessments can facilitate the identification of effective programs and areas for enhancement.

5.5 Areas for Future Studies

Future studies should concentrate on numerous critical domains to improve comprehension of the links emphasised in the study. A thorough examination of the causal factors between housing expenditure and residential unit delivery may yield insights into efficient urban development policies and practices. Further investigation is necessary to understand the negative impact of education spending on student performance, and to explore potential changes in allocation techniques to improve school support and improve educational quality. Furthermore, the study ought to investigate the causes of the statistically negligible correlation between health expenditure and health outcomes in South Africa, pinpointing potential obstacles to efficient healthcare delivery and analysing socio-economic determinants.

Furthermore, comparative analyses within economic blocks could reveal regional disparities in housing, education, and health outcomes, facilitating customized interventions that cater to distinct country requirements. Moreover, longitudinal studies could evaluate the enduring effects of integrated community development projects that include housing, education, and health sectors, assessing their efficacy in enhancing overall quality of life.

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