UNIVERSITY OF GHANA

COLLEGE OF HUMANITIES

GOVERNMENT EXPENDITURE AND PRIVATE INVESTMENT IN GHANA

BY

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This thesis is submitted to the University of Ghana, Legon in partial fulfilment of the requirement for the award of **MPHIL in ECONOMICS** degree

DECEMBER, 2021

DECLARATION

This is to certify that this thesis is the result of research undertaken by Peter Damoah Awuni under supervision towards the award of a Master of Philosophy (M.Phil.) degree in Economics at the Department of Economics, University of Ghana, Legon. I hereby declare that this thesis has not been submitted in part or in full for any other degree and all references to other people's work has duly been acknowledged.

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ABSTRACT

The drive to encourage private sector participation in the Ghanaian economy has led to the implementation of some pro-private sector development policies that involved government spending in expanding energy, health, education and road infrastructure. The economic literature however remains inconclusive about the effectiveness of this increase in government expenditure on private investments and whether any potential threshold effects exist. Accordingly, this thesis tests the hypothesis for the case of Ghana by exploring the threshold effect of government expenditure on private investment in Ghana using annual time series data from 1984 to 2018. The study employed the Threshold Autoregressive (TAR) model to ascertain the optimal level of government expenditure that promotes private investment by addressing asymmetric and non-linear deficiencies of the usual linear models applied in previous studies. The main finding of the study revealed that the threshold value of government expenditure is 13.38% of GDP. Below the threshold value, government spending crowds-out private investment while government expenditure above the threshold crowds-in private investment. Hence, the relationship between government expenditure and private investment is non-linear; specifically, it is U-shaped. The causality test conducted reveals a unidirectional causality from government expenditure to private investment. The study recommends more government spending towards increasing social capital while taking steps to minimize spending inefficiencies emanating from abandoning state projects, rent-seeking and, the maximization of personal and political interest. Finally, the study recommends targeted tax incentive policy to productive sectors of the economy.

DEDICATION

This thesis is dedicated to my mother, Esther Damoah.

ACKNOWLEDGEMENT

My utmost gratitude goes to God for the gift of life, health and protection throughout this journey. Further, I state my sincere appreciation to my supervisors; Prof. Bernardin Senadza and Dr. Emmanuel Abbey for their time, guidance and constructive comments to make this study a success. I am most grateful to all faculty members at the Economics Department. Finally to my colleagues whose support has made this journey possible, I say God bless you.

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LIST OF ABBREVIATIONS

ADF	Augmented Dickey-Fuller
AfDB	African Development Bank
AIC	Akaike Information Criterion
ARDL	Autoregressive Distributed Lag
BOG	Bank of Ghana
CIPA	Central Investment Promotion Agency
CGD	Commission on Growth and Development
CUSUM	Cumulative Sum
CUSUMSQ	Cumulative Sum Squared
DTRD	Domestic Tax Revenue Division
ERP	Economic Recovery Programme
FAP	Fiscal Adjustment Programme
FINSAP	Financial Sector Adjustment Programme
FPE	Final Prediction Error
GDP	Gross Domestic Product
GAS	Ghana Audit Service

GMM	Generalized Moment Method
GIPC	Ghana Investment Promotion Centre
GPRS I	Ghana Poverty Reduction Strategy I
GRA	Ghana Revenue Authority
GSS	Ghana Statistical Service
GSGDA	Ghana Shared Growth and Development Agenda
GPRS II	Growth and Poverty Reduction Strategy II
IMF	International Monetary Fund
LR	Likelihood Ratio
MIGA	Multilateral Investment Guarantee Agency
MMDAs	Metropolitan, Municipal and District Assemblies
NPPPP	National Policy on Public Private Partnerships
ODA	Official Development Assistance
OLS	Ordinary Least Squares
PI	Private Investment
PP	Phillips Perron
RESET	Ramsey Regression Error Test

SIC	Schwarz Information Criterion
SAP	Structural Adjustment Programme
SDGs	Sustainable Development Goals
SOEs	State Owned Enterprises
TAR	Threshold Autoregression
TGE	Total Government Expenditure
UN	United Nations
UNCTAD	United Nation Conference on Trade and Development
VAR	Vector Autoregression
VECM	Vector Error Correction Model
WDI	World Development Indicators

CHAPTER ONE

INTRODUCTION

1.1 Background of Study

Evaluating and understanding the link between government expenditure and private investment has received some attention in recent years. There are, however, mixed conclusions regarding the relationship between the two variables because the former has differential effect on the latter (Mamatzakis, 2001). Socialist economy has government taking up almost all roles and private sector playing little to no economic role. Keynesian economics justifies this trend by arguing that private sector decisions often result in inefficient macroeconomic outcomes, which demand active public sector policy responses (fiscal and monetary policies) to stabilize the economy. However, emerging evidence points to the argument that private sector investment is the engine of growth (Abdaljawwad & Sarmidi, 2017). Moreover, some studies also suggest that there is a much greater contribution from the private sector to economic growth than from the public sector (Abdaljawwad & Sarmidi, 2017; Khan & Reinhart, 1990; Makuyana & Odhiambo, 2018). Calling for private sector-led growth also means that the role and to a larger extent, expenditure of government must reduce.

However, government expenditures are a very crucial policy tool through which an enabling environment can be created for greater private sector participation. According to Keynesian economics, a pool of public investment forms the bedrock and creates an incentive for a greater private sector involvement. For instance, government expenditure was found to be complementing private investment in some developing and developed countries, thereby

supporting the Keynesian argument of using fiscal policy mix to stimulate and expand the economy (Kandil, 2009; Rashid, 2006).

Ghana therefore implemented trade liberalization, investment and tax incentive policies among others to woe private sector participation (Asante, 2000; Haedofia, 2019). Large sums of revenue that otherwise would have been generated for other useful purposes are forgone via tax incentives in the form of tax holidays and rebates (GIPC, 2020; Oppong & James, 2016). Investing to keep a healthy and educated labour force does not only promote increased productivity but also ensures that there are more healthy working days. A higher life expectancy for an economy promotes investment in medium to long-term projects. Public expenditure in the provision of the road network, telecommunication, and energy is needed to boost private investment. A well-established legal framework and independently working judicial system, general security, and protection of assets and business are very crucial ingredients in the private investment decision-making process (Kousky et al., 2006).

The government of Ghana further implemented various private sector development policies that include Economic Recovery and Structural Adjustment Programmes; Growth and Poverty Reduction Strategy (GPRS 1 & 2) as well as the Ghana Shared Growth and Development Agenda (GSGDA I & II). Key among the objectives was to enhance private sector development and a private sector-led industrialization project within a stable macroeconomic setting. The provision of social capital in the form of reliable energy, security, good road network, quality health, and education reduces the private cost of doing business, increases the marginal

productivity of private capital, and ensures higher returns on investment (Hermes & Lensink, 2001).

Many other African economies also embarked on similar major public investments in order to close the infrastructure deficit to attract the private sector (Ortiz-Ospina & Roser, 2016). High debt levels in Africa coupled with declining international aid means the rate of growth through the public sector investments is limited. Hence, the private sector has a major role in helping African countries towards economic recovery and progress. Investment in both physical and social infrastructure is one sure way the private sector can help.

Economic reforms in Africa have enabled the private sector to grow and serve as the bedrock for growth. In terms of economic activity, the relative functions played by both the private sector and the state have become much clearer. Private sector development becomes more important as African economies grow. This is because, the private sector provides almost 90% of jobs in Africa with over 60% share in total investments as well as over two-thirds of total output (AfDB, 2014). These have been made possible by government expenditures in reducing bottlenecks in business start-ups, simplifying tax and registration processes as well as strengthening solvency framework and investor protection rights/laws (AfDB, 2014).

Figure 1.1 provides a graphical trend of how government expenditures in Africa compares with the world average and other regional economies between 2000 and 2018. Data also indicates that government expenditure for Africa averages 26.85% of GDP which is not far from the global

average of 28.95% of GDP (IMF, 2019). That means public spending in Africa is within global levels and should be able to attract private investment.

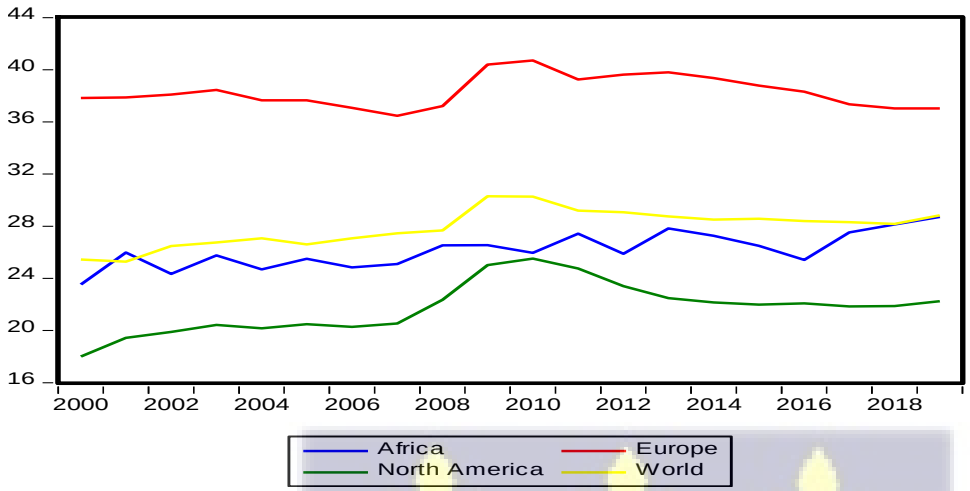

Fig. 1.1 Regional Average Government Expenditures as share of GDP
Source: IMF, World Economic Outlook Database, 2019

Despite the huge government expenditures in Africa to induce private sector investment, private investment in general and private interest in financing and delivering infrastructure in Africa seems to be declining. In terms of private interest in financing and delivering infrastructure in Africa, figure 1.2 indicates that the volume of infrastructural projects with private sector participation has fallen significantly in the past decade; declining from US $15billion in 2012 to US $5billion in 2019. Apparently the limited role of private investors is also evident as internationally, Africa only attracts 2% of global flows of Foreign Direct Investment (Eyrand, Pattillo & Selassie, 2021). This relation may be attributed to government spending producing counterproductive results. Therefore, a good measure of balance must be adhered to when spending since government spending can further cause economic distortions and ultimately crowd out private investment.

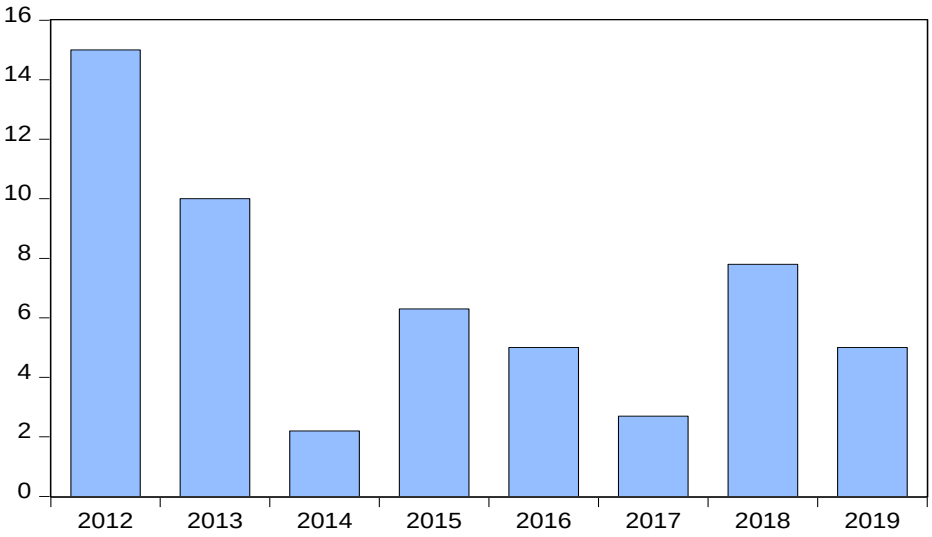

Fig. 1.2 Investment in Infrastructure with Private Sector Participation (in Billion USD)

Source: Private Partnership in Infrastructure (PPI) Projects Database, World Bank.

According to the Classical economist, a stable environment is key for a smooth operation of the private sector, and hence how these expenditures are funded has great effects on private sector investment (Balde, 2011). The crowding-out hypothesis is premised on the argument that, either means of financing government expenditure (taxes and borrowing) offsets whatever positive gains the economy gets from public capital. Tax financing government expenditures implies more taxes in the form of personal and corporate income taxes that do not only reduce retained profit for new capital injections but also affects the incentive of people to work, save and invest with an overall negative impact on economic growth (Sineviciene & Railiene, 2015). Therefore, when a government decides to use tax revenue to promote private sector development, the effect may not be complementary as expected. Meanwhile, Ghana implemented the Fiscal Adjustment Programme (FAP) in 1988 which was meant to reduce the budget deficit. This indirectly meant more payment of taxes in the economy.

Domestic borrowing also means that domestic credit available to the private sector is reduced, interest rates are likely to increase which would drive up the cost of capital and lead to a crowding-out of private investment. It is however possible that a higher interest rate, signaling more returns, can boast savings and investment in a financially repressed economy (McKinnon, 1973 & Shaw, 1973). However, when domestic savings is not enough to propel the economy on its sustained growth path, external borrowing is recommended but only on a condition that expected benefits outweigh the costs (Hunt, 2007 & Krugman, 1988). External borrowing and debt servicing may affect private investment through the exchange rate. When the local currency depreciates, it increases the cost of importing capital machinery and other inputs. It may also encourage export and local consumption since domestic goods are cheaper relative to imported goods.

Successive governments of Ghana have borrowed to finance expenditure, with a rising trend of the national debt stock (BoG, 2020). Jones (2016) observed that even though substantial portions of the country's debts were written off after attaining the high indebtedness status in 2002, the debt stock keeps rising. This means that the country may likely suffer from the debt overhang effect, where a significant percentage of government revenue is used to service debts rather than expanding basic infrastructure.

Another relevant proposition, the Ricardian Equivalence theorem argues that there may not be any change at all in aggregate demand to affect investment, as people are in full knowledge of government fiscal policies and their impact (Goldsmith, 2008). Any current shortfall in government budget financed by borrowing would be offset with taxes in the future, leaving

interest rates and private investment unaffected. That is, saving and investment behaviours are adjusted so that government expenditure has no significant effect on the economy.

The above narrative indicates that whiles the government's major objective of spending in the key sectors of the economy is to boost private sector participation and improve general welfare; the macroeconomic consequences arising from these expenditures can crowd-out the benefits partially or fully. However, previous studies that attempted to analyze this relationship assumed a linear and symmetric effect between government expenditure and private investment (Hermes & Lensink, 2001). These relationships were examined in the direction that, a rise or decrease in government expenditure has the same corresponding effect on private investment. That is, if a 10% increase in government spending reduced private investment by 6%, then it indirectly means that cutting down government spending by 10% would increase private investment by 6%.

This study, therefore, attempts to find the optimal level of government expenditure by conducting a threshold analysis to evaluate non-linear effects of government expenditure on private investment, taking asymmetric effects into consideration.

1.2 Problem Statement

The level of economic involvement by the government through its choice of fiscal policy mix has both direct and indirect implications on economic growth through the various macroeconomic variables including private investment (Kimaro et al., 2017). Firms in the free market system rely largely on profit levels to make their investment decisions with less focus on

societal welfare. Consequently, there may be overproduction or underproduction arising from positive and negative externalities. Government therefore, intervenes with its fiscal policy tools such as taxes and expenditure to ensure equitable distribution of economic outcomes to maximize social welfare. Abdaljawwad and Sarmidi (2017); and Makuyana and Odhiambo (2018), however, argues for private sector-led growth with a reduced role of the state due to high inefficiencies in the public sector that are born out of corruption, rent-seeking and the maximisation of personal and political interest (Arvate et al., 2010; Bernauer & Koubi, 2013; Dzhumashev, 2014; Goel & Nelson, 1998).

On the other hand, both public and private investment has been identified as contributors to economic growth (Khan & Reinhart, 1990; Makuyana & Odhiambo, 2018). Similar conclusion was arrived at in a United Nations Conference on Trade and Development forum that, government investments alone are not sufficient to address the sustainable economic growth problems of developing countries (UNCTAD, 2015). Consequently, it is estimated that African economies must increase their national investment to at least 35% of GDP, 23% of which must be from the private sector (AfDB, 2013).

Data from the Ghana Statistical Service shows that private investment for Ghana averages 11.7% of GDP for the period 1984-2018 with total investment averaging 19.2% of GDP (GSS, 2021). A thorough observation of the data also shows that, private investment target of 23% has not been achieved. Additionally, total investment levels have been low. Ghana's investment levels are low as compared to fast-growing countries, identified by the Commission on Growth and

Development of the World Bank, to have had their investment levels at 30% of GDP or more (CGD, 2008). Low levels of investments pose a problem because investment is a key ingredient that influences the rate of growth and level of income (Sisay, 2010).

However, it has been established that the government cannot produce all funding to meet the required investment to propel the economy to desired growth level (Makuyana & Odhiambo, 2018; UNCTAD, 2015). The private sector becomes the best alternative to achieve sustained economic growth. Productive government spending is one major way to improve private investment levels (Barro, 1990). Therefore government's efforts through various private sector reforms and programmes to attract private investment are required. Private sector development programmes such as Ghana Poverty Reduction Strategy (GPRS I) and Growth and Poverty Reduction Strategy (GPRS II), National Public-Private Partnership Policy (NPPPP), the 10-Point Agenda and the creation of Investment Promotion Agencies and tax incentives policies have all been implemented with public spending in human capital development, road networks, reliable energy with wider coverage and investment in research and development and institutions to make it easier to do business in Ghana (Asante, 2000).

These policies and its accompanied expenditures were in line with the Keynesian argument of crowding-in effect and supported by some empirical studies that found a positive effect of government spending on private sector investment (Hermes & Lensink, 2001; Kandil, 2009; Mamatzakis, 2001; Rashid, 2006). They argued that public provision of goods and services that increases social capital, entering the production mix of the private sector positively while

enhancing physical and human capital efficiency as well as increasing profitability tend to complement private investment (Hermes & Lensink, 2001).

On the contrary, the classical crowding-out hypothesis can occur whereby increasing government expenditure may weaken the economic growth process by reducing total investment through the reduction available credit to the private sector (Shetta & Kamaly, 2014) or through high-interest rate (Hermes & Lensink, 2001). When the government borrows internally to finance its expenditure, there is competition on the domestic credit market which would likely increase the cost of borrowing and increase cost of doing business. Tax financing government expenditures implies more taxes in the form of personal and corporate income taxes that do not only reduce retained profit for new capital injections but also affects the incentive of people to work, save and invest with an overall negative impact on economic growth (Sineviciene & Railiene, 2015). Some empirical studies have also confirmed the situation where government expenditure crowds-out private investment (Furceri & Sousa, 2009; Kim & Nguyen, 2020; Tchouassi & Ngangue, 2014).

One major conclusion from the above discussion is that, government expenditure intended for the promotion of private sector and general growth can produce unintended consequences that can offset the positive benefits forecasted. Hence, the relationship between government expenditure and private investment is not conclusive from both theoretical and empirical point of view. It may be the case that both extreme position of crowding-in and crowding-out can occur in a given economy at different times, where government expenditure can promote private investment up to a point and then crowd-out private investment or vice versa.

The focus of this study is to find the optimal level of government expenditure that best impacts private investment. The optimal level to be obtained from a threshold analysis produces the level of government expenditure that ensures that positive benefit from government expenditure is maximized and spending efficiency also achieved. No study in the literature on government expenditure-private investment nexus has investigated the optimal level of government expenditure necessary for private investment. Existing works focus primarily on the relationship (positive or negative). Additionally, the threshold analysis becomes imperative for not only giving the turning point missed by linear models but also deals with asymmetries in studying relationships between economic variables (Zhang, 2002).

1.3 Research Questions

This study attempts to answer the following questions:

1. What is the relationship (nature of relationship) between government expenditure and private investment in Ghana?
2. What is the optimal level of government expenditure required to promote private investment in Ghana?

1.4 Research Objectives

The primary goals of this study are:

1. To investigate the relationship (nature of relationship) between government expenditure and private investment in Ghana
2. To determine the level of government expenditure that is optimum for private sector growth in Ghana.

1.5 Significance of Study

The private sector has been identified as an important enabler of economic transformation; creating jobs and increasing national output. It has also become imperative that Ghana's industrial drive be more practical and comprehensive. Several other pro-private sector growth policies and programmes have been implemented over the years. These include: the GPRS I & II, GSGDA and the ten (10) point pillars of the Government's Industrial Transformation Agenda that contains the one district, one factory policy and Public-Private sector dialogue. One key objective of these policies is an industrialization agenda led by the private sector within a stable macroeconomic environment.

Government expenditure represents commitment by the state/public to achieving the set goals in these policies. Government expenditure in providing the infrastructural base, the structuring and strengthening of the educational and training system, business regulatory reforms and broader consultation with stakeholders, especially the private sector in policy formulation process are among the various channels with which government attempts to promote private sector economic activities. Consequently, it has become a requirement going forward to design economic policies that would not only help minimize the threat but help to fully optimize the benefits of private sector development to ensure more sustained growth, development and improved living standard.

A comprehensive analysis of the impact of government expenditure on private investment on the economy may be very useful and supportive to design a revival strategy for a private sector-led economy. The results of the study therefore can serve as a reference point for policymakers whereby reviewing the outcome, government or policy formulators would know the optimal

level of government expenditure that stimulates private investment more and formulate strategies accordingly.

Academically, this study extends the literature about the Ghanaian context by attempting to understand and reveal the exact relationship between government expenditure and private investment. This study does not only determine the direction and magnitude of impact but attempts to find the optimal level of government spending that produces the best positive effect.

1.6 Outline of Study

The study attempts to examine the effectiveness of government expenditure in enhancing private sector development over the years. The study starts with an introductory chapter that gives a background to the study, problem statement spelt out in research questions and objectives as well as the development relevance of this study. Chapter two presents an overview of Ghana's economy relative to history, climate, and trends in government expenditure, debt, and private investment. Chapter three then provides both theoretical and empirical reviews of the literature relevant to the study. Chapter four presents the methodology which discusses both theoretical framework and estimation technique that would be used to assess the effect of public spending on private investment. Chapter five presents estimation and discussion of results. A general conclusion that includes policy recommendations and studies limitations is provided in chapter six.

CHAPTER TWO

OVERVIEW OF INVESTMENT AND GOVERNMENT EXPENDITURE IN GHANA

2.1 Introduction

This chapter presents a brief report on past levels of private investment, some private sector development policies as well as trends in government expenditure.

2.2 Investment Climate and Policy Interventions

Private investment in Ghana has not been at the desired levels tracing back to colonially influenced dependency on foreign manufactured products (Ackah, 2014). This greatly affected local entrepreneurship because the private sector was alien to the economy. In a bid to improve this situation, Nkrumah post-independence initiated a process to critically assess and come out with solutions on how to overcome business challenges faced by Ghanaian businesses. The result was that since the indigenes did not have the requisite knowledge and experience, the state would establish and manage local enterprises and later transfer them to private Ghanaian investors when they had gathered some experience (Haedoafia, 2019).

This great idea of revitalizing the private sector was however abandoned and preference rather given to foreign business investors. Nkrumah lacked faith in local businesses but more importantly, for the fear that local privatization would empower some Ghanaians through wealth creation and become a possible threat to his political ambitions (Haedoafia, 2019). Again, private sector development in a broader sense represented capitalism which was a direct opposite of Nkrumah's broader aim of socialism (Asante, 2000).

Having realized that there could not be sustained growth and development with the domination of state-owned enterprises (SOEs) and taste for foreign products, there was a shift to private sector development in the 1980s. Successive governments, therefore, began implementing various programmes to achieve this new vision including the 1981 Investment Code (Act 437) and the establishment of a Central Investment Promotion Agency (CIPA). Other major interventions that prioritized private sector development include Economic Recovery and Structural Adjustment Programmes.

These policies and programmes utilized investment promotion tools such as tax holidays, depreciation allowance, exemption from import duties, investment allowance as well as minimizing excessive administrative bureaucracies (Asante, 2000). Externally, the state looked to widen its capital injection when it entered into a Multilateral Investment Guarantee Agency (MIGA) of the World Bank in 1988 that ensured foreign investors were given insurance cover to minimize investment risk. Further, domestic access to credit by the private sector was expanded by liberalizing the financial sector through the Financial Sector Adjustment Programme (FINSAP) in 1989.

To consolidate the gains from prior programs, the Ghana Investment Promotion Agency was set up in 1994 to help encourage and promote investment. Poverty alleviation policies that had private sector development as one of its key agenda include the: (i) Ghana Poverty Reduction Strategy I (2003 – 2005); (ii) Growth and Poverty Reduction Strategy II (2006 – 2009); (iii) National Policy on Public-Private Partnerships (2011); (iv) Ghana Shared Growth and

Development Agenda I (2010 – 2013); (v) Ghana Shared Growth and Development Agenda II (2014 – 2017).

GPRS 1 (2003-2005) was to strengthen institutional arrangement to well as expand financial access at low cost to enhance private sector development. Although the state facilitated credit expansion sourced from various external banks, there were still regulatory challenges, inadequate credit, as well as high cost of credit and hence GPRS II was implemented to curb these challenges with private sector competitiveness a key objective (Haedoafia, 2019).

More recent programmes and policies to boost the private sector include the Ghana Shared Growth and Development Agenda (GSGDA I & II) implemented between 2010-2013 and 2014-2017 respectively. The main policy objective of GSGDA I was to clearly outline key industrial areas and direct both private and public investment in accordance with the nations direction of economic transformation (NDPC, 2010). These keys areas were identified to be the agricultural, extractive, tourism and creative art industry. Capacity and efficiency of private managers were enhanced through training. Production constraints were minimized through the provision of infrastructure and cost-reducing technology. Additionally, the Private Sector Development Strategy (PSDS I & II) sort to reduce administrative bottlenecks hindering private sector growth by reducing the time and number of days it takes to register a business in the country. This improved the ease of doing business ranking of the country and the competitiveness of the private sector (NDPC, 2014).

Another government policy that highlights the importance of the private sector to national growth is the "10 Point Agenda" programme (MoTI, 2021). This programme within a 10-point strategy, seeks to facilitate the setting up of new businesses with minimal state interest and increase domestic retail infrastructure to accommodate the expected high production. It also attempts to consolidate the gains made under the PSDS I & II by promoting regulatory reforms that would further enhance ease of doing business. Additionally, the programme compliments the National Policy on Public-Private Partnership (NPPPP) by constantly engaging the private sector in policy dialogue.

2.3 Trends in Private Investment (1984-2018)

Private investment shows a fairly upward trend but still lower than 25% of GDP. Public investment was higher than private investment between 1984 and 1998. Since 1999, private investment forms a greater proportion of national investment.

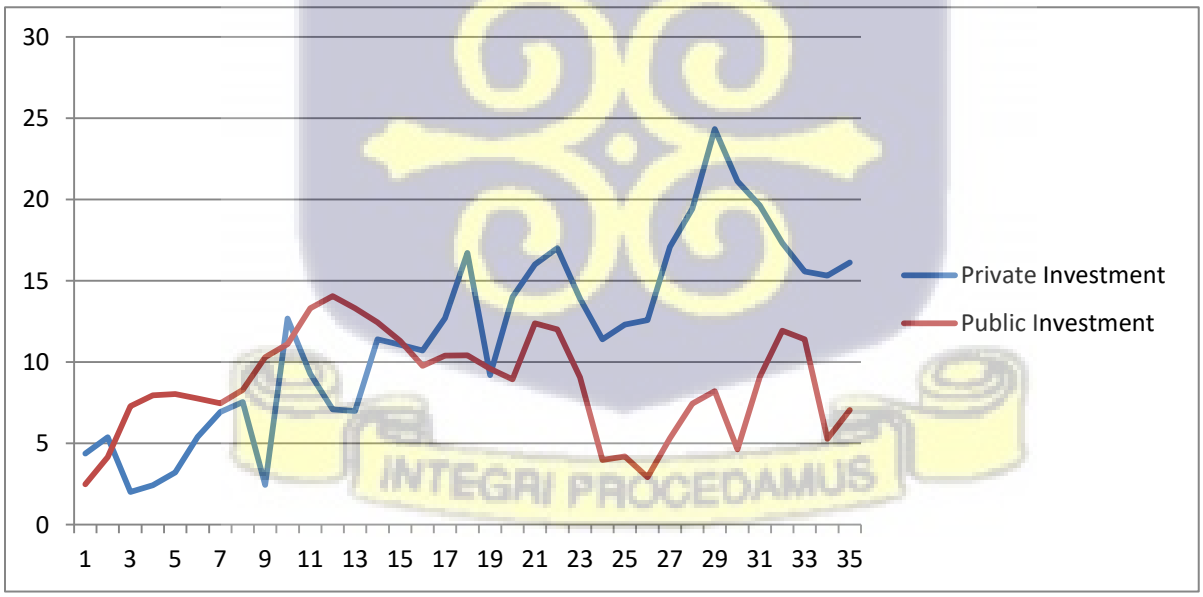

Fig. 2.1 Trends in Public and Private Investment in Ghana (1984-2018)

Source: Author's construct (GSS)

Private investment rose from 4.37% in 1984 to 12.67% in 1993. It further rose to 16.71% in 2001 which indicated improvement and significance towards achieving a private sector-led growth. Private investment averages 11.5% for the full 36-year period. Recent years have seen encouraging levels with an average of 16.6% for the last 15 years whiles it improves in the last decade to about 17.8%.

2.4 Trends in Government Expenditure

The implementation of these private sector developmental programmes involved government commitments in various sectors of the economy. It involved investment in road networks, commitments to provide regular and reliable energy with wider coverage, and investment in research and development and institutions to make it easier to do business in Ghana. It also involved expenditures in fixing the limited physical infrastructure as well as developing the human capital resource in education and health.

A careful observation of Bank of Ghana data reveals that Ghana's expenditure has always been increasing. In nominal terms, government total expenditure rose from GH 2.75million in 1984 to GH 82.16million in 1993. It further increased to GH 1,898.13million in 2003, GH 27,276.27million in 2013, and then GH 58,196.96million in 2018. In terms of GDP, government expenditure was less than 5% of GDP between 1984 and 2005. Government expenditure as a share of GDP increased from 5.59% in 2006 to 28.73% in 2015. The average government spending for the last decade (2009-2018) stands at 24.03% of GDP with the highest value of 38.02% of GDP occurring in 2018.

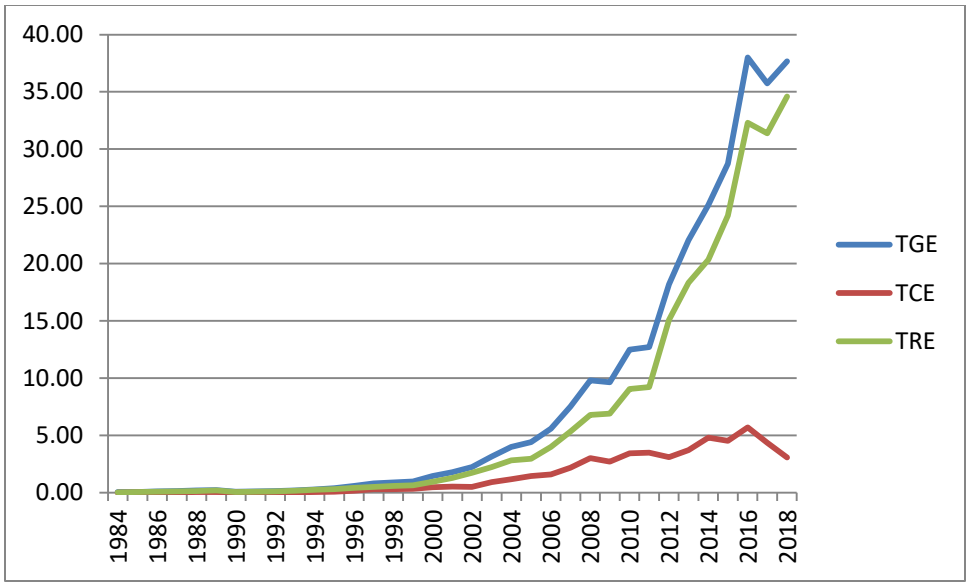

Fig 2.2 Trends in government expenditure as a share of GDP (1984-2018)

TGE-Total Government Expenditure, TCE-Total Capital Expenditure, TRE-Total Recurrent Expenditure.
Source: Author's construct (Bank of Ghana)

The graph above reveals that as government expenditure increase over time, a large portion is allocated to consumption expenditure with lower shares to capital expenditure. The maximum share that capital expenditure has received for the full period is 5.7% of total government expenditure in 2016

2.5 Government Revenue and Public Debt

The government of Ghana derives its revenue from various sources which can be broadly grouped into tax revenue and non-tax revenue. Non-tax revenue which is mostly made up of fees, charges, dividends, profits of public corporations, and royalties amounted to GH¢

47,636.73million which is equivalent to 30.82% of GDP (Bank of Ghana, 2021). This shows a significant increase in value from GH¢ 5,619.7million in 2008 representing just 6.88% of GDP.

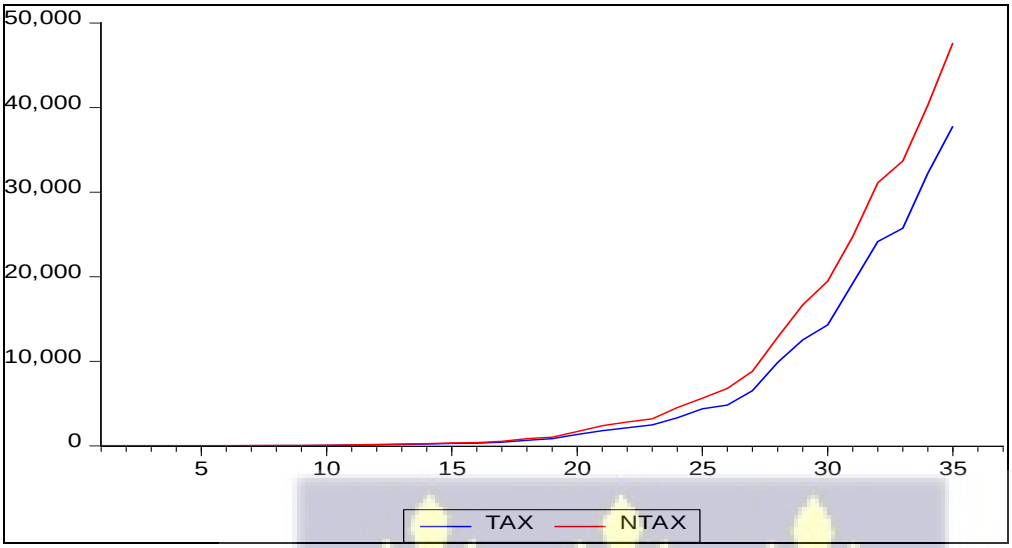

Fig 2.3 Government Tax and Non-tax revenue in GH¢M (1984-2018)

NB: Year 1=1984 and Year 35=2018, where tax=government tax revenue and ntax= government non-tax revenue (all in GH¢M)

Ghana Revenue Authority (GRA) is the authorized body responsible for collecting taxes in Ghana. Whiles the Domestic Tax Revenue Division (DTRD) collects domestic direct and indirect taxes, the Customs Division is responsible for generating tax revenue at the port, borders, and other entry points around the country. According to the Bank of Ghana, Government tax revenue collected in 2018 amounted to GH¢ 37,784.19 million which constituted 24.45% of GDP (BoG, 2020). Although more can be done, this represented a significant rise from GH¢ 4,368.48million in 2008 (5.35% of GDP).

One major challenge facing successive governments in Ghana is revenue mobilization given the consistent annual budget (fiscal) deficits. Data from the Bank of Ghana shows that the government has been running a rising budget deficit for the past 20 years. For instance, the overall budget balance has averaged a deficit of 6.5% of GDP from 2009-2018. Consequently, and in line with the dual gap theory, domestic and external borrowing has been resorted to financing state expenditures. Ghana's debt stock keeps rising even though huge portions of debts were written off two decades ago after reaching the high indebtedness zone (Jones, 2016).

Despite this gesture, the country suffers from debt overhang effects where a significant percentage of government revenue is used to service debt. For example, interest payments on the debt rose from GH¢ 1,032.32million in 2009 to GH¢ 15,821.82million in 2018. In terms of GDP, this represented a rise from 1.2% to 10.24% (BoG, 2020).

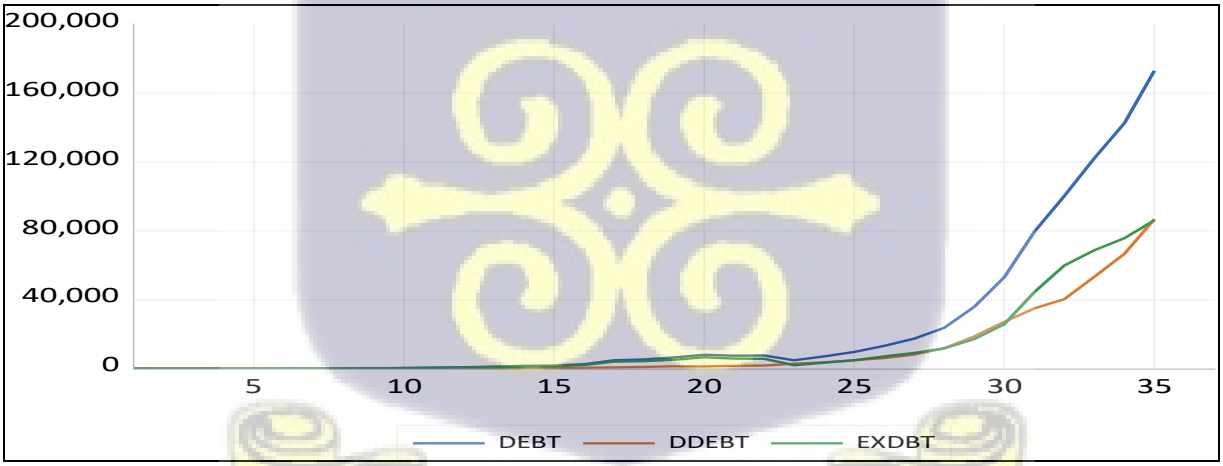

Fig 2.4 Composition of Public Debt: External and Domestic in GH¢M (1984-2018)

NB: Year 1=1984 and Year 35=2018, where debt=total public debt, ddebt=total domestic debt and edbt= total external debt (all in GH¢M)

Figures from the Bank of Ghana reveal that of the total public debt of GH¢ 173,068.7Million in 2018, GH¢8,899.74Million (50.21% of total debt) represented domestic debt while GH¢86168.96Million was external debt (BoG, 2020). From the graph above, it can be seen that there is a catch-up effect of domestic debt on external debt. Initial levels show that total public debt was largely made up of external.

2.6 Summary

The poor performance of public corporations necessitated the industrialization drive through the private sector. Ultimately, the private sector was expected among other things, to create employment opportunities and to revive the economy towards long-term growth. In terms of creating jobs, the national employment report indicates that the private sector has met expectations accounting for 85.6% of total employment in Ghana (GSS, 2015). A similar observation was made in the National Industrial Census (NIC) of 2003, which indicated that 87.7% of people employed in Ghana are in the private sector (GSS, 2006 and NIC, 2003). Moreover, Aryeetey and Baah-Boateng (2015) observed a 48% increase in formal employment in the private sector between 1984 and 2000. The Ghana Investment Promotion Center over 10 years, registered over 1,400 projects (BoG, 2005). This can be attributed to gains made from improving investor perception about the business environment. In terms of infrastructure, the implementation of GSGDA I resulted in the expansion of roads by 617kilometers and increased access to electricity from 67% in 2010 to 72% in 2012 (GDPC, 2014)

Though significant efforts have been made in a bid to promote private sector growth, some few challenges remain. Policies such as GPRS I focused on ensuring macroeconomic stability without much consultative process in its preparation. This includes the little engagement of the private sector who is a key stakeholder in the policy. The continual legal tussles between government and private investors portray an unpleasant review of the existing regulatory framework's ability to ensure a friendly business environment. With the inputs of the private sector, and an appropriate legal and regulatory framework needs to be reviewed, strengthened; made simple, clear and straightforward.

Despite interest rates reducing significantly to help businesses, it remains high. The high levels of domestic borrowing by the state may as well deprive the private sector of credit. For instance, the Bank of Ghana observed that whiles the purchase of government treasury increased by 28% (between 2020Q2 and 2021Q2), domestic credit to private growth fell from 14.8% to 6.8% (BoG, 2021). Moreover, the distribution of government expenditure is skewed towards consumption expenditure with very low capital expenditure. This means that over the years less attention has been paid to public infrastructural development. It is imperative that public spending in capital projects is increased within the budgetary allocation process so that the weak social capital base would be improved to enhance private sector investment and general economic growth.

CHAPTER THREE

LITERATURE REVIEW

3.1 Introduction

This chapter discusses theoretical literature in support of the study. Some empirical works on the effects of government expenditure on private investment with an attention on linear and nonlinear analysis are discussed. The first part would look as relevant economic theories underpinning the study. The second section would review various studies already done on government expenditure-private investment nexus and identify some gaps.

3.2 Theoretical Review

Effect of Government Expenditure on Private Investment

Analysing the exact impact of government spending on private investment is complex. Three theoretical predictions on the linkage between government expenditure and private investment exist. These are the Keynesian theory of crowding-in effect through improved infrastructure, the Classical theory of crowding-out effect through the interest rate, and the Ricardian Equivalence theory of no overall effect.

3.2.1 Keynesian Crowding-In Effect

Keynesian economics argues that government expenditure propels economic growth and increases economic activities that ultimately encourage private sector participation (Ono, 2014). This implies that government spending crowd-in or complements the private sector. Government fiscal drive that aims at increasing public productive spending in infrastructural projects such as roads, energy, security, and communication directly enters the private sector production function;

reducing the cost of doing business and raising the expected returns/profitability of private firms which further leads to more private investment spending (Erenberg,1993). Government expenditures in areas such as research and development (R&D) and education can be said to be enhancing technological advancement which drives private innovation and inventions (Glomm & Ravikumar, 1997). In this case, the crowding-in effect hypothesis is premised on the fact that government expenditure is seen as a productive input as postulated in models by Barro (1990) and, Glomm and Ravikumar (1994).

The crowding-in hypothesis by the Keynesians does not discard the countering effects from government activities such as borrowing and taxing to finance its expenditure. However, the positive effects of increasing government expenditures in the provision of public capital which is an input in the private sector production function are greater than the negative externalities associated with rising government expenditure (Zungu, Greyling & Sekome, 2020). This means that the net effect of government expenditure according to this principle is that, government spending promotes human and physical capital accumulation which ultimately ensures growth and development. Again, government interference in the economy to correct market failures, negative externalities as well as maintaining law and order and political stability is a major driving force of private investment and growth (Barro,1990).

Following the above proposition and assuming a simple production function of the private sector as

$$Yp=f(Lp, Kp) \quad (3.1)$$

Where Kp and Lp are private capital and labour respectively.

Government expenditure therefore may raise social capital which in turn increases the marginal productivity of private capital.

$$Kp = f(Kg) \quad (3.2)$$

Where private capital (Kp) is an increasing function of social capital (Kg).

Therefore the final output function of the private sector can be written as

$$Yp = f[Lp, Kp(Kg)] \quad (3.3)$$

Equation 3.3 indicates that when government expenditures are productive and able to increase the marginal efficiency of private capital leading to high expected profit, private investment spending would increase, all things being equal.

Secondly, government expenditures can indirectly increase private investment through increased aggregate demand. Income levels are a major determinant of private investment in developing economies (Asante, 2000; Jalloh, 2014). Expenditures such as wages and salaries, poverty alleviation transfer payments as well as giving government projects to local contractors may directly enter into the utility function of individuals via higher incomes. This can lead to marginal increases in incomes allocated to both consumption and savings. Increases in demand for final goods signals to private investors of profit exploitation that leads to expansion of productive capacity. Also, higher private savings may boast investment via increased availability of loanable funds. However, Mo (2007) argues that the reallocation of government consumption spending to the provision of public infrastructure can lead to better growth of real GDP although both can boost private investment.

Two important issues relating to the crowding-in effect discussed above are highlighted. First, it must be noted that high consumption expenditure (largely made up of public wage bills) that do not commensurate with increased productivity, as well as politically motivated projects that do not increase the stock of social capital may crowd-out private sector investment (Baumol,1967 and Niskanen,1968). Secondly, real resource crowding-out may however occur when private investors fail to expand their productive capital but rather dwell on public investments made by the government (Chakraborty, 2002). In other words, private investors overly rely on the pool of public investment without adding to their capital stock. This indicates that government investment expenditure in enhancing social capital may be a substitute for private sector investment.

3.2.2 Classical Crowding-Out Effect

Crowding-out effect is an unintended result of a rather expansionary fiscal policy where an increase in government expenditure financed by taxation or borrowing, is unable to stimulate economic activity but rather reduce private sector growth. Adequate financial resources would be needed to provide the social infrastructure that facilitates and improve the efficiency of private investment. For a start, individuals believe in the government's objective of optimal growth in the overall economy and private sector growth and therefore, expect its budgetary allocation on expenditures that are growth-enhancing (Raymayanti & Horn,2010). However, as it has been maintained by the crowding-out hypothesis, increasing government size may adversely impact private investment because government spending would be financed through more borrowing, high taxes, or printing of more currencies (Asimakopoulos & Karavias, 2016). This theory is

premised on the fact that taxation is a disincentive to private investors because it reduces their returns and borrowing raises the interest rate as well as reduces credit availability. In effect, the crowding-out hypothesis argues that the economic losses from government fiscal decisions are huge to the extent that the net effect crowds-out private investment rather than complement them.

3.2.2.1 Effects of Government Taxation

Taxes, the involuntary transfer of funds from the private sector to the government, remains one of the main sources of government income, and keeping the budget deficit low is a crucial objective of government. Reducing the deficit subsequently means that more revenue (mostly taxes) must be raised to finance government expenditure. Generally, taxes tend to have a disincentive effect on work, saving, and investment decisions (Sineviciene & Vasiliauskaite, 2012). Hence, taxes may directly enter the production and profit function negatively. Higher import taxes may likely increase the cost of imported inputs. Personal income taxes and profit taxes reduce returns to investment (Edane & Okoi, 2014).

Moreover, consumption is inversely related to taxes and hence any increase in taxes reduces the disposable income of households. Consequently, aggregate demand may fall. Falling aggregate demand may not send positive signals to private investors to expand. Hence private investment may reduce with time.

3.2.2.2 Effects of Domestic Government Borrowing

When public savings are not enough to finance government expenditures, the state may enter into the domestic loanable funds market to acquire more funds. This action by the government causes two effects on the domestic credit market. First, there is resource crowding-out where the government competes and deprives the private sector of investment credit. Commercial banks may opt to go for less risk and hand over fewer loans to the private sector (Shetta & Kamaly, 2014). Domestic credit to the private sector is a major stimulator of private investment in both developing and developed countries; therefore any action that leads to a fall in funds to the private sector shrinks private sector development (Asante, 2000; Jalloh, 2014).

Secondly, government borrowing from the domestic pool of financial resources may increase the interest rate. Given the supply of loanable funds on the funds market, increased demand for loans from the government is likely to raise the interest rate. Moreover, the government may also agree to pay a higher interest rate to get the funds to complete its project. A higher interest rate to the private investor represents a higher cost of capital (Jorgenson, 1967). As a result, we expect that higher interest rates would dampen private investment spending as confirmed by Jalloh (2014).

However, the effect of a higher interest rate may be different in a financially repressed economy. According to Mckinnon (1973) and Shaw (1973), higher interest rates may lead to more domestic credit availability, implying a favourable resource crowding-in from an otherwise financial crowding-out. The main argument here is that a higher interest rate, which is the return on savings, may encourage saving and make more loanable funds available. It is therefore correct

to assume that a higher interest rate emanating from government involvement in the domestic credit market can lead to more private sector investment as found in some studies (Akinlo & Oyeleke, 2018; Frimpong & Marbuah, 2010).

3.2.2.3 Effects of External Government Borrowing

Developing countries sometimes face low domestic savings needed to finance the investment required for a more sustained economic growth and development (Hunt, 2007). It is therefore imperative for investments to be financed with external borrowing (to augment domestic savings) to kick start the economic growth process where domestic savings would rise over time. The most important criteria is that externally borrowed funds should be used efficiently so that the returns, in the form of enhanced productivity and overall output, should be greater than the associated cost (Abdullahi, Bakar & Hassan, 2016). Although reasonable borrowing may likely help to boost economic growth, investment or capital formation is one crucial channel for that effect to materialize.

There is a general perception in the economic literature; of which some are backed with empirical studies, that external borrowing adversely affects investment (Abdullahi, Bakar & Hassan, 2016). This relationship is termed as the "debt overhang" theory by Krugman (1988) where the expected present value of the loan in terms of its utilization is lower than the signed up value. Debt overhang can stall the growth process in developing economies because debt servicing begins to take up large portions of government revenue that would have otherwise been used for productive projects. However, because the borrowed funds were not able to enhance

productivity by providing the needed social capital and reducing the cost of doing business, the economy can as well lose private investors.

Following the discussions above, the government has two major sources of funding its expenditure: Tax and Borrowing.

Public savings (Sg) as represented by government budget is given as Revenue (T) less Expenditure (G)

$$Sg=T-G \tag{3.4}$$

Provision of social capital (Kg) comes from the public budget, hence depends on public savings

$$Kg=f(Sg) \text{ or } Kg=f(T-G) \tag{3.5}$$

However, government expenditure aimed at increasing social capital (Kg) reduces public savings (Sg). That is social capital negatively affects public savings.

Combining equations (1), (4) and (5), Private capital can be formulated as:

$$Kp=f[Kg\ (Sg)] \text{ or } Kp= f[Kg(T-G)] \tag{3.6}$$

This ambiguous relation shows that the final effect of social capital on private investment (Kg) largely depends on the government budget balance. Nevertheless, the respective effects of tax and borrowing are unavoidable because the budget balance is a function of taxes and borrowing.

3.2.2.4 Crowding-out Effects from Non-Economic factors

Beyond tax and borrowing, there exist several other non-economic reasons cited in the literature that can lead to a crowding-out effect from government expenditure. For instance, high government expenditure represented by the size of the public sector is a conduit for corruption, rent-seeking, and other forms of unproductive activities that renders government spending unable to produce the intended positive effects (Arvate et al., 2010; Bernauer & Koubi, 2013; Dzhumashev, 2014). This leads to inefficiencies in government spending arising from the production of low-quality public goods and services in education, health, and justice. Meanwhile, Goel and Nelson (1998) identify bureaucracy as a promoter of corruption in the public sector because individuals would find ways to bypass them. This would probably lead to more government spending to make rules and regulations, creating institutions to fight corruption without any corresponding increase in productivity.

Aydin and Edin (2019) argue that such activities increase the cost of doing business, distort the operation of the market system, and ultimately discourage private investments. Government transfer payments including unemployment benefits raise reservation wage which allows people not to take up jobs hence reducing labour availability and increasing labour cost to the private sector simultaneously (Vedder & Gallaway,1998). Meanwhile, Kim and Nguyen (2020) attribute the negative effect on the mobility of productive inputs, particularly labour, between the public and private sectors. The main contention is that high public sector wages either lead to mass mobility of labour from the private sector to the public sector or increase labour cost in maintaining the labour force in the private sector.

3.2.3 Ricardian Equivalence Theory

Under the assumption of rationality and forward-looking to pay more taxes to enable the government to defray borrowed funds; individuals alter their saving and consumption spending behaviour (Gumus, 2003). To ensure consumption smoothening in the future, households are prepared to reduce current consumption and save more. This means that the rise in private savings is equivalent to the reduction in public savings (that led to government borrowing) leaving the interest rate unchanged and hence the domestic credit market and private investment is unaffected (Goldsmith, 2008). From a result point of view, the Ricardian effect in principle produces the same effect when private investment is interest inelastic.

According to this theory, government domestic borrowing presents two likely effects namely; positive wealth effect and negative effects. The positive wealth effect occurs in terms of interest payments that would accrue to individuals and entities who lend to the government. The negative wealth effect arises because all citizens would pay more future taxes to clear all debts, thereby reducing wealth. Therefore, based on the Ricardian principle, these two effects neutralize and the net effect is zero (Goldsmith, 2008). Hence government spending would have no effect on private investment.

The rationality assumption by the Ricardian equivalence theory may be self-defeating. When individuals can correctly predict that productive government expenditure would increase returns to their private capital, there would be no need to cut down on current consumption and increase private savings now. That is, individuals would make economic gains from the improvement in

social capital that would improve profitability levels in such a way that, they can pay future higher taxes more conveniently without private investment being affected (Goldsmith,2008).

3.3 Empirical Literature

A review of existing empirical studies shows that there are two strands (linear and non-linear) examining the relationship between various forms of government expenditure (public investment, total government expenditure, capital/recurrent, sectorial) and private investment. These strands support three positions on the linkage between government expenditure and private investment: positive denoting the Keynesian position, negative denoting classical crowding-out, and no significant effect representing the Ricardian equivalence principle.

3.3.1 Public Investment and Private Investment

Early stages of development and well-sustained industrialization of an economy require huge infrastructural spending by the state (Musgrave, 1969; Rostow, 1971). One of the first studies to empirically examine this relationship is Aschauer (1989). In his seminal paper on the United States of America, Aschauer (1989) used data from 1949-1985 and found a crowding-in effect from public investment. The study revealed that higher levels of public investment-private capital ratio had a significantly positive effect on private sector productivity. Following the work of Aschauer (1989) who found a complementarity effect, many studies such as Erenburg (1993); Ekpo (1999), Erden and Holcombe (2005); Ghura and Goodwin (2000), Karagol (2014) and others have also evaluated the linkage between public and private investment for various

economies. Although most studies provide evidence of positive effects, the results lack consensus because others report negative effects.

For instance, Erden and Holcombe (2005) attempted to determine the key factors that influence private investment using a sample of 19 developing countries across the world. The study revealed that public investment expenditure can promote private investment in developing countries. Specifically, the study showed that for every 10% addition of public investment, private investment increases by 2%. The importance of public investment to economic development was further highlighted by Sineviciene and Vasiliauskaite (2012) who found that public investment expenditures explained about 80% of changes in private investment in Estonia, Latvia and Lithuania.

Further, Mahmoudzadeh, Sadeghi and Sadeghi (2013) also conducted a study to analyse the relative effects of government consumption expenditure, public capital spending as well as the budget deficit on private investment across a sample of 23 developed and 15 developing economies. Panel estimation using data from 2000-2009 revealed that increases in public spending on capital formation crowds in private investment in both developed and developing countries. Specifically, every one percent increase in government investment spending increases private investment in developing and developed countries by 0.31% and 0.095% respectively. This was confirmed by Jalloh (2014), who empirically examined the relationship between private investment and macroeconomic variables in Sierra Leone. The study found public investment and level of financial development crowding-in private investment. The study whiles confirming

the accelerator principle for Sierra Leone established that interest rate, inflation and political instability crowd-out private investment.

In these studies that looked at government investment expenditure, one would have expected positive externalities that would crowd-in private investment as proposed by Kneller et al., (1999). However, other studies such as Akpalu (2002), Cavallo and Daude (2008) and Karagol (2014) find a crowding-out effect of public investment, which lend credence to the unproductive spending distinction posited by Barro (1990). Karagol (2014) examined the relationship between government investment expenditure and private investment for the period 1968-2000. Estimates from the cointegration and impulse response function indicate that public investment and government consumption spending affected private investment negatively in Turkey. Notwithstanding the results and whiles admitting that fiscal policy through government expenditure may enhance development in general, Karagol (2014) argued that assessing their effectiveness by examining the various components is key for policy.

Cavallo and Daude (2008) find that investment expenditure in developing countries crowds-out private investment using data from 116 developing countries from 1980-2006. Applying a dynamic panel estimation technique, the study further revealed that the degree of substitutability between government investment expenditure and private investment spending depends on financial sector development, level of openness as well as strength of institutions. Specifically, an economy with high openness to external trade, with a well-developed banking sector together with strong and efficient state institutions experiences less crowding-out effect. The authors

however argued that not all public investments may crowd-out private because adequate social capital through the selection of infrastructural projects that would produce the highest effect of increasing marginal efficiency of private capital, may produce a complementary effect as seen in Aschauer (1989).

Akpalu (2002) applied Engle-Granger's two-step approach with the Johansen multivariate test in modeling private investment in Ghana. He made use of yearly time series data in the period of 1970 to 1994 and concluded that public investment crowded-out private investment in Ghana. This result was not consistent with Asante (2000), one of the initial papers evaluating this nexus in Ghana and found a complementarity effect. Although both studies used data within the same time scope, Asante (2000) combined both OLS and Cross-Section analysis. Recent findings such as Frimpong and Marbuah (2010); and Pickson and Asante (2016) using expanded data and new methods, including time scope of both Asante (2000) and Akpalu (2002), showed that public investment was not significant in explaining changes in private investment in Ghana although a positive relationship exists between them.

These findings justify the economic reasoning by Hermes and Lensink (2001) that public investment crowds-out private investment when they become unproductive. It is also possible that public investment may not be seen to be having any direct effect on private investment. For instance, Gjini and Kukeli (2012) in their pooled cross-sectional analysis of 11 East European countries investigating the public-private investment relationship found no evidence of crowding

effect from public investment on private investment as was also the case for Asia and Latin America (Ghura & Goodwin,2000)

Similarly, Kollamparcbil and Nicolaou (2011) found no evidence of either crowding-in or crowding-out but indicated that public investment expenditure impacted private investment through the accelerator effect. This means public investment may affect private investment through other macroeconomic variables.

3.3.2 Total Government Expenditure and Private Investment

Based on these earlier works on public investment, various studies have expanded the scope to directly look into total government expenditure-private investment nexus within the Keynesian-Classical argument.

In terms of total government spending, results that support the crowding-in hypothesis include Kandil (2009), who evaluated the effectiveness of government spending across a sample of developing and developed countries. Results revealed that in general, increases in government expenditure stimulate consumption, investment and growth across all samples. The study further revealed that crowding-in associated with government spending was larger for developing countries relative to developed economies. This was attributable to excess liquidity in developing economies which meant that there were more resources idle and that government expenditure could be financed without shrinking the private sector. Basar, Polat and Oltulular (2011) and Rashid (2006) in separate studies also showed that there was a crowding-in effect from government expenditure on private investment in Turkey.

Other empirical studies that confirm the crowding-out hypothesis in a linear study include Furceri and Sousa (2009) who introduced the business cycle in examining the effect of changes in government expenditure on private consumption and investment using data across 145 developed and developing countries. The study indicated that between 1960 and 2007, government expenditure crowded-out private investment for the sample. Further, Furceri and Sousa (2009) revealed that per the data used, the effects of government spending on private investment were not fully dependent on the business cycle. Thus, the outcome did not conform to the predictions of the real business cycle model where increasing government expenditure is supposed to stimulate private investment upward.

Kim and Nguyen (2020) found that an unexpected rise in government expenditure reduced a firm's capital and Research &Development spending which leads to investment contraction. Employment and sales growth were negatively affected by an increase in government hiring and wage spending. The study concludes that government spending crowds-out private investment. However, they used the labour channel rather than the traditional interest rate or tax rate channel. Kim and Nguyen (2020) attribute the negative effect of government expenditure on private investment on the mobility of productive inputs, particularly labour, between the public and private sectors. The main contention is that high public sector wages either lead to mass movement of labour from the private sector to the public sector or increase labour cost in maintaining the labour force in the private sector.

Tchouassi and Ngangue (2014) investigated how government expenditure affects private investment in Africa using a sample of 14 countries using annual data from 1980 to 2010. Although the sample size was small, results from the dynamic structured error correction mechanism revealed that government expenditure did not promote private investment in Africa.

In line with the strand of the linear relationship between government spending and private investment within the Keynesian-Classical proposition, studies such as Sineviciene and Railiene (2015); and Ahmed and Miller (2000) also delved into the relative effects of the mode of financing government expenditure. This is important because the crowding-out hypothesis is premised on how government funds its spending. Higher taxes in the form of personal and corporate income taxes do not only reduce retained profit for capital injections but also affect the incentive of people to work, save and invest thereby, negatively affecting economic growth (Sineviciene & Railiene, 2015). The tax burden can therefore affect private investment negatively (Senzu & Ndebugri, 2019). Alternatively, tax incentives can be a major stimulating tool for private investment.

More comprehensively, Ahmed and Miller (2000) posited that there is generally a larger crowding-out effect associated with tax-financed government expenditures than debt-financed spending. Public spending funded with borrowing when used efficiently can produce long-term benefits as evidenced in Nigeria (Apere, 2014). Short-run negative relationships found between public borrowing and private investment may diminish in the long run suggesting that debt-

financed public spending when utilized in productive activities may become growth-enhancing (Lidiema, 2017).

3.3.3 Disaggregated Government Expenditure and Private Investment

Studies that attempted to investigate the relation between the government's total expenditure and private sector investment failed to recognize differences in government expenditure. Various categories of government expenditure have differential impact on investment and other macroeconomic indicators as well (Hermes & Lensink, 2001). Aggregate studies do not give any indication of the sectorial incidence of government expenditure on private investment. It is also possible that overall small effects of aggregate variables can hide crucial significant effects for specific sectors (Barro, 1990; Saeed et al, 2006).

Some studies have therefore attempted to further unravel the ambiguities surrounding this topic and to inform better policy by further decomposing government spending into capital/recurrent and sectorial expenditures to identify unit effects (Omojalaibi, Okenesi & Mesagan, 2016; Saba & Nyepah, 2020).

Wu and Zhang (2009) in an attempt to understand the relationship between government spending and private investment in China, applied the Error Correction model together with the cointegration technique using time series data from 1978 to 2004. The study found that government capital expenditure in infrastructure, health, research and education complemented private investment in the long run. Similarly, Ekpo (1999) evaluated the contribution of

government expenditure to general economic performance for the Nigerian economy. The study revealed that total capital and recurrent expenditures in health and education crowded in private investment. Additionally, capital expenditures in transport and communication complemented private investment while recurrent spending in agriculture and construction promoted private investment.

Some recent studies such as Jairath (2008), Saeed et al (2006) and Umoro and Yaqub (2013) also provide some valuable contributions to this debate by investigating direct links between government expenditure and private investment in specific sectors. For instance, Umoro and Yaqub (2013) used government and private health expenditures to represent public and private investment in health respectively. They found that in Nigeria, government health investment expenditure induced more private sector investment in the health sector through appropriate regulation and tax incentives.

Oyieke (2012) also investigated the validity of Musgrave's development theory in the Kenyan economy using data from 1964-2006 within a Cointegration and Error Correction Framework. It was observed that public investment in the agricultural sector crowded in private investment. Meanwhile, public infrastructural spending had no significant effect on private investment.

Additionally, Jairath (2008) examined the relationship between public and private investment spending in agricultural marketing infrastructure in India. The study revealed a complementarity between public and private investment. However, the crowding-in effect was rather coming from the private sector. That is to say, private investments in the agricultural infrastructure setting in

India induce more investment from the public sector. Moreover, Saeed et al (2006) revealed that public investment spending in agriculture crowded-in private investment in agriculture. The study further revealed that the government was in direct competition with the private sector in the provision of manufactured goods for the period under study, hence a crowding-out effect between government investment and private investment in the manufacturing sector.

Laopodis (2001) also evaluated the relative impact of the government's military and non-military expenditures for Greece, Spain, Portugal and Ireland using annual data from 1960 to 1997. Results from the dynamic error correction model showed that military expenditure was not significant in explaining levels of private investment across all the sampled economies. However, public capital (infrastructure) expenditure in areas such as health and education crowds-in private investment in all countries except Spain where public capital may be seen as a substitute for private capital. Total government expenditures in housing, transport and communication sectors also stimulated private investment across the sample except for Spain.

Malizard (2015) in an attempt to highlight the critical role played by defense and security in promoting the business environment assessed the relationship between military expenditure and private investment in France. A disaggregated evaluation revealed that private investment responds positively to changes in military equipment budget. However, overall military expenditure crowds-out private investment in France largely because of a greater negative or crowding-out effect associated with non-equipment military spending. The Baseline model posits that investments in other sectors of the economy compete with the military sector for the same

proportion of output, where consumption is divided between the private and public (Smith, 1980). Therefore the study failing to moderate the effects of other sectors in estimation distorts the results obtained.

3.3.4 Non-linear Effects of Government Expenditure on Private Investment

The literature presented above provides valuable contributions by various authors to making the government expenditure-private investment debate clearer. However, these studies consider only a linear relationship in the debate. Barro (1990) and Devarajan et al. (1996) presents models that indicate that government expenditure may be productive but only up to a certain point. Moreover, Hermes and Lensink (2001) articulate that a minimum level of government investment spending may be needed before the positive benefits are felt in the economy.

Studies considering the possible non-linear relationship between government expenditure and private investment are scarce. Hermes and Lensink (2001) provide a comprehensive analysis of both a linear and non-linear relationship between disaggregated government spending and private investment for a sample of 33 developing countries.

Linear relationship examined between functional categories of government expenditure by Hermes and Lensink (2001) revealed that public expenditures in health, consumption (wages) and social security crowded-out private investment. Meanwhile, the non-linear estimation showed that health and consumption (wages) expenditure has an inverted U-shaped relationship

with private investment indicating that initial levels of government expenditure in the health sector promotes private investment but only up to a certain level, then crowds it out. It also provides evidence to show that beyond the optimal level of civil service workers, payment of wages becomes inefficient. By this result, Hermes and Lensink (2001) stress the need to consider non-linearity in the government expenditure-private investment debate where with a U-shaped relationship, the study further revealed that the positive externalities associated with defense and productive capital expenditure do not accrue until some time when the needed minimal investment has been made. Consistent with economic theory, this is suggestive that defense and capital expenditure may not seem to be promoting private investment in the short-run because it takes time for the positive marginal effects to be felt in the economy.

Additionally, Njuru et al. (2014) in a study in Kenya concluded that both capital and recurrent government expenditure exerts a positive impact on private investment. The study further revealed a nonlinear relationship between recurrent expenditure and private investment, indicating that recurrent spending crowds in private investment up until a certain threshold beyond which it becomes unproductive.

3.3.5 Ghana's Perspective

Contributing to the extant literature, studies on Ghana are skewed towards investigating the linear effects of public investment spending on private investment (Akpalu, 2002; Asante, 2000; Frimpong & Marbuah, 2010; Pickson & Asante, 2016). Earlier studies such as Asante (2000) provided evidence to show that private investment had received a positive impact from public

investments made. However, recent findings indicate that public investment spending is not significant in explaining private investment levels in Ghana (Frimpong & Marbuah, 2010; Pickson & Asante, 2016). This may be indicative that, either public investments lost their usefulness as time passed with no relevant additions or new infrastructural investments were not productive and efficient enough to boost investment.

3.4 Summary and Conclusion

The relationship between government expenditure (and public investment spending) and private investment, or the appropriate function in the economic life of an economy has received much attention in the literature. A review of the literature shows that the majority of the existing works on this topic employed linear models and obtained mixed results. These studies contend that a negative relationship signifies crowding-out, where increasing government expenditure weakens economic activities. On the other hand, a positive relationship denotes a crowding-in effect where government spending is a necessity and a potent tool for stimulating economic activity and ensuring redistribution of income equitably. This conflicting result shows that government participation in the economy represented by the level of government expenditure has an optimum.

In line with Musgrave Theory, one strand of the literature focuses on investigating the impact of public investment on private investment with mixed results. Another strand also examines how total government spending affects private sector investment in which crowding-in and crowding-out results were found for both developing and developed countries. The main goal of these

studies was to find the short-run and long-run effects along with a linear and symmetric model. Some studies such as Hermes and Lensink (2001) attempted to address this weakness by considering a non-linear relationship and providing an extensive direction and magnitude of the effect of government spending on private investment. Further, others investigated the presence of asymmetric effects of government expenditure on private investment.

Although the nonlinear examination points to the fact that government expenditure is either effective up to a point or above point, it fails to determine exactly the point. There is therefore the need to conduct a threshold analysis of government spending, an area not found in the literature. A threshold where government expenditure produces economic gains that equals its alternative cost and should possibly not be exceeded. The goal is to find the optimal support that the government can provide and this involves finding the optimal level of government expenditure.

CHAPTER FOUR

METHODOLOGY

4.1 Introduction

This chapter discusses the theoretical framework and model specification employed to determine the relationship between government expenditure and private investment. A set of explanatory variables underpinned by economic theory is briefly discussed. The estimation technique employed, data sources, as well as some diagnostic tests to be conducted, are explained. Finally, the conclusion of this chapter is presented.

4.2 Theoretical Framework

Demand for investment arises from profit maximization, speculative procurement of productive machinery, and as an increasing function of national output or income (Haavelmo, 1950). Investments are expected to accrue a flow of returns for the foreseeable future; hence they are only made until the net present value is zero. Alternatively, investments are made until the present value of expected streams of revenue is equal to the opportunity cost of capital (Eklund, 2013). Hence acquisition and formation of physical capital among other investment activities by economic units depend on the associated cost and potential returns taking into account prevailing uncertainty and risk.

This study is based on the neoclassical theory of investment to capture the nexus between private investment and its primary determinants (Jorgenson, 1967). Where the optimal stock of capital is given as

$$K^* = \frac{PaY}{C} \quad (4.1)$$

Equation 4.1 depicts the relationship between desired capital stock K*, capital-output ratio (a), output price (p), output (Y) and Capital cost C (taxes and interest rate). Transforming equation 4.1 into a linear function becomes:

$$K_t = \varphi P_t Y_t C_t^{-1} \quad (4.2)$$

However, net investment is the difference between current capital stock and previous capital stock. That is net investment (I_t) is equal to changes in capital stock, ΔK_t.

$$I_t = \Delta K_t \quad (4.3)$$

Combining equation 4.2 and 4.3, the net investment function can be stated as:

$$I_t = \Delta(\varphi P_t Y_t C_t^{-1}) \quad (4.4)$$

And can be re-written and include the error term as:

$$I_t = \varphi_1 \Delta P_t + \varphi_2 \Delta Y_t - \varphi_3 \Delta C_t + U_t \quad (4.5)$$

4.3 Model Specification

Following Malik (2013) and Omojolaibi, Okenesi and Mesagan (2016) as well as the theoretical review, equation 4.5 is augmented with fiscal policy variables. This would enable the inclusion

of government expenditure as the interest variable and other macroeconomic variables such as debt and terms of trade to assess the classical-Keynesian crowding-out/crowding-in effects.

That is private investment can be written functionally as:

$$PI_t = \text{f}\,(TGE_t, TAX_t, DEBT_t, GDP_t, INT_t, INF_t, TOT_t) \quad (4.6)$$

Therefore equation 4.5 becomes:

$$PI_t = \varphi_0 + \varphi_1 TGE_t + \varphi_2 INF_t + \varphi_3 GDP_t + \varphi_4 INT_t + \varphi_5 TAX_t + \varphi_6 DEBT_t + \varphi_7 TOT_t + U_t \quad (4.7)$$

Where,

PI is private investment (Gross fixed capital formation, Private, % GDP), TGE is total government expenditure (% GDP), TAX is tax revenue (% GDP), DEBT is public debt (% GDP), GDP is real gross domestic product (GH¢' M), INT is the interest rate (end of year average T-bill), INF is the level of inflation (average period), TOT is terms of trade (% of GDP), μ is the random error term, φ_i are estimated coefficients and t is time (1,2, …T).

4.3.1 Data Sources

Data for the study was obtained from Bank of Ghana, Ghana Statistical Service, and World Development Indicators of the World Bank. Specifically, Total Government Expenditure, Tax Revenue, Total Public Debt, Gross Domestic Product, Interest Rate and Inflation data were taken from Bank of Ghana's Economic and Financial Data. Private Investment data were obtained from Ghana Statistical Service and Terms of Trade obtained from World Development

Indicators. The study period was chosen basically because of data availability. Specifically, the decomposition of total investment into private/public from the Ghana Statistical Service.

4.3.2 Description of Variables

The selection of independent variables for this study was based on economic theory and empirical studies. The explanatory variables obtained from the neoclassical investment theory are GDP, Inflation (prices), taxes and interest rate. Others are public debt and terms of trade (Openness). The measurement indicators of the explanatory variables as well their expected relationship with the dependent variable are briefly discussed below.

Private Investment: Capital formation by the private sector refers to growth in real assets, productive capital, creating and increasing the value of wealth (Abdullahi, Bakar & Hassan, 2016). That is private investment includes the acquisition of capital assets by the private individuals, that are expected to generate a stream of income and increase in value. Gross capital formation, private, as used to represent private investment is measured as a share of GDP. This measure has been used in various empirical studies by Sineviciene and Vasiliauskaite (2012)

Government Expenditure: Government policy objectives are best seen in its spending allocation and direction. The budgetary allocation to infrastructural and consumption expenditure goes a long way to determine the impact it has on economic growth through various macroeconomic variables. Private investment may be boosted by increasing the infrastructural base of the economy as quality and strong institutions that would ensure security and protect property rights. In this light, government expenditure is supposed to crowd in private investment in line with the Keynesian view. In line with policy objectives of the ERP, SAP, GPRS 1 and GPRS 2, this study

expects a positive relationship between government expenditure and private investment. Otherwise, a negative relationship would confirm the classical crowding-out theory of government expenditure.

Taxes: Taxes are non-voluntary payments made to the government without any direct return. According to the Neoclassical theory of investment, taxes are a cost to the private investor. Tax is a disincentive to investment because private investors paying high personal income tax as well as profit tax reduces their returns. Meanwhile, the government would also want to reduce its budget deficit in the face of rising government expenditure. The study uses government total tax revenue as a proxy. Although tax incentives may be used to promote private investment, this study expects a negative effect from taxes on private investment.

Public Debt: This is a control variable based on the argument of the Classical crowding-out hypothesis that, the government may borrow to fund its spending which may subsequently lead to crowding-out of private economic activity through high-interest rates. Domestic borrowing reduces credit to the private sector which may deprive private investment as well as accumulates public debt payable by future taxes. The government may pay a higher interest rate to secure loanable funds. Domestic banks may also want to avoid risk by lending more to the state and less to the private sector (Shetta & Kamaly, 2014). Borrowing externally can be a necessary evil for developing countries that need funds to bridge the gap between required capital and domestic savings. However, as Krugman (1988) opined, expected returns must be higher than the signed value of the loans. Thus external debt is supposed to complement the deficient domestic savings to ensure economic progress (Hunt, 2007). But due to the misapplication of these debts and its associated revenue shrinkage by debt servicing, external debt may crowd out private investment.

This study, therefore, expects a negative relationship between total public debt and private investment.

National Output/Income: Investment is a derived demand; to produce goods and services to meet demand. Therefore, higher national income from the previous year signals high expected profits to investors to increase production capacity to meet demand. The accelerator theory of investment argues that investment is directly proportional to output/income whiles the neoclassical theory argues a fractional increase. This implies that increases in national income or output leads to more private investment as both private savings and consumption increase. Due to the accelerator effect, the expected sign of national output/income as represented by real GDP is positive.

Interest rate: Interest rate represents the cost of acquiring capital funding to the private sector investor. Hence higher rates of interest in accessing loanable funds can reduce private investment. However, higher interest indicating greater returns on deposit or savings can increase private investment by making available more loanable funds. Thus, the effect of interest rate is ambiguous depending on whether the data support the neoclassical model or the Mckinnon-Shaw (1973) hypothesis. Given the direct trade-off between the state and the private sector on the credit market, this study uses the end-of-period average of the Treasury Bill as a proxy for interest rate. The expected sign is therefore ambiguous.

Price levels: Inflation is used as a proxy for general price levels as found in the neoclassical model of investment. Private investment thrives in a macro-economically stable economy. High levels of inflation signal loss of economic control by the state and present uncertainties that may defeat the crowding in benefits associated with other investment variables (Asante, 2000). It is

therefore expected that high rates of inflation reduce private investment as found in studies such as Akinlo and Oyeleke (2018); and Jalloh (2014). Hence, the expected sign is negative.

Terms of Trade (Openness): Trade openness reflects the extent of trade liberalization in the economy measured as net exports normalized by GDP. Trade openness is important in the private investment nexus because it can produce a mechanism for the inflow of capital and outflow of capital as well (Bibi et al., 2012). Also, the level and direction of terms of trade (exports-imports) can indirectly have favourable and unfavourable effects on private investment through the exchange (Ajide & Lawanson, 2012; Quattara, 2004). For instance, a depreciation of the local currency raises the cost of imports including capital and productive machinery which adversely affect private investment. Similarly, an appreciation of the local currency may promote private investment by reducing the cost of imported inputs. The net effect of trade openness trade (and liberalization), that allows for market system exchange rate regime and free capital mobility, is ambiguous.

4.3.3 Test for Nonlinear and Threshold Effect

To achieve the objective of finding the optimal level of government expenditure in the government expenditure-private investment nexus, the regression relation in equation 4.6 is written as:

$$PI_t = \alpha_0 + \alpha_1 X_t + \mu_t \qquad (4.8)$$

Where PI_t represents private investment at a time (t). X_t is a vector of independent variables including government expenditure, μ_t is the error term, and α_i is a vector of estimated coefficients.

4.3.3.1 Test for a non-linear relationship using Auto Distributed Lag Model (ARDL)

This method follows the approach by Pesaran et al. (2001) where an error-correction framework is used to both obtain short-run and long-run estimates in a single step. ARDL model is an extension of the ordinary least square model that can be applied for series with mixed order of integration. The ARDL approach has the advantage of yielding consistent estimates of the long-run coefficients that are asymptotically normal irrespective of whether the underlying regressors are I (1) or I (0). The model chooses a maximum number of lags that is sufficient for the data generating process. The ARDL estimation technique, through a linear transformation, produces a dynamic short-run error correction model (ECM) that captures the short-run dynamics together with the long-run relationship without losing long-run information. Moreover, the ARDL procedure is robust in small samples and makes it possible to estimate cointegration through ordinary least squares.

Previous empirical studies including Hermes and Lensink (2001) have attempted to evaluate the non-linear relationship between government expenditure and private investment using the quadratic specification (thus, including both the linear and quadratic term of government expenditure in the model as independent variables) in the ARDL model. Although the quadratic

specification gives a nonlinear relationship (U-shaped or inverted U-shaped) indicating the presence of a turning point, the actual point is not known.

Again, Haans and He (2016) opined that even though the quadratic term may be significant, it cannot be sufficient to establish a non-linear relationship because the linear term and quadratic term may be highly correlated. Moreover, to establish a non-linear relationship between government expenditure and private investment, the co-efficient of both linear and squared terms must be significant.

4.3.3.2 Modelling Government Threshold Effect on Private Investment

To evaluate the presence of nonlinearities in the government expenditure-private investment nexus, the study employs a Threshold Auto-regressive (TAR) model to estimate the threshold effect of government expenditure on private investment. This methodology was developed by Tong (1978) and which was later expanded by the works of by Tsay (1989) and Hansen (1997, 2000). TAR model is a suitable method used in investigating economic relationships that are affected by structural changes or regimes. It is a relatively simple model to specify, estimate, and interpret. The main idea behind this model, as noted in Aydin and Esen (2017), is to allow for the estimation of linear models for multiple regimes and ascertain whether there are differences in effect.

The study considers the two-regime TAR model to estimate the non-linear relationship between government expenditure and private investment as follows:

$$PI_t = \alpha_0 + \alpha_1 X_t \, I(GE < T) + \alpha_2 X_t I(GE \geq T) + \mu_t \qquad (4.9)$$

The threshold variable (GE) is total government expenditure, T is the threshold parameter, I(.) is a function that assumes 1 if the value of government expenditure is below the estimated threshold value. This technique allows for the division of the sample into two regimes depending on whether the threshold variable is above or below the estimated threshold. The different regimes are indicated by the slopes α_1 and α_2.

$$PI_t = \alpha_1 X_t + \mu_t \quad if\ GE_t < T \tag{4.10}$$

$$PI_t = \alpha_2 X_t + \mu_t \quad if\ GE_t \geq T \tag{4.11}$$

Where GE_t is the variable likely to cause regime change (or the regime splitting variable) and T is a value indicating the point of regime-switching (threshold value). Equation 4.11 represents the regime below the threshold and equation 4.11 represents the regime above the threshold.

However, because there is no a priori knowledge of the threshold value, it must be estimated together with some parameters represented by a dummy variable D,

$$D(T) = \begin{cases} D = 0\ if\ GE_t < T \\ D = 0\ if\ GE_t \geq T \end{cases}$$

4.3.3.3 Threshold Identification

Given the threshold variable and the linear specification, we estimate the threshold value and the parameters of the TAR model using non-linear least squares as a natural approach for estimation and the optimal threshold value is the value at which the residual sum of squares (SSR) is minimized.

In that regard, the first step in obtaining the threshold requires that equation 4.9 is estimated using OLS. The Sum of Squared Error (S_1) for all values of the threshold variable is calculated as:

$$S_1(T) = \hat{\mu}(T)'\hat{\mu}(T)$$

The threshold parameter is then obtained by minimizing the sum of squared error, S_1 such that:

$$\hat{T} = argminTS_1(T)$$

That is the first step to estimating equation 4.9 is to test for linearity relying on the null hypothesis that $\alpha_1 = \alpha_2$ against the threshold model. Inferences are made relying on the Lagrangian Multiplier (LM) statistic for potential value through bootstrapping whose properties and validity are checked (Hansen, 1997). The standard process of hypothesis testing cannot be used, because, under the null hypothesis of no threshold effect, the threshold parameter T will be unidentified. Hansen (1997) therefore suggests a standard heteroscedasticity-consistent Lagrange Multiplier (LM) bootstrap method to ascertain the asymptotic critical value and the p-value. Thus, Hansen (1997) shows that through the bootstrap, p-values asymptotically valid since it achieves the first-order asymptotic distribution

4.3.3.4 Test for Threshold Significance

To properly examine any possible threshold effect of government expenditure—private investment nexus, a test must be conducted to ensure that the existence of the threshold is statistically significant. The test for threshold significance compares the slopes of the two regimes (α_1 and α_2).

The null hypothesis states that the slope coefficient of the regimes is equal hence there is no threshold effect. That means that the relationship is linear.

$$H_o: \alpha_1 = \alpha_2$$

$$H_a: \alpha_1 \neq \alpha_2$$

The alternative hypothesis also states that there are significant differences in the two slopes across the two regimes. Hence, there is a nonlinear relationship or there is a threshold effect.

We test the statistical significance of $H_o: \alpha_1 = \alpha_2$ using the likelihood ratio (LR) test. Hansen (1996) proposes a bootstrap procedure of likelihood ratio test as:

$$LR_1(T) = \frac{S_1(T) - S_1(\hat{T})}{\delta^2}$$

Where $S_1(T)$ and $S_1(\hat{T})$ is the sum of squared residuals under $H_o: \alpha_1 = \alpha_2$ and $H_a: \alpha_1 \neq \alpha_2$ respectively. Under large LR values, T is statistically significant where its reliability is examined by setting an asymptotic confidence interval (c) within which it falls.

4.4 Pre-Estimation Test

Evaluating the relationship between macroeconomic variables can be associated with some problems that need to be addressed to present results that are underpinned economically. Macroeconomic variables have the tendencies to change either downwards or upwards over time and hence may present trends rather than economic relationships. Consequently, two or more variables may establish a long-run relationship even though they may both be non-stationary. It

is therefore imperative to test for unit root as well as test for the existence of cointegration among the variables used in this study.

4.4.1 Unit Root Test

To establish any meaningful relationship between two or more variables, it is important to ensure that the future does not vary substantially from the past (Stock & Watson, 2011). This implies variables should be stationary such that their probability distribution does not change over time. Many macroeconomic time series usually exhibit non-stationary nature where it is difficult for the variables to return to the long-run path and varies with time. This problem makes results unreliable and hence tests must be conducted to ascertain its presence and make the necessary corrections. The Augmented Dickey-Fuller test and Philips-Perron test to perform the unit root test.

4.4.1.1 Augmented Dickey-Fuller (ADT) Test

Dickey and Fuller (1979) introduced the basic unit root test model as

$$X_t = \alpha_0 + \alpha_1 X_{t-1} + \delta t + \varepsilon_t \quad (4.12)$$

$$\Delta X_t = \alpha_0 + \vartheta_1 X_{t-1} + \delta t + \varepsilon_t \quad (4.13)$$

Where X_t is the time series being tested, $\vartheta_1 = \alpha_1 - 1$, $\Delta X = X_t - X_{t-1}$, Δ is the first difference, t is the time trend and ε_t is the error term. Hence equation (4.12) represents the level form of the time series whiles the difference form is given by equation (4.13). When the coefficient of X_{t-1}

(α_1 & ϑ_1) are zero, then the series are non-stationary. The Dickey-Fuller test however does not address any possible autocorrelation in the dependent variable.

The Augment Dickey-Fuller (ADF) test allows for higher-order autoregressive processes thereby resolving these setbacks. The addition of ith lags of the dependent variable helps absorb the white noise and any autocorrelation present. The ADF model is stated as:

$$\Delta X_t = \alpha_0 + \vartheta_1 X_{t-1} + \sum_{i=1}^{k}(\vartheta_i X_{t-i}) + \delta t + \varepsilon_t \quad (4.14)$$

From equation 4.14, the following hypotheses are tested:

$H_0: \vartheta = 0, X_t\ has\ unit\ root\ (nonstationary)$

$H_1: \vartheta < 0, X_t\ has\ unit\ root\ (stationary)$

The null hypothesis states that the series contains unit root or is not stationary. The alternative hypothesis also states that there is no unit root hence the series are stationary. One problem about the unit root test that is not resolved by economic theory is the inclusion or exclusion of time trends. Hansen and King (1998) argue that the ADF test should include time trends whiles McKoskey and Selden (1998) do not find any necessity in including time trends in unit root testing. However, some variables may evolve around a trend whiles others may not.

4.4.1.2 Phillips-Perron Unit Root Test

Similar to the ADF test, the Philip-Perron test for unit root also addresses the problem of higher autocorrelation. However, this approach makes a non-parametric correction to the t-statistic,

addresses issues of autoregressive heteroscedasticity and serial correlation as well (Philips & Perron, 1988). Hence the Philip-Perron unit test is more robust and augments the ADF method.

4.4.1.3 Zivot-Andrews (ZA) test for Structural Breaks

Another type of nonstationarity occurs when there is a structural break that distorts the series. Microeconomic and macroeconomic policies implemented over the years, changes in the structure of the economy as well as sectorial interventions may be some major sources of structural breaks in macro data. Estimated results from these breaks only depict the average between the two periods (Stock & Watson, 2011). Unit root testing with ADF and Philip-Perrons does not account for possible structural breaks. The Zivot-Andrew (1992) test addresses this problem; by considering the presence of a structural break and determining the break date endogenously. By assuming that breaks happen gradually, ZA tests for unit root by allowing for a single break in both intercept and trend.

The following models are tested accordingly:

I. Single break in intercept

$$\Delta X_t = \alpha_0 + \vartheta_1 X_{t-1} + \beta DI_t + \sum_{i=1}^{k}(\vartheta_i X_{t-i}) + \delta t + \varepsilon_t \quad (4.15)$$

II. Single Break in trend

$$\Delta X_t = \alpha_0 + \vartheta_1 X_{t-1} + \sigma DT_t + \sum_{i=1}^{k}(\vartheta_i X_{t-i}) + \delta t + \varepsilon_t \quad (4.16)$$

III. Single break in both intercept and trend

$$\Delta X_t = \alpha_0 + \vartheta_1 X_{t-1} + \beta DI_t + \sigma DT_t + \sum_{i=1}^{k}(\vartheta_i X_{t-i}) + \delta t + \varepsilon_t \quad (4.17)$$

Where DI is a dummy that represents possible breaks that shift the intercept and DT is representing trend shift.

The hypothesis testing for three equations is given as:

$H_0: \vartheta = 0, X_t$ *has a unit root with a trend and no structural break*

$H_1: \vartheta < 0, X_t$ *is trend stationary with a single structural break*

The null hypothesis for equations (I-III) is $\vartheta = 0$ indicating a trend with no structural breaks. The alternative hypothesis also states $\vartheta < 0$ implying a trend-stationarity with a single structural break at each possible breakpoint.

4.4.2 Cointegration Test

Two or more variables may be non-stationary yet, produce a long-run relationship. Intuitively, these economic variables would never converge but the difference between them assumes a stable trend that suggests they are related in the long run. That is two unrelated variables with the same stochastic trend may seem validly related. It is important therefore to examine whether the variables are cointegrated (despite testing for unit root) to capture information on their long-run equilibrium, validly interpreting coefficients as long-run multipliers (Johansen, 1988). This is because the levels of these variables may be drifted apart temporarily by external forces, but they would eventually revert to their long-run path. Otherwise, no economic relationship exists between them.

The ARDL bounds test approach would be used to test for the long-run relationship among the variables. ARDL bounds test for cointegration is superior and produces consistent results for

small sample (Pesaran et al., 2001). That is, it is more robust for small sample size which is ideal for this study. Moreover, this approach can be used irrespective of whether the series are I(0) or I(1). Additionally, this technique reduces the likelihood of the problem of endogeneity. This is because each variable stands as a single equation or they are taken as endogenous, hence there is no residual correlation (Nkoro & Uko, 2016).

The test is conducted with the following framework:

$$\Delta Y_t = \alpha_0 + \sum_{i=1}^{m} \alpha_{2i} \Delta Y_{t-i} + \sum_{i=1}^{n} \alpha_{3i} \Delta X_{t-i} + \alpha_4 Y_{t-1} + \alpha_5 X_{t-1} + \mu_t \qquad (4.18)$$

Where the bound test is evaluated under the following hypothesis:

Ho: $\alpha_1 = \alpha_2 = \alpha_3 = 0$

Ha: $\alpha_1 \neq \alpha_2 \neq \alpha_n \neq 0$

The null hypothesis states that there is cointegration whereas the alternative states that there is no cointegration among the variables. Hence, there is no long-run relationship among the variables when the null hypothesis is rejected. The F-statistic is compared with the critical values given by Pesaran et al. (2001).

4.5 Post-Estimation Tests

In order to ensure that the estimates obtained and interpreted are robust and meet the standard econometric procedures, some post estimation diagnostic tests would be conducted. These tests would check whether there is serial correlation and whether the model applied is correctly specified and stable. Other test include heteroscedasticity and normality test.

4.5.1 Test for Serial Correlation

The Breusch-Godfrey test (by Godfrey 1978) for serial correlation will be used to examine if different lags of the residuals are correlated. Serial correlation affects the efficiency of the regression estimators which also can affect the standard errors which invalidate the significance tests leading to wrong inferences being made. The model of the residuals under the Breusch-Godfrey test is given as:

$$\epsilon t = \epsilon t{-}1\rho + \quad , \mu t \sim (0, \sigma\mu\, 2)$$

The test comprises of the following null and alternative hypotheses:

$$Ho: \rho = 0$$

$$H1: \rho \neq 0$$

Where the null hypothesis states that there is no serial correlation as against the alternative that there is serial correlation in the model.

4.5.2 Test for Heteroskedasticity

Efficient co-efficients are those whose error terms have a constant variance. In that sense, they are said to be homoscedastic. Testing for the presence of heteroskedascity is important because its presence would lead to incorrect inference of the estimated co-efficients. Additionally, the model would suffer from the least variance of unbiased estimates if the model is not homoscedastic.

4.5.3 Normality test

The non-normality of the residuals may result in problems associated with the statistical inference of the coefficient estimates such as significance tests and confidence intervals that depend on the assumption of normality (Brooks, 2014). This study will use the Jarque-Bera test for normality in the residuals.

4.5.4 Stability Test

The stability of the coefficients are tested using the Cumulative sum of the recursive residuals (CUSUM) and Cumulative sum of squared recursive residuals (CUSUMSQ) tests proposed by Brown et al. (1975). Both tests are graphical in nature, where the residuals are modified recursively and plotted against the 5 percent significance level breakpoints. The rule of thumb is that the coefficients are stable if the plot of the CUSUM and CUSUMSQ lie within the 5 percent significance level.

4.5.5 Regression Specification Error (Functional form) Test

The Ramsey Regression Error Test (RESET) (Ramsey, 1969) will be used to test if the non-linear combinations of the fitted values can explain the dependent variable. The model is said to be misspecified if a non-linear combination of the fitted values can explain the dependent variable

4.5.6 Granger Causality Test

When two variables A and B are cointegrated, then there may be one of the following relationships between them. Either A affects B; B affects A or A and B affect each other. Where the first two effects show a unidirectional relationship whiles the latter shows a bidirectional relationship between the variables. This reinforces the argument that if two or more variables are not cointegrated, then they are independent of each other (Shrestha & Bhatta, 2017). Granger (1969) developed a causality test technique to identify such relationships. Where, when current and lagged values of A increase the predictive power of future values of B, we can say that A "Granger causes" B.

The Granger causality test for private investment and government expenditure can be specified as:

$$\Delta PI_t = \sum_{i=1}^{n} \alpha_i \Delta PI_{t-i} + \sum_{j=1}^{n} \beta_j \Delta LTGE_{t-j} + u_{1t}$$

$$\Delta LTGE_t = \sum_{i=1}^{n} \gamma_i \Delta LTGE_{t-i} + \sum_{j=1}^{n} \vartheta_j \Delta PI_{t-j} + u_{2t}$$

The equations above test the causality between government expenditure and private investment where the current values of private sector investment are related to its past values and the past

value of government expenditure. Similarly, current levels of government expenditure are related to its past values as well as past values of private investment.

The hypothesis to be tested is given as:

Ho: $\beta_j = 0$ (TGE does not Granger cause PI)

Ha: $\beta_j \neq 0$ (TGE Granger cause PI)

and Ho: $\vartheta_j = 0$ (PI does not Granger cause TGE)

Ha: $\vartheta_j \neq 0$ (PI Granger cause TGE)

A unidirectional relationship exists when one of the null hypotheses is rejected. When both null hypotheses are rejected, then there is a bidirectional relationship. However, when we fail to reject both null hypotheses, then there is no causality between the variables.

4.6 Conclusion

This chapter presented the Neo-classical theory of investment as the theoretical framework for this study. The variables to be considered (government expenditure, GDP, inflation, interest rate, taxes, debt and terms of trade) were briefly explained with their expected relationships spelt out as well as the source of data for this study. Also, a few pre-estimation tests including unit root test and cointegration were discussed.

CHAPTER FIVE

ESTIMATIONS AND DISCUSSION OF RESULTS

5.1 Introduction

This chapter presents descriptive statistics of the variables as well as results from the unit root test and cointegration test. The threshold estimation results would also be presented and discussed. Further, some post-estimation model diagnostic tests including stability, serial correlation and others would be presented. The analysis is carried out using E-views 2010.

5.2 Descriptive Statistics

The descriptive statistics presented in Table 5.1 depict measures of central tendency and dispersion such as the standard deviation, median and mean. Other highlights such as the maximum, minimum skewness, Jarque-Bera and kurtosis are also included. From Table 5.1 below, the total number of observations for all the variables is thirty-five (35). For the period under consideration, the average value of private investment is 11.73 which is close to the median of 12.3.

The maximum value for the data sample is from GDP with a maximum of GH¢ 154,547million whiles the minimum value for the sample is inflation with a minimum of 0.407362. All variables, except total government expenditure and terms of trade, have a positive skewness indicating that it has a long right tail with higher values than the sample mean.

Table 5.1 Descriptive Statistics of raw data from 1984-2018 (Sample=35)

	PI	TGE	GDP	INT	INF	TAX	DEBT	TOT
Mean	11.73	14.52	64,737	23.42	20.92	33.99	54.32	68.69
Median	12.31	13.87	54,775	21.96	17.15	23.77	51.04	70.01
Max	24.33	22.11	154,547	42.77	59.46	103.55	111.95	116.05
Min	2.01	6.31	6,779.83	9.90	0.41	0.57	16.24	18.81
Std. Dev	5.77	4.89	42,739	9.25	12.53	25.32	21.71	23.54
Skewness	0.03	-0.06	0.50	0.56	1.11	1.19	0.41	-0.09
Kurtosis	2.24	1.87	2.30	2.43	4.07	3.52	2.80	2.49
Jarque-Berra	0.86	1.89	2.15	2.29	8.83	8.70	1.03	0.42
Prob.	0.65	0.39	0.34	0.32	0.01	0.01	0.60	0.81

Source: Author's computation from E-views 10

The kurtosis values for private investment, total government expenditure, GDP, debt, terms of trade and interest rate (i.e. 2.24, 1.87, 2.30, 2.80, 2.49 and 2.43 respectively) are platykurtic and they mirror a normal skewness because they are less than three (< 3). Taxes and inflation with kurtosis values of 3.52 and 4.07 respectively, on the other hand, are greater than three (> 3) and are leptokurtic meaning that they are positively skewed with a long right tail. The Jarque-Bera statistic which measures the difference of the skewness and kurtosis of the series with those from a normal distribution indicates that private investment, total government expenditure, GDP, debt, terms of trade and interest rate are normally distributed whiles the rest of the variables are not normally distributed.

5.3 Pre-Estimation Tests

5.3.1 Unit Root Test

To estimate the relative effects of the mode financing government expenditure on private investment, it is required to ascertain the order of integration of the variables being considered. That is, following Pesaran et al. (2001), it is important to conduct a stationarity test to ensure the variables are I(0), I(1) or a combination. The Augmented Dickey-fuller (ADF) and Phillips-Perron (PP) tests were employed. The results of the unit root test are presented in tables 5.2 and 5.3

Table 5.2 Augmented Dickey-Fuller (ADF) and Philip-Perron (PP) Test (AT LEVELS)

	ADF			PP			ORDER
Variable	Test stat	5%	P-Value	Test Stat	5%	P-Value	
PI	-1.90	-2.95	0.3281	-1.65	-2.95	0.4437	
TGE	-0.9034	-2.954	0.7745	-2.9245	-3.5484	0.1678	
TAX	-1.9887	-3.568	0.5837	-2.1868	2.9511	0.2145	
DEBT	-2.9633	-3.595	0.1607	-2.151	-3.55	0.5004	
LGDP	-2.21	-3.55	0.4674	-2.01	-3.55	0.5727	
INF	-4.23	-3.56	0.0110	-4.01	-3.55	0.0177	I(0)
INT	-2.53	-3.55	0.3134	-2.25	-2.95	0.1958	
TOT	-1.953	-3.55	0.6048	1.955	-3.55	0.4125	

Source: Author's computation from E-views 10

Table 5.3 Augmented Dickey-Fuller (ADF) and Philip-Perron (PP) Test (At First Difference)

	ADF			PP			ORDER
Variable	Test stat	5%	P-Value	Test Stat	5%	P-Value	
PI	-7.44	3.55	0.0000	-11.21	-3.55	0.0000	I(1)
TGE	-7.0604	-3.55	0.0000	-7.0592	-3.55	0.0000	I(1)
TAX	-5.27	-3.58	0.0011	-9.0164	-3.55	0.0000	I(1)
DEBT	-5.06	-3.55	0.0013	-4.567	-3.55	0.0048	I(1)
LGDP	-5.88	-3.55	0.0002	-6.07	-3.55	0.0001	I(1)
INT	-6.55	-3.55	0.0000	-6.83	-3.55	0.0000	I(1)
TOT	-5.904	-3.55	0.0002	-6.0736	-3.55	0.0001	I(1)

Source: Author's computation from E-views 10

The null hypothesis of both ADF and PP tests states that the series has a unit root while the alternative hypothesis states that the series has no unit root. The Mackinnon (1996) critical values, as well as the probability values, are used as the benchmark in rejecting or failing to reject the null hypothesis. Hence from the results in table 5.2, all variables were non-stationary at levels except inflation which was stationary at levels. The other variables that were non-stationary at levels were tested at their first difference. Using the same test and hypothesis, results in table 5.3 indicate they all become stationary at their first difference.

5.3.2 Zivot-Andrews Test for Structural Breaks

The Zivot-Andrew (1992) test for unit root tests the null hypothesis of a unit root with a trend with no structural break against the alternative hypothesis of a trend stationary process with a structural break. The result for the Zivot-Andrew unit root test is presented below.

Table 5.4 Zivot-Andrew Test (levels)

Variable	Test Stat	1%	5%	10%	P-value	Break Date
PI	-5.4838**	-5.57	-5.08	-4.82	0.0107	2007
TGE	-3.5162	-5.57	-5.08	-4.82	0.1026	2009
LGDP	-2.8287	-5.57	-5.08	-4.82	0.8705	2007
INT	-4.5992	-5.57	-5.08	-4.82	0.1601	2002
INF	-5.2353	-5.57	-5.08	-4.82	0.1813	1995
TAX	-4.8058	-5.57	-508	-4.82	0.1101	1997
DEBT	-4.1221	-5.57	-5.08	-4.82	0.5233	2004
TOT	-4.4814	-5.57	-5.08	-4.82	0.5708	2006

NB: *, ** and *** denotes significance at 10%, 5% and 1% respectively
Source: Author's computation from E-views 10

From the table above, it can be seen that the null hypothesis of a unit root without a structural break is not rejected for total government expenditure, log of GDP, interest rate, inflation, tax and debt. However, the null hypothesis of unit root without a structural break is rejected at a 5% significance level for private investment. The structural break in private investment can be said to have occurred as a result of the implementation of the Ghana Poverty Reduction Strategy (GPRS I) as well as the Growth and Poverty Reduction Strategy (GPRS II) in 2003 and 2005 respectively. The primary objective of these programmes was to create an enabling environment for high private sector productivity. This was done through improving the general infrastructural base in the economy including expanding access to quality education and health, reliable energy and road networks.

Given that the Zivot-Andrew test indicates that private investment (dependent variable) undergoes a structural break in 2007, the dummy variable $\alpha_8 DUM_{2007}$ is introduced in equation 4.4 to account for the structural break. The dummy variable $\alpha_8 DUM_{2007}$ takes a value of zero (0) from 1983-2007 and one (1) from 2008 to 2018.

5.3.3 Cointegration Results from ARDL F-Bound Test

The long-run F-Bounds test was used to examine whether there exists any long-run relationship between the variables. The null hypothesis of this test states that there is no levels relationship between the variables. The alternative hypothesis also states that there is a long-run relationship among the variables. When the F-statistic is greater than the upper bound critical value, I (1), then we reject the null hypothesis and accept the alternative that there is a long-run relationship among the variables. Otherwise, we fail to reject the null hypothesis that there is no long-run relationship between the variables if the F-statistic is lesser than the lower bound critical value, I (0).

Table 5.5 Cointegration test using the ARDL F-Bound test

Sign. Level	Lower Bound I(0)	Upper Bound I(1)	F-Statistic
10%	2.38	3.45	5.400931
5%	2.69	3.83	
2.5%	2.98	4.16	
1%	3.31	4.63	

Source: author's computation using E-Views 2010

The F-Statistics in the table is greater than the upper bound at 10%, 5% and 1% significance levels. The results, therefore, show that the null hypothesis is rejected. That is we accept that there is a long-run relationship among the selected variables.

5.4 Threshold Auto-Regressive (TAR) Model Results

5.4.1 Test for Existence of Threshold Effects

Before discussing the results, it is important to test the existence of a significant threshold effect of government expenditure on private investment as well as determine the direction of causality between them.

Table 5.6 Threshold Identification Test

Null Hypothesis	F-Stat	Bootstrap P-Value	No. of bootstrap replications	Trimming percentage
No Threshold	13.99***	0.0000	1,000	0.15
One Threshold	5.67154	0.1415	1,000	0.15

NB: *, ** and *** denotes significance at 10%, 5% and 1% respectively
Source: Author's computation from E-views 10

Table 5.6 presents the test results for the threshold effects with government expenditure as the threshold variable. The results of the threshold test and asymptotic p-values are obtained through 1,000 bootstrap replications to correct the standard errors of the estimates. We first need to examine the existence of a threshold effect. The value of F statistics is 13.99 with bootstrap p-value 0.0000. Therefore, the null hypothesis that there is no threshold is rejected at the 1 percent

significant level, suggesting one threshold at least. However, in examining whether there exists more than one threshold, the null hypothesis of one threshold cannot be rejected. This is because the test shows an insignificant bootstrap p-value, 0.1415. Therefore, the test procedure implies one threshold. Also the 95 percent asymptotic confidence region is significant and given as (12.51, 13.87). This shows the preciseness of the threshold estimates.

5.4.2 TAR model results

The results from the TAR model examining the effects of government expenditure below and above the threshold are presented in table 5.7 below.

The threshold value of government expenditure as shown is 13.38% of GDP. The study finds a negative and significant effect of government expenditure on private investment below the threshold value. The results further indicate that government expenditure below the threshold crowds-out private investment. Below the threshold, every 1% increase in government expenditure leads to a fall in private sector investment by 1.42%. However, when government expenditure is above the threshold value, there is a crowding-in effect on private investment. The study finds a positive and statistically significant coefficient of 0.488 at a 10 percent level above the threshold. This implies that every 1% increase in government expenditure that occurs above the threshold leads to an increase in private investment by 0.49%.

Table 5.7 TAR model results

Threshold Variable: Government Expenditure	Co-efficient	Prob.
Threshold (T)	13.38	
TGE < T	-1.42	(0.0099)***
TGE ≥ T	0.488	(0.0927)*
Non-Threshold Variables		
Log of GDP	3.143	0.0256**
Inflation	-0.012	0.8904
Interest Rate	0.1533	0.0999*
Trade Openness (Terms of Trade)	0.0828	0.0313**
Tax	-0.060	0.2145
Debt	-0.021	0.5669
Dummy	0.024	0.1475
R-Squared	0.875	
Adjusted R-squared	0.831	
95% Confidence Interval	(12.51, 13.87)	

NB: *, ** & *** denote significance level at 10%, 5% and 1% respectively
Source: Author's computation from E-Views 2010

Implicitly, the result shows a U-shaped relationship between government expenditure and private investment. Where low levels of government expenditure exert a negative impact on private investment up to a point (in this case the threshold value) and begin to promote private sector investment. This can partly be attributed to the low capital budgetary allocation over the years. Available data reveals low levels of financial resources allocated as development expenditure (BoG, 2020). Between 1984 and 2018, total government expenditure allocated to capital spending averages 23.6% while for the same period, recurrent expenditure as a share of total

government expenditure averages 76.4%. However, Mo (2007) argues that the reallocation of government consumption spending to the provision of public infrastructure can lead to better growth of real GDP although both can boost private investment. The private sector thrives on the provision of public capital such as an effective transport system (including the ports and habour, railway, road and aviation) for the movement of goods and services, human resources and physical machinery. Good health infrastructure like hospital and clinic facilities adequately equipped with the appropriate health equipment and educational infrastructure to train the needed human capital to ensure private sector efficiency. But because the allocation to the infrastructural provision is low, less social capital would be provided to promote private sector participation. This means that it would take so many years before government expenditure can exert a positive influence on private investment.

Another set of a cause that might impede government expenditure is a set of non-economic reasons such as corruption, rent-seeking, maximization of personal and political interest. According to Bernauer and Koubi (2013), huge government consumption expenditure (largely made up of public wage bill) indicates that government size is large and a conduit for corruption because it increases bureaucracies. In effect, sub-standard public goods and services are produced which do not reflect the volume of state funds used. The government is then forced to spend huge sums of funds in the fight against these negative practices at the expense of providing infrastructure. In the end, it makes no impact in promoting private sector participation just as Aydin and Edin (2019) argues that such activities increase the cost of doing business, distort the operation of the market system, and ultimately discourage private investments.

Additionally, maximization of political interest where state projects are abandoned because there have been changes in government also leads to wastages of government expenditure. For instance, the Auditor General report for 2020 shows that government of Ghana paid over GH¢60million in interest accrued over delayed contract payments of roads in Accra only (GAS, 2021). According to the report, this amount could pay for three kilometers of the road, but was wasted on just one.

About interest rate, the study revealed a positive and significant relation with private investment. With a co-efficient of 0.15, every 1 percent increase in interest rate increases private investment by 0.15 percent at a 10 percent level of significance. This result indicates that government domestic debt does not crowding-out private investment through the financial market but rather, the McKinnon and Shaw (1973) hypothesis of higher interest rate inducing investment is confirmed. This hypothesis argues that a higher interest rate (which is the returns on saving) encourages more savings. Increased savings also means that more domestic credit is made available for the private sector. It has been empirically shown that more private sector credit crowds in private investment in Ghana (Asante, 2000; Frimpong & Marbuah, 2010). Hence the crowding-in effect of interest rate conforms to studies such as Frimpong and Marbuah (2010) but differ with results from studies such as Jalloh (2014) who found a negative and significant relationship between interest rate and private investment in Sierra Leone.

The co-efficient of trade openness represented by terms of trade is 0.08, positive and significant at a 5 percent level of significance. This means that opening the economy up for trade globally promotes private investments in Ghana since every 1% increase in terms of trade leads to a rise in private investment by 0.08%. The implementation of liberal trade policies (under ERP and SAP) championed by the IMF and World Bank ensured the use of flexible exchange rates, tariff adjustments and reduction of state control on the exchange rate market (Laryea & Akuoni, 2012). Free capital mobility also ensures that external funding in the form of foreign direct investment is used to support the domestic private sector. This study thus supports findings by Asante (2000) but is inconsistent with Bibi et al. (2012) and Quattara (2004) who found that trade openness (terms of trade) harms private investment in Pakistan and Senegal respectively.

The coefficient of log of GDP is 3.143, positive statistically significant at 5 percent level. Thus for every 1 percent increase in GDP, private investment increases by 0.03 percent. The positive sign is consistent with economic theory, specifically the neoclassical theory of investment. Hence demand conditions are significant in promoting private investment in Ghana. This result confirms previous studies on Ghana (Asante, 2000; Frimpong & Marbuah, 2010).

As expected, the coefficient of inflation is negative but not statistically significant. This indicates that macroeconomic stability is crucial to promoting private sector investment in Ghana. Higher rates of inflation signal less government control of the economy and breeds uncertainty which does not encourage private sector participation. Profitability is a key determinant in private sector participation in every economy and hence an indicator that threatens profit discourages

private investment. The negative relationship is supported by a similar study in Sierra Leone by Jalloh (2014). In Nigeria however, Akinlo and Oyeleke (2018) found a positive statistically significant relationship between inflation and private investment where can be viewed as higher prices attracting existing and new investors to expand to enjoy more profit.

The dummy variable added did not have any effect on the results because it was found to be insignificant.

5.5 Post-Estimation Tests

The diagnostic and stability test results in table 5.8 show that the TAR model passes the tests for serial correlation, functional form, normality and heteroscedasticity. The decision rule for these tests states that we fail to reject the null hypothesis if the probability value is greater than the significant levels at 10 percent, 5 percent or 1 percent.

Table 5.8 Diagnostic and Stability for TAR model

TEST	F-STATISTIC	PROB.
Breusch-Godfrey Serial Correlation LM Test	0.7428	0.4869
Heteroscedasticity Test: ARCH	1.4897	0.2312
Functional Form (x^2_{Ramsey})	0.0001	0.9780
Jarque-Bera Normality Test	0.1015	0.9505
CUSUM	Stable	
CUSUM SQUARED	Stable	

NB: *, ** & *** denote significance level at 10%, 5% and 1% respectively
Source: Author's computation from E-Views 2010

It can therefore be concluded that there is no residual serial correlation, heteroscedasticity, misspecification of the functional form and non-normal errors. The CUSUM and CUSUMsq plot in Figures 5.1A and 5.1B below indicates the stability of parameters at a 5 percent significance level.

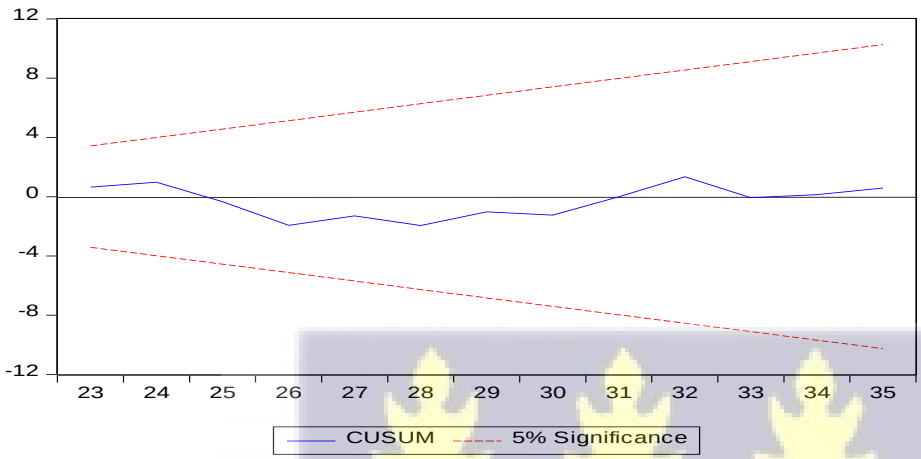

Figure 5.1A Plot of Cumulative Sum of the long-run model

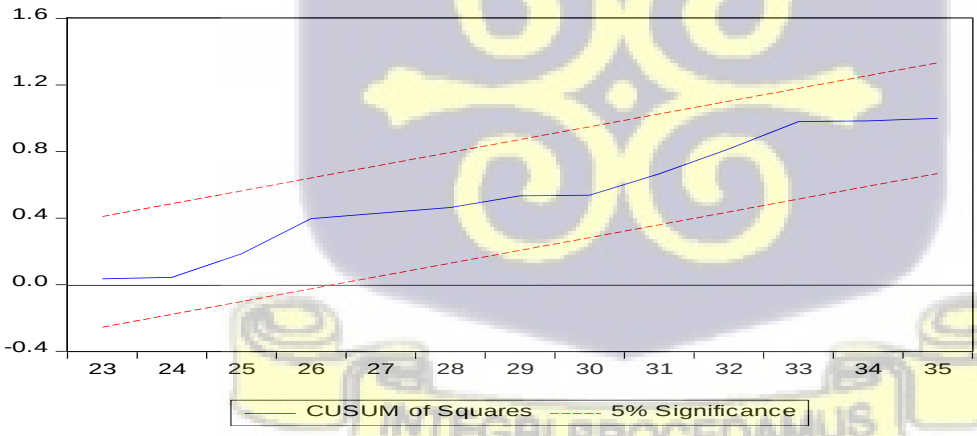

Fig 5.1B Plot of Cumulative Sum of Squares Residuals of the TAR model

Granger Causality Test

The Granger causality test is used to identify the direction of causality between private investment and government expenditure. Results from the test are presented in Table 5.9.

Table 5.9 Granger causality between Private investment (PI) and Government Expenditure (TGE)

Null Hypothesis	F-Statistic	Prob.	Decision
TGE does not Granger cause PI	4.47730	0.0206**	Unidirectional
PI does not Granger cause TGE	1.67154	0.2062	

NB: *, ** and *** denotes significance at 10%, 5% and 1% respectively
Source: Author's computation from E-views 10

The results from table 5.9 show that the null hypothesis of government expenditure does not cause private investment to be rejected at a 5 percent level of significance. This means that government expenditure has serious implications on private sector development. However, we fail to reject the null hypothesis that private investment does not granger cause government expenditure since the probability value is more than 5 percent. Hence, the conclusion is that there is a unidirectional causality between private investment and government expenditure (from government expenditure).

5.6 Conclusion

This chapter presented the outcome of the government expenditure and private investment nexus using the Threshold Autoregressive (TAR). A non-linear relationship (in the form of a U-Shape) between government spending and private investment was found. A threshold value (indicating

the turning point) of 13.38% of government expenditure was obtained. The study found that, increases in government expenditure below the threshold value crowded-out private investment. However, a positive change in government expenditure above the threshold crowds-in private investment.

This reveals that lower levels of government expenditure do not promote private investment in Ghana. Low levels of capital budget allocation, discontinuation of government projects when there are changes in the government as well as corruption and rent-seeking are some reasons for this occurrence. The presence of these factors creates a situation where more public funds need to be spent before public investment can make any meaningful impact on the private investment decision-making process since private investment largely depends on public infrastructure to thrive.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This chapter presents a summary of the study including the highlights of the main findings. Recommendations, as well as areas for future studies, are presented.

6.2 Summary and Conclusion

The nature of the relationship between government expenditure and private investment has been investigated widely yet remains inconclusive. This study departs from the study of relationships to determine the optimal government expenditure needed to promote private investment in Ghana. The main objective of this study was to investigate the presence of non-linearities (threshold effect) of government expenditure on private investment in Ghana for the period 1984 to 2018. The implementation of policies such as Economic Recovery Programme (ERP) in 1983, Structural Adjustment Programme (SAP) in 1987, Ghana Poverty Reduction Strategy (GPRS I) in 2003, and Growth and Poverty Reduction Strategy (GPRS II) in 2006 as well as the National Policy on Public-Private Partnerships (NPPPP) in 2011 signalled the state's pursuance of increased private sector participation. Similarly, there has been some institutional establishment including the Ghana Investment Promotion Agency (GIPC) was created in 1994 to lead efforts in encouraging private sector investment. Moreover, whiles the Multilateral Investment Guarantee Agreement (MIGA) signed with the World Bank in 1988 sort to woe external investors by reducing risk, the introduction of the Financial Sector Adjustment Programme (FINSAP) in 1989 was to ensure a more liberalized financial sector with more access to credit.

The theoretical proposition of Keynesian crowding-in effect argues that government can use a combination of its fiscal policy tools to affect economic changes. The theory predicts that public spending in productive sectors that increases social capital and reduces the cost of doing business, crowds-in private sector investment. Reducing taxes ensures more after-tax profit as well as increases consumer purchasing power, which may lead to more demand and cause more investment. The Classical proposition of crowding-out however states that government involvement in the economic activities using its fiscal tools substitutes for the private sector. That is government spending and taxes rather discourage than promote private sector investment. Consistent with theory, empirical studies attempting to investigate the government spending-private investment nexus have been inconclusive. Moreover, there is no concrete study in Ghana that analyses the effect of total government expenditures on private investment.

This study examined the effect of government expenditure on private investment in Ghana using annual time series data from 1984 to 2018. The study employed the Threshold Autoregressive (TAR) model to ascertain the optimal level of government expenditure necessary to promote private investment. Further Granger causality test as developed by Granger (1969) was used to examine the direction of causality between private investment and government expenditure. The stationarity test was conducted using the Augmented-Dickey Fuller test and Phillip-Perron Test. Results showed that all variables were stationary at first difference except inflation and tax revenue which were stationary at levels.

The main finding of this study based on the threshold analysis conducted revealed that the optimal level of government expenditure as far as private investment is concerned is 13.38%.

Specifically, crowding-out of private investment occurs when government expenditure is below the threshold. Government expenditures above the threshold value produce a crowd-in effect on private investment. Implicitly it implies that there is a U-shape relationship between government expenditure and private investment in Ghana. This indicates that any increase in government expenditure at lower levels reduces private investment. Hence, the Classical theory of crowding-out effect from government expenditure is confirmed for lower levels of government spending. Also, government expenditure equal to or greater than 13.38% of GDP promotes private sector investment. Thus, the Keynesian hypothesis is confirmed only after government expenditure has attained a minimum value of 13.38%.

Other results from the threshold estimation show that the McKinnon and Shaw (1973) hypothesis was confirmed in this study with interest rate having a positive and significant relationship with private investment. The accelerator effect was also confirmed with a positive and significant coefficient of GDP. Inflation was found to be having a negative relationship with private investment implying that macroeconomic uncertainties do not promote private sector investment. The TAR model passed some diagnostic and stability tests conducted which include; serial correlation, heteroscedasticity, misspecification (RESET) and normality in residuals, Cumulative sum of the recursive residuals (CUSUM) and Cumulative sum of squared recursive residuals (CUSUMSQ). The Granger causality test also showed that there was unidirectional causality running from government expenditure to private investment. Thus confirming the crowding-in and crowding-out effects obtained in the empirical estimations.

6.3 Recommendations

On policy, the results of the study highlight the following. Crowding-out effect is associated with lower levels of government expenditure implying that, government has to spend more before they can attract private investment because of expenditure wastages and leakages. It is therefore recommended that government take steps to minimise ineffective public spending and financial leakages so that every level of government expenditure (whether low or high) is productive. Government through the Attorney General could grant prosecutorial powers to the Auditor General/Audit Service to prosecute public officials who are surcharged for diverting public funds meant for developmental projects to deter others whiles getting value for money for every unit of government expenditure.

Additionally, government through the Ministry of Finance and the District Assembly Common Fund (DACF) Secretariat should link governmental budgetary transfers or annual allocations of district assemblies to the completion of existing projects before new ones are started to curb the menace of abandoning or discontinuing state funded projects. In this regard, monitoring and evaluation officers of all the regional coordinating councils should provide periodic or annual assessment report of the districts to the finance ministry. Notwithstanding, the central government must make more capital budget allocation in productive sectors such as infrastructure and human capital development which tend to raise private capital levels. Moreover institutions such as Registrar General Department must be strengthened to prevent delays in obtaining business operation documents.

It is also recommended based on the inverse relationship between taxes and private investment that, the government should not increase taxes but ensure the effective use of tax incentives. Taking into account the current situation of a narrow tax net, reducing general taxes is not an ideal option. Hence efforts to increase the tax base would ensure that corporate and profit tax rates can be lowered to boost private investors. Moreover, tax incentives targeted at specific productive investment sectors would help boost private investment. This recommendation implies that state agencies such as Ghana Revenue Authority (GRA) in collaboration with Ghana Investment Promotion Center (GIPC) must review tax exemptions and incentives to ensure that tax expenditures are not abused but channelled to areas that would produce higher returns to the growth process of the economy.

6.4 Study Limitation and Areas for Further Research

Further research in this area should address the impact of disaggregated government expenditure and the various types of taxes to identify unit effects separately in Ghana. Also, it would be of interest to assess the relative contributions of government spending in key sectors of the economy to private investment in the same sector. For instance, how government expenditure in health affects private investment in health.

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