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THE ECONOMICS OF GOVERNMENT SPENDING: AN INSTITUTIONAL APPROACH

BY

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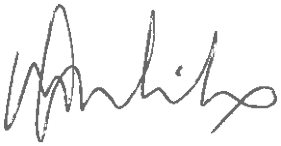
DECLARATION

I, Mthokozisi Mlilo do hereby declare that this thesis which is submitted for the degree of Doctor of Philosophy to the University of the Witwatersrand, Johannesburg is my own work, except otherwise indicated and acknowledged. It has not been submitted before for any degree or examination in any other university.

Signature of candidate: 

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ABSTRACT

This thesis investigates the role of institutional quality on the impact of government expenditure on economic performance. The thesis consists of five chapters. Chapter 1 provides an introduction of the thesis. Chapters 2, 3 and 4 are empirical chapters examining the role of institutions on the relationship between government expenditure and various indicators of economic performance. Chapter 5 concludes by giving policy recommendations.

In chapter 1 we provide a background, motivation, objectives, hypothesis to be tested, gaps in the literature, contributions of the study and the main findings. In chapter 2 we explore how institutional quality affects the government spending-output growth nexus. We estimate a modified growth accounting model found in Hansson and Henrekson (1994) and control for institutional quality by employing panel regression techniques on a panel of 71 countries over a period 1970-2015. Our main estimation technique, 3SLS with seemingly unrelated errors, is able to control for endogeneity and cross equation correlation. We find that the institutional quality variable has a mitigating effect on the relationship between government expenditure and output growth however, government expenditure generally has a negative and detrimental effect on output growth. This suggests that better institutional quality offsets the adverse effects of government expenditure. As such, there is a need to come up with policies that strengthen institutional quality and enhance the effectiveness of government expenditure programs.

Chapter 3 we examine the role of institutions on the optimal size of the government. The quadratic method of Armey (1995) and Scully (1994) method are employed on the country (time series regression) and group (panel data regression) estimations. Furthermore, we use the Hansen (1999) panel threshold regression technique to determine the presence of an optimal size and the values thereof. We ascertain that the majority of countries do have a significant optimal size of government. However, we note that the optimal size of government varies across countries and regions. Despite the presence of a non-linear relationship between government expenditure and output growth, there seems to be a marked difference between the size of government across levels of development and institutional arrangements. Countries with better institutions and higher levels of development seem to have a lower optimal level of government size. Perhaps, better institutions and higher levels of development help mitigate the adverse effects of government expenditure on output growth through the minimisation of the scope and scale of government activities, i.e., government size.

Chapter 4 investigates the Twin Deficits Hypothesis (TWDH) and the role of institutional quality on a sample of 48 countries for the period 1995-2013. Using the national income accounting decomposition and the approaches in Feldstein and Horioka (1980) and Fidrmuc (2003) we investigate the role of institutional quality and capital mobility on the current account deficits and the government budget deficits (i.e., TWDH) nexus. We apply OLS, fixed effects, random effects regressions and panel cointegration techniques in our analysis. The results from the panel cointegration tests show that a long run relationship exists between the current account balance, investment and the government budget balance. The results reveal that current account deficits are mainly driven by private investment flows. However, we only find support for the Twin Deficits Hypothesis in a sample of developed countries and higher institutional quality countries. The results imply that governments of these countries enjoy financing from international sources and can easily finance their budget deficits without siphoning domestic savings away from investment. This result is unsurprising considering that capital seems to flow towards areas with perceived less risk. This suggests that current account deficits in developing countries are as a result of private agents' decisions and not driven by government budget deficits.

DEDICATION

To my addition to the next generation, Aquillo, Aurora and *labako* Mlilo.

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TABLE OF CONTENTS

DECLARATION i
ABSTRACT ii
DEDICATION iv
ACKNOWLEDGEMENTS v
Acronyms and Terms 6
Chapter One: 8
1 Introduction 8
1.1 Background to the study and problem statement 8
1.2 Research problem 11
1.3 Research objectives 12
2.1.1 Research questions (RQ) 13
1.4 Institutional environment and institutional proxies 13
1.5 Findings of the study 15
1.6 Organisation of the study 17
Chapter Two: 19
2 An institutional analysis of government expenditure effects on growth 19
2.1 Introduction 19
2.2 Literature review 22
2.1.2 Theoretical Perspectives 22
2.1.3 Government spending and the macroeconomic environment 24
2.1.4 Government spending as a productive or unproductive expenditure 24
2.1.5 Government and the institutional framework: a review 25
2.3 Contribution and significance of the study 29
2.4 Methodological approach 30
2.4.1 Theoretical growth model 30
2.4.2 Stylized facts on the nature of ∅ 31
2.4.3 Empirical model, Estimation 32
2.4.4 A brief description of the estimation techniques considered 32
2.5 Empirical results 35
2.5.1 Descriptive statistics, unit root testing and correlation analysis 36

2.5.2 Regression Results 37
2.5.3 Robustness checks and additional analysis 46
2.6 Discussion of results and Conclusion 50
2.7 Appendix 1: Tables 52
2.8 Appendix 1: Figures 67
Chapter Three: 68
3 The optimal size of government and output growth: do institutional differences matter? 68
3.1 Introduction 68
3.2 Literature review: economic growth models, BARS curve, and institutions 70
3.2.1 The BARS curve 70
3.2.2 Drivers of the growth of government size: an explanation 72
3.2.3 Evolution of expenditures and the optimal size of government 74
3.2.4 Contribution and significance of the study 74
3.3 Research methodology, model specification, and data sources 75
3.4 Data, Estimation and Results 79
3.4.1 Times series estimation 81
3.4.2 Panel regression estimation 83
3.4.3 Threshold regression estimation 90
3.5 Conclusion 94
3.6 Appendix 2 96
Chapter Four: 99
4 The Feldstein-Horioka puzzle, Twin Deficits Hypothesis and institutional quality 99
4.1 Introduction 99
4.2 Literature review 103
4.2.1. Contribution and significance of the study 105
4.3 Research design and methodology 106
4.3.1 Stylized facts 107
4.3.2 Estimation technique 107
4.4 Data, estimation and results 108
4.4.1 Data description 108
4.4.2 Estimation and discussion of results 111

4.4.2.1 Panel Cointegration Analysis 115
4.4.3 Subsample analysis 120
4.5 Conclusion 122
Chapter Five: 125
5 Conclusions and Recommendations 125
5.1 Summary 125
5.2 References 128

LIST OF TABLES

CHAPTER TWO:

Table 2.1: List of Countries 35
Table 2.2: Interaction effects of Government expenditure proxies and the quality of government. Dependent variable: Output growth 39
Table 2.3 : Interaction effects of Government expenditure proxies and political corruption. Dependent variable: Output growth 44
Table 2.4: Pooled OLS - Interaction effects of Government expenditure proxies and the quality of government. Dependent variable: Output growth 47
Table 2.5: Pooled OLS - Interaction effects of Government expenditure proxies and political corruption. Dependent variable: Output growth 48

Table A1. 1: List of variables and definitions 52
Table A1. 2: Summary statistics 54
Table A1. 3: Correlation matrix 55
Table A1. 4 : Panel unit root testing (variables in levels) 56
Table A1. 5: Government consumption (3-year averages, 1970-2015) 57
Table A1. 6: Total government (3yr averages, 1970-2000) 58
Table A1. 7: Wages (3yr averages, 1970-2000) 59
Table A1. 8: Current expenditures (3yr averages, 1970-2000) 60
Table A1. 9: Public services (3yr averages, 1970-2000) 61
Table A1. 10: Subsample analysis – Institutional differences (Political corruption) 62
Table A1. 11: Subsample analysis – Institutional differences (Legal Origin, LO) 63
Table A1. 12: Subsample analysis - Regional dummies*Government final consumption 64
Table A1. 13: Fractionalisation 65

CHAPTER THREE:

Table 3.1: List of countries 79
Table 3.2: Variable definitions 80
Table 3.3: Summary statistics by region 80
Table 3.4: Panel unit root testing 85
Table 3.5: Panel regression results (GMM). Dependent variable: Output growth (GDPg) 87
Table 3.6: Panel regression results (GLS). Dependent variable: Output growth (GDPg) 87
Table 3.7: Panel regression results (Pooled). Dependent variable: Output growth (GDPg) 88
Table 3.8: Subsample analysis, Institutional quality. Dependent variable: Output growth (GDPg) 90
Table 3.9: Threshold regression, the whole sample. Dependent variable: Output growth (GDPg) 91
Table 3. 10: Threshold regression, the whole sample. Dependent variable: Output growth (GDPg) 93

Table A3. 1: Optimal size of government final consumption expenditure (G*) - country specific regressions. Dependent variable: Output growth (GDPg) 96

CHAPTER FOUR:

Table 4. 1: Variable definitions 109
Table 4.2: List of countries 110
Table 4.3: Descriptive statistics (1995-2013) 110
Table 4.4: Correlation matrix 111
Table 4.5: Panel unit root results 111
Table 4.6: Feldstein Horioka and Institutional Quality: Dependent variable: Domestic Investment 114
Table 4.7: Test of mean differences in Savings and Investment: institutional subsample 115
Table 4.8: Feldstein Horioka and Institutional Quality: A subsample analysis: Dependent variable: Domestic Investment 115
Table 4.9: Pedroni test (Trend and intercept) 116
Table 4.10: Kao test 116
Table 4.11: Wald Test of the ARDL long-run terms 117
Table 4.12: Critical Value Bounds of the F-statistic 117
Table 4.13: Unrestricted ARDL regression: Dependent variable: *CAB* 118
Table 4.14: Long run causality 118
Table 4.15: FMOLS and DOLS results for the whole sample: Dependent variable: *CAB* 119
Table 4.16: test of mean difference: capital openness and institutional quality 120
Table 4.17: Subsample analysis, capital openness, Institutional quality and level of development (FMOLS pooled estimates): Dependent variable: *CAB* 121

LIST OF FIGURES

Figure 1: Moderation between Government consumption expenditure and qog..... 41
Figure 2: Moderation between total government expenditure and qog..... 41
Figure 3: Moderation between current expenditures (CExp) and qog..... 42
Figure 4: Moderation effect of Public services expenditure and qog..... 42
Figure 5: Moderation effect of government wages expenditure and qog..... 43
Figure 6: Moderation effect of government consumption and Political corruption..... 45
Figure 7: Moderation effect of Current expenditures and Political corruption..... 45
Figure 8: Moderation effect of Wages and Political corruption..... 46
Figure 9: BARS curve..... 75
Figure 10: BARS curve: an extended elaboration..... 77
Figure 11: Evolution of government expenditure (*Govtcon)* and output growth (GDPg)..... 84

Figure A1. 1: Evolution of GDP per capita (1970-2015)..... 67

Acronyms and Terms

AfDB	-	African Development Bank
ARDL	-	Autoregressive Distributed Lag
BARS	-	Barro, Armey, Rahn and Scully
CLRM	-	Classic Linear Regression Model
DOLS	-	Dynamic Ordinary Least Squares
EA	-	East Asia
FH	-	Feldstein and Horioka
FE	-	Fixed Effects
FMOLS	-	Fully Modified Ordinary Least Squares
GDP	-	Gross Domestic Product
GDPg	-	GDP growth
GLS	-	Genelarised Least Squares
GMM	-	Generalised Moments Model
Govtcon	-	Government final consumption expenditure
IMF	-	International Monetary Fund
IQ	-	Institutional quality
MENA	-	Middle East and North Africa
OLS	-	Ordinary Least Squares
QoG	-	Quality of Government
PolCptn	-	Political Corruption
RE	-	Random Effects
SEA	-	South East Asia
SoA	-	South Asia
SSA	-	Sub-Sahara Africa

SUR - Seemingly Unrelated Regression

SCAN - Scandinavian countries

TWDH- Twin Deficits Hypothesis

3SLS - Three Stage Least Squares

OECD - Organisation for Economic Cooperation and Development

Chapter One:

1 Introduction

1.1 Background to the study and problem statement

The importance of government expenditure has recently been renewed, with fiscal policy stimuli featuring prominently across countries (Brahmbhatt & Canuto, 2012; IMF, 2017; Khan & Saeed, 2012). One such example is government interventions across the globe in the wake of the 2008 Global financial crisis. Arguably, quantitative easing helped restore economic confidence and reduce the risks of further contagion from the crisis. This is despite the neo-liberal policies of fiscal consolidation and expenditure roll-backs from the late-1980s to the mid-1990s as per structural adjustment programs (SAPs) and similar advice from multilateral agencies such as the World Bank and the International Monetary Fund (IMF) which had been the traditional policy for economic stabilisation (Feldstein, 1998). With the reawakened interest in fiscal policy, it is important that we investigate the effects of fiscal policy, particularly government spending, on the economy.

Amongst economists, the role of the government in an economy has been explored from different dimensions with three main roles emerging; regulatory, re-distributive and public goods provision (Musgrave & Musgrave, 1989). With these roles, the government to some extent fosters an environment that promotes economic prosperity for its citizens. Government spending programs, unlike tax revenues policies, have more direct effects on the economy and more suited to targeted interventions (Hur, 2015). However, a consensus on the effects of government spending on the macro-economy is yet to be found (Kneller, Bleaney, & Gemmell, 1999; Moreno-Dodson, 2013). For instance, theoretical models of growth tend to have divergent outcomes on the impact of government expenditure, and also, an empirical survey on the effects of government expenditure/size on output reveals that the size of government can have positive (see, Agenor & Moreno-Dodson, 2006; Aschauer, 1989; Ram, 1986), negative (Grier & Tullock, 1989; Landau, 1983) or both effects (see, Barro, 1990; Kneller et al., 1999; Scully, 1989) depending on the nature of government outlays. Nonetheless, most of the studies done on the impact of government spending on the macro-economy have focused on the nature and different types of public spending but less on the role played by the social, legal and political environment (i.e., the institutional

environment). As a result, there is a paucity of literature on how government expenditure impacts the macro-economy under different institutional environments.

An institutional analysis of government spending effects on the macro-economy may be able to explain the inconsistencies in the empirical findings, and in this thesis, the reasons why the differences in the institutional environment matter on the effects of government spending will be proffered. The literature reflects the view that a country's economic fortunes over time are determined, to a large extent, by the institutional environment (Côté & Healy, 2001; Olson, 1996). "Institutions form the incentive structure of a society, and the political and economic institutions, in consequence, are the underlying determinants of economic performance" (North, 1993). As such, it is believed that differences in country growth rates and incomes are mainly due to differences in institutional arrangements (Olson, 1996). The mainstream schools of economic thought have a shortcoming in their analysis of government spending and economic growth because they fail to incorporate institutional differences in their theories. This thesis seeks to extend this debate by providing an empirical investigation of government spending effects on the macro-economy by incorporating institutional quality (correspondingly referred as, quality of institutions) effects as the debate would not be complete without the inclusion of this variable.

The inclusion of institutional quality variables in a study such as this one provides an opportunity for comparisons among countries/regions as well as between government expenditures, which has not been studied after controlling for institutions. To the extent that government expenditure categories have a varying impact under different institutional environments, this will increase a policymaker's ability to discriminate among the expenditure categories, and thus, enable them to come up with policies that apply to different institutional contexts. Taking cognisance of the important role that fiscal policy should be playing in developing economies, especially Africa, the study extends the institutional economics insights beyond the growth-institutions divide and looks at the moderating effects of institutions on the government expenditure-growth nexus as well. The section on institutional analysis of government spending effects on growth seeks to compare the impact of government expenditure on growth under different institutional quality settings across categories of government expenditure and among countries.

This thesis consists of three essays that are linked by their view of the role of the government, through spending, as the key determinant of a country's growth trajectory. However, the government is a complex organization run by individuals who are self-maximising and motivated by self-interest (Downs, 1957) which might differ from the social interest. The problem of self-interested agents who pursue private benefits at the expense of social welfare can be solved through a system of effective institutions. "Institutions are the rules of the game" (North, 1987) and when efficiently structured they could reconcile private and social benefits (Barrelli & Pessoa, 2002). Following on Kaufmann and Kraay (2008), the concept of institutional quality is defined as the traditions and institutions by which authority is exercised in a country.

To understand the effects of government spending on output growth, it is important that we understand the desirable or optimal size of government conducive for maximum growth. Ever since Keynes (1936) proposed his ideas, government activity has increased substantially. For example, the United States economy started off at a level of 12% of gross domestic product (GDP) in 1930 and reached a level of 36% of GDP in 2013. What started off as a demand management exercise soon became an avenue for other endeavours such as redistribution, promotion of equality, public goods provision and market failure correction. According to Mueller (2003), government spending was on an upward trend during the 1930s and receded in the early 1990s. Theories on these increases are diverse and varied. Basically, all nations registered an increase in their government size but not all of them registered the same economic fortunes. According to Olson (1996), those countries with best policies and institutions achieve most of their potential, while others achieve a tiny fraction of their potential income, and hence, differences in economic growth. The scale of government spending today is quite substantial and evident. However, the effects of government size on the economy and the desirable level (or optimal size) of government are debatable. To this end, it is important that we estimate the optimal size of the government and its relationship with the institutional environment.

Lastly, it is important that we investigate how government budget balances affect the external balance, the twin deficits hypothesis (TWDH). The institutional environment affects the investment and saving decisions of agents in an economy and to some extent affects the external balance as well. For example, trends in government spending, the size of government and budget deficits are associated with economic, political and institutional conditions (Roubini & Sachs,

1989). Roubini and Sachs (1989) note during periods of high (low) growth government spending decreases (increases) and so do the levels of budget deficits. Furthermore, the authors observe that nations with poor institutions experience high levels of government spending and large budget deficits.

1.2 Research problem

Research studies have noted that institutions have a bearing on the economic fortunes of a country (Davis & North, 1971; Gradstein, 2008; North, 1987, 1990). The research problem addressed in this research is about the lack of knowledge regarding how the institutions/institutional quality is associated with fiscal policy variables namely government spending and budget deficits and their interplay with other macro-economic aggregates. Lacking from the literature is a complete perspective that links public economics perspectives and macro-economic equilibrium models to the development of a general model of the economics of government spending. The research problem examined in this research is addressed using stylized facts and an empirical analysis approach.

This thesis debates that because of differences in the institutional environment government spending effects will be varied amongst countries. For instance, it contends that the impact of government provided goods on growth is a function of the institutional environment. When goods are provided by the government or its functionaries, a principal-agency problem arises (Essama-Nssah & Moreno-Dodson, 2012; Mueller, 2003, p. 545). It can be argued that government-provided goods would be provided in a way that suits the interests of the public agents and away from social interests. Dependent on the strength of the institutional environment, public agents will attempt to channel their efforts towards those activities with the highest returns, which could be rent-seeking and obtaining bribes (Chobanov & Mladenova, 2009). Furthermore, a weak institutional environment affects household choices and biases them towards rent-seeking activities (Gradstein, 2008). Institutions alter economic agents' incentives and ultimately their choice menu of economic activities. That is, they could reflect a penalty or reward associated with an activity. Government expenditure programs and activities often present opportunities for corruption and rent extraction (Fisman & Gatti, 2002a; Gupta, De Mello, & Sharan, 2001). However, the magnitude with which an individual can influence the incidence of government provided goods on their welfare is dependent on the quality of institutions. If the quality of

institutions is weak, most of the benefits of government provided-goods will befall a small fraction of the population (La-Porta, Lopez-de-Silanes, Sheilfer, & Vishny, 1999). This could render government spending effects on growth and output negligible or negative.

From the extant literature, we note that the relationship between government expenditure and output growth depends on the structure of the economy and the environment, hence the divergence of results in the empirical literature (see for example, Badinger, Fichet de Clairfontaine, & Reuter, 2017; Butkiewicz & Yanikkaya, 2011; Mundell, 1963; Peacock & Shaw, 1971; Tanzi & Davoodi, 1997). As such, this thesis seeks to add to the knowledge of how institutions impact the relationship between government spending and the macro-economy.

1.3 Research objectives

The motivation for this study is driven by the resurgence of fiscal policy in the aftermath of the global financial crisis of 2008. The aim of this study is to explore the macroeconomic effects of government spending and as well as assess the role of institutional quality on the link between government spending and the macro-economy. Below is a detailed list of the objectives of the study:

I. To assess the impact of institutional quality on government spending and economic growth relationship.

II. To establish whether an optimal size of governments exists and how institutional quality affects it.

III. To explore whether the quality of institutions attenuates or accentuates the relationship between government budget balance and the current account balance.

The empirical evidence on the impact of government spending, budget balance and the quality of institutions on the macro-economy, has several policy implications. For instance, it will facilitate a better understanding of government spending effects and help in identifying and/or effective and efficient government expenditure mix and its utilisation. With prudently crafted government spending programs it is reasonable for one to think that government spending could help increase output and reduce social ills.

2.1.1 Research questions (RQ)

This research will attempt to answer the following questions:

RQ100 Does institutional quality affect the impact of government spending on GDP?

RQ200 Does the size of the government have any link with economic growth?

RQ201 Is the optimal size of government dependent on the institutional environment?

RQ300 Does the quality of institutions have an effect on the relationship between budget deficits and current account deficits?

1.4 Institutional environment and institutional proxies

A proper definition and measurement of institutions is elusive (Hodgson, 2006). Institutions are generally defined as the rules of the game. Furthermore, institutions can be thought of as regularities in repetitive interactions among human beings. Institutions form, or are, a special type of a rule-based social structure which constrains and enables behaviour in a society. The social structure has the potential to alter the behaviour of economic agents and influence their choices and preferences (Hodgson, 2006, p. 2). They can also be understood of as being customs and rules that provide a set of incentives and disincentives for human beings (Hodgson, 2006; North, 1990). According to Hodgson (2006, p. 2), institutions can be thought of as, "systems of established and prevalent social rules that structure social interactions". Institutions bring about order and predictability in interactions amongst members of the society. For example, rules on an economic exchange are that once you pay the agreed price you will receive the specified commodity at the agreed time. One should note that institutions are not confined to rules and norms only (Hodgson, 2006; North, 1990). Institutions or the social structure can be thought of as socially embedded systems of rules and boundaries; an organisation, firm or political party can be regarded as an institution.

According to the institutional theory, organizational behaviour is influenced and shaped by its surrounding environment (Scott, 2004). Social, economic, and political factors constitute an institutional structure (La-Porta et al., 1999) of a particular environment which provides economic agents (private and public) with advantages for engaging in specific types of activities (Hodgson, 2006). Institutional environment determines the incentive structure that organizations and

individuals face. Systems of monitoring and control shape public agents' conduct (Voigt, 2012). Where there are weak systems, it is expected that government spending is directly channelled towards rents. For instance, institutional and macroeconomic contexts are heterogeneous within developing economies themselves and different from those of the developed world. This thesis seeks to disentangle the effects of heterogeneous institutions among countries as the determining factor between those countries which are successful and unsuccessful. Hence, it is argued that institutional theory is relevant in explaining differences in the effect of fiscal policy among countries. According to the Economic Commission for Africa (2016, p. ix), the quality of institutions and their effectiveness are seen as essential for structural transformation and efforts towards inclusive development in Africa. Furthermore, the institutional structure and its quality have far-reaching implications, it maps the risk profile of a country, as it affects access to assets and markets, shapes investment decisions, aid allocation and foreign policy (Economic Commission for Africa, 2016). Therefore, the impact and effects of governance and its institutions are of greater importance to the development and economic progression of a country.

For the purposes of this study, the quality of institutions is used to gauge the impact of institutions on government expenditure and their interaction with the macro-economy. The quality of institutions will be drawn from the underlying social structure and the perceptions regarding the social structure of each country; a mix of perception- and non-perception- based measures of institutional quality variables will be used. For example, the pervasiveness of corruption is closely linked with poor institutional quality or weak governance (Economic Commission for Africa, 2016). To some extent the quality of institutions in a society can be associated with the prevalence of corruption; this can be measured through perception (and non-perception) based measures. The effectiveness of rules (institutions) depends on their enforcement (status); they cannot be ignored by society for them to have an impact on behaviour (Hodgson, 2006, p. 6). This can also be inferred from the perceptions of society regarding institutions.

This study utilises different proxies to capture various forms of institutions, i.e., formal, informal, socio, political and economic institutions, for each chapter. For instance, in chapter two, institutional proxies that are believed to have an effect on the efficacy of government operations are utilised. Ceteris paribus, an improvement in institutions improves a country's economic fortunes (North, 1990, 1993). In chapter three, we use the proxies of political and social institutions

that promote the proliferation of the size of government. In chapter four, economic institutions that have a bearing on private agents' investment and saving decision making are explored. These proxies are readily available from information organisations such as the World Bank among others. Proxies of institutions are vast and wide in scope which makes it difficult to choose an ideal proxy. Among other statistical techniques, data reduction methods were utilised to avert the problem of having to choose a suitable proxy amongst competing ones, the chosen methods are the principal components and factor analysis techniques.

1.5 Findings of the study

In chapter 2 we explore how institutional quality affects the government spending-output growth nexus. We estimate a modified growth accounting model found in Hansson and Henrekson (1994) and control for institutional quality by employing panel regression techniques. We identify the possibility of endogeneity between output growth, institutional quality, and government expenditure. To control for endogeneity, we use the seemingly unrelated regression with three stage least squares technique. This chapter uses different proxies of government expenditure to test the government expenditure – output growth relationship. The results reveal that government expenditure generally has a negative and detrimental effect on output growth. We find that the institutional quality variable has a mitigating effect on the relationship between government expenditure and output growth. The negative effects of government expenditure on output growth are reduced/reversed in environments (countries) with better institutional quality. This suggests that better institutional quality decreases the negative effects of government expenditure. Alternatively, this means better institutional quality offsets the adverse effects of government expenditure.

In chapter 3 we examine the role of institutions on the optimal size of the government. The quadratic method of Armey (1995) and Scully (1994) method are employed on the country (time series regression) and group (panel data regression) estimations. Also, we use the Hansen (1999) panel threshold regression technique to determine the presence of an optimal size and the values thereof. We ascertain that the majority of countries do have a significant optimal size of government. However, we note that the optimal size of government varies across countries and regions. Despite the presence of a non-linear relationship between government expenditure and output growth, there seems to be a marked difference between the size of government across levels

of development and institutional arrangements. Countries with better institutions and higher levels of development seem to have a lower optimal level of government size. Perhaps, better institutions and higher levels of development help mitigate the negative/adverse effects of government expenditure on output growth through the minimisation of the scope and scale of government activities, i.e., government size.

Lastly, chapter 4 investigates the role of capital mobility and institutional quality on the relationship between the current account balance, domestic investment, and government budget balance. Panel data and panel cointegration techniques are used to test the twin deficits hypothesis and the Feldstein and Horioka (1980) puzzle. In this chapter, we find that domestic investment finance is highly mobile and a major contributor to current account deficits. This result is robust to subsample analysis and at odds with the findings of Feldstein and Horioka (1980) who posit that capital was immobile for developed countries. Furthermore, we document evidence that institutional quality enhances capital mobility and indirectly amplifies the relationship between current account balances and domestic investment. This implies that there is relatively less capital mobility in countries with poor governance, rule of law and rampant corruption, i.e., poor institutional quality. This finding resonates with that of Freytag and Voll (2013) who highlights increased transaction costs, uncertainty and risks to investment associated with locations that are marred by poor institutional quality.

Furthermore, in chapter 4 we find no support for the co-movement of government budget balances and current account balances in developing countries and for countries with poor institutions. This result suggests that governments in these countries finance most of their budget deficits through local channels. This result is unsurprising given that capital seems to flow towards areas with perceived less risk. This suggests that current account deficits in developing countries are as a result of private agents' decisions and not driven by government budget deficits.

The findings of this thesis suggest that government expenditures have a detrimental effect on the growth of output however; these can be mitigated by improving governance and regulatory control over government expenditure programs. We can conclude that improved institutions do mitigate the negative/adverse effects of government expenditure. This implies that there is a need to develop policies that strengthen governance institutions.

This thesis contributes to the literature in the following ways: (1) in chapter 2, we contribute to the old debate on the relationship between government expenditure and output. However, the thrust of this thesis looks at the role of institutional quality on the relationship between government expenditure and output, a relatively new direction of inquiry on an existing economic problem. It is important that we identify institutional quality variables that have a positive effect on the government expenditure-output nexus. Our methodology improves on the estimation techniques used in Butkiewicz and Yanikkaya (2011) and Nawaz and Khawaja (2016) studies by making use of the three stages least squares (3SLS) estimation procedure, with seemingly unrelated regression option, which is effective in handling problems associated with long panels (large T), and endogeneity. Additionally, we use a unique measure of corruption that captures corruption at the three branches of the government. (2) In chapter 3, we investigate and estimate the optimal size of the government using a modified quadratic model of Armey (1995) that controls for institutional quality. We contribute to the literature by identifying institutional quality as a determinant of the optimal size of government. This finding is important because it sheds light on the determinants of the optimal size of government which is non-existent on the empirical literature. (3) Lastly, in chapter 4 we contribute to the twin-deficits hypothesis literature by examining the role of institutions on the co-movement of budget deficits and current account deficits. Our research strategy draws on many fronts; first, we identify that current account balances (deficits) are a function of capital mobility. Then we investigate whether capital mobility is determined by the institutional environment which implies, to some extent, that current account balances are a function of the institutional quality. This chapter contributes to the literature by proffering a possible explanation on why we observe a twin deficit of the current account and the budget balance. Future areas of study would include disaggregated institutional quality measures to identify those facets of governance that improve the efficacy of government expenditures. Additionally, potential areas of study would involve identifying those expenditure categories that generated the least negative effects on output growth.

1.6 Organisation of the study

The rest of the thesis is organised as follows: chapter 2 provides an empirical examination of the effects of institutional quality on the relationship between government expenditure on output growth. Chapter 3 extends the work in chapter 2 by estimating the optimal size of government and ascertaining the role of institutions on the optimal size of government activity. Chapter 4 provides

empirical evidence on what drives current account deficits by probing the role of the government budget balance, domestic investment and institutional quality. Chapter 5 concludes and provides policy recommendations.

Chapter Two:

2 An institutional analysis of government expenditure effects on growth

2.1 Introduction

Competing models in the economic literature offer differing perspectives on the effects of fiscal policy instruments on growth. In the neoclassical growth models, see Solow (1956) and Swan (1956), fiscal policy is thought to be impotent when it comes to long run growth. Thus, fiscal policy instruments would only affect savings and investment decisions which would only culminate in changed equilibrium factor ratios rather than the steady state growth rate which is a function of exogenous factors. In endogenous growth models, see Barro (1990) and Romer (1986), improvements to physical and human capital does influence the steady state growth rate hence there is scope for fiscal policy. Instruments of fiscal policy could be used to promote economic growth, that is, government spending on education, health and infrastructure development could increase the productivity of labour and capital. However, according to developmental economists and political scientists there has been a disdain for government involvement in the economy since the late 1980's as per the neoliberal agenda and the Washington Consensus' prescriptions and conditions attached to multilateral loans (Doornbos, 1990; Ostry, Loungani, & Furceri, 2016; Rowden, 2009, 2010). Recently, the same dissuasion against government involvement in the economy is seen in the Maastricht criteria and the Growth and Stability pact for joining the euro area. These sentiments have led to a diminished role of the government sector in the developing world. However, we notice a renewal of government involvement in the post global financial crises of 2008-9.

For instance, the African continent, given its resource base, has consistently underperformed compared to its peers on economic growth (Collier & Gunning, 1999; Easterly & Levine, 1997; Ndulu, 2006; Platteau, 2009). This has puzzled economists and policymakers alike. IMF and World Bank programs which have been a success in other continents have either underperformed or failed to lift most of the African economies out of underdevelopment and poverty. This has led to some antagonism and protest towards the Bretton Woods institutions in the African economic landscape and renewed the call for home grown solutions (Naim, 2000).

Most of the policy prescriptions from the IMF and the World Bank concentrated on real factors of growth alone and neglected the institutional/governance aspects of these African nations.

Despite crafting their 'home grown' solutions most African economies have regressed and are in poverty[1] (Collier & Gunning, 1999; Easterly & Levine, 1997), with a single African country, Equatorial Guinea, making it into the high income group as per the World Bank's income classification (WDI, 2015). Government expense as a share of GDP is on average at most 20% (Hur, 2015) and the public sector is the largest employer of the total workforce in the formal sector. Foreign direct investment (FDI) is small[2] (average of 1.7% of GDP for the whole continent), if not non-existent in most of the nations. Investment is in-borne and mostly undertaken by government (Sy, 2016). As such, the majority of economies in developing economies and Africa have fiscal driven investment, with government running most projects under quasi-fiscal policy (Abizadeh & Yousefi, 1998; Hur, 2015; Ndulu, 2006). This is despite that developing countries have the least share of government spending to GDP (around 20%) as compared to OECD and higher income countries which have close to 40% to the GDP ratio (Hur, 2015). According to Hur, developing countries have greater fiscal expansion capacity than developed countries. However, the larger the scope of government coupled with a lower bureaucratic quality the larger the rent seeking problem becomes; for example corrupt activities are likely to increase (Gyimah-Brempong, 2002; Platteau, 2009). For government expenditure to have a growth enhancing impact in developing countries, it would seem institutions would need to be as equally effective as those of the developed countries. For instance, Nordic states, which have superior institutions, have relatively large government sectors and better economic success. Studies on government spending effects have concentrated on developed and underdeveloped nations, with African nations constituting a smaller fraction of the sampled units. This study fills this void by assessing the impact of government spending on the macro-economy whilst incorporating a larger number of African countries in the sample.

Institutions matter for economic development and performance (North, 1990). Arguably, the pioneering work by North (1987) paved the way for this line of analysis. North found that differences in institutional arrangements generated different levels of economic growth amongst countries. According to proponents of institutional quality (hereafter, *IQ*), good government

[1] See Figure A1 for an evolution of GDP per capita by regions. Sub-Saharan Africa has lagged behind other regions in terms of GDP per capita over time.
[2] FDI is on average of 1.7% of GDP for Africa excluding South Africa (UNCTAD, 2015).

institutions help foster economic growth (Pande & Udry, 2005; Plumber & Martin, 2003; Wu, Tang, & Lin, 2010) by adopting the 'right' public policy or spending decisions (Butkiewicz & Yanikkaya, 2011; Kagundu, 2006). This notion is stressed by Bergh and Henrekson (2011, p. 875) :

> …in addition to what governments do, it is important how it is done: Transparent rules, rule of law and well-defined property rights seem to be conducive for growth…

It is essential that we understand the interaction of institutions and the transmission of government spending effects on the macro-economy. Pande and Udry (2005) argue that institutional quality may cause poor countries and its people to remain poorer because such institutions could be growth inhibiting. However, it is noted in the literature that the level of development of an economy can generate better institutions (North, 1981), thus suggesting some level of endogeneity between the two variables. To what extent have formal and informal institutional arrangements promoted or stifled the efforts of government through spending programs aimed at increasing growth?

Until recently, most studies on the effectiveness of government spending on growth have focused on including real factors that affect growth, i.e., human capital, capital stock, and trade openness, and less on soft factors, i.e., institutional factors, with the exception of a few studies (see, Butkiewicz & Yanikkaya, 2011; Nawaz & Khawaja, 2016). There is a dearth in the extant literature on the effects of institutions on government spending and this study seeks to add on the extant literature. The present study differs from previous studies in several ways. First, it attempts to explicitly purge out the effects of institutions on the impact of government spending by analysing the interaction effects of the two research variables; to the author's knowledge, virtually all prior studies testing the effects of government expenditure only examine the impact of government expenditure in different institutional contexts as opposed to evaluating the link between the two on their outcome on growth. Second, it uses a unique measure of institutional quality which captures political corruption within the three branches of government as opposed to the popular measures of corruption that focus on public officials' abuse of power for personal gain. Moreover, the political corruption variable is relatively long compared to its counterparts, spanning from as early as 1970. Third, it improves on the estimation techniques used in previously

mentioned studies by making use of the three stages least squares (3SLS) estimation procedure, with seemingly unrelated regression option, which is effective in handling problems associated with long panels *(large T),* heterogeneity bias, presence of missing or unknown control variables, numerous indicator variables and endogeneity Finally, it uses a larger sample of African countries, virtually all countries were included except for 9 countries that had no meaningful data points.

2.2 Literature review

This section presents the extant literature on the relationship between government spending, institutions and the macro-economy.

2.1.2 Theoretical Perspectives

Three theories are identified that are of relevance to the institutional analysis of government spending effects on the macro-economy. These are; the institutional; the political-agency and the contractarian theories. According to the institutional theory, organizational behaviour is influenced and shaped by its surrounding environment (Scott, 2004). Social, economic, and political factors constitute an institutional structure (La-Porta et al., 1999) of a particular environment which provides economic agents (private and public) with advantages for engaging in specific types of activities (Hodgson, 2006). The institutional environment determines the incentive structure that organisations and individuals face. Systems of monitoring and control shape public agents' conduct (Voigt, 2012). Where there are weak systems, it is expected that government spending is directly channelled towards rents. Institutional and macroeconomic contexts are heterogeneous among individual and grouped countries. For instance, there are differences between developing and developed countries' institutions. This paper seeks to disentangle the effects of heterogeneous institutions as the determining factor between those countries whose expenditure programs are successful and unsuccessful. Hence, it is argued that institutional theory is relevant in explaining differences on the effects of fiscal policy. Based on a report by the Economic Commission for Africa (2016, p. ix) , the quality of institutions and their effectiveness are seen as essential for structural transformation and efforts towards inclusive development in Africa. Furthermore, the institutional structure and its quality has far reaching implications, it maps the risk profile of a country, as it affects access to assets and markets, shapes investment decisions, aid allocation and foreign policy (Economic Commission for Africa, 2016). Therefore the impact and effects of Africa's governance and its institutions are of greater importance to the continent's development and economic progression (Collier, 2006).

Proponents of the *political agency theory* state that behaviour amongst groups with similar goals are likely to have different motivations and intentions, which can lead to differing outcomes. An agency relationship exists when a 'principal' delegates authority to an 'agent' to perform some task on their behalf. The agency problem can arise because of information asymmetry between government and society. The society might not possess enough information to effectively select (adverse selection) and monitor (moral hazard) public agents, hence public agents are expected not to act in the interests of the society (see, for example, Akerlof, 1970; Holstrom, 1979). This agency problem of divergent interests between contracting parties can be alleviated if there are means or measures to check and monitor the performance of the agent (Akerlof, 1970; Holstrom, 1979; Stiglitz, 1975) and perhaps institute some form of penalty for any deviation from the interests of the principal. This is possible through an effective system of institutions to regulate conduct. Taking a cue from North's (1990, pp. 201-202) definition, "Institutions are a set of rules, compliance procedures and moral and ethical behavioural norms designed to constrain the behaviour of individuals in the interests of maximizing the wealth or utility of the principals", it is possible to reconcile the interests of the agents (in this case, the government and its proxies) and the principals (voters) if a system of effective institutions is developed[3]. This study investigates the impact of the role of the government in the economy after controlling for the agency problem. Control of the agency problems is conducted by establishing the relationships between voters/electorate as 'principals' and public officials (rulers/politicians and state officials/bureaucrats) as the 'agents'. However, politicians can be viewed as both principals and agents, i.e., principals to bureaucrats and agents to voters or parliamentarians being dependent on an electoral system.

According to the *contractarian theory*, institutions emerged through a social contract (Buchanan, 1975; Hobbes, 2010) between members of the society. Institutions were to set the 'rules of the game' as a panacea for anarchy. With the formation of a social contract—the state was ignited—the state was delegated the use of violence in exchange for social protection and maintaining law and order (Buchanan, 1975; Rodrik, 2000). The Government through the state is regarded as the enforcer of contracts. As such, the government ought to provide public goods –

[3] Pande and Udry (2005) dispute the last part of this definition for its take on agency, i.e., they believe institutions need not be designed (*de facto* versus *de jure* institutions), and it is not entirely true that institutions are established for the sole purpose of rectifying the agency problem. Nonetheless, in this instance institutions can be designed to mitigate the agency problem.

mostly through the regulatory function – that lift citizens out of anarchy to a higher level of welfare which can only be achieved when there is order and security (Mueller, 2003). Initially, defence, policing and social order were important then political institutions relating to governance became important as well. With the passage of time, these institutions were augmented by economic institutions. Economic institutions clarified ownership and the right to the use of resources and markets. Clearly defined economic institutions reduce the level of uncertainty in markets, and this has an economic growth stimulating effect. Casson, Della Giusta, and Kambhampati (2010), notes that "it is not growth-igniting institutions alone that matter but also growth-sustaining institutions are important in order to reinforce long-term economic development and conflict management institutions, which will resolve social conflict".

2.1.3 Government spending and the macroeconomic environment

Competing models in the economic literature offer differing perspectives on the effects of fiscal policy instruments on growth, with neoclassical growth models[4] stating that fiscal policy is impotent when it comes to long run growth; fiscal policy instruments would only affect savings and investment decisions which would only culminate in changed equilibrium factor ratios rather than the steady state growth rate which is a function of exogenous factors. In endogenous growth models[5], improvements to physical and human capital does influence the steady state growth rate hence there is scope for fiscal policy instruments in promoting economic growth, i.e., government spending on education, health and infrastructure development could increase the productivity of labour (mental and physical capabilities) and even physical capital. However, according to developmental economists and political scientists there has been a disregard for government involvement in the economy since the late 1980's as per the Washington Consensus' prescriptions and conditions attached to multi-lateral loans (Doornbos, 1990; Rowden, 2009, 2010). This has led to a diminished role of the government sector in the developing world.

2.1.4 Government spending as a productive or unproductive expenditure

In the empirical literature, researchers have classified government spending components into productive and non-productive elements (see for example, Barro (1991); Deverajan, Swaroop, and Zou (1996); Bleaney, Gemmell, and Kneller (2001); Levine and Renelt (1992)). It is argued in the literature that there is a positive correlation between productive government spending and

[4] For example, Solow (1956) and Swan (1956)
[5] See models by Romer (1986)

economic growth and there exists a negative relationship between unproductive government spending and economic growth. However, it is not that clear how a spending component that is classified as productive is different from an unproductive component, this lack of definiteness is shown by different signs on the impact of an identical expenditure classification for different countries in the empirical literature. Most of the empirical evidence seems to support the presence of a positive and significant impact of productive government spending on output (Agenor & Neanidis, 2006; Jones, 1990; Storm & Feiock, 1999; Su, Yucel, & Taylor, 2003) whilst government consumption and defence spending is linked with a negative output response (Abu-Bader & Abu-Qarn, n.d; Benoit, 1978; Deverajan et al., 1996).

With the foregoing, in the public choice literature the nature of a public spending component is subject to its capture by rent-seeking agents whose narrow interests result in a divergence between private and social costs thus causing inefficiency and rendering the spending component unproductive. Based on the public choice perspective, the impact of a spending component could take either sign dependent on the institutional environment (control of rent-seeking activity). It is important that a study on government spending effects should control for institutional differences amongst countries.

2.1.5 Government and the institutional framework: a review

Institutions shape the way economic agents make their decisions, both in the private and public sectors (North, 1987; Pande & Udry, 2005). Consequently, institutions determine how public expenditures are distributed and utilised by government agents. The core of the argument is that formal and informal institutions shape an economic agent's behaviour in different ways. Firstly, the stronger the rule of law and property rights protection, the lesser the agency problem (arising from possible expropriations), and thus the contracting cost (North, 1987). Secondly, from the law and economics literature, the better the quality of law enforcement, the higher the cost of non-compliance with rules and regulations. It is reasonable to conclude that countries with higher qualities of regulatory control and law enforcement will tend to have more effective public expenditure programs.

Most of the trade in poor institutional environments is restricted to interpersonal exchanges, social networks and contracts are informal and constrained by kinship relations. According to Aron (2000), in weak institutional environments firms or agents are not able to engage in complex and/or long-term contract exchanges because of a lack of effective enforcement. The author suggests that

well defined property rights and enforceable rules could encourage long term contracting, affect the volume and efficiency of investment and help develop capital markets which are an engine for economic growth. In addition, weak institutions are likely to deter public-private partnerships on infrastructure development because of uncertainty and fear of expropriation (AfDB, 2013, p. 40).

Legal origin is well documented in the literature for explaining differences in policy outcomes amongst countries (Voigt, 2012). Countries of the "Common Law" legal origin exhibit higher levels of, property rights protection and rule of law enforcement than their "Civil-Law" counterparts (Fabro & Aixala, 2009; La-Porta et al., 1999). Differences in these legal systems stem from their designs; "Common-Law" is developed as an attempt to limit the state whilst "Civil Law" is an extension of the State apparatus in controlling economic life. Common-Law offers more certainty in its administration than Civil-Law because of its adherence to the doctrine of legal precedent. With the doctrine of legal precedence there is a level of certainty on legal recourse for economic players that might need it. Certainty of laws and their application is desirable for the rule of law (Voigt, 2012) and economic growth. Security and certainty of property rights, including claims on future income streams and proceeds from investment, encourages factor and capital accumulation which is directly linked with economic growth.

The degree of ethnic-fractionalization in a population has an influence on a number of economic variables including but not limited to investment (Mauro, 1995), economic growth (Easterly & Levine, 1997; Ndulu, 2006), the quality of government (Alesina, Devleeschauwer, Easterly, Kurlat, & Wacziarg, 2003; La-Porta et al., 1999) and how resources get to be distributed (Bittencourt, 2012; Fabro & Aixala, 2009; Keefer & Khemani, 2003). It measures the probability that two randomly sampled people will come from different groups. When a population is highly fractionalized, the dominant ethnic group is expected to dictate public policy, bias the distribution of infrastructure and government expenditures. According to social polarisation literature, when a political party (politician) wins an election it (s/he) has to reward those who put it (him/her) into power, either through concessions or social development programs (Besley, Pande, & Rao, 2007; Duncan & Nakagawa, 2006; Keefer & Khemani, 2003). There is widespread evidence of marginalization along tribal lines in Africa, India and the Arab states, with rulers/leaders enriching their native areas and creating economic opportunities for their kith and kin. It is hypothesised that countries with fractionalized populations will have weak government institutions. This in turn will

lead to less growth enhancing fiscal policy choices and the impact of government spending will be small.

On a similar but different perspective to that of fractionalization, Plumber and Martin (2003) find a non-linear relationship between democracy and government spending. It is noted in their paper that if larger numbers of people have an influence on the political outcome; to the politicians it becomes more expensive to service their interest, thereby increasing government spending on public goods and rental transfers. They note that democracy does not necessarily lead to increasing economic growth, but moderate levels of democracy are associated with higher growth rates, this assertion is contrary to Olson (1982) who proclaims that high levels of democracy are matched by higher growth rates. With highly democratised and/or fractionalized societies, the cost of rewarding the constituencies is significant and large, this might manifest in bloated and bigger government agencies.

Concentrated countries exhibit larger social-capital[6] than their counterparts. Population per square kilometre measures the degree of concentration or congestion of people in a country. The more concentrated a population the higher is the diffusion of information across people. In concentrated populations, one would expect to find uniform 'informal' institutions, loosely referred to as culture, and increased co-operation generated by years of interactions between groups of people. Uniform cultural traits are likely to increase social-capital, and a high social-capital fosters trust, information exchange and lowers transaction cost from cooperation and coordination problems (Fabro & Aixala, 2009; North, 1990; Putman, 1993). With increased information flow, the agency problem is most likely to be mitigated and result in public officials pursuing policies that are of public interest. Cultural traits have been noted to proffer some explanation on per capita income differences amongst nations (Knowles & Weatherston, 2006; Landes, 1990; Olson, 1996; Pande & Udry, 2005). Culture is regarded as a public good, it is considered that when voters acquire more knowledge about what the real outcomes of government policies will be, then it is most likely that these policies would be improved and increase per capita income (Olson, 1996). Olson similarly notes that densely populated countries or concentrated countries have a higher per income capita than their counterparts which are sparsely populated.

[6] Social–capital is a measure of a population's involvement in social or collective efforts. Putnam (1993) defines social capital as features of social organization such as trust, norms, and networks that can improve the efficiency of society.

Olson attributes this notion to the effect of better institutions and policies that would attract immigration.

Most of government expenditures are reserved for public goods and services provision. In the social theory of government, government is viewed as a benevolent social planner. The sole role of government is to allocate, regulate and redistribute the economy and resources through public goods[7] provision. However, in the public choice theory, governments are run by rational agents who seek to maximize their utility functions ahead of that of the society. Taking a cue from the public choice perspective, public goods are/can be divided into 'targeted' and 'non-targeted' goods (Keefer & Khemani, 2003; Lizerri & Perscio, 2001). In the literature, 'targeted' public goods can be identified with 'pork-barrel' projects which are concentrated on a few voters. Pork barrel projects and targeted goods to a larger extent are viewed as non-monetary redistributions disguised as public goods. Targeted public goods are those goods and services that public officials and politicians are able to siphon rents from, obtain bribes, and further their narrow interests[8]. Whilst, with 'non-targeted' goods it is difficult to extract rents, for example education and health expenditures whose provision is universal and non-excludable. Politicians in countries with less effective governments/institutions are more likely to provide 'targeted' public goods ahead of 'non-targeted' goods (Duncan & Nakagawa, 2006; Keefer, 2007; Keefer & Khemani, 2003; Lizerri & Perscio, 2001; Sheilfer & Vishny, 1993) and likewise, politicians have an inclination to tax minorities and target benefits to the majority. However, Lizerri and Perscio (2001) notes that there exists a "trade-off between efficiency and targetability" leading to less than optimum outcomes. Owing to the foregoing issue, the impact of government expenditures on growth is expected to be subdued in less effective governments.

Fiscal centralization and decentralization have an effect on policy choices. However, the effects of fiscal centralization/decentralization are mixed and inconclusive. In certain studies centralization has been found to improve institutional quality and associated with higher growth rates (e.g., Treisman, 2000). However, it has been that, in centralized nations, corruption is much rampant than in decentralized nations (Fisman & Gatti, 2002a, 2002b; Wei, 2000). Public officials

[7] Public goods refer to both goods and services provided by the government.
[8] Interest could be rewarding voters and simple wealth accumulation through bribes among other things. Hence, the definition of targeted goods includes pork-barrel effects and other self-maximizing initiatives by government agents. A typical example would be expenditure on infrastructure, public wages and subsidies (Keefer & Khemani, 2003).

are easily captured by interest groups, either at policy formulation or at the implementation phase. It is difficult and costly for the electorate to monitor and check officials if directives are initiated at a central level than when it is done at the local level of government.

Levels of real or perceived corruption are found to negatively impact investment and economic growth (Mauro, 1997; Rose-Ackerman, 1978; Sheilfer & Vishny, 1993; Tanzi & Davoodi, 1997). The impact and effects of government spending has been hampered by a weak regulatory and institutional environment coupled with high levels of corruption (Wu et al., 2010). In Africa, bureaucratic and administrative corruption is rife and unabated, it ranges from petty corruption to grand corruption and this has retarded growth prospects of these nations. Corruption is regarded as a transaction cost (Acemoglu & Verdier, 2000) of using the government in rectifying market failures and whose cost is unavoidable if market failure is significant. What is conspicuous from Acemoglou and Verdier study is that corruption cannot be totally eradicated in activities that involve government; the least that could be done is to reduce the prevalence of corruption. To this end, one notable study by Abotsi and Iyavarakul (2015) has calculated a tolerable level of corruption and found that beyond the optimal level, corruption had a detrimental effect on FDI. Other studies claim corruption has a positive effect on growth because it 'oils the wheels of production' however, the majority of studies highlight that the costs of corruption are so high relative to the benefits of 'oiling' production. According to Tanzi et al corruption increases public investments and lowers its productivity. The authors also note that distortionary effects of corruption are exacerbated by weak auditing institutions.

2.3 Contribution and significance of the study

This chapter adds to the debate on the relationship between government expenditure and output. However, in this chapter we focus on the moderating effect of institutional quality on the relationship between government expenditure and output. Considering the paucity of studies that look at the role of institutions in the government expenditure-growth nexus. It is important that we identify institutional quality variables that have a positive effect on the government expenditure-output relationship. Furthermore, different government expenditure categories have been identified as having different impact on output growth for different countries. Consequently, identifying those expenditures that are influenced by the quality of institutions is important for the development of appropriate government policies that seek to increase output growth.

2.4 Methodological approach

This section briefly discusses the approach which is going to be used towards obtaining empirical results.

2.4.1 Theoretical growth model

Following on the methodology of Hansson and Henrekson (1994) the model is rooted on the foundations of a production function with a *Hicks-neutral* or factor augmenting technological progress:

1. $$Y_{it} = A_{it} f(K_{it} L_{it}),$$

output Y_{it} in a given country *i* at a time *t* is a function of capital K_{it} and labour L_{it}. A_{it}, measures the level of total factor productivity (TFP). Taking time derivatives for all the variables and rewriting the equation yields the following equations 2-5:

2. $$\frac{dY}{dt}_{it} = \frac{dY}{dA}\left[\frac{dA}{dt}_{it}\right] + \frac{dY}{dK}\left[\frac{dK}{dt}_{it}\right] + \frac{dY}{dL}\left[\frac{dL}{dt}_{it}\right]$$

3. $$\frac{dY}{dt}_{it} = \frac{dY}{dA}\left[\frac{dA}{dt}_{it}\frac{A}{A}\right] + \frac{dY}{dK}\left[\frac{dK}{dt}_{it}\frac{K}{K}\right] + \frac{dY}{dL}\left[\frac{dL}{dt}_{it}\frac{L}{L}\right]$$

4. $$\frac{dY}{dt}_{it}\frac{1}{Y} = \frac{dY}{dA}\left[\frac{dA}{dt}_{it}\frac{A}{A}\right]\frac{1}{Y} + \frac{dY}{dK}\left[\frac{dK}{dt}_{it}\frac{K}{K}\right]\frac{1}{Y} + \frac{dY}{dL}\left[\frac{dL}{dt}_{it}\frac{L}{L}\right]\frac{1}{Y}$$

5. $$\frac{\dot{Y}}{Y}_{it} = m_A\left[\frac{\dot{A}}{A}_{it}\frac{A}{Y}\right] + m_K\left[\frac{\dot{K}}{K}_{it}\frac{K}{Y}\right] + m_L\left[\frac{\dot{L}}{L}_{it}\frac{L}{Y}\right]$$

$\frac{\dot{A}}{A}_{it}$, $\frac{\dot{K}}{K}_{it}$ and $\frac{\dot{L}}{L}_{it}$ are the relative growth rates of total factor productivity, capital and labour in country *i* at time *t*, m_A is the marginal productivity of TFP which is assumed to be different across countries. Whilst, m_L and m_K are the marginal productivities of labour and capital and are assumed to be constant across countries. No assumption is made about the functional form of the production function. In specifying how government spending share to output (g_i) impacts growth, it is assumed that it affects it through the rate of total factor productivity. The growth of total factor productivity is given by[9]:

6. $$\frac{\dot{A}}{A}_{it} = \varphi + \emptyset g_{it},$$

where φ captures initial level of income or initial factor productivity among other variables that influence the growth of total factor productivity. $\emptyset$, measures the effect of government

[9] For similar specifications see, also, Demetriades and Hook Law (2006).

spending on total factor productivity. Further, it is assumed that the institutional quality (IQ) of an environment affects the impact of government spending on output growth through ∅. The effect of institutions on ∅ is given by:

7. $$\partial \frac{\dot{A}}{A_{it}} \Big/ \partial g_{it} = f(IQ) = \emptyset.$$

2.4.2 Stylized facts on the nature of ∅

In equation 8, the impact of government spending coefficient ∅ is comprised of positive public goods effect and the negative rents effect[10]. Government spending is expended in the provision of public goods and/or in the extraction of rents. For simplicity, it is assumed that the total effect is an additive sum of public goods and rent effects. In equation 9, extraction of rents is a function of institutions. The higher the quality of institutions the lower is the amount of rents extracted.

8. $$\phi = f[b(\overset{+}{p}), b(\overset{-}{r})] \quad ; \text{where} \quad b(p) \neq b(r)$$

9. $$r = f(\overset{-}{IQ})$$

Based on equation 8, it can be seen that the effects of government spending ∅ can be either positive or negative depending on the magnitude of the rents component *b(r)* relative to public goods component *b(p)*. It is reasonable to think that in countries with poor institutions, for example in kleptocratic nations, where public agents' rent seeking behaviour is unconstrained because of low regulatory oversight it is likely that *b(r) > b(p)*. It is expected that the impact of government spending will be more pronounced and favourable to growth in countries with effective institutions than in countries with poorer institutions, where the impact of government spending might even be negative.

By combining equations 6 and 7 with equation 5, output growth in country *i* can be expressed as follows:

10. $$\frac{\dot{Y}}{Y_{it}} = \beta_0 + \beta_1 g_{it} + \beta_2 \left[\frac{\dot{K}}{K_{it}}\right] + \beta_3 \left[\frac{\dot{L}}{L_{it}}\right] + u_{it}$$

[10] The composition of public goods and rent effects is not important. However, the associational relationship is what we are interested in. The impact attributable purely to public goods (*b(p))* and rents *(b(r))* determines the sign and magnitude of ∅.

2.4.3 Empirical model, Estimation

The benchmark model to be estimated is presented below:

11. $$y_{it} = a + a_{0it} + \beta_0 y_{0i} + \beta_{1i} X_{it} + \beta_2 G_{it} + \beta_{3i} IQ_{it} + u_{it}$$

where: y is GDP per capita growth, hereafter output growth, a is an intercept, a_{0it} represents a vector of country specific factors, y_0 is the log of initial income, X_{it} is a vector of variables that are key determinants of growth (e.g., trade openness, schooling years, life expectancy, gross capital formation), G_{it} is the log of government spending proxy (total and disaggregated components are used) and IQ_{it} is a vector of conditioning variables made up of the soft factors of growth, i.e., proxies of institutional quality and u_{it} is the stochastic error term. From standard growth models, we expect $\beta_0 < 0$ or > 0 if there is convergence or divergence respectively; $\beta_2 < 0$ if government spending is captured by rent seekers and $\beta_2 > 0$ if government spending is productively used for public goods provision. Given the likelihood of a bi-directional causation between growth and institutions, we treat growth, *y* and all the proxies of *IQ* as endogenous in our estimations. To avert the endogeneity problem, we employ an endogenous estimator because of the inherent flaws in pooled Ordinary Least Squares (OLS) estimator, random and fixed effects models. A brief discussion and summary of the estimators is given below.

2.4.4 A brief description of the estimation techniques considered

The structure of our data is comprised of OECD countries, emerging economy countries and all African (only those with available data for the proxies of government expenditure) countries. The quality of government expenditure data is poor due to a lack of transparency around some of the expenditure components, e.g., most notable is the secrecy around defence expenditure and expenditures of the executive branch of the government. Government expenditure data is fraught with frequent missing data points; this is most notable for African countries. To mitigate this problem, we have created non-overlapping 3- and 5-year averages from 1970-2015. Despite averaging, the data still has missing data points for some countries for the sampling time frame. Frequent missing data points are a challenge when one wants to do a dynamic analysis. Dynamic estimation techniques such as the GMM and sys-GMM suffer from low power when the data has missing data points. Thus, the study overlooks GMM estimators and, rather, uses other estimators that are applicable to the research questions and less sensitive to missing data points. A brief discussion of the estimation techniques is presented below.

In a pooled model, we simply combine all the time series and cross section elements in sequential blocks and use the combined data to obtain OLS estimates. This technique assumes that the intercept and slope parameters are the same across all individuals. However, it is possible to estimate the pooled model by OLS with sufficient degrees of freedom as it produces consistent and efficient estimates for the intercept and the slopes. Considering that our sample countries have heterogeneous elements within them, it is not plausible to assume that intercepts and the slope are equal for all cross-section units and do not vary over time. Since the aim of this study is to unravel government spending effects under different institutional settings, the pooled regression technique will be overlooked in favour of more flexible techniques that will cater for the heterogeneous nature of our data set and also allow us to relax some of the CLRM[11] assumptions.

An improvement of pooled OLS model often involves specifying the fixed (FE) or random (RE) effects of the error term. In case of the fixed effect model, the error is assumed to consist of two components: (i) a fixed component that can be estimated and (ii) a stochastic, independent and identically distributed component. The fixed component of the error term need not be strictly uncorrelated with the explanatory variables. The fixed effect model specification is appropriate if we are focusing on a specific set of countries and the inference is restricted to the behaviour of these set countries. For the RE model, the error term is assumed to consist of two components as well; (i) a randomly determined individual components and (ii) a stochastic, independent and identically distributed component. For the RE model to be consistent and unbiased the individual component of the error term needs to be strictly uncorrelated with the explanatory variables.

To capture the individual behavioural effects of the set countries, the fixed effects technique makes use of dummy variables. However, the inclusion of dummy variables will lead to; (1) a loss in degrees of freedom, that is, we will be estimating N-1 extra parameters if we include the intercept and (2) the problem of multi-collinearity. Moreover, the fixed effects technique cannot handle the effect of time-invariant variables such historical institutional factors or country characteristics such as, initial income level, legal origin and ethno-linguistic fractionalization which are some of the research variables. With the RE model, degrees of freedom are preserved, however the assumption that the differences in country estimates is random is difficult to justify considering that institutional differences don't result from a random process.

[11] Classic Linear Regression Model

Thus, the choice between the two techniques is dependent on the whether the error term is correlated with explanatory variables or not. If it is correlated, the fixed effect model is to be estimated; but in the absence of correlation, then random effect estimation approach will be most suitable. A Hausman test is used to select between RE and FE models.

The direction of causality between the variables of interest, government spending, institutions and economic growth, is not clear cut and runs in more than one direction. It is plausible that one treats the explanatory variables as endogenous covariates. To overcome the likely problem of endogeneity, this study utilises endogenous estimators. There is a long list of these estimators; the choice is motivated by the availability of 'good' instruments and whether the relationships under investigation are dynamic or not. Furthermore, moderate to high correlation among explanatory variables in growth studies is quite common; this study is not unique to this problem as shown by the correlation coefficients in Table A1.3. The presence of high correlation, multicollinearity, results in inefficient standard errors as they get to be inflated within a growth accounting equation, which in turn, results in insignificant coefficients.

Due to the caveats of the previously mentioned estimators, the three stage least squares (3SLS) with seemingly unrelated (SUR) error terms is utilised[12] to estimate equation 11 because it is capable of addressing the endogeneity issue and control for correlation effects amongst equations in the sample. For instance, there is good reason to assume country growth rates are interrelated. Furthermore, with this estimator, we are able to address some of the problems that were highlighted previous, i.e., feedback effects between institutional quality variables, economic growth and government expenditure and the ensuing multicollinearity. We model the growth equation, government expenditure equation and an *IQ* equation (for the quality of government and political corruption variables) simultaneously and in the process purge out endogeneity. Furthermore, the 3SLS is an instrumental variables (IV) estimator (Angrist & Pischke, 2009, p. 90) therefore suitable for this analysis since endogeneity is suspected. Furthermore, by assuming and allowing structural equations to be correlated through error terms (across equations) the 3SLS (SUR) allows for a joint estimation of the system with efficient results when compared to the 2SLS and the pooled OLS. Moreover, we are able to estimate different country time series, which are

[12] We report results from the 3SLS technique.

then weighted by the covariance matrix of the disturbances so as to control for inter-country effects.

To investigate the moderating effects of institutional quality on government expenditure, interaction terms are introduced in the model and equation 12 is estimated.

12. $$y_{it} = a + \beta_0 y_{i0} + \beta_1 X_{it} + \beta_2 G_{it} + \beta_3 IQ_{it} + \beta_4 (G * IQ_{it}) + u_{it},$$

Furthermore, in a bid to disentangle and isolate the institutional effects, public goods and rents effects on the impact of government spending on growth, we do a subsample analysis conditional on proxies of institutional quality, levels of development and estimate equation 13:

13. $$y_{it} = f(y_0, X_{it}, G_{it} | IQ_{it})$$

2.5 Empirical results

The data used comprised 71 countries made up of 45 African countries (including South Africa), 22 OECD nations and 4 BRIC (Brazil- Russia- India- China) nations spanning 1970-2015, see Table 2.1 for a list of countries. The data is obtained mainly from the World Bank's world development indicators (WDI) database[13], Easterly (2001) and the University of Gothernberg's Quality of Government (*qog*) dataset[14]. The data on government proxies is comprised of two sets (i) the post-1994 classification and (ii) the pre-1994 classification which ended in year 2000. Three- and five-year averages are utilised in this study so as to cater for persistence and cyclical effects in the data. Table A1.1 has the variable definitions and details of the data including sources.

Table 2.1: List of Countries

Australia	Algeria	Liberia	Brazil
Belgium	Angola	Libya	India
Canada	Burkina Faso	Madagascar	China
Germany	Burundi	Malawi	Russian Federation
Greece	Cameroon	Mali	
Finland	Central African Rep.	Morocco	
France	Chad	Mozambique	
Netherlands	Congo	Namibia	
Norway	Congo, Dem. Rep.	Niger	
Portugal	Cote d'Ivoire	Nigeria	
Luxembourg	Benin	Rwanda	

[13] WDI (2016)
[14] http://www.qog.pol.gu.se

Korea, Rep.	Botswana	Senegal
Ireland	Egypt	Sierra Leone
Italy	Equatorial Guinea	Somalia
Japan	Eritrea	South Africa
Denmark	Gabon	Sudan
Sweden	Gambia, The	Swaziland
Switzerland	Ghana	Tanzania
Spain	Guinea	Togo
United Kingdom	Kenya	Tunisia
United States	Lesotho	Uganda
	Kenya	Zimbabwe
	Lesotho	

2.5.1 Descriptive statistics, unit root testing and correlation analysis

Table A1.2 provides summary statistics of the variables used for the whole sample: means are in the first rows, followed by median, minimum, maximum, standard deviation and coefficient of variation, respectively. Most of the study variables are displaying a slightly normal distribution, with means and medians close to each other. The variations within variables is moderate as shown by a coefficient of variation less than 1 but for the gross domestic product per capita, government subsidies and transfers as a share of GDP (*subsidies*). From the correlation matrix, see Table A1.3, we find low, moderate and high correlation amongst some proxies of government expenditure. This suggests that the alternative proxies of government expenditures capture slightly different facets of government expenditure activities; this necessitates the need to use multiple proxies of government expenditure to get a complete picture of the impact of government expenditures on output growth. All our measures of the institutional quality (*IQ*) are significantly correlated suggesting that *IQ* proxies measure a similar dimension(s). For the purposes of this study, we use the *qog* and *PolCptn* as the main measures of *IQ* since they cover the entire sample time frame and they are available for 90% of the sampled countries. Ethnic fractionalisation is used as an alternative *IQ* variable since it is less of a subjective measure as compared to the *qog* and *PolCptn* variables. The data is winsorised at a level of 5% to cater for outliers and oddities in the data.

Panel unit root test results are presented in Table A1.4 and we report that the variables are stationary in levels. Most of the variables are stationary at the 1% level of significance with a few variables being stationary at the 5% level. Four panel unit root tests were considered, namely

Levin, Li and Chu test, Im, Pesaran and Shin test and the Fisher ADF and PP tests. Where there were differences in unit root results, we chose the majority outcome.

2.5.2 Regression Results

The objective of this chapter is to find the role of institutional quality on the government and output growth relationship. As such we report two sets of results, full step-wise estimation for each government expenditure proxy (found in the appendix) and the models with variables of interest, i.e., institutional quality, within the text body of this chapter. The full estimation results are summarised and presented in the appendix in Tables A1.5-A1.9. The variables of interest are government expenditure (and its proxies) and the interaction terms (*PolCptn*gov_consum* and *PolCptn*gov_consum*). For instance, Table A1.4 presents the results of the models which estimate the association between GDP per capita growth, government expenditure proxies and *IQ* after controlling for growth accounting variables. There are 3 panels in Table A1.5 representing proxies of government expenditure. The first panel (Model 1) reports the results from the basic growth accounting model showing the effect of government expenditure (i.e., government consumption (*gov_consum*) on per capita growth without conditioning for institutional quality. Unsurprisingly, the results in panel 1 in most of the tables show that government expenditure has a negative and significant effect on per capita growth. The second panel (columns 2-4) augments column 1 by incorporating the institutional variable, quality of government (*qog*) and the interaction term *qog*gov_consum*. The interaction term is intended to capture the moderation effect of institutions on the effect of government expenditure on growth. The third panel (columns 5-7), in the same fashion as in the second panel, augments column 1 by incorporating the institutional variable, political corruption (*PolCptn*) and the interaction term *PolCptn*gov_consum*. The same format is used for other specifications using different proxies of government expenditure and the two sets of institutional quality proxies; results are reported in Tables A1.6-A1.9. For brevity and ease of packaging, we report only the results where the government expenditure variable in the first panel of the table is significant.

We find a persistent negative and significant impact of government expenditure in most of our models using different proxies of expenditure (total, government final consumption, wages, current expenditures and public services) but the models using subsidies, government capital expenditure, social security expenditures, defence, health and education expenditure as a proxy

were insignificant[15]. These results corroborate existing empirical findings which also report a negative association between government expenditure and output growth (for example see, Barro (1990), Benoit (1978)). Furthermore, we find significant expected apriori signs for the institutional proxies, i.e., quality of institutions and the level/extent of political corruption, in most of our models. The results show that as the quality of institutions, i.e., quality of government (extent of political corruption), increase (decreases) the per capita output growth increases. The findings on *IQ* variables support the widely held view by institutional proponents (Acemoglu, Johnson, & Robinson, 2004; North, 1987, 1990) who also found a positive association between the rule of law, quality of bureaucracy and a low level of corruption with growth in per capita income. Further, we proceed and estimate the interacted terms of government expenditure proxies with the institutional quality variables. The interaction terms will aid in purging out the effects of institutional quality on the impact of government expenditure on per capita output. A summary of the interaction effects is presented in Tables 2.2 and 2.3.

[15] Hasnul (2015) also finds an insignificant relationship between education, defence, health and development expenditure and economic growth.

Table 2.2: Interaction effects of Government expenditure proxies and the quality of government. Dependent variable: Output growth

Notes: The table presents results of 3SLS [SUR] regression estimates for the whole sample. 3-year averages are used to estimate the models. Quality of Government (*qog*) is used as proxy for Institutional quality (*IQ*). Interacted terms are the product of government expenditure and the *IQ* variable. Estimates that are significantly different from zero at 10%, 5%, and 1% are marked with *; **, and ***, respectively. Standard errors are in parenthesis.

	1	2	3	4	5
Initial income	-0.967***	-0.459	-0.322	-0.757**	-0.475
	(0.198)	(0.308)	(0.319)	(0.338)	(1.50)
Trade	0.013**	0.020**	0.015*	0.009	0.012
	(0.007)	(0.009)	(0.009)	(0.010)	(1.54)
Popg	-0.433***	-0.777***	-0.594**	-0.425	-0.660***
	(0.151)	(2.581)	(0.249)	(0.266)	(0.243)
Schooling	0.900	1.898	2.061*	3.164**	2.235*
	(0.661)	(1.318)	(1.212)	(1.382)	(1.228)
Capital	0.202***	0.173***	0.154***	0.232***	0.159***
	(0.024)	(0.039)	(0.037)	(0.040)	(0.037)
Qog	-2.340	-5.110	-9.597***	-3.522	-5.589**
	(2.271)	(3.384)	(3.056)	(1.440)	(2.560)
Gov_consum	-0.453***				
	(0.090)				
Gov_consum*qog	0.442***				
	(0.128)				
Total_gov		-0.198***			
		(0.069)			
Total_gov*qog		0.188**			
		(0.090)			
Current_exp			-4.735***		
			(1.127)		
Current_exp*qog			5.326***		
			(1.367)		
Publicservices				-1.065***	
				(0.376)	
Public~s*qog				1.926***	
				(0.596)	
Wages					-0.772***
					(0.228)
Wages*qog					0.908***
					(0.311)
Constant	6.270***	4.277*	6.800***	0.350	4.088**
	(1.681)	(2.337)	(2.244)	(0.17)	(1.994)
N	303	183	176	152	176
chi-sq.	161.87***	76.53***	91.12***	77.66***	83.77***

Quality of Government (qog)[16]

In Table 2, the moderating effect of institutions (*qog*) on government expenditure (*gov_consum*, *total_gov*, *wages* and *current_exp*) is significant and positive in all the models. This suggests that as the quality of government increases, holding or increasing the share of government expenditure, a positive impact is generated which offsets the general negative impact of government expenditure *ceteris paribus* on growth. We proceed and plot the significant interaction effects by graphing the marginal impact of government expenditure on per capita output growth on a given fixed set of institutional quality values. The margins plot is important when one seeks to map out the marginal effects (or slopes) of a predictor variable conditional on some moderating variable. This is highlighted in Figures 1-5, where the margins plot for *gov_consum, total_gov, current_exp, publicservices and wages* conditional on three values of *qog* (at 0; 0.5 and 0.9) is shown. In Figure 1, the slope of the impact of government consumption as the size of expenditure increases becomes flatter for the highest level of the quality of government set at 0.90 whilst the slope of the impact line is steeper and more negative for lower levels of *qog*. Overall the negative impact of government consumption becomes less as the quality of government improves. Perhaps, the negative effect of government expenditure is more nuanced in environments with a less quality government. We also find the same result for the moderation effect of *qog* on total government expenditure, shown in Figure 2. Recently, Afonso and Jalles (2016) similarly uncovered the mitigating role of institutions on the negative impact of government expenditure on output using different proxies of institutional quality.

[16] A word of caution: when dealing with interaction terms involving continuous variables the researcher must note that some conditional impacts, i.e., $(\beta_1 + \beta_2 X)Z$, in this case, when the moderating effect of X is absent (X=0) the impact of Z is B_1, could be nonsensical and devoid of meaning (for an elaboration, see Hayes, 2013, pp. 225-227). For instance, the interaction between *qog* and government expenditure (G) will be $(\beta_{qog} + \beta_G * G)qog$; by assuming that G=0 we can have a conditional impact of β_{qog}. When scrutinised carefully, one notices that there is no possibility of having a status-quo where government expenditure is non-existence (stateless-ness). However, when the roles are reversed and qog=0, i.e., quality of government is terrible, we have a conditional impact of β_G which signals the full impact of the negative effect of an ineffective government, this somehow makes sense as compared to the other scenario. As such, we base our interpretation of the interaction terms on the moderating effect of institutional quality *(qog and PolCptn)* on the impact of government expenditure on per capita output growth throughout this chapter.

Figure 1: Moderation between Government consumption expenditure and qog

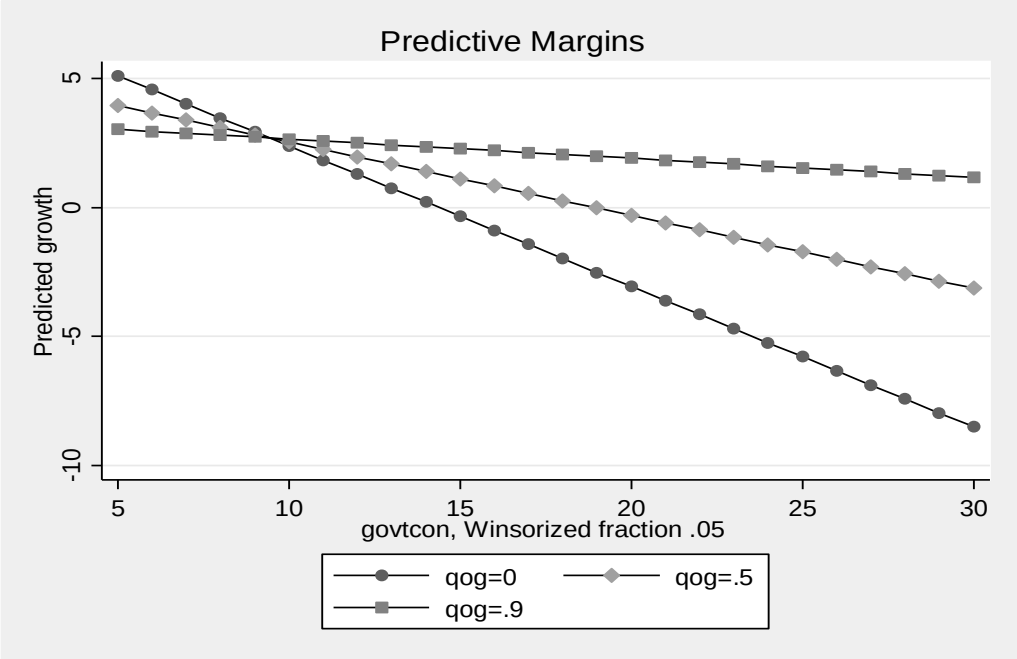
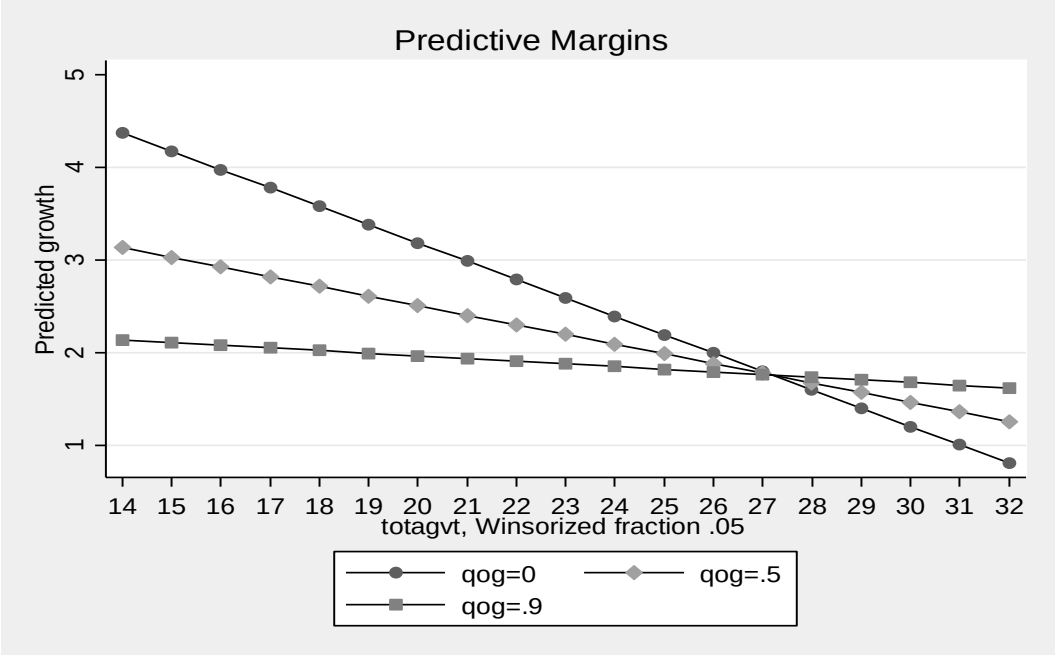


Figure 2: Moderation between total government expenditure and qog



Interestingly, in Figures 3, 4 and 5 below, the impact of government spending becomes positive at the highest level of *qog*. We see the marginal impact of current expenditures, public

services expenditure and wages becomes positive as the quality of government improves and reaches the highest level.

Figure 3: Moderation between current expenditures (CExp) and qog

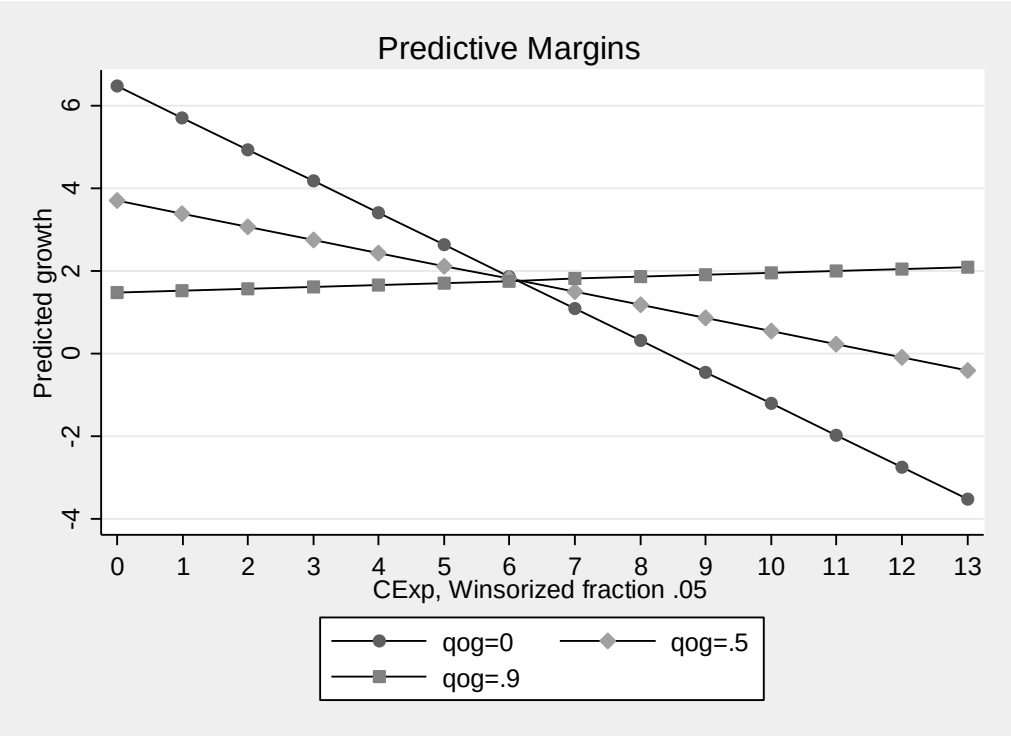


Figure 4: Moderation effect of Public services expenditure and qog

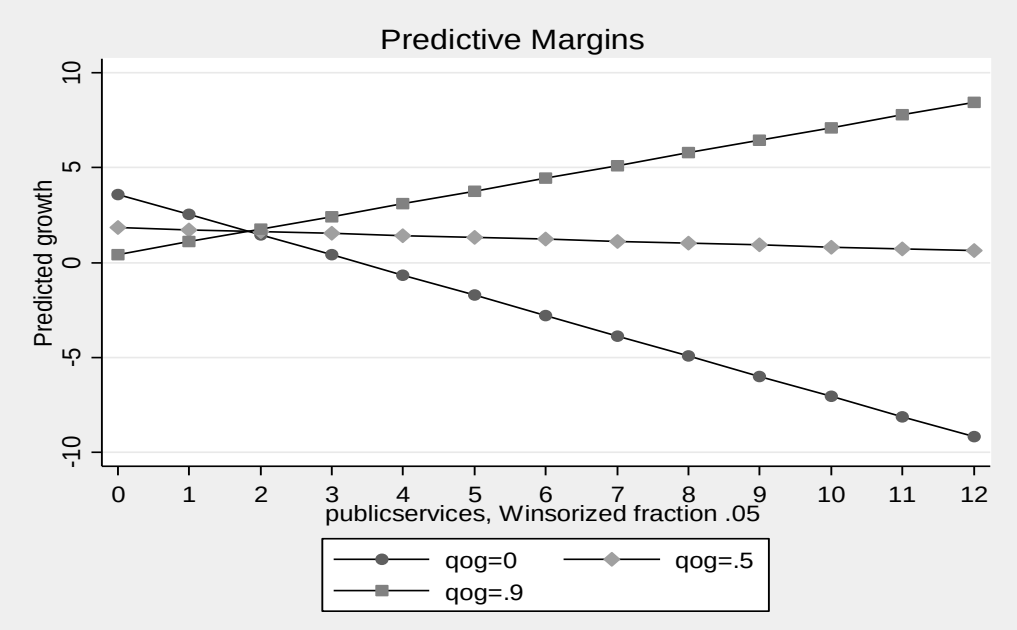
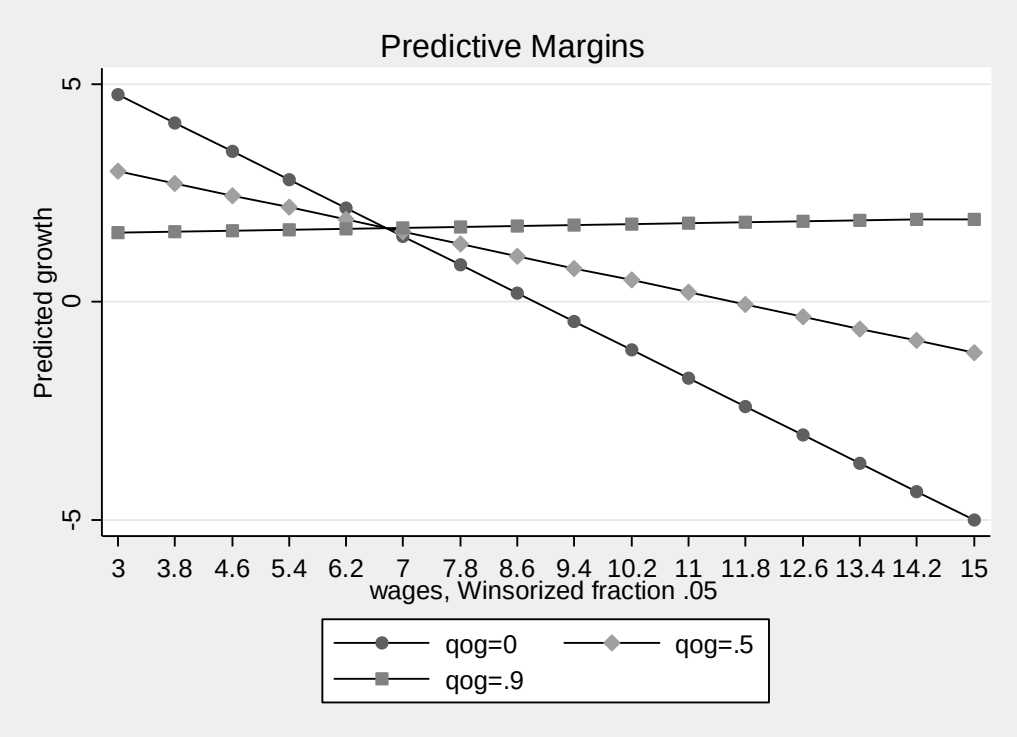


Figure 5: Moderation effect of government wages expenditure and qog



Political Corruption (PolCptn)

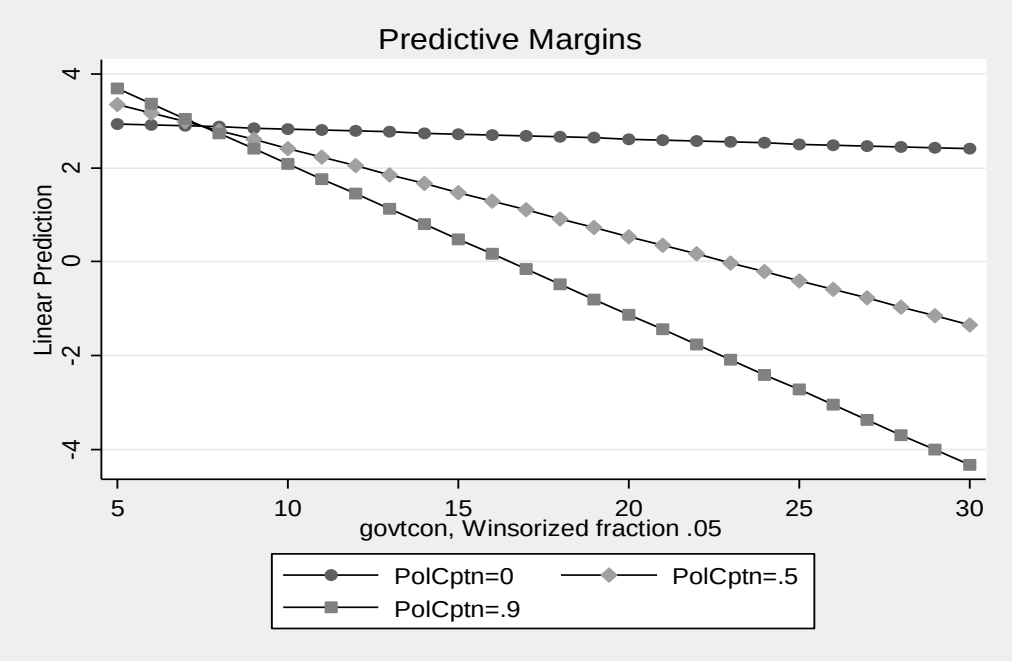
In Table 3 above, the moderating effect of the extent of political corruption (*PolCptn*) on government expenditure (*gov_consum*, *total_gov*, *wages* and *current_exp*) is significant and negative in all the models. This suggests that as the extent of political corruption increases, holding or increasing government expenditure at the same time, a negative impact is generated which augments and strengthens the general negative impact of government expenditure *ceteris paribus* on growth. This is highlighted in Figure 6, where the margins plot for *gov_consum* conditional on three values of *PolCptn* (0; 0.5; 0.9) and we observe that the negative impact of government expenditure declines as political corruption decreases towards zero. The slope of the impact of government consumption becomes flatter and less negative as the extent of political corruption decreases. The slope of government consumption is more negative as the highest level of political corruption is set at 0.90. Perhaps, the negative effect of government expenditure is more nuanced in environments with a less quality government characterised by high political corruption.

Table 2.3 : Interaction effects of Government expenditure proxies and political corruption. Dependent variable: Output growth

Notes: The table presents results of 3SLS [SUR] regression estimates for the whole sample. 3-year averages are used to estimate the models. Quality of Government (*qog*) is used as proxy for Institutional quality (*IQ*). Interacted terms are the product of government expenditure and the *IQ* variable. Estimates that are significantly different from zero at 10%, 5%, and 1% are marked with *; **, and ***, respectively. Standard errors are in parenthesis.

	(1)	(2)	(3)	(4)	(5)
Initial income	-0.759***	-0.593***	-0.418*	-0.720***	-0.543**
	(0.153)	(0.200)	(0.220)	(0.246)	(0.223)
Trade	0.008	0.010	0.003	0.001	0.003
	(0.006)	(0.008)	(0.007)	(0.008)	(0.007)
Pop growth	-0.028	-0.165	-0.084	-0.410*	-0.112
	(0.106)	(0.169)	(0.165)	(0.226)	(0.164)
Schooling	3.792***	4.126***	2.813**	1.693	3.370**
	(0.957)	(1.348)	(1.377)	(1.730)	(1.382)
Capital	0.176***	0.166***	0.165***	0.167***	0.168***
	(0.017)	(0.026)	(0.024)	(0.026)	(0.024)
PolCptn	3.210**	1.015	5.093***	-1.068	2.350
	(1.521)	(1.848)	(1.822)	(1.437)	(1.513)
Gov_consum	-0.011				
	(0.049)				
PolCptn*Gov_con	-0.355***				
	(0.090)				
Total_gov		-0.036			
		(0.027)			
Total_gov*PolCptn		-0.064			
		(0.056)			
Current_exp			0.339		
			(0.363)		
Current_exp*PolCptn			-3.216***		
			(0.941)		
Publicservices				-0.126	
				(0.198)	
Publicservices*PolCptn				-0.020	
				(0.364)	
Wages					0.003
					(0.097)
Wages*PolCptn					-0.443**
					(0.210)
Constant	-12.514***	-14.214***	-11.332**	-3.066	-12.286***
	(3.415)	(4.719)	(4.750)	(6.140)	(4.757)
N	543	333	300	275	300
Chi-sq.	239.97***	98.49***	102.04***	83.11***	100.00***

Figure 6: Moderation effect of government consumption and Political corruption



However, the negative relationship seems to dissolve as the level of political corruption decreases for the following expenditure proxies, *wages* and *current expenditure*s whose impact slopes are positive (see, Figures 7-8).

Figure 7: Moderation effect of Current expenditures and Political corruption

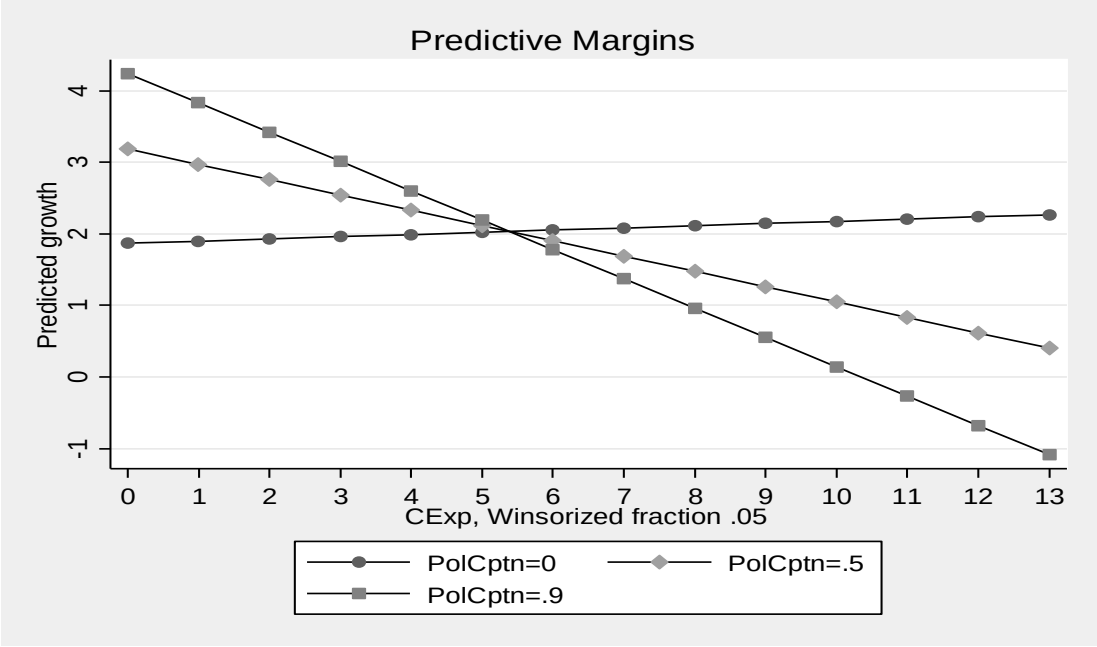
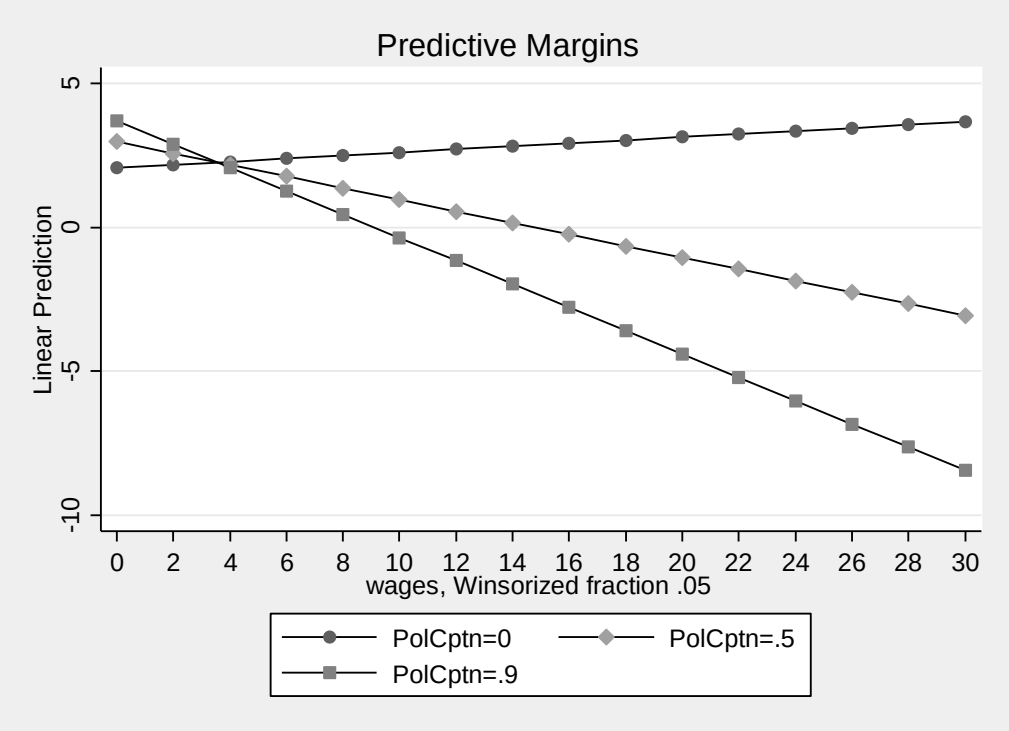


Figure 8: Moderation effect of Wages and Political corruption



2.5.3 Robustness checks and additional analysis

To test for robustness in our results, we re-estimate the models using pooled OLS and random effects, also we conduct a subsample analysis based on a cohort of measures. We interrogate the association between government expenditure and growth after controlling for the level of development, origin of law, ethnic fractionalisation and partitions of the data on the median values of the institutional quality proxies. Additionally, we do a sensitivity analysis based on 5-year averaged data and report no material differences with those of the 3-year averages. Government consumption (*gov_consum)* variable is chosen as the main variable for robustness testing due to its long time series length and country coverage. Where possible, we include the other government expenditure proxy variables.

Results on pooled OLS are presented in Tables 2.4 and 2.5, we find no qualitative differences between these results and those obtained in the 3SLS, all the interacted terms maintain their signs and are statistically significant. We note that the pooled OLS standard errors are a bit inflated; this has resulted in some control variables becoming insignificant and the interacted terms moving away from the 1% level of significance. Particularly, the significant levels of the interacted terms have deteriorated in the model.

Table 2.4: Pooled OLS - Interaction effects of Government expenditure proxies and the quality of government. Dependent variable: Output growth

	1	2	3	4	5
Initial income	-1.007***	-0.449	-0.344	-0.593	-0.447
	(0.289)	(0.336)	(0.456)	(0.602)	(0.461)
Trade	0.017*	0.028**	0.015	0.011	0.013
	(0.009)	(0.014)	(0.011)	(0.012)	(0.011)
Pop growth	-0.316**	-0.334	-0.414	-0.204	-0.443
	(0.149)	(0.493)	(0.337)	(0.464)	(0.344)
Schooling	4.601**	9.636***	5.098	4.940	5.512*
	(1.820)	(2.927)	(3.126)	(3.366)	(3.123)
Capital	0.188***	0.144***	0.124**	0.218***	0.131**
	(0.036)	(0.040)	(0.051)	(0.055)	(0.054)
Qog	-4.380	-10.360***	-10.414**	-4.034	-6.388
	(3.135)	(3.895)	(4.640)	(3.774)	(3.942)
Gov_consum	-0.489***				
	(0.122)				
Qog*Gov_consum	0.456**				
	(0.183)				
Total_gov		-0.302***			
		(0.078)			
Qog*Total_gov		0.285***			
		(0.101)			
Current_exp			-4.855***		
			(1.770)		
Qog*Current_exp			5.402**		
			(2.225)		
Publicservices				-0.993***	
				(0.293)	
Qog*Publicservices				1.800***	
				(0.542)	
Wages					-0.774**
					(0.381)
Qog*Wages					0.876*
					(0.490)
Constant	-10.032	-30.005***	-11.316	-18.034	-16.001
	(6.277)	(11.322)	(11.884)	(12.767)	(11.684)
Observations	303	183	176	152	176
chi-sq.	104.069	68.594	47.584	80.938	45.247

Notes: * $p<0.1$; ** $p<0.05$; *** $p<0.01$, robust standard errors in parentheses.

Table 2.5: Pooled OLS - Interaction effects of Government expenditure proxies and political corruption. Dependent variable: Output growth

	1	2	3	4	5
initial income	-0.701***	-0.593***	-0.388	-0.654*	-0.509**
	(0.183)	(0.200)	(0.240)	(0.351)	(0.249)
trade	0.008	0.010	0.003	0.001	0.002
	(0.008)	(0.011)	(0.008)	(0.009)	(0.008)
Pop growth	-0.018	-0.165	-0.073	-0.413	-0.095
	(0.121)	(0.301)	(0.292)	(0.345)	(0.288)
schooling	3.354***	4.130**	2.542	0.968	3.096
	(1.115)	(1.744)	(1.855)	(2.138)	(1.912)
capital	0.179***	0.166***	0.162***	0.173***	0.168***
	(0.024)	(0.035)	(0.035)	(0.043)	(0.035)
PolCptn	3.206	1.017	4.564	-1.132	2.232
	(2.156)	(2.221)	(2.934)	(2.044)	(2.003)
gov_consum	-0.016				
	(0.073)				
PolCptn*Gov_consum	-0.355***				
	(0.133)				
total_gov		-0.036			
		(0.033)			
PolCptn*total_gov		-0.064			
		(0.068)			
current_exp			0.228		
			(0.435)		
PolCptn*current_exp			-2.943**		
			(1.469)		
publicservices				-0.080	
				(0.205)	
PolCptn*publicservices				-0.067	
				(0.347)	
Wages					0.003
					(0.085)
PolCptn*wages					-0.438*
					(0.261)
Constant	-11.103***	-14.229**	-10.139	-0.673	-11.354*
	(4.140)	(6.453)	(6.682)	(6.951)	(6.805)
N	543	333	300	275	300
chi-sq.	144.71***	64.79***	51.66***	44.46***	50.84***

Notes: * $p<0.1$; ** $p<0.05$; *** $p<0.01$. Robust standard errors in parentheses

We partition the data by legal origin, i.e., common law and civil law, and the median value of *IQ* variable of choice (i.e., *qog* and *PolCptn*); we find no statistical differences between the

effects of government expenditure (*gov_consum*, *wages*, *total_gov*) conditional on legal origin, see Table A1.10 for the results on *gov_consum*. Probably, legal origin has no effect on the impact of government expenditure since it mainly affects private agents' decision making on matters that deal with economic life and not government made decisions. However, differences on the impact of government expenditure based on partitions of *IQ* (i.e., quality of government and political corruption) are statistically significant, see Table A1.9. We find larger negative effects of government expenditure on per capita output growth in environments with an *IQ* score that is unfavourably different from the sample median score of *IQ*. This is expected considering that the *IQ* variables have a direct bearing on public/government agents' decision-making processes and ultimately their choices. This signals the scope for policy interventions that can strengthen the dimensions of the institutional environment of a country and directly or indirectly affect the outcomes of government expenditure. Policies aimed at either improving the quality of the bureaucracy, control of corruption and upholding of the rule of law should be encouraged and strengthened.

Furthermore, the study uses ethnic-fractionalization as an *IQ* proxy and report that a high degree of fractionalization has a negative effect on growth, see Table A1.12. The interacted term between government expenditure and fractionalization is statistically insignificant for all the spending categories but for wages. Fractionalization seems to have a negative and significant moderating effect on wages; perhaps this could be linked with clientelism, nepotism and politics of patronage. With a fractionalized society, different ethnic regions or provinces need to be included in the sharing of the pie[17] and the easiest way is to employ them within government structures and form the bulk of the civil servants. This generates a negative effect on growth as rent seeking activities increase as a result of fractionalization in the society. This is somehow linked with the observation in Keefer and Khemani (2003) and Platteau (2009) who note that in fragmented societies, politicians have no incentive to offer society-wide public services. There is little benefit in doing so, since they need only to reward the ethnic group that matters and public employment is one way of achieving that (Keefer, 2007), the wages bill will also grow and have a negative growth effect.

[17] See Lybeck (1988, p. 34) for an example on political fragmentation and coalition governments.

2.6 Discussion of results and Conclusion

The results obtained in this paper can be surmised as follows. First the results point out that, generally, government expenditure has a negative effect on the growth of per capita income whilst institutions have a positive effect on growth. We failed to find any significant positive effects of government expenditure on output growth using the full sample and partitioned data. This result is at odds with the findings of Nawaz and Khawaja (2016) who find a positive and negative effect of government spending in developed and developing countries respectively. We find no significant differences between the effect of government expenditure on output growth in developed and developing countries. However, when regional dummies are interacted with government consumption expenditure a significant positive impact is registered for OECD countries suggesting a better effectiveness of government expenditure in OECD countries compared to other countries, see Table A1.11. The dummy for Sub-Sahara Africa is negative and significant suggesting that government expenditure has a detrimental effect on growth. These findings, considered jointly, imply that the level of development has a bearing on the impact of government expenditure on output growth. Nevertheless, a negative impact of government is registered across regions albeit with government expenditures in OECD nations having a less detrimental effect on growth. Our results corroborate the works of Afonso and Jalles (2011, 2016); Butkiewicz and Yanikkaya (2011); Angelopoulos and Economides (2008); Benoit (1978); Deverajan et al. (1996) and Dar and AmirKhalkhali (2002) among others, who find a negative government expenditure effect on output growth.

Second, our findings further suggest that institutions have a moderating effect on the impact of government expenditure on output growth. The results from the interacted terms reveal that as the quality of governance improves the, generally, negative effect of government expenditure decreases or even becomes positive in some expenditure categories. This finding suggests that the overall effect of government expenditure on growth depends on the combined effect on productivity as a result of the levels of institutional quality and the level of government expenditure. The role of the institutional environment in shaping the relationship between government expenditure and growth is not so straight forward; since institutions not only do they drive down adverse social ills like corruption but also improve the efficiency of government expenditure financed activities. So as to purge out the channels, through which institutional quality and government expenditure interact, we insinuate that as the quality of institutions improve,

corruption, public agency problems and other rent seeking activities decline, and the efficiency of public sector activities improve hence generating positive growth effects.

We conclude that institutions have a moderating effect on the impact of government expenditure on growth in per capita income. Despite finding a negative effect of government expenditure in all the expenditure proxies used in this study, we note that the negative impact varies according to the level of development and the quality of institutions of a country. However, we find no significant effects of differences in legal origin. The impact of government expenditure seems not to be influenced by the legal regime, i.e., common or civil, present in a country.

2.7 Appendix 1: Tables

Table A1. 1: List of variables and definitions

Growth Specific Independent Variables				
No.	**Variable name**	**Variable Label**	**Definition**	**Source**
1.	GDP per capita	*Initial income*	This variable captures differences in levels of development of the countries and for convergence. We first compute the natural logarithm of the initial level of GDP per capita which is set at 1970.	Authors' own calculations from the World development indicators.
2.	Population growth rate	*Popg*	This variable captures population growth. It is computed as the lagged log value of the fertility rate.	The data are available from the World development indicators.
3.	Schooling years	*Schooling*	This variable is a measure of the literacy levels of the population. These are based on Barro and Lee computations.	The data are available from Dahlberg, Holmberg, Rothstein, Khomenko, and Svensson (2017).
4.	Trade	*Trade*	This variable is a measure of trade openness and it is computed as the current value of the sum of exports and imports as a percentage of GDP.	Authors' own calculations from the World Bank database.
5.	Gross capital formation	*Capital*	This variable captures the amount of domestic investment. It is computed as the natural log of the gross capital formation	Authors' own calculations from the World Bank database.
6.	Government spending	*Gov*	This variable captures the amount of government spending and its components. It is computed as the current percentage value of GDP. Proxies of *G* are as follows: *total_gov* - total government expenditure; *gov_consum* – government consumption of final goods and services; *educ* – education expenditure; *health* – health expenditure; *publick* – government capital expenditure; *defence* – defence expenditure; *wages* – expenditure on salaries and wages; *publicservices* – expenditure on	Data available from the World Bank database and Easterly (2001)

	public services; *subsidies* – expenditure on subsidies and transfers; *Current_exp* – current expenditure.

Institutional Specific Independent Variables				
No.	**Variable name**	**Variable Label**	**Definition**	**Source**
1.	Political corruption	*PolCptn*	This variable measures the extent of corruption within the three branches of the government; executive, legislature and judiciary. It is an aggregation of the average of (a) public sector corruption index; (b) executive corruption index; (c) the indicator for legislative corruption; and (d) the indicator for judicial corruption. Higher values indicate more corruption. The scale is measured from 0-1.	The data are available from Dahlberg et al. (2017)
2.	Quality of Government	*qog*	This variable measures the quality of the government. It is the average of three ICRG components; (1) corruption, (2) law and order and (3) bureaucracy quality. Higher values indicate higher quality of government. The scale is measured from 0-1.	The data are available from Dahlberg et al. (2017)
3.	Legal Origin	*LO*	This variable identifies the legal origin of the Company Law or Commercial code of each country. It is classified into two categories, English common law and French Civil law.	The data are available from Dahlberg et al. (2017)
4.	Fracti-onalization	*Fractlztn*	Reflects the probability that two randomly selected people from a given country will not belong to the same ethnic group. The higher the number, the more fractionalized society. The scale is measured from 0-1.	The data are available from Dahlberg et al. (2017)

Table A1. 2: Summary statistics

Stats	Gdpcapgrowth	Trade	Popg	Schooling	Capital
Mean	1.75	56.68	1.83	1.00	23.51
Median	1.82	52.74	2.19	1.04	22.20
Minimum	-4.10	28.43	-5.50	0.07	8.26
Maximum	7.82	92.02	10.05	1.24	37.78
Std. deviation	3.04	22.41	1.18	0.25	7.34
Coef. of variation	1.73	0.40	0.64	0.25	0.31

Stats	Total_Gov	Gov_Consum	Qog	Polcptn	Fractlzn	Current_Exp
Mean	31.28	16.75	0.56	0.43	0.49	5.42
Median	31.45	17.27	0.47	0.46	0.53	6.05
Minimum	14.95	7.99	0.25	0.01	0.00	1.76
Maximum	50.45	25.39	0.97	0.94	0.93	12.81
Std. deviation	10.55	5.24	0.24	0.29	0.30	1.79
Coef. of variation	0.34	0.31	0.43	0.67	0.61	0.34

Stats	Educ	Defence	Publick	Health	Wages	Subsidies
Mean	3.38	2.83	3.37	2.17	6.33	0.89
Median	3.42	2.60	2.73	1.55	6.07	0.50
Minimum	0.39	0.98	0.98	0.25	1.77	0.01
Maximum	7.25	6.01	10.24	6.07	12.86	3.37
Std. deviation	1.95	1.43	2.40	1.76	3.24	1.04
Coef. of variation	0.58	0.51	0.71	0.81	0.51	1.16

Source: Author's calculations

Table A1. 3: Correlation matrix

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Gdpcapgrowth[1]	1								
Trade[2]	0.0631*	1							
Popg[3]	-0.1821*	0.0241	1						
Schooling[4]	0.0941*	0.0609*	-0.4505*	1					
Capital[5]	0.4560*	0.2648*	-0.1542*	0.2344*	1				
Fractlzn[6]	-0.3526*	0.053	0.5646*	-0.3650*	-0.3613*	1			
Qog[7]	0.2993*	0.1234*	-0.6070*	0.5798*	0.1983*	-0.6456*	1		
Polcptn[8]	-0.2382*	-0.0179	0.5456*	-0.3989*	-0.2782*	0.6229*	-0.8566*	1	
Total_Gov[9]	-0.0187	0.5059*	-0.2887*	0.2945*	0.1844*	-0.3482*	0.3515*	-0.2508*	1
Gov_Consum[10]	-0.0355	0.4277*	-0.2993*	0.2789*	0.2047*	-0.3217*	0.4560*	-0.4382*	0.5415*
Educ[11]	-0.0305	0.5329*	0.2302*	-0.1672*	0.0546	-0.1150*	-0.1945*	0.2029*	0.5645*
Defence[12]	-0.016	-0.1752*	0.1757*	0.0339	0.0598	-0.1811*	-0.2209*	0.0853	0.1257*
Publicserv~[13]	-0.2222*	0.3413*	0.5061*	-0.3728*	-0.0766	0.3675*	-0.4479*	0.3274*	0.2590*
Health[14]	0.0279	0.1700*	-0.3480*	0.2940*	0.1815*	-0.3469*	0.3559*	-0.3880*	0.4848*
Wages[15]	-0.2298*	0.1977*	0.3442*	-0.2249*	-0.0472	0.1271*	-0.4536*	0.4334*	0.3963*
Subsidies[16]	0.0115	0.3298*	0.0289	0.0285	-0.1044	-0.0151	0.1314	-0.1285	0.2608*
Publick[17]	-0.0645	0.2515*	0.4631*	-0.3610*	0.0191	0.2018*	-0.5325*	0.4809*	0.2882*
Current_Exp[18]	-0.2246*	0.2347*	0.3256*	-0.2648*	-0.1066*	0.1440*	-0.4418*	0.4239*	0.4108*

	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]
Gov_consum[10]	1								
Educ[11]	0.2413*	1							
Defence[12]	0.0736	0.1217*	1						
publicserv~[13]	0.0215	0.5237*	0.2010*	1					
Health[14]	0.2768*	0.0978*	0.0537	0.0177	1				
Wages[15]	0.0433	0.7055*	0.2973*	0.6056*	0.0236	1			
subsidies[16]	0.0908	0.2552*	-0.1368	0.1504*	-0.1739*	0.2356*	1		
Publick[17]	-0.1071*	0.5750*	0.2685*	0.6693*	0.0131	0.6190*	0.0377	1	
Current_exp[18]	0.0723	0.7057*	0.2353*	0.5694*	0.0151	0.9638*	0.2737*	0.5856*	1

Source:Author's calculations

Table A1. 4 : Panel unit root testing (variables in levels)

	Levin, Li & Chu test	Im, Pesaran & Shin test	ADF-Fisher test	PP-Fisher test
Gdpcapgrowth	-13.41***	-8.42***	306.22***	416.24***
Trade	-4.32***	-0.944	155.17***	149.79***
Popg	-0.09***	-6.82***	308.7***	179.19***
Schooling	-8.62***	-4.36***	246.24***	186.9***
Capital	-7.88***	-3.33***	181.12***	178.21***
Fractlzn	N/A	N/A	N/A	N/A
Qog	-8.88***	-3.05***	174.64***	144.64***
Polcptn	-4.8***	-1.49***	162.89**	122.49
Total_Gov	-7.611***	-1.91***	88.39***	135.9***
Gov_Consum	-7.56***	-4.04***	218.23***	237.18***
Educ	-19.12***	-6.17***	132.42***	145.67***
Defence	-28.34***	-0.93***	92.91**	99.19**
Publicservices	-19.48***	-5.47***	114.64***	101.87***
Health	-7.86***	-3.87***	129.53***	147.8***
Wages	-12.09***	-0.72	77.21***	84.03***
Subsidies	-987.9***	-122.95***	52.11**	21.2
Publick	-11.94***	-3.12***	112.21**	119.21**
Current_Exp	-12.19***	-0.49	93.46**	98.07**

Notes: Levels of significance at 1% and 5% are marked by *** and ** respectively. N/A-no results since the variable is fixed over time for each country.

Table A1. 5: Government consumption (3-year averages, 1970-2015)

Notes: The table presents results of 3SLS [SUR] regression estimates for the whole sample. 3-year averages are used to estimate the models. Quality of Government (*qog*) and Political corruption (*PolCptn*) are used as proxies for Institutional quality (*IQ*). Interacted terms are the product of government expenditure and the *IQ* variable. Estimates that are significantly different from zero at 10%, 5%, and 1% are marked with *; **, and ***, respectively. Standard errors are in parenthesis.

	1	2	3	4	5	6	7
Initial income	0.064	-0.892	-0.734	-0.967	-0.268	-0.258	-0.364
	(0.121)	(4.45)***	(3.53)***	(4.89)***	(2.02)**	(1.89)*	(2.72)***
Trade	0.010	0.013	0.003	0.013	0.011	-0.002	0.008
	(1.80)*	(2.03)**	(0.44)	(2.04)**	(1.88)*	(0.46)	(1.42)
Popg	-0.230	-0.490	-0.361	-0.433	-0.078	-0.049	-0.069
	(2.17)**	(3.20)***	(2.26)**	(2.86)***	(0.71)	(0.44)	(0.64)
Schooling	-0.387	0.940	1.390	0.900	0.160	0.050	-0.021
	(0.86)	(1.39)	(1.97)**	(1.36)	(0.35)	(0.11)	(0.05)
Capital	0.187	0.172	0.138	0.202	0.178	0.164	0.199
	(12.25)***	(7.41)***	(5.77)***	(8.29)***	(11.36)***	(10.23)***	(12.03)***
Gov_consum	-0.121	-0.162		-0.453	-0.160		-0.012
	(4.49)***	(4.81)***		(5.02)***	(5.57)***		(0.24)
Qog		4.707	2.857	-2.340			
		(4.52)***	(2.74)***	(1.03)			
Qog*Gov_consum				0.442			
				(3.46)***			
PolCptn					-2.578	-1.630	2.681
					(4.71)***	(3.05)***	(1.73)*
PolCptn*gov_con							-0.334
							(3.62)***
Constant	-0.778	2.110	0.364	6.270	2.402	0.455	0.246
	(0.97)	(1.76)*	(0.29)	(3.73)***	(2.39)**	(0.46)	(0.21)
N	576	303	308	303	543	550	543
chi-sq.	190.93***	144.18***	95.15***	161.87***	200.01***	147.51***	217.97***

Table A1. 6: Total government (3yr averages, 1970-2000)

Notes: The table presents results of 3SLS [SUR] regression estimates for the whole sample. 3-year averages are used to estimate the models. Quality of Government (*qog*) and Political corruption (*PolCptn*) are used as proxies for Institutional quality (*IQ*). Interacted terms are the product of government expenditure and the *IQ* variable. Estimates that are significantly different from zero at 10%, 5%, and 1% are marked with *; **, and ***, respectively. Standard errors are in parenthesis.

	1	2	3	4	5	6	7
Initial income	0.076	-0.602**	-0.734***	-0.459	-0.144	-0.144	-0.137
	(0.143)	(0.304)	(0.208)	(0.308)	(0.182)	(1.171)	(0.183)
Trade	0.016**	0.023**	0.003	0.020**	0.009	-0.004	0.006
	(0.007)	(0.009)	(0.007)	(0.009)	(0.008)	(0.8)	(0.008)
Popg	-0.340**	-0.922***	-0.361**	-0.777***	-0.239	-0.050	-0.192
	(0.146)	(0.251)	(0.159)	(0.258)	(0.166)	(0.459)	(0.173)
Schooling	-0.573	2.000	1.390**	1.898	-0.281	-0.393	-0.401
	(0.616)	(1.333)	(0.706)**	(1.318)	(0.669)	(0.414)	(0.668)
Capital	0.166***	0.135***	0.138***	0.173***	0.176***	0.169	0.193
	(0.019)	(0.034)	(0.024)	(0.039)	(0.022)	(11.08)***	(0.025)***
Total_gov	-0.053***	-0.061***		-0.198***	-0.045***		-0.017
	(0.015)	(0.023)		(0.069)	(0.017)		(0.027)
Qog		1.172	2.857***	-5.110			
		(1.563)	(1.043)	(3.384)			
Qog*Total_gov				0.188**			
				(0.09)			
PolCptn					-1.066	-1.423	1.310
					(0.789)	(2.79)***	(1.899)
PolCptn*Total_gov							-0.079
							(0.057)
Constant	-0.708	1.573	0.364	4.277*	0.564	0.165	-0.632
	(1.057)	(1.966)	(1.255)	(2..337)	(1.282)	(0.18)	(1.541)
N	355	183	308	183	333	598	333
chi-sq.	115.20***	70.51***	95.15***	76.53***	84.76***	165.13***	87.14***

Table A1. 7: Wages (3yr averages, 1970-2000)

Notes: The table presents results of 3SLS [SUR] regression estimates for the whole sample. 3-year averages are used to estimate the models. Quality of Government (*qog*) and Political corruption (*PolCptn*) are used as proxies for Institutional quality (*IQ*). Interacted terms are the product of government expenditure and the *IQ* variable. Estimates that are significantly different from zero at 10%, 5%, and 1% are marked with *; **, and ***, respectively. T-statistics are in parenthesis.

	1	2	3	4	5	6	7
Initial income	-0.130	-0.803	-0.734	-0.475	-0.292	-0.258	-0.171
	(0.84)	(2.65)***	(3.53)***	(1.50)	(1.53)	(1.89)*	(0.87)
Trade	0.008	0.012	0.003	0.012	0.002	-0.002	0.003
	(1.28)	(1.48)	(0.44)	(1.54)	(0.24)	(0.46)	(0.37)
Popg	-0.229	-0.906	-0.361	-0.660	-0.207	-0.049	-0.143
	(1.54)	(3.89)***	(2.26)**	(2.72)***	(1.24)	(0.44)	(0.85)
Schooling	-0.177	2.593	1.390	2.235	0.187	0.050	0.037
	(0.28)	(2.07)**	(1.97)**	(1.82)*	(0.27)	(0.11)	(0.05)
Capital	0.174	0.120	0.138	0.159	0.182	0.164	0.188
	(8.16)***	(3.41)***	(5.77)***	(4.31)***	(7.84)***	(10.23)***	(8.11)***
Wages	-0.163	-0.130		-0.772	-0.160		0.034
	(3.63)***	(2.07)**		(3.38)***	(3.12)***		(0.35)
Qog		0.203	2.857	-5.589			
		(0.12)	(2.74)***	(2.15)**			
Qog*Wages				0.908			
				(2.92)***			
PolCptn					-0.340	-1.630	2.675
					(0.40)	(3.05)***	(1.73)*
PolCptn*Wages							-0.496
							(2.34)**
Constant	-0.324	2.771	0.364	4.088	0.593	0.455	-1.341
	(0.28)	(1.39)	(0.29)	(2.05)**	(0.42)	(0.46)	(0.83)
N	322	176	308	176	300	550	300
chi-sq.	114.94***	71.80***	95.15***	83.77***	85.21***	147.51***	92.22***

Table A1. 8: Current expenditures (3yr averages, 1970-2000)

Notes: The table presents results of 3SLS [SUR] regression estimates for the whole sample. 3-year averages are used to estimate the models. Quality of Government (*qog*) and Political corruption (*PolCptn*) are used as proxies for Institutional quality (IQ). Interacted terms are the product of government expenditure and the *IQ* variable. Estimates that are significantly different from zero at 10%, 5%, and 1% are marked with *; **, and ***, respectively. T-statistics are in parenthesis.

	1	2	3	4	5	6	7
Initial Income	-0.081	-0.798	-0.734	-0.346	-0.249	-0.144	-0.092
	(0.53)	(2.63)***	(3.53)***	(1.08)	(1.31)	(1.17)	(0.47)
Trade	0.009	0.014	0.003	0.014	0.002	-0.004	0.004
	(1.36)	(1.60)	(0.44)	(1.73)*	(0.29)	(0.87)	(0.50)
Popg	-0.256	-0.934	-0.361	-0.615	-0.222	-0.050	-0.127
	(1.72)*	(3.98)***	(2.26)**	(2.52)**	(1.32)	(0.46)	(0.75)
Schooling	-0.390	2.581	1.390	2.028	0.085	-0.393	-0.093
	(0.63)	(2.06)**	(1.97)**	(1.66)*	(0.12)	(0.95)	(0.13)
Capital	0.167	0.111	0.138	0.151	0.173	0.169	0.180
	(7.80)***	(3.08)***	(5.77)***	(4.13)***	(7.48)***	(11.08)***	(7.85)***
Current_Exp	-0.803	-0.700		-4.787	-0.763		0.343
	(3.17)***	(2.06)**		(3.99)***	(2.71)***		(0.75)
Qog		0.098	2.857	-9.732			
		(0.06)	(2.74)***	(3.00)***			
Qog*Current-Exp				5.481			
				(3.54)***			
Polcptn					-0.335	-1.423	5.290
					(0.39)	(2.79)***	(2.59)***
Polcptn*Current_Exp							-3.265
							(3.03)***
Constant	0.029	3.354	0.364	7.115	0.904	0.165	-2.037
	(0.02)	(1.60)	(0.29)	(3.12)***	(0.62)	(0.18)	(1.18)
N	322	176	308	176	300	598	300
Chi-Sq.	110.86***	71.74***	95.15***	89.38***	82.17***	165.13***	93.85***

Table A1. 9: Public services (3yr averages, 1970-2000)

Notes: The table presents results of 3SLS [SUR] regression estimates for the whole sample. 3-year averages are used to estimate the models. Quality of Government (*qog*) and Political corruption (*PolCptn*) are used as proxies for Institutional quality (*IQ*). Interacted terms are the product of government expenditure and the *IQ* variable. Estimates that are significantly different from zero at 10%, 5%, and 1% are marked with *; **, and ***, respectively. T-statistics are in parenthesis.

	1	2	3	4	5	6	7
Initial income	-0.277	-0.922	-0.734	-0.757	-0.502	-0.144	-0.496
	(1.70)*	(2.67)***	(3.53)***	(2.24)**	(2.49)**	(1.17)	(2.39)**
Trade	0.010	0.013	0.003	0.009	0.003	-0.004	0.003
	(1.46)	(1.26)	(0.44)	(0.87)	(0.41)	(0.87)	(0.39)
Popg	-0.522	-0.526	-0.361	-0.425	-0.497	-0.050	-0.495
	(2.69)***	(1.93)*	(2.26)**	(1.60)	(2.28)**	(0.46)	(2.26)**
Schooling	-0.781	3.679	1.390	3.164	-0.448	-0.393	-0.450
	(1.21)	(2.60)***	(1.97)**	(2.29)**	(0.62)	(0.95)	(0.62)
Capital	0.169	0.188	0.138	0.232	0.180	0.169	0.181
	(7.44)***	(4.79)***	(5.77)***	(5.75)***	(7.38)***	(11.08)***	(7.28)***
Publicservices	-0.184	0.037		-1.065	-0.171		-0.147
	(2.41)**	(0.23)		(2.83)***	(1.86)*		(0.74)
Qog		1.673	2.857	-3.522			
		(0.88)	(2.74)***	(1.44)			
Qog*Publicservices				1.926			
				(3.23)***			
PolCptn					-0.874	-1.423	-0.721
					(0.98)	(2.79)***	(0.51)
PolCptn*Publicservices							-0.050
							(0.14)
Constant	1.284	-1.415	0.364	0.350	2.741	0.165	2.629
	(0.98)	(0.68)	(0.29)	(0.17)	(1.75)*	(0.18)	(1.49)
N	293	152	308	152	275	598	275
chi-sq.	103.89***	62.94***	95.15***	77.66***	82.34***	165.13***	82.37***

Table A1. 10: Subsample analysis – Institutional differences (Political corruption)

Notes: We partition the data into two sub-groups based on the median score of Political corruption (*PolCptn*). Futhermore, we checked for robustness using an optimal level of political corruption that is desirable before the negative effects set in. Our results are similar; hence we only report these ones. Estimates that are significantly different from zero at 10%, 5%, and 1% are marked with *; **, and ***, respectively. T-statistics are in parenthesis.

	PolCptn < Median	*PolCptn* > Median
	1	2
Initial Income	-0.490***	0.017
	(0.175)	(0.43)
Trade	0.014**	0.013
	(0.007)	(0.02)
Popg	-0.113	0.385
	(0.13)	(0.33)
Schooling	4.088***	4.499*
	(1.25)	(2.37)
Capital	0.166***	0.178***
	(0.02)	(0.04)
Gov_Consum	-0.138***	-0.290***
	(0.04)	(0.09)
Constant	-13.887***	-18.603**
	(4.21)	(9.16)
N	246	105
Chi-Sq.	141.74	39.09
Wald Test:_B[Gov_Consum((1)-(2))]=0	19.28*	

Table A1. 11: Subsample analysis – Institutional differences (Legal Origin, LO)

Notes: We partition the data into two sub-groups based on legal origin (Common and Civil law). Estimates that are significantly different from zero at 10%, 5%, and 1% are marked with *; **, and ***, respectively. T-statistics are in parenthesis.

	Common law	Non-Common law
	1	2
Initial Income	0.250	-0.332
	(0.79)	(1.14)
Trade	-0.000	0.022
	(0.04)	(1.84)*
Popg	-0.202	0.192
	(1.06)	(0.91)
Schooling	0.995	6.164
	(0.58)	(3.06)***
Capital	0.191	0.143
	(6.61)***	(3.83)***
Gov_Consum	-0.168	-0.183
	(3.33)***	(2.68)***
Constant	-5.223	-23.150
	(0.94)	(3.41)***
N	158	115
Chi-Sq.	77.00	36.66
Wald Test :_B[Gov_Consum((1)-(2))]=0	0.08	

Table A1. 12: Subsample analysis - Regional dummies*Government final consumption

Notes: We partition the data into two sub-groups based on the median score of Political corruption. Furthermore, we checked for robustness using an optimal level of political corruption that is desirable before the negative effects set in. Our results are similar; hence we only report these ones. Estimates that are significantly different from zero at 10%, 5%, and 1% are marked with *; **, and ***, respectively. T-statistics are in parenthesis.

	SSA	OECD	NORDIC	MENA	BRIC	Regional
initial income	-0.459	-0.956	-0.409	-0.385	-0.391	-1.001
	(2.71)***	(4.57)***	(2.38)**	(2.25)**	(2.30)**	(4.57)***
Trade	0.016	0.011	0.010	0.010	0.008	0.018
	(2.40)**	(1.75)*	(1.62)	(1.50)	(1.26)	(2.67)***
Popg	0.051	0.165	-0.057	-0.066	-0.079	0.266
	(0.38)	(1.21)	(0.44)	(0.51)	(0.61)	(1.85)*
Schooling	2.621	3.259	4.327	4.324	4.331	0.892
	(2.07)**	(2.90)***	(3.79)***	(3.74)***	(3.78)***	(2.66)***
Capital	0.170	0.191	0.173	0.174	0.176	0.191
	(8.83)***	(9.92)***	(8.95)***	(8.93)***	(8.95)***	(10.20)***
Gov_consum	-0.097	-0.192	-0.161	-0.149	-0.150	-0.169
	(2.60)***	(5.85)***	(4.80)***	(4.59)***	(4.63)***	(2.17)**
SSA*Gov_con	-0.079					-0.045
	(2.73)***					(0.67)
OECD*Gov_consum		0.156				0.194
		(4.52)***				(2.41)**
NORD*Gov_consum			0.031			-0.008
			(1.22)			(0.33)
MENA*Gov_consum				-0.018		0.016
				(0.63)		(0.22)
BRIC*Gov_consum					-0.031	0.063
					(0.91)	(1.09)
Constant	-8.919	-8.971	-15.339	-15.547	-15.457	
	(2.00)**	(2.24)**	(3.97)***	(3.96)***	(3.98)***	
N	351	351	351	351	351	351
chi-sq.	175.03***	194.09***	166.28***	164.71***	165.34***	379.59***

Table A1. 13: Fractionalisation

Notes: The table presents results of 3SLS [SUR] regression estimates for the whole sample. 3-year averages are used to estimate the models. The ethnic-fractionalisation index (*Fractlzn*) is used as a proxy for Institutional quality (*IQ*). Interacted terms are the product of government expenditure and the *IQ* variable. Estimates that are significantly different from zero at 10%, 5%, and 1% are marked with *; **, and ***, respectively. T-statistics are in parenthesis.

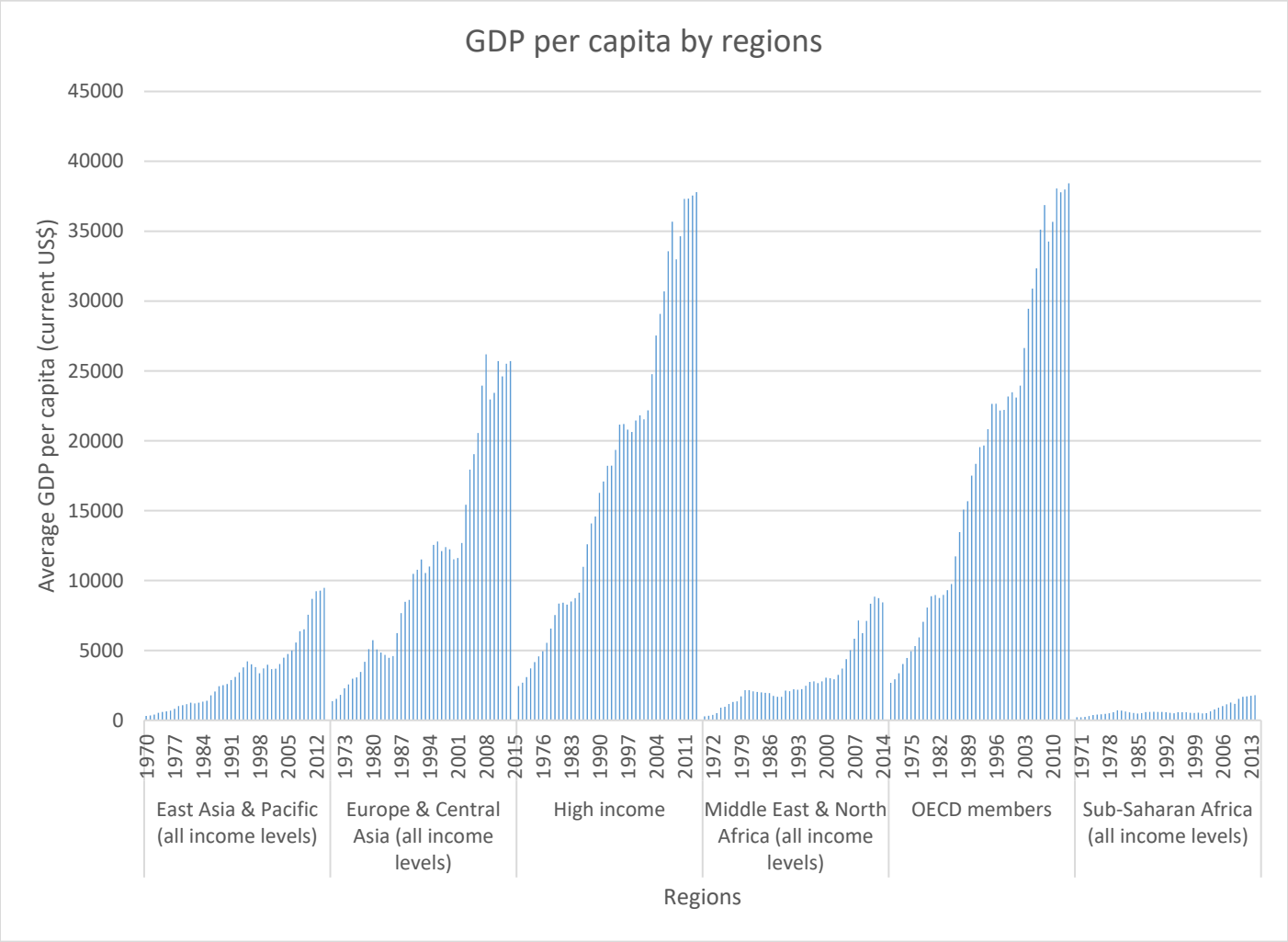
	1	2	3	4	5	6	7	8
Initial income	0.060	0.087	0.143	0.134	-0.104	-0.116	-0.260	-0.222
	(0.43)	(0.61)	(0.84)	(0.79)	(0.58)	(0.65)	(1.39)	(1.19)
Trade	0.015	0.015	0.025	0.024	0.013	0.015	0.021	0.020
	(2.32)**	(2.38)**	(2.85)***	(2.66)***	(1.69)*	(2.01)**	(2.12)**	(2.08)**
Popg	0.086	0.084	0.008	0.004	0.062	0.081	-0.240	-0.235
	(0.63)	(0.62)	(0.04)	(0.02)	(0.30)	(0.40)	(0.92)	(0.91)
Schooling	-0.375	-0.376	-0.672	-0.611	-0.152	-0.060	-0.513	-0.710
	(0.70)	(0.71)	(0.92)	(0.84)	(0.20)	(0.08)	(0.66)	(0.91)
Capital	0.157	0.150	0.133	0.123	0.127	0.119	0.135	0.135
	(7.88)***	(7.28)***	(5.19)***	(4.58)***	(4.71)***	(4.39)***	(4.63)***	(4.65)***
Gov_consum	-0.151	-0.210						
	(4.75)***	(3.73)***						
Fractlzn	-2.590	-4.555	-2.820	-4.926	-2.537	-0.467	-2.231	-0.407
	(4.74)***	(2.76)***	(4.14)***	(2.81)***	(3.76)***	(0.35)	(2.83)***	(0.30)
Gov_consum*Fractlzn		0.120						
		(1.26)						
Total_gov			-0.069	-0.090				
			(3.42)***	(3.47)***				
Total_gov*Fractlzn				0.073				
				(1.30)				
Wages					-0.162	-0.043		
					(2.91)***	(0.51)		
Wages*Fractlzn						-0.352		
						(1.80)*		
Educ							-0.211	0.005
							(1.87)*	(0.03)
Educ*Fractlzn								-0.557
								(1.63)
Constant	0.732	1.709	0.201	1.233	0.840	0.169	1.696	0.903
	(0.72)	(1.33)	(0.16)	(0.84)	(0.61)	(0.12)	(1.11)	(0.57)
N	337	337	223	223	205	205	188	188
chi-sq.	167.61***	169.99***	82.17***	84.49***	76.36***	80.82***	68.84***	72.46***

Table A1. 13 continued'

	9	10	11	12	13	14
iincome	-0.149	-0.152	-0.182	-0.181	-0.073	-0.090
	(0.77)	(0.79)	(0.97)	(0.96)	(0.41)	(0.51)
Trade	0.002	0.002	0.011	0.011	0.013	0.015
	(0.30)	(0.31)	(1.48)	(1.48)	(1.76)*	(1.95)*
Popg	-0.314	-0.312	-0.354	-0.353	0.043	0.057
	(1.22)	(1.22)	(1.40)	(1.39)	(0.21)	(0.28)
Schooling	-0.456	-0.445	-0.378	-0.381	-0.279	-0.207
	(0.55)	(0.54)	(0.49)	(0.49)	(0.37)	(0.27)
Capital	0.155	0.154	0.136	0.137	0.119	0.115
	(5.04)***	(5.03)***	(4.67)***	(4.61)***	(4.44)***	(4.27)***
Defence	-0.086	-0.119				
	(0.70)	(0.57)				
Fractlzn	-1.612	-1.838	-1.996	-1.912	-2.526	-0.475
	(2.12)**	(1.33)	(2.65)***	(1.72)*	(3.74)***	(0.25)
Defence*Fractlzn		0.090				
		(0.20)				
Health			-0.183	-0.173		
			(1.84)*	(1.20)		
Health*Fractlzn				-0.059		
				(0.10)		
Current_exp					-0.834	-0.413
					(2.73)***	(0.87)
Curent_exp*Fractlzn						-1.246
						(1.15)
Constant	0.872	0.972	1.353	1.308	1.301	0.651
	(0.56)	(0.59)	(0.90)	(0.83)	(0.90)	(0.42)
N	183	183	188	188	205	205
chi-sq.	66.33***	66.38***	68.70***	68.71***	75.03***	76.83***

2.8 Appendix 1: Figures

Figure A1. 1: Evolution of GDP per capita (1970-2015)



Source: Author own calculations

Chapter Three:

3 The optimal size of government and output growth: do institutional differences matter?

3.1 Introduction

This chapter examines the role of institutions on the optimal size of government. The role of the government and its effects on an economy is widely contested with diverse and varied explanations being postulated (IMF, 2017). From the classical economists, who maintain that the role of government should be minimised, and at best avoided, and let the forces of free enterprise drive the economy, to public choice economists, who believe that the government is made up of individuals who above all seek to maximise their self-interests and end up capturing government programs and policies to the detriment of the general populace. On the contrary, government presence and its activities is encouraged by the Keynesian doctrine. In essence, the government and its functionaries are essential for a well-functioning society (Afonso & Jalles, 2011), it is not a question of its presence rather its extent in the economy. The empirical evidence hasn't been helpful as well. This chapter seeks to join this debate by investigating the optimal size of government.

Studies on the effects of government size on output reveal that the size of government can have positive (see, Agenor & Moreno-Dodson, 2006; Aschauer, 1989; Ram, 1986), negative (Grier & Tullock, 1989; Landau, 1983) or both effects (see, Barro, 1990; Dar & AmirKhalkhali, 2002; Kneller et al., 1999; Scully, 1989) on output depending on the nature of government outlays among other things. From these studies we conjecture that there exists an inverted-U relationship between government size and output (for the earliest studies on this idea see, Armey, 1995; Barro, 1990; Rahn & Fox, 1996; Scully, 1989, 1994). However, the theoretical models used, in the pioneering studies, to calculate the optimal size of government are different to one another. Nonetheless, there is some agreement on the inverted-U relationship and it is thought that beyond some minimum level, the growth of government is detrimental to an economy's growth (Armey, 1995; Barro, 1990; Rahn & Fox, 1996; Scully, 1994).

Most of the approaches to the issue of government scope and its size suggest that there might be some level of government size which is desirable over other levels, the optimal size/level. The optimal size of the government is defined as the amount of government spending that yields the greatest growth in output. Alternatively, it could be thought of as the output-growth maximising level of government expenditure. The concept of an optimal size of government seems to be universally accepted in the economic literature with studies of Barro, Armey, Rahn, and Scully (thereafter, BARS) leading this discourse. The precise optimal size of the government seems to be varied and a general consensus is not available (Asimakopoulos & Karavias, 2016; Chao & Grubel, 1998; Kahn, 2011). Perhaps a lack of consensus in the optimal sizes is due to the models used, however, the quadratic specification seems to be popular in the empirical literature. However, a strict adherence to the optimal level of government seems to be popular within the economics fraternity[18]. Whilst, the idea of an optimal size of the government is widely used as a planning tool by practitioners, economists, advisors and policymakers in evaluating government's scope in the economy, however, a 'straight-jacket' interpretation of the optimal size is inadvisable. This paper seeks to highlight that it need not be the only guiding tool when evaluating an economy's government size. Institutional arrangements have an influence on the optimal size of the government.

There is a dearth of literature on the effects of institutions on the optimal size of government, with an exception of the Forte and Magazzino (2011) study which investigated the effects of the level of development. Our study is different to that of Forte and Magazzino (2011) in that we have a more diverse sample that includes non-European countries and also addresses the shortcomings of similar studies highlighted in Kahn (2011) who notes that the samples used are generally made up of countries with larger government sizes. Furthermore, we extend the analysis by incorporating institutional and governance measures. Our study additionally uses a panel threshold estimation which is a much more robust method of estimating thresholds in these types of studies, since the optimal size is estimated internally using the data properties and not a pre-specified equation. Most of the studies on the optimal size of government have been on OECD and European countries; to the best of our knowledge, (1) no studies have been done for a larger

[18]As a rule of thumb, attributable to Keynes' recommendation, 25% is regarded as a tolerable limit of government size (Forte & Magazzino, 2016), anything above is frowned upon in policy discussions. Whilst, Milton Friedman (1997) suggests that the optimal size of government to be between 15-50% of output.

and diverse dataset that incorporates countries outside Europe, (2) this study makes use of the Hansen (1999) fixed effects panel threshold regression technique which is superior to the linear estimation techniques used in most of the studies on optimal size of government since it adequately deals with heterogeneous panels. Most studies simply solve for a maximum point without considering the possibility of heterogeneous parameters. The optimal sizes for these studies might be biased and inconsistent due to the imposition of the assumption of homogeneous slopes amongst countries. This paper extends the analysis on the optimal size of government by incorporating institutional differences, levels of development and the use of a panel threshold model.

3.2 Literature review: economic growth models, BARS curve, and institutions

The scope of government policy (i.e., the effects of government spending and taxation) has long been viewed as having transitory effects on the growth rates of economies. According to the standard neoclassical growth theories (see, Solow, 1956; Swan, 1956) the long run growth of an economy is exogenously determined by technological change and population growth. However, with the advent of the endogenous growth theories, long-run growth is thought to be endogenously determined by government policy among other factors (Barro, 1990; Lucas, 1990; Romer, 1986). In studies that use endogenous growth models, government policy has far-reaching implications for a country's economic performance; taxation, budget balance and expenditure all have an effect on the long run growth[19] of the economy through their direct and/or indirect effects on the efficient use of resources (Pevcin, 2003; Scully, 1989), the rate of factor accumulation (Dar & AmirKhalkhali, 2002; Heitger, 2001) and the pace of technological progress.

3.2.1 The BARS curve

The idea of an optimal government size or the size of government can be traced to the 'napkin drawn' idea of Arthur Laffer who drew the relationship between tax revenue and taxation rates (Tanzi, 2014). Laffer concludes in his idea that beyond some level of taxation as a share of output, the tax revenue will eventually diminish, and ultimately reach zero, as the tax rate approaches 100% of output. Government spending is an offshoot of tax revenues. Spending done by the government can either be solely financed through taxes or a mix of borrowings, gifts, and taxes. It is from the relationship between taxes and government spending that the BARS curve is borne. As the share of government spending grows from zero; initially, output is positively related

[19] Also, an extension of the Harrod-Domar model with a government sector reveals that growth is determined by government actions, for example, see Peacock and Shaw (1971, p. 97).

to government expenditure, i.e., the state provides pure public goods for example provision of security and rule of law, as we move away from total anarchy (Afonso & Jalles, 2011; Buchanan, 1975; Casson et al., 2010) and later we have a negative association, i.e., most probably when the economy is overly-regulated or even worse when we have embezzlement of state funds.

Empirical studies on the effects of government size on output reveal that the size of government can have both positive and negative effects (see, Barro, 1990; Scully, 1989) on output depending on the nature of government outlays among other things. The effects of government spending and its size thereof on growth are diverse and varied without a clear transmission path. Perhaps, these findings suggest that there exists an inverted-U relationship between government size and output. However, a majority of these studies on the effects of the size of government have sought to determine the effects of government size and calculate the optimal size of government, and less on the drivers and possible determinants of the optimal size.

With the exception of Forte and Magazzino (2011), Hakro (2009) and Kustepeli (2005) most of the cross-country studies do not control for heterogeneity in panels. Failure to control for heterogeneity leads to inconsistent results due to the restrictive assumption of homogeneous slopes or parameters in the estimated model across countries and regions. Most of the studies on government size show that the optimal level of government size is variegated across regions and income levels. Trends in government spending, budget deficits and the size of the government seem to be associated with economic conditions inter alia political and institutional characteristics of the economies (Roubini & Sachs, 1989). Long run values depend on institutional settings, however. For countries with highly organized groups, e.g., unionised workers and various interest groups; the scope of the government is expected to be more pronounced, large and probably unproductive as well. As Olson (1965) would put it "all interest groups are set up for the sole purpose of redistribution," and this can have adverse effects on the incentives to create more output and wealth.

The assumption that an inverted-U relationship exists poses a lot of methodological challenges. According to Mueller (2003), this assumption is reasonable if we assume that the size of government is exogenously determined and not influenced by output. Under this assumption, Mueller (2003) reasons that “it does not really matter *why* government sectors are too large or too small, what matter is that both possibilities exist; that is, countries are allocated along the curve".

Secondly, the author notes that government size could be endogenously determined, whereby politicians, bureaucrats or citizens choose a size that maximises output. Based on this observation it could be difficult to come up with a statistically significant relationship because all observations would be clustered around the maximum points. This is similarly highlighted in Slemrod, Gale, and Easterly (1995) as a Wagner's law related problem. A third observation is that there are several different relationships between government size and output dependent on other factors, like the level of development (Mueller, 2003, p. 549) and perhaps, the quality of institutions (Chobanov & Mladenova, 2009). It could be argued that the determination of an optimal size is possibly spurious, trivial and uninformative if the appropriate control variables, e.g., institutional quality, level of development inter alia, of the country and the direction of causation between government size and economic growth have not been accounted for in the analysis. Failure to adequately control for panel heterogeneity would result in biased estimates of the optimal size since the parameters will be estimated under the pretext of homogenous slopes for the countries. Some have attempted to control for heterogeneity by estimating an augmented Armey (1995) model which incorporates country variables that might be linked with the size of a government, for example, unemployment rate, trade openness and population dynamics. However, such an exercise is futile in purging out heterogeneity or cross-country differences so long as the coefficients for government expenditure are assumed to be homogenous (Fouquau, Hurlin, & Rabaud, 2008).

3.2.2 Drivers of the growth of government size: an explanation

The main contributor to the growth of government size is attributable to the redistributive arm of the government (Aranson & Ordeshook, 1981; Peltzman, 1980; Tullock, 1983, p. 2). It would seem different functions and components of the government have different effects on growth, some are desirable whilst others are frowned upon. The redistributive role of the government is arguably viewed as the most important amongst its roles because it enables the government to raise living standards and divide the pie "fairly" amongst the population (see, Scully, 2002). On the contrary, other economists view the function of government, the regulatory role, that protects individual property rights, maintains and enforces the laws of the land as the most crucial component of the government (Gwartney, Holcombe, & Lawson, 1998). However, when both of these functions or components of government are viewed closely, one can see that they both exist to a certain extent to move and prevent the society/state from falling into anarchy.

One can surmise that economic prosperity prevails when all economic participants are secure in their property rights and against the expropriation of any kind. This is achievable with a proper and well-functioning government. However, the scope of government involvement and its effect on economic prosperity is thought to have positive but diminishing marginal returns to scale as the scale of government operations increases relative to output. This creates a non-linear relationship between government expenditure and growth of output (see, for example, Barro, 1990; Chao & Grubel, 1998; Gwartney et al., 1998). It is thought that beyond some minimum level, the growth of government is detrimental to an economy's growth (for example see, Chao & Grubel, 1998; Folster & Henrekson, 2001; Grossman, 1988; Peden, 1991; Peden & Bradley, 1989; Scully, 1994). Economists who are against an increased presence of the government in the economic environment have sought to calculate and determine the optimal size of government. A multitude of studies have been conducted in that regard of calculating the optimal size (De Witte & Moesen, 2010) but a general consensus is elusive just as in literature on the drivers of the growth in government (Lybeck, 1988; Mueller, 1987).

Since the era of the great depression, government size has increased considerably due to a multiplicity of reasons. However, trends in government spending, budget deficits and the size of the government seem to be mainly associated with economic conditions inter alia political and institutional characteristics of the economies (Roubini & Sachs, 1989). Long run values of the size of government depend on institutional settings, however. Long- and short-run choices of government size are associated with the political orientation—left or right leaning (Cusack, 1997; Facchini & Melki, 2011); family size (De Witte & Moesen, 2010); bureaucratic growth (Niskanen, 1968, 1971); displacement effects and one-time events (Peacock & Shaw, 1971); ratchet effect of publicly produced goods (Baumol, 1968); level of development (Wagner, 1877) and the extent of organized interest group activity (Buchanan & Tullock, 1962; Meltzer & Richard, 1978; Olson, 1965, 2007) in favour of or against possible income transfers by the government, among other factors. For countries with highly organized groups, e.g., unionized workers, social assistance recipients and various interest groups, the scope of the government is expected to be more pronounced and larger. According to Lybeck (1988), a summary of the studies of the possible drivers of the growth in government size would be confusing given that the reasons are wide and at times divergent. This chapter adds to the literature and debate on the determinants of the optimal size of government.

3.2.3 Evolution of expenditures and the optimal size of government

According to Roubini and Sachs (1989), the share of government spending in 1965 in OECD countries was 25% and 30% for the European OECD members; in 1985, it moved to an average of 41% whilst the average for European OECD members had risen to 51% respectively. On a similar note, in Peden (1991) the US government expenditure totalled 10% in 1929 and had reached 35% in 1986. Peden calculates the optimal size of government to be 17.5% for the US and concludes that the US government was over-sized in 1986. Peden's results resemble those of Vedder and Gallaway (1998) who estimate the optimal size of government to be 11.4% for the period 1960-1997. In most studies, the proliferation of government expenditure is considered to be mainly driven by transfer payments (Vedder & Gallaway, 1998) and current transfers (Roubini & Sachs, 1989). An observation in the literature on the evolution of government expenditures reveals that capital expenditures are the first to be slashed during episodes of fiscal consolidation because they are the least rigid component of public spending. This perhaps could be because capital expenditures also carry the least political liability. As such, the structure of government spending has shifted markedly from being one of providing collective goods to a structure that promotes the growth of a welfare state (OECD, 1985, p.16). These types of expenditures tend to self-perpetuate or have ratchet effect. According to Peltzman (1980), "government's role in the allocation of resources has increased considerably over the last century, and the growth shows no sign of abating. As a result, governments everywhere in the developed world have moved from a sometimes trivial to a now uniformly considerable role in shaping national expenditures." With that said, it is important that we investigate the optimal size of government across countries and regions.

The role of institutions cannot be overlooked in any cross-country analysis of government spending. This paper seeks to extend the analysis on the determination of the optimal size of government by investigating the role of differences in institutional settings on the optimal size of governments. To conduct the empirical investigation, we use a combination of both time series and panel data techniques on annualised data for the different models of the optimal size.

3.2.4 Contribution and significance of the study

There is a dearth of literature on the effects of institutions on the optimal size of government, with an exception of the Forte and Magazzino (2011) study which investigated the effects of the level of development. This study offers an extension to the analysis of Forte and

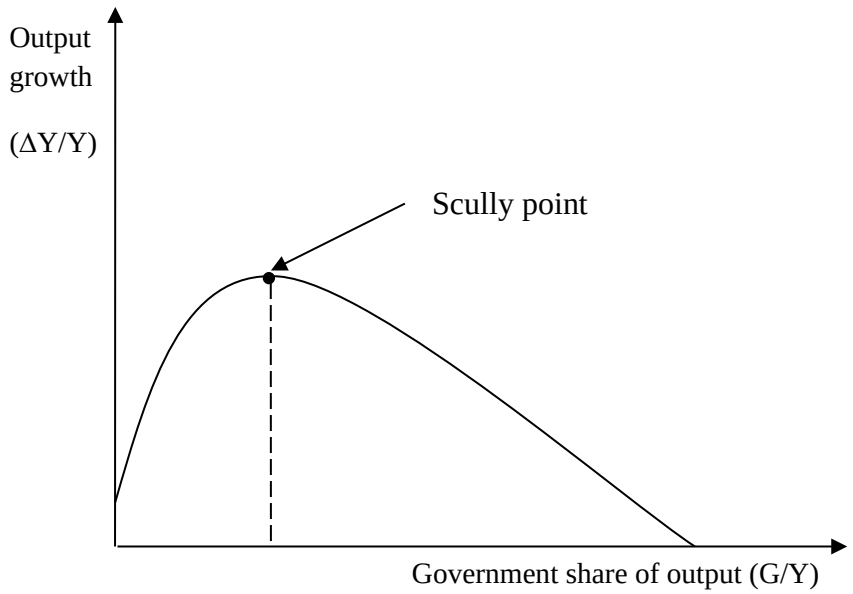
Magazzino by incorporating governance measures. Panel studies on developing countries are limited with most of the studies focusing on OECD and European countries. To the best of our knowledge, no studies have been done for a larger and diverse dataset that incorporates countries outside Europe. Consequently, policy prescriptions and recommendations have been biased towards the optimal sizes that are applicable to developed countries. As such, it is important that we identify factors that determine the optimal size of government with this study focusing on the quality of institutions. Extant studies simply solve for a maximum point without considering the possibility of heterogeneous parameters as a result of differences in institutional environments. The optimal sizes for these studies might be biased and inconsistent due to the imposition of the assumption of homogeneous slopes amongst countries.

3.3 Research methodology, model specification, and data sources

This chapter adopts a two-pronged approach; (1) determine the optimal levels of government size and (2) reconcile these with the institutional environment.

For the optimal size of government, we follow the methods in Amery (1963), Rahn (1964) and Scully (1992). It is assumed that there is a concave quadratic relationship between government size and output growth. Government size is thought to have a diminishing marginal effect on the growth of output (see Figure 9 for a depiction).

Figure 9: BARS curve



Following Vedder and Gallaway (1998), Forte and Magazzino (2011), Pevcin (2003) and Chobanov and Mladenova (2009), our benchmark theoretical model[20] is represented in equation 14 as follows;

14. $$\frac{\Delta Y}{Y} = a_i \frac{G}{Y_{it}} - b_i(\frac{G}{Y_{it}})^2.$$

Where a_i represents the positive contribution of government expenditure to output and b_i captures the negative effects of a large size of government. The estimates of a_i and b_i are obtained from a regression estimation for each respective country/panel. Afterwards, the first and second derivatives of the above function are sought and the Scully point is determined as follows;

15. $$\frac{\partial \frac{\Delta Y}{Y}}{\partial \frac{G}{Y}} = 0$$

16. $$\frac{\partial^2 \frac{\Delta Y}{Y}}{\partial (\frac{G}{Y})^2} = 0 \quad where\ f``(x) = \begin{cases} -z, \mid z < 0, optimal\ size\ is\ established \\ z, \quad z \geq 0, undefined \end{cases}.$$

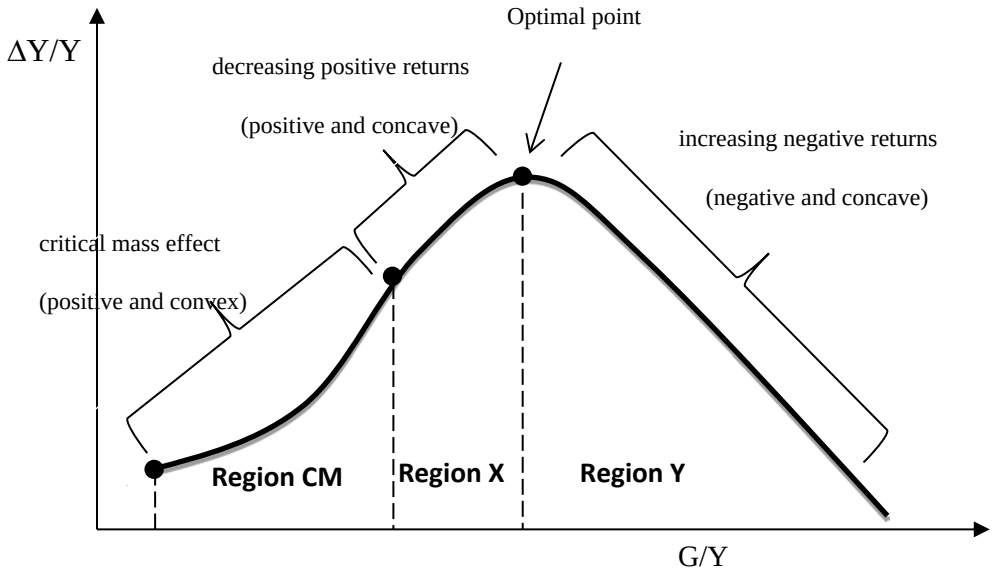
On another note, we can view the BARS curve as a depiction of the relationship between government size and output growth during the different stages of development. The upward segment coincides with the initial stages of development, i.e., state formation when the government engages in pure public goods provision, for example, sets up the legal, property-rights and rule of law infrastructure which are key to productivity and wealth accumulation; there is an accelerated growth of output as the size of government increases. During the second stage of development, as the government encroaches into the provision of other types of goods that are not entirely public goods,[21] the weight of the size of government has a negative effect on output growth; the downward sloping segment of the curve represents the period after the legal environment has been set up when the government encroaches into the provision of other forms of goods that the private sector could best provide. Most studies on the optimal size of government focus on the concavely shaped relationship which might be limited in present day context; most nations have moved beyond the initial stages of development.

[20] We choose a parsimonious specification since our main aim to isolate the relationship between output growth and government expenditure.

[21] income-elastic goods such as better publicly provided education and health care, and increased security through increased police and defence allocations (Mueller, 2003, p. 509; Wagner, 1877).

According to Bayraktar and Moreno-Dodson (2015), the non-linearity analysis in the output-government expenditure nexus is key to policy interventions that can be ascribed. Bayraktar and Moreno-Dodson (2015), suggest that the relationship between government size and output growth could be represented by a convex or a concave function depending on the impact of government size on the economy. The function can be positive and concave – higher and higher values of government expenditure will have less and less impact on output growth – or positive and convex – large values result in a larger impact on output growth, i.e., "critical mass"[22] or "network" effects. In this analysis, we emphasise a third segment: negative and concave – generally, government expenditure has a negative effect on output growth with higher and higher values of government expenditure having a larger negative impact on output growth. This is especially true for countries that are beyond the initial stage of development and are now operating on the downward sloping side of the BARS curve. As such, we expect a downward sloping portion with an ever-increasing negative slope for most countries (see Figure 10 for an illustration of this idea). It is surprising to find so little support and no investigation on the 'positive and convex' and the 'negative and concave' relationships, respectively in the empirical literature.

Figure 10: BARS curve: an extended elaboration



[22]A critical mass of government provided goods has to be reached before the positive effects of government expenditure could be augmenting, e.g., a certain minimum amount (threshold) of tarred roads or railway lines is required before such projects could have an exponentially positive impact on output. Once the threshold has been met, an additional increase in such a project will have an exponential growth effect on output.

Step 3: Stylized facts and institutional analysis

A brief analysis of the role of institutions on the effectiveness of government spending on output growth reveals that the quality of institutions has a positive effect on the effectiveness of government programs: however, this depends on the segment of the BARS curve. Thus, it is logical to propose the following:

i. The magnitude and size of a_i in equation 14 would partly be influenced by the quality of institutions. Better institutions should increase the effectiveness of government programs by reducing the negative effects or social cost of government programs on output growth. For instance, if the economy is operating on the upward sloping segment of the BARS curve; government expenditure is beneficial albeit, initially, at an increasing rate and, eventually, at a decreasing rate, i.e., regions CM and X, respectively, in Figure 10. A country characterised by better institutions will experience a larger size of a_i relative to b_i, i.e., the positive effects will outweigh the diminishing returns effect. As such, the diminishing marginal productivity of government spending in countries with poor institutional quality (*IQ*) should be larger and more pronounced; hence, we expect the size of b_i in equation 14 to be large relative to a_i and the optimal point, in Figure 10, to be reached earlier than that of countries with better institutions. This proposition is in line with Mueller (2003) and Slemrod et al. (1995)'s analysis on the effects of the level of development and cost of government programs on the optimal size.

ii. Whilst, if we are on the downward segment of the BARS curve; government expenditure is costly and severe at higher levels. A country with better institutions will have a smaller size of a_i relative to b_i, i.e., the negative effects[23] will be outweighed by the diminishing returns. However, with a downward sloping segment, for simplicity we assume the diminishing marginal product to be large and increasing irrespective of the country's institutional quality. As such, we expect that the impact of government expenditure to be more negative and larger in countries with poor institutional quality. Considering that most countries, if not all, have moved past the early stages of development synonymous with

[23]Better institutions, arguably, will help mitigate the negative effects of government expenditure in the economy through the efficient use of public funds and a minimisation of the 'plunder of the public purse', per se. Countries with better institutions have effective checks and balances on the management of the fiscus compared to their counterparts and as such the 'real' negative cost of government size will be quite evident and government programs kept to a minimum in such countries.

state formation, i.e., region CM in Figure 10; we assume that our sample of countries is operating in regions X and Y.

Based on equation 15 the optimal size, for Figure 10, reduces to this function:

17. $$\frac{\partial^2 \frac{\Delta Y}{Y}}{\partial (\frac{G}{Y})^2} = \frac{a_i}{2b_i}$$

From equation 17, it can be argued with respect to the upward sloping segment that the value of the optimal size will be small or will occur at lower levels for countries with poor *IQ* than is the case for countries characterised by better *IQ*. On the other hand, for the downward sloping segment, countries with poor *IQ* will have larger optimal sizes of government and countries with better *IQ* having smaller optimal sizes of government.

3.4 Data, Estimation and Results

This study utilises annualised country-level data for 63 countries with available data for government final consumption expenditure as a share of GDP (*Govtcon*) and output growth spanning 44 years (1970-2014). Moreover, we attempted making use of total government expenditure data but had to drop the variable due to missing data points and the absence of continuous time series data points. Our sampled countries are drawn from OECD, Asia (developing and developed), Latin America and Africa, see Table 3.1 for a comprehensive list. The data used is obtainable from various sources[24]. Table 3.2 has the variable definitions.

Table 3.1: List of countries

Algeria	Denmark	Madagascar	Singapore
Australia	Egypt	Malawi	South Africa
Austria	Finland	Malaysia	Spain
Belgium	France	Mali	Sri Lanka
Benin	Gabon	Mexico	Sudan
Botswana	Ghana	Morocco	Sweden
Brazil	Greece	Netherlands	Thailand
Burundi	India	Niger	Tunisia
Cameroon	Indonesia	Norway	Turkey
Canada	Iran	Pakistan	United Kingdom
Central African	Iraq	Panama	United States
Chile	Israel	Peru	Zimbabwe
China	Italy	Philippines	
Colombia	Japan	Portugal	

[24]Quality of Government database from http://www.qog.pol.gu.se; World Bank database and the Easterly (2001) dataset, all freely available from the internet.

Congo	Kenya	Rwanda
Congo, Dem. Rep.	Korea, South	Saudi Arabia
Cote d'Ivoire	Luxembourg	Senegal

Table 3.2: Variable definitions

Variable symbols	Variables	Source
GDPg	annual percentage growth in Gross Domestic Product (GDP)	WDI
Govtcon	Government final consumption expenditure as a percentage of GDP	WDI
G-sqr	Square of *Gov_consum*	Own calculations
IQ	Institutional quality variable is derived as the first principal component of the six World Governance Indicators	WGI

Following Forte and Magazzino (2011) and Pevcin (2003), time series and panel data estimation techniques are used in this study. For the time series estimation, the Autoregressive Moving Average specification with independent variables (ARMAX) model; and a simple OLS model with Newey and West standard errors for the correction of heteroscedasticity and autocorrelation are used. For panel data estimation we use the pooled OLS as a benchmark model. Due to a possibility of heteroskedasticity, serial correlation and endogeneity in the sample, we use the generalised least squares (GLS) and GMM models. Furthermore, a threshold regression analysis is undertaken as a robustness check to validate the optimal sizes generated in the quadratic specification.

Table 3.3: Summary statistics by region

	OECD		SSA		SCAN		ASIA		Total Sample	
	Govtcon	*GDPg*	*Govtcon*	*GDPg*	*Govtcon*	*GDPg*	*Govtcon*	*GDPg*	*Govtcon*	*GDPg*
1970	14.45	5.17	14.12	6.97	17.82	4.03	11.00	8.29	14.42	7.41
1980	16.40	3.93	13.89	4.27	20.63	3.17	11.41	6.32	15.11	4.84

1990	17.57	3.21	14.60	2.92	22.40	2.51	11.74	6.27	16.06	3.42
2000	18.00	3.19	14.57	2.30	23.30	2.72	11.42	5.44	15.55	3.45
2010	18.85	1.97	14.00	3.90	23.07	1.57	12.21	5.26	15.77	3.60
2014	19.82	1.36	15.08	4.97	24.45	1.05	12.47	4.86	16.51	3.61

Source: Author's calculation. Notes: SSA, sub-Saharan Africa; SCAN, Scandinavian countries.

Table 3.3 provides descriptive statistics for the total sample and subsamples used. For the total sample, we note that the coefficient of variation of government expenditure proxies are small and average about 36% of the mean whilst there is more variation in output growth which registers a coefficient of variation of 117% of the mean. This suggests that most government sizes are relatively close to each other whilst the variation in output growth is marked and different. Furthermore, we decompose the summary statistics into regions of the world and track averages over time (decades), shown in Table 3.2. We note that *Govtcon* grew the most in OECD and SCAN countries from a low of 14.45% and 17.82% in 1970 to a high of 19.82% and 24.45%, respectively. The growth in output also declined steadily during the same period for both regions from a high of 5.17% and 4.03% in 1970 to a low of 1.36% and 1.05% in 2014 for the OECD and SCAN countries, respectively. It is important to highlight that output growth dipped in 2010 possibly due to the global financial crisis of 2008-9 in the US and Europe. The regions of SSA and Asia registered a moderate growth in their government sizes accompanied by a slight decrease in output growth for the period 1980-2014.

3.4.1 Times series estimation

We first test for unit roots and find that our variables, output growth (*GDPg*) and government consumption expenditure (*Govtcon*) are integrated of orders zero and one respectively (results not tabulated) for each country. With the unit root results, we suspect cointegration of the two variables. A test for cointegration for each country using the Johansen (1988) and Gregory and Hansen (1996) test is conducted and we find that *Govtcon* and *GDPg* are cointegrated in less than half of the countries in our sample, 16 out of 63 countries (see Table A3.1 in the appendix). The results for the Toda and Yamamoto causality testing on government expenditure and output growth are varied; 49 countries have some form of causality (21 countries exhibit Wagner's law properties; 13 countries exhibit Keynesian properties and 15 countries have a bi-direction) and 14 countries show no evidence of causality. With the mixed results on cointegration and causality

testing, we follow suit of prior studies on optimal size of government that proceeded and estimate the optimal size despite the potential pitfalls of doing such (Forte & Magazzino, 2011). There is a high chance that there is feedback from the government expenditure variable (*Govtcon*) to output growth (*GDPg*), as evidenced by the large number of countries that exhibit Wagner's Law properties. Our choice is to proceed and estimate despite the potential feedback effects is the desire to preserve our sample size. Should we only estimate the optimal size for countries that have Keynesian properties our sample will be reduced by more than three quarters. However, later on, we try to mitigate this problem by introducing panel data methods that cater for the possibility of endogeneity and feedback effects.

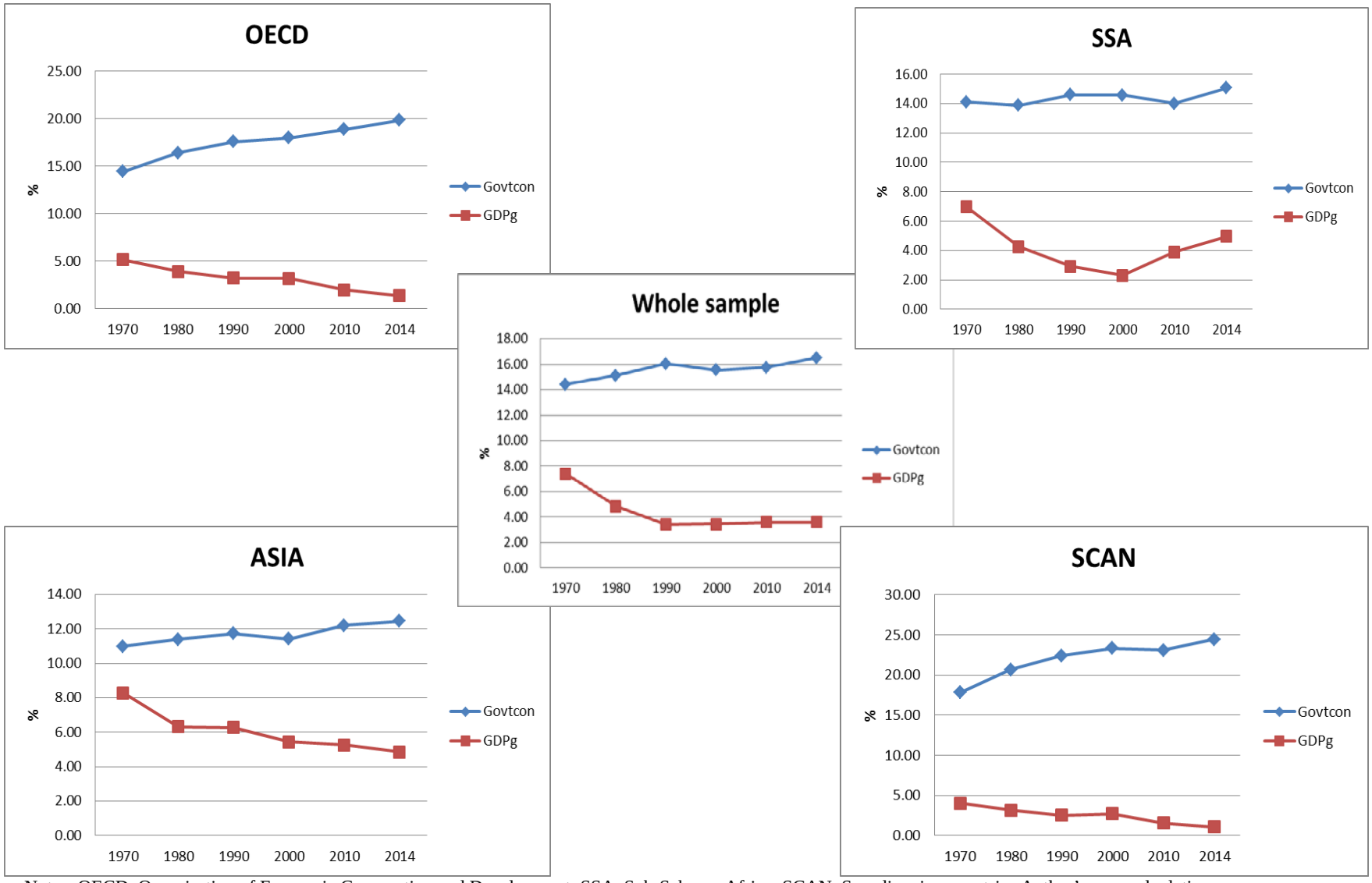
Equation 14 is estimated using an ARMAX model and an OLS model with Newey and West error terms. Results are presented in Table A3.1. The dependent variable is the growth in output (*GDPg*) and the independent variables are the government expenditure variable and its squared term. As indicated earlier, the government expenditure variable in levels will capture the positive effects of public expenditure on output growth whilst the squared government expenditure term will capture the diminishing marginal returns to an increasing share of government expenditure relative to output. As such we expect a positive coefficient for the linear term and a negative coefficient for the squared term.

Results are presented in Table A3.1. The coefficients of the variables of interest came out as expected for the majority of countries in our sample but India, Kenya, China, and Ghana. A link test, inter alia, was used as a post-estimation test and we find that most of the models are adequately specified. We proceeded and calculated the optimal size of government G*. The average size of government ranges from a minimum of 6.09% for Cameroon and a maximum of 29.99% for Israel. A simple comparison of the average size of government to the optimal size reveals that most of the countries are operating beyond their optimal sizes but for Burundi, Egypt, Malaysia, Mali, Pakistan and Sri Lanka. This affirms our initial assumption that countries are on the downward sloping portion of the BARS curve. We further estimate the optimal size of government expenditure using the method in Scully and still we find that the majority of countries operate beyond their optimal size except for Australia, Austria, Brazil, China, Democratic Republic of Congo, Denmark, Egypt, India, Indonesia, Luxembourg, Malaysia, Mali, Mexico, Morocco, Niger, Norway, Portugal, Rwanda, Sweden, Tunisia, and Zimbabwe. Additionally, we note that the optimal size calculated depends on the method used, i.e., quadratic or Scully's model.

3.4.2 Panel regression estimation

There is considerable variation in the optimal sizes of the countries in the times series estimations; a possible reason could be differences in underlying country characteristics such as the institutional arrangements and economic environment. As an attempt to purge out the sources of differences in G*, a panel regression analysis is conducted. Panel data analysis offers some advantages that cross section and time series estimation would not provide, for example, there is increased variability in the data, reduced multicollinearity and larger degrees of freedom in the regression. We estimate the optimal government size using pooled OLS, GLS and GMM techniques; with the latter two models we can control for possible heterogeneity, autocorrelation, correlation within cross sections and across panel and endogeneity. Figure 11 is a graphic display of the evolution of government consumption and output growth by regions. We note that government consumption seems to have increased during the period under study in all the regions but SSA which somehow oscillated around the starting point. Generally, there is a negative relationship between government consumption and output growth as exhibited by a divergence between the two curves. However, the relationship is not so evident when we look at the SSA context.

Figure 11: Evolution of government expenditure (*Govtcon)* and output growth (GDPg)



Notes: OECD, Organisation of Economic Cooperation and Development; SSA, Sub-Saharan Africa; SCAN, Scandinavian countries.Author's own calculation.

Due to the huge reduction in our sample when we restrict our analysis to countries with Keynesian properties, i.e., causality running from *Govtcon* to *GDPg*, we do not pursue this estimation strategy and do panel analysis for the whole sample and subsamples.[25] To avoid the spurious regression problem, panel unit root testing is performed for the whole sample and we find that our variables are stationary in levels, at the one percent level of significance (see Table 3.4). We test for panel cointegration and find that output growth and government expenditure proxies are cointegrated across all subsamples (results not tabulated). Further, we test for causality and find that there is causality running from either direction or both, except for South Asia. Moreover, we note that there is bi-directional causality for the whole sample, OECD and SSA countries. The ASIA group of countries exhibit Wagner's law properties whilst SCAN countries display Keynesian properties.

Table 3.4: Panel unit root testing

Variable	LLC	IPS	ADF Fisher	PP_Fisher
GDPg	-34.4***	-33.29***	1166.36***	1183.84***
Govtcon	-4.68***	-4.98***	206.36***	214.35***

Notes: *** 1% level of significance.

Panel regression results are presented below in Tables 3.5-3.7. Our results are based on regressions using the pooled OLS (population average (PA)) model, generalised least squares (GLS) model and the dynamic GMM model. Our estimated models have the expected apriori signs across all regression techniques used. The first column in each table shows the results for the whole sample; we find that the optimal size of government ranges from a minimum of 14.50% for the pooled OLS to a maximum of 16.12% for the GMM model. Results for the optimal size of government (G*) seem to be robust to the estimation technique used as shown by a small variation within the whole sample estimates, i.e., a 4% variation between the Pooled OLS and GMM estimates. This result falls within the range of values reported in the literature which is between 11-25% (see for example, Asimakopoulos & Karavias, 2016; Chen & Lee, 2005; Hajamini &

[25]See, Forte and Magazzino (2011) for a similar treatment.

Falahi, 2012; Vedder & Gallaway, 1998). However, there is a marked difference when we conduct a subsample analysis.

Following Mueller (2003, p. 549), who warns against relying on pooled estimates, we split the sample into OECD, SSA, MENA, Asia, EA, SoA and SEA.[26] We note that the optimal size of government is smallest for the Asia subsample and largest for MENA. The distribution of the optimal size of government across groups is on average 10.5% for Asia, 12.60% for OECD, 13.50% for SSA and 21% for MENA countries. A comparison of the OECD and non-OECD countries shows that the optimal size of the OECD sub-group is smaller than that of the non-OECD group. This result is robust even after taking out MENA countries (results not tabulated). This result affirms our proposition that a country with better institutions ought to have a smaller optimal size of government. It could possibly be that countries in our sample are operating on the downward sloping segment of the BARS curve. Since government expenditure has negative effects on the growth of output, we can insinuate that the quality of institutions helps in mitigating the negative effects of government via limiting the size of government in an economy. Given that a huge government involvement in the economy is associated with rent-seeking activities and allocative inefficiency, i.e., over-production of public goods and over-regulation (Asimakopoulos & Karavias, 2016; Chobanov & Mladenova, 2009; Gray, Lane, & Varoudakis, 2007; Grossman, 1988), a limited or minimal government size is desirable. However, this result is at odds with Mueller (2003, p. 550: fig. 22.3b), who propositions that better developed countries, which tend to have better institutions, will have a larger optimal size of government compared to the least developed countries. Our results suggest that developed and better institutional quality countries are likely to achieve their maximum growth rates with lower levels of government expenditure than developing and low institutional quality countries which require a larger government size to attain the same level of growth in output. This implies that better institutional quality countries are more efficient than their counterparts.

[26]EA, East Asia; SoA, South Asia; SEA, South East Asia; MENA, Middle East, and North Africa.

Table 3.5: Panel regression results (GMM). Dependent variable: Output growth (GDPg)

	GMM								
	Whole Sample	NonEOCD	OECD	SSA	MENA	Asia	SoA	SEA***	EA
Govtcon	0.548***	0.597***	0.737**	0.587***	0.472***	0.806***	2.146**	0.799***	0.797***
	(0.168)	(0.13)	(0.329)	(0.142)	(0.065)	(0.127)	(1.034)	(0.098)	(0.267)
G-sqr	-0.017***	-0.018***	-0.03*	-0.022***	-0.011**	-0.038***	-0.122*	-0.037***	-0.04***
	(0.009)	(0.007)	(0.016)	(0.007)	(0.002)	(0.009)	(0.067)	(0.007)	(0.016)
Optimal G*	**16.12**	**16.58**	**12.28**	**13.34**	**21.45**	**10.61**	**8.8**	**10.8**	**9.96**
Average	15.68	14.53	17.82	14.33	18.26	11.75	10.78	11.17	13.68
Wald	49.19***	34.4***	96.1***	17.86***	12.11***	305.58***	7.46**	530.32***	342.18***
Sargan	62.51	40.49	21.5	18.65	6.35	616.49*	1.703	336.37	244.823
AR(2)	-1.436	-0.439	-0.379	-1.114	1.558	-1.312	1.446	-1.798*	-1.618
No.countries	63	41	22	20	9	11	3	5	3
N	2772	1804	924	880	396	473	132	215	126

Notes: *; **; *** represents 10%, 5% and 1% levels of significance respectively. Instruments set: L2D.GDPg, L2D.G-sqr, L2D.Govtconw, L(1/6).GDPg, L(2/6).Govtcon. **Optimal G**, is the calculated optimal size of government (G*= a/2b).

Table 3.6: Panel regression results (GLS). Dependent variable: Output growth (GDPg)

	GLS								
	Whole Sample	NonOECD	OECD	SSA	MENA	Asia	SoA	SEA	EA
Govtcon	0.552***	0.555***	0.631***	0.556***	0.456***	1.096***	0.833**	0.964***	1.709***
	(0.007)	(0.009)	(0.031)	(0.041)	(0.033)	(0.067)	(0.122)	(0.095)	(1.916)
G-sqr	-0.018***	-0.016***	-0.025***	-0.019***	-0.01**	-0.052***	-0.034*	-0.043***	-0.09***
	(0.0003)	(0.0003)	(0.001)	(0.002)	(0.001)	(0.004)	(0.009)	(0.0060	(0.012)
Optimal G*	**15.33**	**17.34**	**12.62**	**14.6**	**22.8**	**10.5**	**12.25**	**11.2**	**9.49**

Average G	15.68	14.53	17.82	14.33	18.26	11.75	10.78	11.17	13.68
Wald	8518.85***	3761.27***	453.3***	316.47***	261.42***	328.8***	251.98**	106.79***	129.38***
No.countries	63	41	22	20	9	11	3	5	3
N	2772	1804	968	880	396	484	132	220	132

Notes: *; **; ***represents 10%, 5% and 1% levels of significance respectively. G*, is the calculated optimal size of government (G*= a/2b).

Table 3.7: Panel regression results (Pooled). Dependent variable: Output growth (GDPg)

	PA								
	Whole Sample	NonOECD	OECD	SSA	MENA	Asia	SoA	SEA	EA
Govtcon	0.555***	0.551***	0.641***	0.504***	0.496***	1.2***	0.854**	1.053***	4.057***
	(0.073)	(0.062)	(0.08)	(0.091)	(0.033)	(0.155)	(0.072)	(0.24)	(1.18)
G-sqr	-0.018***	-0.016***	-0.025***	-0.016***	***	-0.057***	-0.035*	-0.045***	-0.239***
	(0.004)	(0.003)	(0.004)	(0.006)	(0.004)	(0.012)	(0.005)	(0.019	(0.086)
Optimal G*	**15.42**	**17.22**	**12.82**	**15.75**	**20.67**	**10.53**	**12.2**	**11.7**	**8.49**
	15.68	14.53	17.82	14.33	18.26	11.75	10.78	11.17	13.68
Wald	334.12***	254.97***	170.05***	125.73***	125.26***	167.46***	454.19***	135.49***	407.48***
No.countries	63	41	22	20	9	11	3	5	3
N	2772	1804	968	880	396	484	132	220	132

Notes: *; **; ***represents 10%, 5% and 1% levels of significance respectively. G*, is the calculated optimal size of government (G*= a/2b).

Furthermore, in Table 3.8, we estimate the optimal size of government across institutional differences. The data is split into sub-groups based on differences in levels of corruption and quality of government. We create a composite score for the quality of government institutions (*IQ*) using the principal components analysis reduction method on the six World Governance Indicators. Further, we divide the data into two partitions based on the median score of *IQ*, i.e., countries with better institutions are located above the median score and countries with poor institutions located below the median score. We find that the optimal size of government is smaller in countries with better institutions, with G* equal to 12.76 whilst it is equal to 17.09 for countries with poor institutions. This finding corroborates the results in Forte and Magazzino (2011) where the optimal sizes of the upper income quartile in the EU were significantly lower than those of the Mediterranean and lower income quartile groups. Furthermore, we find a statistically significant and negative coefficient on the interaction term (*IQ*Govtcon*) and a positive coefficient for *IQ* in the last column of Table 3.8. This suggests that as the quality of government increases, the overall share of government expenditure as a percent of GDP reduces and consequently contributes to a smaller optimal size of government. This interpretation is to be treated with caution; this is only plausible if we are operating on the negative sloping segment of the BARS curve or when government programs have a negative welfare effect and as such proper governance structures work to curtail the expansion of governments' 'wasteful' programs. Nonetheless, this finding corroborates related literature on government expenditure which argues that better institutions have a negating effect on the growth of the size of government (for example, see Keefer & Knack, 2007).

Table 3.8: Subsample analysis, Institutional quality. Dependent variable: Output growth (GDPg)

	Poor Institutional quality (N=589)	Better Institutional quality (N=589)	Whole sample with interaction term (N=1178)
Govtcon	0.551***	0.685***	0.632***
	(0.094)	(0.07)	(0.065)
G-sqr	-0.016***	-0.027***	-0.023***
	(0.005)	(0.004)	(0.003)
IQ			1.201*
			(0.643)
*IQ*Govtcon*			-0.08**
			(0.033)
G*	**17.09**	**12.76**	

Notes: G*, is the calculated optimal size of government (G*=a/2b).***, significance at the 1% level and standard errors are in parenthesis.

3.4.3 Threshold regression estimation

For robustness testing, we perform a fixed effects panel threshold regression to estimate the optimal size of government. The model is estimated using the Hansen (1999) method where country individual effects are demeaned from the panel data. This method is superior to the quadratic estimation conducted in the previous section since the threshold estimate(s) is(are) generated internally through bootstrapping over repeated sampling, unlike the quadratic estimation which relies on a parametric inference of a point estimation.

An adaptation of Hansen's method yields the following model:

$$\frac{\Delta y}{y} it = \beta_1 govtcon_{it} * I(govtcon_{it} \leq \gamma_i) + \cdots + \beta_n govtcon_{it} * I(govtcon_{it} > \gamma_n) + \varepsilon_{it}$$

where $\frac{\Delta y}{y}$ is the growth of output; $\beta_1 \; and \; \beta_n$ are the usual parameters with respect to a change in the independent variable (*Govtcon*); however, in this case these slopes are conditional on values

of the regime dependent variable (*Govtcon*) versus the unknown threshold value(s)(γ_i). This model reduces to:

$$\frac{\Delta y}{y} it = \beta_i Govtcon_{it}(\gamma_i) + \varepsilon_{it}$$

and,

$$Govtcon_{it}(\gamma_i) = \begin{pmatrix} Govtcon * I(Govtcon \leq \gamma_i) \\ Govtcon * I(Govtcon > \gamma_i) \end{pmatrix} => \beta_i = \beta(\gamma_i).$$

The number of thresholds can range from a minimum of one to any number depending on the data properties, i.e., the order of non-linearity. To determine the number of thresholds an F-test is utilised.[27] Results from the fixed effect threshold regression are presented below in Table 3.9. First, we test for the presence of a threshold, results shown in the first panel, and find that there are at least two thresholds at 11.61 and 19.23 for the whole sample, shown in the second panel. We reject the null hypothesis of linearity and conclude that there is non-linearity in our relationship. The relationship has more than one rate of change. This result is somehow comparable with the panel estimation results where we found the optimal size of government ranging from 10.61 (Asia) to 21.45 (MENA) whilst the whole sample's optimal size was 16.12 (see GMM results).

Table 3.9: Threshold regression, the whole sample. Dependent variable: Output growth (GDPg)

	F-stat	P-value
F1 (single threshold)	18.84**	0.04
F2 (double threshold)	14.43*	0.09
F3 (triple threshold)	14.65	0.48

Model	Threshold value	Lower CI	Upper CI
Threshold - 1	19.238	18.752	19.305
Threshold - 2	11.606	11.283	11.667

	coefficient	std error

[27]See, Hansen (1999) for a detailed exposition.

Govtcon		
(*Govtcon*≤ 11.606)	0.45	(0.577)
11.606<*Govtcon*≤19.238	-0.061*	(0.037)
Govtcon>19.238	-0.152***	(0.029)
Chi-sq	38.42***	
No. countries	63	
N	2772	

Notes: *; **; *** represents 10%, 5% and 1% levels of significance respectively and standard errors are in parenthesis.

The estimated model can be summarised with the following regression equation:

$$\frac{\Delta y}{y} it = 0.45 Govtcon_{it} * I(Govtcon_{it} \leq 11.606) - 0.061 Govtcon_{it} * I(11.606 < Govtcon_{it} \leq 19.238) Govtcon - 0.152 Govtcon_{it} * I(Govtcon_{it} > 19.238) + \varepsilon_{it}.$$

The regression slope estimates in the threshold regression indicate the effect of government expenditure (*Govtcon*) in three regimes as postulated in the augmented BARS curve in Figure 10:

- When *Govtcon* ≤ 11.606, the positive coefficient of 0.45, though insignificant, suggests that at lower levels of government size and up to 11.606 there is a positive relationship between *Govtcon* and output growth (*GDPg*). This segment is synonymous with the upward sloping section of the BARS curve in regions CM and X.
- When *Govtcon* is greater than 11.606 and less than or equal to 19.238, i.e.,$(11.606 < Govtcon_{it} \leq 19.238)$, the negative coefficient of -0.061 suggests that output growth is negatively related to *Govtcon*. This segment is the same as the decreasing segment of the BARS curve in region Y.
- When *Govtcon*> 19.238, a negative relationship, with a coefficient of -0.152, is sustained and much stronger than in the previous regime. This suggests that government expenditure is much more detrimental to the growth of output at a size greater than 19.238. Beyond this optimal point, any increase in government size generates an even large negative effect on output growth as depicted in region Y.

This result is in line with what the literature on government size postulates. Excessive government size hampers economic growth whilst a minimal government size is pro-growth in the

context of maintenance of law and order, protection of property rights and the provision of purely public goods (Afonso & Jalles, 2011; Mueller, 2003). Therefore, we suggest that the optimal size of government consumption be kept below 11.606% of the gross domestic product.

Furthermore, we estimate a panel threshold regression for subsamples based on levels of development, i.e., OECD and non-OECD countries. The regression for each group reveals an existence of at least a single threshold value, i.e., optimal size. We find that the optimal size for the OECD group, with a higher level of development, is lower than that of the non-OECD group a relatively less developed group of countries. The threshold estimate for OECD is at 11.51% whilst that of the non-OECD group is 15% and 19%, see Table 3.10. The panel threshold subsample results seem to be similar to the whole sample estimates and more importantly they support the view that countries with better institutions and higher levels of development seem to have a lower optimal size of government. Perhaps, less developed countries require more resources, i.e., government expenditure, to achieve their maximum level of output growth due to institutional inefficiencies.

Table 3. 10: Threshold regression, the whole sample. Dependent variable: Output growth (GDPg)

OECD			**Non OECD**		
	Threshold Value	F-stat		Threshold Value	F-stat
Th-1	11.51	17.46**	Th-1	15.01	13.48*
			Th-2	19.002	12.16***
	coefficient	std error		coefficient	std error
Govtcon			***Govtcon***		
(*Govtcon*≤ 11.51)	-0.434***	0.093	(*Govtcon*≤ 15.01)	0.105*	0.062
Govtcon>11.51	-0.6***	0.051	(15.01<*Govtcon*≤ 19.002)	-0.003	0.045
			Govtcon>19.002	-0.094***	0.035
Chi-sq	46.77***		Chi-sq	18.62***	
No. countries	22		No. countries	41	
N	968		*N*	1801	

Notes: *; **; *** represents 10%, 5% and 1% levels of significance respectively.

3.5 Conclusion

The empirical literature on the size of government has produced mixed results on the optimal level of government as a share of output. In this chapter, we examined the relationship between government size and output growth and the role of institutions (i.e., level of development; degree of corruption; and quality of government) in determining the optimal size of government. Time series and panel regression techniques are applied on a sample of 63 countries. The different techniques used in this study help in providing insights on the stability and robustness of the results. We conclude that the optimal size of government consumption ranges between 11-20% and this range corroborates existing empirical findings (see for example, Asimakopoulos & Karavias, 2016; Chen & Lee, 2005; Hajamini & Falahi, 2012; Vedder & Gallaway, 1998).

With the quadratic optimization problem, our results show a generally positive and significant impact of government size to current output growth and the diminishing marginal returns term is significantly negative as expected. This relationship is robust to regression techniques used and on panel and time series estimations. This result suggests that government expenditure has growth enhancing effects but on a limited scale before the negative diminishing marginal returns offset the positive impact of government expenditure. The findings of this study support previous studies that find the existence of a positive and negative effect of government size on output growth; thus the existence of a turning point in the relationship or an inverted U-shaped relationship (Armey, 1995; Balatsky, 2012; Barro, 1990; Forte & Magazzino, 2011; Mueller, 2003; Rahn & Fox, 1996; Scully, 1994).

However, our findings provide evidence that the optimal size of government varies across countries and regions. Despite the presence of a non-linear relationship between government expenditure and output growth, there seems to be a marked difference between the size of government across levels of development and institutional arrangements. The study finds that better institutions and levels of development mitigate the negative effects of government expenditure on output growth through a minimisation of the scope and scale of government activities, i.e., government size. Countries with effective and better institutions can minimise the proliferation and growth of the public sector due to the inherent adverse effects that accompanies a large government size. This implies that the size of government in an economy needs to be minimised to its most basic form, i.e., public goods production. This can be achieved with a framework of enhanced institutional arrangements via which government growth can be curtailed

or minimised. As the quality of institutions improves, corruption, public agency problems and other rent-seeking activities decline, and so does the size of government. Furthermore, levels of oversight, bureaucratic accountability, and monitoring improve with a higher level of development, and hence, a minimal size of government is attained in an economy. This suggests that worth better institutional efficiency, countries can achieve their maximum output growth by employing a smaller but efficient size of government. We draw a parallel with findings on government expenditure that show that the quality of governance minimises the size of government (Kagundu, 2006), especially for those categories that are susceptible to rent-seeking (Keefer & Knack, 2007) and likely to be targeted to special interest groups (Keefer, 2007). However, our finding is not consistent with Wagner's law where it is postulated that the level of development will increase the size of government (Mueller, 2003; Slemrod et al., 1995). The main policy recommendation from this study is that an adherence to a strict level of government size for all countries is not appropriate; the optimal size of government is country specific. Thus, the optimal size depends on institutional quality among other socio-economic factors. We recommend that countries ought to strengthen their institutions so that to enhance the efficiency of government programs such that more output can be realised for each input of government expenditure spent.

3.6 Appendix 2

Table A3. 1: Optimal size of government final consumption expenditure (G*) - country specific regressions. Dependent variable: Output growth (GDPg)

	Quadratic method										Scully method	Causality and Cointegration	
Country	*Govtcon*	std err	*G-sqr*	std err	Chi-sq	G* (OLS)	N	Average *Govtcon*	Arima	G* (ARMA)	G*		
Algeria	0.947***	-0.205	-0.045***	-0.013	80.35***	10.64	44	16.09	ma(1)	10.7	15.08	→	yes
Australia	0.617***	-0.204	-0.025**	-0.012	307.02***	12.44	44	17.44	ma(1)	11.91	**19.28**	□	no
Austria	1.023***	-0.236	-0.049***	-0.013	138.84***	10.55	44	18.17	ma(1)	10.51	**19.61**	□	no
Belgium	0.914***	-0.135	-0.037***	-0.006	129.3***	12.28	44	21.65	ma(1)	12.46	17.01	→	yes
Benin	0.461*	-0.276	-0.013	-0.019	67.62***	18.44	44	12.95	ma(1)	19.17	12.04	←→	no
Botswana	1.103***	-0.216	-0.032***	-0.009	81.26***	17.13	44	22.33	ma(1)	16.89	19.06	←	yes
Brazil	1.052***	-0.247	-0.048***	-0.014	73.57***	10.96	44	15.14	ma(1)	10.85	**16.58**	←→	no
Burundi	0.21*	-0.11	-0.005	-0.004	7.89***	**22.58**	44	15.85	ma(1)	**21.5**	14.44	←→	no
Cameroon	2.896***	-0.57	-0.237***	-0.053	62.89***	6.11	44	10.58	ma(1)	6.09	n/a	←	yes
Canada	0.8***	-0.204	-0.031***	-0.009	116.68***	12.82	44	21.24	ma(1)	12.18	17.79	□	no
Central African R.	0.388	-0.248	-0.019	-0.016	4.09	9.85	44	13.77	ma(1)	10.2	n/a	□	no
Chile	2.098***	-0.408	-0.144***	-0.036	144.99***	7.28	44	11.82	ma(1)	7.38	n/a	←	no
China	0.584	-0.462	0.006	-0.033	497.38***	n/a	44	13.57	ma(1)	n/a	**33.27**	→	no
Colombia	0.885***	-0.092	-0.039***	-0.006	227.68***	11.12	44	13.08	ma(1)	11.09	10.67	←→	no
Congo	0.915***	-0.219	-0.036**	-0.011	33.5***	12.64	44	17.38	ma(1)	13.42	9.38	←	yes
Congo, Dem. Rep.	0.601***	-0.232	-0.044**	-0.021	7.59***	6.8	44	9.54	ma(1)	7.11	**5.73**	→	yes
Cote D'ivoire	0.697**	-0.284	-0.034*	-0.018	15.43***	10.28	44	14.79	ma(1)	18.17	n/a	←	no
Denmark	0.802***	-0.259	-0.029**	-0.011	116.51***	13.73	44	24.71	ma(1)	13.53	**29.2**	□	no
Egypt	0.557***	-0.099	-0.013**	-0.006	258.15***	**21.59**	44	15.12	ma(1)	**20.18**	**18.66**	←	no
Finland	0.992***	-0.149	-0.042***	-0.008	175.81***	11.84	44	20.22	ma(1)	11.65	16.17	□	no
France	0.924***	-0.145	-0.038***	-0.007	187.78***	12.32	44	21.66	ma(1)	12.26	21.53	→	yes
Gabon	0.836***	-0.373	-0.04*	-0.024	12.03***	10.72	44	14.97	ma(1)	10.62	n/a	←	yes
Ghana	0.188	-0.266	0.011	-0.022	46.61***	n/a	44	11.74	ma(1)	16.59	7.87	←→	yes
Greece	1.196***	-0.241	-0.061***	-0.013	31.11***	9.87	44	17.57	ma(1)	9.96	n/a	←	yes

India	0.452	-0.389	0.006	-0.034	217.44***	n/a	44	10.72	ma(1)	n/a	**14.65**	←→	yes
Indonesia	0.678	-0.563	-0.006	-0.057	300.69***	n/a	44	9.11	arima(1, 1, 1)	9.4	**16.48**	←	no
Iran	0.692**	-0.262	-0.031*	-0.018	17.54***	11.16	44	14.71	arima(1, 1, 1)	n/a	n/a	←→	no
Iraq	1.046***	-0.202	-0.031***	-0.007	31.9***	17.04	44	19.7	ma(1)	17.04	14.48		no
Israel	0.323***	-0.056	-0.005**	-0.002	112.34***	29.8	44	29.99	ma(1)	**34.1**	21.89	←	yes
Italy	1.304***	-0.317	-0.065***	-0.017	42.84***	9.92	44	18.18	ma(1)	9.94	16.05	→	yes
Japan	0.956***	-0.137	-0.049	-0.008	86.23***	9.76	44	15.7	ma(1)	9.74	14.03		no
Kenya	0.175	-0.313	0.006	-0.019	63.1***	n/a	44	16.67	arima(1, 1, 1)	n/a	n/a	←	no
Korea, South	2.655***	-0.261	-0.17	-0.019	162.52***	7.81	44	11.76	ma(1)	7.77	12.18		no
Luxembourg	1.607***	-0.377	-0.086***	-0.023	64.34***	9.34	44	15.68	ma(1)	9.08	**18.21**	←	no
Madagascar	0.521	-0.353	-0.035	-0.036	9.45***	n/a	44	9.83	ma(1)	7.24	n/a	←	no
Malawi	0.87***	-0.201	-0.037**	-0.013	53.04***	11.85	44	15.21	ma(1)	11.61	14.31	→	no
Malaysia	0.761***	-0.256	-0.021	-0.017	141.63***	**17.95**	44	14.02	ma(1)	15.23	**17.22**		no
Mali	0.553***	-0.403	-0.015	-0.026	28.1***	**18.07**	44	12.93	arima(1, 1, 1)	15.07	**14.53**		no
Mexico	1.035***	-0.513	-0.066	-0.046	47.32***	n/a	44	10.5	arima(1, 1, 1)	10.3	**14.72**	←→	no
Morocco	0.546***	-0.252	-0.016	-0.014	52.2***	n/a	44	17.25	ma(1)	19.21	**18.64**	←→	no
Netherlands	0.866***	-0.13	-0.034***	-0.006	223.17***	12.85	44	22.44	ma(1)	12.79	14.24	←→	no
Niger	0.36	-0.479	-0.0106	-0.033	20.73***	n/a	44	13.09	arima(1, 1, 1)	13.22	**18.87**	→	no
Norway	0.886***	-0.15	-0.037***	-0.007	195.45***	12.01	44	19.71	ma(1)	12.2	**24.35**	←	no
Pakistan	0.675***	-0.147	-0.022*	-0.012	244.19***	**15.27**	44	11.13	ma(1)	14.46	11.38	←	no
Panama	1.512***	-0.247	-0.075***	-0.016	130.42***	10.03	44	15.23	ma(1)	10.05	n/a	←	no
Peru	0.5	-0.795	-0.017	-0.068	23.9***	n/a	44	11.03	arima(1, 1, 1)	10.95	n/a	←	no
Philippines	0.348	-0.606	0.006	-0.059	89.42***	n/a	44	9.95	arima(1, 1, 1)	10.73	n/a	←	no
Portugal	0.853***	-0.191	-0.041***	-0.01	39.81***	10.33	44	16.15	ma(1)	10.29	**17.48**	→	yes
Rwanda	0.361	-0.31	0.001	-0.019	54.76***	n/a	44	13.95	arima(1, 1, 1)	n/a	**17.91**	→	no
Saudi Arabia	0.684**	-0.342	-0.021	-0.014	13.15***	16.6	44	23.5	ma(1)	16.62	15.21	→	no
Senegal	0.662***	-0.164	-0.029**	-0.011	78.7***	11.53	44	16.29	ma(1)	11.94	11	←→	no
Singapore	2.176***	-0.542	-0.141***	-0.054	165.13***	7.72	44	10.3	ma(1)	7.46	9.24	←	yes
South Africa	0.471***	-0.153	-0.018**	-0.008	71.23***	12.8	44	17.07	ma(1)	13	12.13	←→	no
Spain	0.906***	-0.137	-0.045***	-0.008	96.04***	9.98	44	15.76	ma(1)	9.96	9.26	←→	no
Sri Lanka	0.868***	-0.125	-0.037***	-0.011	226.48***	**11.83**	44	10.5	ma(1)	11.33	9.79	←	no

Sudan	0.978***	-0.285	-0.047**	-0.022	23.72***	10.52	44	10.89	arima(1, 1, 1)	11.96	10.87	→	no
Sweden	0.612***	-0.168	-0.021***	-0.007	53.15***	14.64	44	25.1	ma(1)	14.52	**28.68**	□	no
Thailand	1.811***	-0.211	-0.106***	-0.017	242.51***	8.54	44	12.46	ma(1)	8.58	n/a	□	no
Tunisia	2.256***	-0.556	-0.12***	-0.033	129.48***	9.4	44	16.39	ma(1)	9.47	**27.73**	□	no
Turkey	1.074***	-0.403	-0.057*	-0.034	70.78***	9.45	44	11.62	ma(1)	9.44	9.45	←→	no
United Kingdom	0.904***	-0.182	-0.041***	-0.009	127.81***	11.11	44	19.15	ma(1)	10.97	15.57	←	no
United States	0.813**	-0.386	-0.040*	-0.025	219.72***	10.14	44	15.81	ma(1)	9.62	11.01	→	yes
Zimbabwe	0.242	-0.263	-0.004	-0.014	4.98***	n/a	44	16.83	arima(1, 1, 1)	16.73	**26.36**	←→	no

Notes: ***, significant at 1% level; **, significant at 5% level; *, significant at 10% level. n/a – represents regressions that couldn't yield statistically significant optimal sizes of government expenditure due to model fitness, non-convergence and insignificant coefficients (statistically and wrong signs). **G*** in bold reflects an optimal size that is above the average government expenditure, i.e., reflects a country that is operating below its optimal size of government expenditure. Causality and cointegration: →,unidirectional from GDPg to Govtcon; ←,unidirectional from Govtcon to GDPg;←→, bidirectional; and □, no causality.

Chapter Four:

4 The Feldstein-Horioka puzzle, Twin Deficits Hypothesis and institutional quality

4.1 Introduction

Persistent current account deficits have the potential not only to be unsustainable but to also have far-reaching macroeconomic consequences in the event of financial flow reversals or sudden stops (Powell & Tavella, 2015), and hence, a cause for concern for policymakers. Most importantly, according to Miller and Russek (1989), "persistently large trade deficits are troublesome because they imply a transfer of wealth to foreigners and possibly a reduction in future generations' living standards." Although some of the issues that are thought to be drivers of persistently large current account deficits are debatable, the role of budget deficits has received more attention. Budget deficits (BD) are considered the main source of current account deficits (CAD), say the adherents of the Twin Deficits Hypothesis, hereafter TWDH. This hypothesis posits that there is a positive co-movement between government budget deficits and the current account deficit. As such, if an economy were to reduce a negative current account balance (CAB) and be able to repay foreign liabilities, the government ought to scale back on its budget deficits (BD). The TWDH policy recommendations, accordingly, appear reasonably simple. However, the policy response is not that simple; a change of position of the budget balance from a deficit to a surplus will not generate a co-movement to the effect that the current account balance changes sign all the time.

This chapter investigates the relation between government budget balance and the current account balance and whether institutions/institutions play any role in that relation. The innovation of this chapter is that it looks at the influence of capital mobility and the quality of institutions on the budget balance and current account balance nexus. This study answers the following question: what role do government budget deficits have on the current account balance, or are other factors at play? Furthermore, this study argues that the positive correlation between budget balance and the current account balance (i.e., TWDH) could be strengthened or weakened by other factors that characterise the economy, for instance, the quality of institutions, origins of law, level of development, capital openness, among others.

According to Feldstein and Horioka (1980), hereafter FH, investors when confronted with risky foreign assets they are most likely to invest in their domestic economy thus a strong correlation between domestic savings and investment is expected. Among other reasons, it is thought that the strong positive correlation is due to high transaction costs and home-equity bais[28] on foreign assets in the financial and capital markets. However, institutions have been found to mitigate and reduce transactions costs, risk included, in an exchange process (North, 1991). Therefore, the FH puzzle can emerge in the presence of a poor institutional environment which restricts the movement of capital across borders. It is plausible to think that in the absence of perfect capital mobility a TWDH is inevitable. It is an important exercise to investigate the role of capital mobility in the CAD and BD nexus due to its implications on policies that target current account deficits. Furthermore, this paper advances the indirect role of institutions on TWDH through their effect on capital mobility. This chapter extends the work on TWDH by showing the moderating role (direct and indirect) of institutions on the CAD and BD nexus.

Identifying the factor(s) that generate a co-movement between CAD and BD is a worthwhile endeavour with a possibility of informing policy prescriptions for improving or reversing the current account balance. However, it should be noted that a high correlation between savings and investment could be a reflection of a country's financial system and development and not evidence of capital immobility (Kasuga, 2004). Findings in Kasuga (2004), suggest that both a country's financial system and its development have a direct role in channelling savings toward investment needs. The more developed a country's financial system is, the higher is the correlation between savings and investment.

There is substantial literature on the possible causes and drivers of current account deficits. Based on the economic development literature, a country on a developmental phase will borrow a lot from the outside world for investment purposes; this would then result in a current account deficit and output growth. In a similar vein, current account deficits are considered a transitory and natural phenomenon as the economy swings between periods of surpluses and deficits such that its national debt is stationary and doesn't explode (Coakley, Hasan, & Smith, 1999; Coakley, Kulasi, & Smith, 1996). On the other hand, for instance, in the absorption approach to the balance

[28]A strong preference for domestic equities or the propensity to invest in one's home country due to perceived high transaction costs and risk associated with foreign equities/assets.

of payments, current account deficits signify an economy that is living beyond its means. This approach resonates with the TWDH, i.e., a tighter fiscal policy can be used as a policy tool to bring down a large current account deficit and contrary true. Drawing from the institutional economics and finance literature, a change in country-specific pull factors, for example, a strengthening of the regulatory environment and rule of law or an increase in the quality of institutions should attract capital inflows (see, Ozmen, 2004; Powell & Tavella, 2015) and consequently create a current account deficit. With an improvement in the quality of institutions in a country, it is expected that home equity bias should reduce as transaction costs, uncertainty, and risk associated with investing in a foreign country decline. With a decline in home equity bias and an elevated level of capital flows the current account deficit is expected to be mainly driven by private capital flows. This suggests that the current account could be driven directly by the actions of the private and/or the public sector and also, indirectly by the underlying economic environment. In the event that the current account is driven by private sector decisions then it will not be much of a concern that requires intervention.

The objective of this chapter is to investigate the association between government budget deficits and the current account deficit and examine whether underlying host country factors influence the association. These factors determine the extent to which a co-movement between BDs and CADs, i.e., TWDH can emerge. Persistent current account deficits and budget deficits in less developed nations, especially Sub-Saharan Africa, is a cause for concern (Osakwe & Verick, 2007) that warrants an investigation on the possible link between the two variables. Moreover, assessing the link between the two variables is important considering that most of the less developed countries rely on government programs and fiscal policy tightening might exacerbate economic woes and hamper development. As mentioned in Rowden (2009) austerity measures have had detrimental effects in less developed countries as a result of IMF's structural adjustment programs. As such it is important that the relationship between the two variables be ascertained after controlling for differences in the economic environment so as to inform policy.

Most of the studies that investigate the CAD and BD nexus focus on the correlation or causality between the two aggregates (Baharumshah, Evan, & Khalid, 2006; Daly & Siddiki, 2009; Normandin, 1999; Ravinthirakumaran, Selvanathan, & Selvanathan, 2016; Vamvoukas, 1999) and in some instances the structural and cyclical causes of CAD (see, Chinn & Prasad, 2003; Dabelle & Faruqee, 1996) are looked at. Additional control variables that are believed to be related to CAD,

e.g., demographics, trade openness, financial markets development, net oil consumption, etc., are included in such studies as this one. However, the addition of control variables does not adequately capture the underlying cross-country differences or heterogeneity amongst countries. This paper takes a different approach from the traditional analysis of this phenomenon by offering an institutional perspective which is novel in such studies with the exception of Chinn and Ito (2007) study. However, this study differs from the Chinn and Ito study in that: (1) it utilises both perception based measures of institutional quality and non-perception based measures, (2) unlike Chinn and Ito, we use time series instead of cross sectional data for the institutional variables, (3) we additionally test for the long run relationships using cointegration techniques whilst Chinn and Ito tested for an association/correlation only.

Despite extensive research on the TWDH, there seems to be a dearth of research on panel studies when compared to time series studies for developing countries. This study is unique to standard TWDH studies because it seeks to unravel the conditions that permit an associational relationship between BDs and CADs by analysing an indirect transmission channel through capital mobility and the quality of institutions. Standard TWDH studies simply look for the presence or direction of a causal relationship between the two variables and fail to answer why such a relationship exists or does not exist.

The contribution of this study is as follows: First, it adds to the debate on what drives the co-movement between BDs and CADs, most studies only focus on the direction of causality: this study focuses on the long run analysis. A long run analysis will aid in assessing the economic impact of budget deficits on the current account deficits. Furthermore, there is a paucity of studies done for less developed countries on the TWDH, most studies are either done for developed nations, Asian nations or single developing nations (Bangake & Eggoh, 2012). This study seeks to fill this gap by focusing specifically on both groups of countries, developed and less developed. Second, this study takes a different approach from the traditional analysis of the TWDH phenomenon by offering an institutional perspective (highlighting the role of institutions) which is novel in such studies. Furthermore, the role of capital mobility within the TWDH is investigated. This too is largely a function of the institutional environment. Findings from this study will be of much help to policymakers and practitioners by offering alternative policy prescriptions for improving or reversing the current account balance.

4.2 Literature review

Effects of fiscal policy on the external balance such that budget deficits can result in a current account deficit and this can be explained through the Mundell-Fleming models. According to the Mundell-Fleming models, a government budget balance would increase domestic absorption, which leads to an increase in income and induce consumption that includes imported goods (Fleming, 1962; Mundell, 1963). Thus, the current account will move to a deficit. Alternatively, a budget deficit will lead to a current account deficit through the interest rate channel, i.e., an increase in domestic interest rates due to increased government borrowing will make domestic assets attractive to foreigners. With an increased uptake of domestic assets, the economy will register capital inflows, an appreciation of the domestic currency which leads to a decrease in exports and an increase in imports. However, in the monetary approach to the balance of payments, a budget deficit would lead to a current account surplus. From the perspective presented above, it is evident that a TWDH can emerge in the Keynesian framework. As such, a country faced with a large current account deficit would need to decrease aggregate demand through the tightening of fiscal policy. According to the Ricardian equivalence proposition, a budget deficit has no effect on the economy as consumers are forward-looking and would internalise the government budget constraint when making consumption and savings decisions. In the Ricardian sense, a government budget deficit will be matched by an equivalent increase in private savings and this would result in an unchanged current account balance.

Since fiscal policy is not conducted in a void there is cross-pollination between it and monetary policy. For instance, with rule-based monetary policy, popular with most central banks, some of the variables affecting the transmission of fiscal policy shocks to the current account, i.e, interest rate, are directly and indirectly degrading the correlation between fiscal policy and the current account. Monetary policy and its variants affect the twin deficits hypothesis indirectly through the transmission paths of variables under the control of monetary authorities such as interest rates, inflation and at times output growth. Additionally, under a rule-based monetary policy system, the Ricardian equivalence proposition breaks down since monetary policy is effectively managing consumer expectations through inflation targets.

Investment is capricious and sensitive to country factors that signal risk, for example, the level of political stability and the likelihood of expropriation among others. Incentives and wealth-maximizing opportunities of agents are defined by the structure of rules, both formal and informal,

and the enforcement levels of such rules. If rules are weak and difficult to enforce, risk-taking initiatives by individuals and organizations is inhibited and so is the overall investment within an economy. Weak institutions increase transaction costs and the costs of transformation in the production process (see, Aron, 2000; North, 1987, 1990; Olson, 1996; Pande & Udry, 2005). Prevailing institutional framework determines the type and form of investment that is adopted by agents. Economic agents when faced with undefined property rights and unenforceable contracts, they will tend to operate at a small scale, acquire inexpensive technology and operate on a short-term horizon without any long-term commitments (Aron, 2000). As such, countries that have better institutions and enforcement of property rights are most likely to have a higher level of domestic investment which is largely financed from external sources (La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1998; Shleifer & Wolfenzon, 2002).

In a recent strand of literature on savings, according to Freytag and Voll (2013), since savings are a decision directed at the future, it is reasonable to suppose that institutions, through the mitigation of uncertainty, have a direct bearing on savings levels. Freytag and Voll note that savings are supposedly influenced by lower order institutions, i.e., the rule of law, protection of property rights and low levels of corruption. Accordingly, savings rates are expected to be lower in environments with lower institutional quality and relatively higher in environments with better institutional quality (for example, see Abu, Karim, & Aziz, 2015). By extension, the institutional environment has an impact on economic growth via the savings channel, i.e., higher savings rates will cascade into higher rates of domestic investment. For example, Bloom and Sachs (1998, 211) note that Africa has low levels of savings and investment due to a multiplicity of problems including bad institutions, poor economic policies, and corruption. On the contrary, a poor institutional environment may encourage precautionary-savings against uncertainty on one's future income (Buzatu, 2015; Freytag & Voll, 2013; Loayza, Schmidt-Hebbel, & Servén, 2000). With precautionary savings, especially in less developed countries/areas, individuals tend to invest in real estate, livestock, and gold which are not counted as part of domestic savings or domestic investment due to their nature and classification. This may give downwardly biased estimates of savings levels for such countries.

Capital mobility allows the transfer of resources through a trade or current account imbalance. Since the current account balance reflects a country’s trade interactions with the rest

of the world, the extent to which a country's citizens are free to trade and transact unhindered is crucial. World output growth is generated as funds and resources flow free across the world due to disparities in countries' savings and investment. Countries with savings' shortages can finance domestic investment by using funds from countries with savings surplus. Due to protectionist policies, most countries have some form of controls over how its economic agents can go about in conducting their business. Various reasons are put across ranging from protection of (1) local industries and jobs, (2) the value of the local currency and (3) the country from an unsustainable national debt due to persistent current account deficits (Leblang, 1997). As such, countries have different forms of capital controls, and hence, the lack of perfect global capital mobility. One of the seven macroeconomic puzzles is related to capital mobility; Feldstein and Horioka (1980), using a sample of OECD countries, note that there was a high correlation between savings and investment, which implied low capital mobility. This puzzle has generated a lot of interest with numerous studies conducted to date.

From the extant literature it would seem the legal and institutional environments of a country are thought to be factors that have moderation effects on the relationship between CAD and BDs (see, Bernanke, 2005; Chinn & Ito, 2007). Almost all of the Sub-Saharan African (SSA) countries have experienced perennial CADs spanning more than three decades since 1970 (Osakwe & Verick, 2007) however, national savings and investment remain small, FDI minuscule and growth rates have been lack-lustrous (Platteau, 2009).

4.2.1. Contribution and significance of the study

The contribution of this study is in many fronts: first, it adds to the debate on what drives the co-movement between budget balances and current account balances. There is a paucity of studies done for less developed countries on the TWDH; most studies are either done for developed nations, Asian nations or single developing nations (Bangake & Eggoh, 2012). This study seeks to fill this gap by focusing specifically on both groups of countries, developed and less developed. Second, by looking at the roles of institutional quality and capital mobility, this study deviates from the traditional analysis of the TWDH phenomenon by offering an institutional perspective (highlighting the role of governance and institutional quality) which is novel in such studies. Furthermore, the role of capital mobility within the TWDH is investigated. This too is largely a function of the institutional environment. Findings from this study have implications policymakers

and practitioners as they offer alternative policy prescriptions for improving or reversing the current account balance.

4.3 Research design and methodology

The twin deficits hypothesis (TWDH) rests on the national income identity. Total expenditure (*Y*) is given by the sum of the expenditure components that make up total output. The national income model is presented in equation 24 below and, by simplifying it, we show in equation 28 that the current account balance (*X-M* or *CAB*) is determined by the government budget balance (*T-G*) and the difference between private savings and investment (*S-I*):

24. $$Y = C + I + G + (X - M)$$[29]

Alternatively, *Y* equals private consumption expenditure, *C*, savings, *S*, and taxes, *T*:

25. $$Y = C + S + T$$

Through substitution and rearrangement of the above equations, yields:

26. $$(X - M) = (S - I) + (T - G)$$

27. $$(X - M) = (S_p - I) + S_g$$[30]

28. $$(X - M) = (S_n - I)$$

The national income identity (and its decompositions) does not convey any structural relationship(s) amongst the variables that make it and by definition, identities should hold. As such the twin deficits hypothesis can only be inferred from a simply causality analysis. Out of such an exercise, three outcomes can emerge (1) a unidirectional causal relation, (2) bi-directional causal relation or (3) no causal relationship. However, the reasons we might get any of the three outcomes remain ad-hoc and atheoretical. This study seeks to find the long run relationship between budget and current account deficits.

Furthermore, this study looks at the components that make up the TWDH. A simple hypothesis is put across that can be tested and perhaps linked with theory in an attempt to come up with a theory-based explanation.

[29] Y=output, C=consumption, I=investment, G=government spending, (X-M) = current account balance.
[30] S_p and S_g is the private saving and public saving variables.

4.3.1 Stylized facts

A TWDH can emerge in equation 28 if the following condition is satisfied, assuming that $S_p \neq S_g$ and there is low capital mobility.

- *Capital mobility is low*

According to FH, economies with low capital mobility tend to exhibit a high correlation between private savings and investment. If the private Saving-Investment gap in equation 29 is close or equal to zero due to low capital mobility, the current account balance will be determined by the budget deficit (S_g). This is shown in equation 30:

29. $(S_p - I) \approx 0$ then it follows that;

30. $(X - M) = (T - G) = (S_g)$, therefore, we can insinuate that fluctuations and movements in (X-M) could be associated with changes in *Sg*. By extension, any measures or government policy that increases capital mobility should lead to a breakdown in the TWDH.

4.3.2 Estimation technique

Based on FH (1980), equation 31 is used to capture the degree of capital mobility, a value of b_1 close to unity will signal capital immobility and lower values of up to zero are associated with high capital mobility. With low capital mobility, it is reasonable to expect that *I* and *S* will be almost equal hence the discrepancy in the private saving-investment balance to be small or even zero ($S_p - I \approx 0$). From equation 30, with a low mobility of capital, the emergence of a twin deficit is inevitable.

31. $$I = a + b_1 S_p$$

The original Feldstein-Horioka equation is viewed as too parsimonious. It probably suffers from omitted variables bias. To correct for this, the method used in Younas (2009) is emulated by including additional variables inter alia the institutional-quality variable. According to Ozmen (2004), better institutions can promote foreign direct investment by mitigating risk associated with investing in foreign assets; this should lead to a reduction in the correlation between *I* and S_p. To capture the impact of institutional quality on the correlation between *I* and S_p, equation 31 is expanded to equation 32 as follows:

32. $$I = a + b_1 S_p + b_2 S_p * IQ + Other\ variables b_3 + e.$$

If an improvement in the quality of institutions results in increased capital mobility; the interaction term in equation 32 should have a negative effect ($b_2 < 0$) (Younas, 2009). Countries with poor institutional quality are likely to have immobile capital and more likely to face twin deficits unlike those countries with better institutions.

To find the long run relationships between CADs and BDs, whilst controlling for capital mobility, we employ the method used in Fidrmuc (2003) as shown in equation 33;

33. $$(X - M) = CAB = \beta_0 + \beta_1 I + \beta_2 S_g.$$

Where the variables in the above equation are as previously defined, the following structural relationships are expected; a negative coefficient is expected on investment ($\beta_1 < 0$),and a positive coefficient on the budget balance ($\beta_2 > 0$). An increase in either of the two variables (*I* and S_g) will deteriorate and improve the current account balance, respectively. If a country is perfectly integrated into the world financial markets the coefficients of *I* and S_g should equal unity because a change in either investment and the budget balance or both will be financed in the world capital markets and effectively captured by the change in the current account (Khan & Saeed, 2012). To capture the long run relationship, we use an autoregressive distributed lag (ARDL) bounds testing approach to cointegration by Pesaran, Shin, and Smith (2001) . The model to be estimated is shown in equation 34. This approach is chosen for its advantages because it allows the estimation of variables with different orders of integration in a single estimation. Results from this approach are easy to implement and interpret. Lastly, there is room to assign different lag lengths to the chosen variables so as to improve the fit of the model.

34. $$\Delta CAB_{it} = \alpha_{i0} + \sum_{i=1}^{p} \beta_{1i}\, \Delta CAB_{it-i} + \sum_{i=1}^{q} \beta_{2i}\, \Delta S_{g_{it-i}} + \sum_{i=1}^{s} \beta_{3i}\, \Delta I_{it-1} + \delta_{1i} CAB_{it-1} + \delta_{2i} S_{g_{it-1}} + \delta_3 I_{it-1} + \epsilon_{it}$$

The coefficients, β's and δ's, are the short and long run estimates and α_{i0} is the intercept term.

4.4 Data, estimation and results

4.4.1 Data description

This study uses three yearly non-overlapping average data for countries with available data for the period 1995-2013. Three yearly averaged data is used so as to purge out short-run cyclical fluctuations since this study seeks to examine the long-run relationship. The data on current

account balance, domestic savings, domestic investment, unemployment rate, growth in gross domestic product per capita is in percentages and derived from the World Development Indicators (WDI) database, whilst data on institutional quality variables are derived from the World Governance Indicators (WGI) and the Quality of Government databases (see Table 4.1 for details). We create a factor score for institutional quality variables through factor analysis. A single factor is retained for each compression[31] based on the Kaiser-Meyer-Olkin measure of sampling adequacy and the scree plot. The data used is obtainable from various sources, all freely available on the internet.[32]

Table 4. 1: Variable definitions

Variable symbols	Variables	Source
GDPKG	Annual growth in Gross Domestic Product (GDP) per capita in percentages.	WDI
Sp	Domestic saving as percent of GDP.	WDI
I	Domestic investment as percent of GDP.	WDI
Sg	Government saving, tax revenues minus government expenditure as percent of GDP. Alternatively, referred to as the government budget balance.	WDI
CAB	Current account balance as percent of GDP.	WDI
UNRATE	Unemployment rate in percentages.	WDI
IQ	A factor analysis score based on the six World Bank Governance Indicators (WGI), the ICRG quality of government index (QoG) and the Vdem political corruption index (PolCptn). This is proxy for the quality of institutions. The score ranges from -0.5 to 1.74.	Author's calculations

The list of the 48 countries included in the analysis is shown in Table 4.2.

[31]A proxy is created, *IQ* based on the 8 institutional quality proxies, namely the six World Bank Governance Indicators (WGI), the ICRG quality of government index and the Varieties of democracy (Vdem)'s political corruption index.

[32]Quality of Government database is available on www.qog.pol.gronigen.se.

Table 4.2: List of countries

Algeria	Finland	Malaysia	Poland	Turkey
Argentina	France	Mauritius	Portugal	United Kingdom
Australia	Germany	Mexico	Russian Federation	United States
Belgium	Greece	Morocco	Singapore	Vietnam
Brazil	Indonesia	Netherlands	South Africa	
Canada	Ireland	New Zealand	Spain	
Chile	Israel	Norway	Sri Lanka	
China	Italy	Pakistan	Sweden	
Colombia	Japan	Panama	Switzerland	
Denmark	Korea, Rep.	Peru	Thailand	
Egypt	Luxembourg	Philippines	Tunisia	

A summary of the data is presented in Table 4.3. We note that there is moderate variation in most of the variables except for *CAB*. The coefficient of variation is approximately 20 for *CAB*, this implies that the data might be skewed or not normally distributed for this variable. Perhaps the data generating process of *CAB* is not derived from a random source but a result of a deterministic process, i.e., from the national income accounting identity. Additionally, the number of observations is significantly low for the government savings (*Sg*) variable; this is due to the difficulty in obtaining continuous and complete data for government accounts, especially for developing countries.[33]

Table 4.3: Descriptive statistics (1995-2013)

	CAB	*Sp*	*I*	*Sg*	*IQ*	*UNRATE*	*GDPKG*
Mean	0.259	25.386	23.797	-2.228	0.603	8.123	2.373
Median	-0.755	24.117	22.918	-2.085	0.656	7.208	2.263
Maximum	9.995	43.846	38.131	3.360	1.891	29.770	7.910
Minimum	-11.928	6.299	11.086	-9.317	-1.051	0.600	-4.282
Std. Deviation	5.057	8.565	5.284	3.374	0.882	4.917	2.282
Coef. Variation	19.518	0.337	0.222	-1.514	1.464	0.605	0.962
N	326	336	336	196	336	336	336

Source: Author's calculation.

[33] The following countries were dropped from the regression models with government savings due empty data points: China, Malaysia, Philippines and Vietnam. Furthermore, the following countries had a reduced number of data entries, i.e., less than 7 data points but more than 3 points: Canada, Mexico, Argentina, Chile, Colombia, Indonesia, Israel, Japan, New Zealand, Luxembourg, Mauritius, Pakistan, Panama, Peru, Poland, Singapore, Spain, Sri Lanka, Thailand and Turkey.

Results of the correlation matrix, in Table 4.4, reveal that most of the variables, if entered simultaneously into the regression, do not pose the problem of multicollinearity except for *Sg* and *I*. However, the correlation between *Sg* and *I* is within the threshold of 45%, and hence, we ignore the threat of multicollinearity.

Table 4.4: Correlation matrix

	CAB	*I*	S_p	S_g	*GDPKG*	*UNRATE*	*IQ*
CAB	1						
I	-0.10*	1					
Sp	0.60*	0.51*	1				
Sg	0.38*	0.44*	0.61*	1			
GDPKG	-0.03	0.43*	0.24*	0.13*	1		
UNRATE	-0.26*	-0.26*	-0.33*	-0.24*	-0.14*	1	
IQ	0.26*	-0.15*	0.21*	0.08	-0.22*	-0.23*	1

Notes: level of significance,* *p<0.1*

4.4.2 Estimation and discussion of results

Panel data estimation techniques are used in this study. To avert the problem of spurious relationships, we test for stationarity amongst our variables. The presence of unit roots or their absence is important for ascertaining long-run relationships, especially when one considers cointegration relationships as in this study. Based on the majority rule, we find that all the variables do not exhibit unit root processes but for *CAB* whose results are inconclusive because of a stalemate, see Table 4.5. One possible reason for an inconclusive decision on *CAB* could be that it is fractionally integrated. A series is fractionally integrated if it has to be differenced *d* times for it to be stationary, *I(d),* with *d* between 0 and 1 (Beyaert, 2003). With the panel unit root testing concluded, we can safely estimate our models without fear of running spurious regressions.

Table 4.5: Panel unit root results

	LLC	IPS	ADF Fisher	PP Fisher
K	-4.663***	-1.747***	107.629	118.032**
Sp	-16.072***	-1.737**	69.222**	56.419
GDPg	-34.4***	-33.29***	1166.36***	1183.84***
CAB	-5.994***	-0.237	104.609	132.823***
UNRATE	-18.097***	-4.481***	88.486**	74.503***
Sg	-29.667***	-8.843***	174.147***	182.863***

Notes: level of significance,* p<0.1; ** p<0.05; *** p<0.01

We determine the role of institutional quality on the Feldstein-Horioka puzzle by estimating the FH equation and its variants. Results are presented and summarised in Table 4.6. The variables of interest are domestic savings (*Sp*) and *Sp*IQ* (the interaction between *Sp* and the institutional quality variable (*IQ*)). We first determine whether domestic saving has any effect on domestic investment without controlling for other variables, this is shown in Table 4.6 (column 1) for each panel (regression technique). In columns 2 and 3 of each panel, we present results with the interaction term and thereafter other control variables. We find a positive and significant association between *I* and *Sp* in all panels of Table 4.6. The coefficients of *Sp*, i.e., the savings retention coefficients, are positive and relatively small which suggests that the effect of domestic saving on domestic investment is positive but small. The savings retention coefficient ranges from 0.317 to 0.40, which is comparable to the coefficients found in Younas (2009). This finding suggests that there is moderate capital mobility across the countries in our sample and the FH puzzle is dismissed since for every unit of domestic investment only a maximum of 0.4 units is financed from domestic savings with the rest from international sources.

Furthermore, we find a negative and significant coefficient on the interaction term across all panels. This result highlights that better institutions/institutional quality has a negative moderation effect on the relationship between savings and investment. According to the literature on institutions and international finance, home equity bias decreases with better governance, rule of law and enforcement of contracts (proxies of institutional quality) (Ozmen, 2004). As the level of uncertainty diminishes, transaction costs and the risk in foreign assets decreases in the capital and financial markets, investment and savings move freely across territories (Aron, 2000; Freytag & Voll, 2013; Olson, 1996). Consequently, with the free movement of capital or capital mobility, the level of domestic investment need not be directly correlated with the level of domestic savings and we expect a decline in the savings retention coefficient. However, this is contrary to Kasuga (2004) who posits that with better financial markets, higher levels of development and perhaps better institutional quality, one would expect a high correlation between savings and investment. The results remain robust even after adding more control variables. The coefficients of *Sp* and *Sp*IQ* maintain their signs even when we add control variables.

We do a sensitivity analysis of the results in Table 4.8 by conducting a subsample analysis. We partition the data into two groups[34] so as to mitigate the problem of mixing heterogeneous panels which might obscure the effects of underlying conditions, i.e., differences in institutional quality. Based on the subsamples of institutional quality in Table 4.7, we find that there are no differences in the means of the investment variable whilst there are differences in the domestic savings variable. In Table 4.8, we estimate the original FH equation on two samples based on the median score of the institutional quality variable, i.e, *IQ*. Two groups are created, i.e., low *IQ* for those values that lie below the median score of 1.180 and high *IQ* for those values greater than or equal to the median score. The subsample results are qualitatively similar to those found in Table 4.6. On average we find that the savings retention coefficient is high for the low *IQ* group when compared to the high *IQ* group across all estimation techniques. This implies that there is relatively less capital mobility in countries with poor governance, rule of law and rampant corruption, i.e., poor institutional quality. This finding resonates with that of Freytag and Voll (2013) who highlights increased transaction costs, uncertainty and risks to investment associated with locations that are marred by poor institutional quality. As a result, investment will flow to locations or regions that have better governance thus lowering the saving-retention coefficient due to the breakdown in the correlation between domestic saving and investment. This has been dubbed the saving glut phenomenon in the United States of America (US); savings from excess areas, mainly Asia, are attracted to the US and away from their countries of origin due to the confidence and certainty associated with the US institutions and governance (Chinn & Ito, 2007). This has led to large CADs in the US and current account surpluses in Asian countries, for example, China.

[34]See Table 4.7, for the t-test of mean differences.

Table 4.6: Feldstein Horioka and Institutional Quality: Dependent variable: Domestic Investment

	OLS			RE			FE		
	1	2	3	1	2	3	1	2	3
Sp	0.317***	0.428***	0.356***	0.317***	0.428***	0.356***	0.318***	0.429	0.351
	(0.37)	(0.04)	(0.04)	(0.37	(0.05)	(0.49)	(0.04)	(0.05)***	(0.05)***
IQ		2.687***	3.028***		2.673***	3.028***		2.668	2.976
		(0.79)	(0.79)		(0.49)	(0.37)		(0.49)***	(0.38)***
Sp*IQ		-0.151***	-0.155***		-0.151***	-0.155***		-0.151	-0.150
		(0.03)	(0.03)		(0.01)	(0.01)		(0.01)***	(0.01)***
UNRATE			-0.152***			-0.152***			-0.134
			(0.04)			(0.02)			(0.04)**
GDPKG			0.531***			0.531***			0.616
			(0.12)			(0.13)			(0.11)***
Constant	15.744***	13.931***	15.570***	15.737***	13.912***	15.571***	15.723***	13.910	15.288
	(0.82)	(0.84)	(0.87)	(0.82)	(0.82)	(0.82)	(0.94)	(1.01)***	(0.99)***
N	336	270	270	336	270	270	336	270	270
R2_A	0.26	0.39	0.46	.	.	.	0.27	0.39	0.47
F	74.00***	42.90***	39.06***	.	.	.	73.62***	280.96***	3,321.37***
chi-sq.	.	.	.	75.18***	840.79***	6402.70***	.	.	.
Time FEs	.	.	.	.	.		Yes	Yes	Yes

Notes: level of significance, * $p<0.1$; ** $p<0.05$; *** $p<0.01$. R2_A – adjusted R square; Time FEs – Time Fixed Effects. We failed to reject the null hypothesis for the Bresuch Pagan LM test for random effect and the Hausman test. Also, the F test (for all $u_i = 0$) is rejected in all fixed effects models implying pooled OLS is appropriate.

Table 4.7: Test of mean differences in Savings and Investment: institutional subsample

	Low IQ	**High IQ**	mean difference
	Mean	Mean	p-value
Sp	23.967	26.882	0.002
I	23.403	22.452	0.263

Notes: median score for IQ=1.180.

Table 4.8: Feldstein Horioka and Institutional Quality: A subsample analysis: Dependent variable: Domestic Investment

	Below-median score of IQ			Above-median score of IQ		
	OLS	RE	FE	OLS	RE	FE
Sp	0.495***	0.495***	0.495***	0.147***	0.146***	0.145**
	(0.05)	(0.06)	(0.06)	(0.05)	(0.22)	(0.22)
Constant	12.739***	12.752***	12.746***	13.042***	19.05***	19.09***
	(1.03)	(1.02)	(1.38)	(1.06)	(0.64)	(0.59)
F	72.32***		74.32***	12.36***		43.38**
chi-sq.		76.32***			43.59***	

Notes: level of significance, * $p<0.1$; ** $p<0.05$; *** $p<0.01$. We failed to reject the null hypothesis for the Bresuch Pagan LM test for random effect and the Hausman test. Also, the F test (for all $u_i= 0$) is rejected in all fixed effects models implying pooled OLS is appropriate.

4.4.2.1 Panel Cointegration Analysis

To jointly test for the twin deficits hypothesis and the Feldstein-Horioka puzzle, we estimate a long run relationship using panel cointegration techniques. The Pedroni (1999) and Kao (1999) panel cointegration tests are used to test for the presence of a long run relationship between *CAB, I* and *Sg*. The Pedroni test has seven test statistics categorised into 'within' and 'between' dimensions. To ascertain the presence of cointegration, we use a majority decision rule based on the seven test statistics. Whilst the Kao test uses a group mean test for cointegration. In

Table 4.9, the results of the Pedroni test are presented. We obtain four out of seven tests rejecting the null hypothesis of no cointegration at the 10% level of significance and on the contrary, we reject the null hypothesis at 5% on three occasions out of seven tests. It is noted that the results from the Pedroni test are mixed and inconclusive. We suspect a loss of power in the ADF statistic of the Pedroni test considering that some of the variables might be fractionally integrated. On the other hand, the Kao test rejects the null hypothesis of no cointegration at the 5% level (see Table 4.10); and hence, we reject the null hypothesis of no cointegration. This implies that there is a long run relationship between *CAB*, *I* and *Sg*; the three variables have a tendency to move together over time (Engle & Granger, 1987).

Table 4.9: Pedroni test (Trend and intercept)

		(within-dimension)			
		Statistic	Prob.	Weighted Statistic	Prob.
Panel	v-Statistic	3.74***	0.00	1.58*	0.06
Panel	rho-Statistic	4.21	1.00	3.88	1.00
Panel	PP-Statistic	0.25	0.60	-2.51***	0.01
Panel	ADF-Statistic	0.29	0.61	-1.20	0.12

	(between-dimension)		
		Statistic	Prob.
Group	rho-Statistic	5.33	1.00
Group	PP-Statistic	-5.62***	0.00
Group	ADF-Statistic	-1.33*	0.09

Notes: level of significance,* p<0.1; ** p<0.05; *** p<0.01

Table 4.10: Kao test

	t-Statistic	Prob.
ADF	-2.015**	0.021

Notes: level of significance, ** p<0.05

Due to the inconclusive result of the Pedroni test, a much more robust test for cointegration is employed viz. the ARDL-bounds test to cointegration by Pesaran et al. (2001). Unlike the Pedroni test, the order of integration of the variables is not important in the Pesaran et al. (2001) bounds test. The results of the bounds test are presented in the next section.

Autoregressive Distributed Lag (ARDL) - bounds testing model

To affirm the correctness of our cointegration results, we also test for the presence of a long run relationship of the same variables using the ARDL bounds testing approach. With this approach, we compare the calculated F-statistic from the ARDL model against the critical values provided in Pesaran et al. (2001). We estimate an ARDL model with an intercept and no trend. The calculated F-statistic is shown in Table 4.11 and Pesaran et al. critical values for C1: iii (case III with unrestricted intercept and no trend) are presented in Table 4.12. The calculated F-statistic (4.603) is greater than the upper bound of 4.14 at the 10% level of significance. This implies that we can reject the null of no cointegration and a long run relationship exists among the variables. Furthermore, we cannot reject or accept the null at the 5% level of significance since the calculated F-statistic is located between the lower and upper bound of the critical values at 5% level of significance. The ARDL results corroborate the Kao test results and we conclude there is a long run relationship between the current account balance, domestic investment, and government budget balance.

We calculate and find that the long run multiplier between *I* and *CAB* is -0.87 [-(-0.117/-0.135)]; in the long-run, an increase in domestic investment of 1 percent will lead to a decrease in the current account balance of 0.87 percent (see Table 4.13). The investment multiplier is close to a unit and this suggests capital mobility in investment financing (Fidrmuc, 2003) and a rejection of the FH puzzle. Whilst a long run multiplier for *Sg* is not significantly different from zero.

Table 4.11: Wald Test of the ARDL long-run terms

Statistic	Value	df	Probability
F-statistic	4.603	(3, 98)	0.004
Chi-square	13.809	3	0.003

Table 4.12: Critical Value Bounds of the F-statistic

Critical Value Bounds of the F-statistic						
	90%		95%		99%	
k	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
2	3.17	4.14	3.79	4.85	5.15	6.36

Table 4.13: Unrestricted ARDL regression: Dependent variable: *CAB*

Variable	Coef.	Std. Error	Diagnostics
C	2.792*	(1.629)	R-sq. = 0.12
Δ*CAB*(-1)	0.216	(0.150)	
Δ*I*(-1)	-0.030	(0.169)	F-Stat. = 3.23***
ΔSg(-1)	0.171*	(0.097)	
CAB(-1)	-0.135**	(0.066)	Dwatson = 1.73
I(-1)	-0.117*	(0.066)	
Sg(-1)	0.011	(0.108)	

Notes: level of significance, ***, **, * equals to p<0.01, p<0.05 and p<0.1 respectively.

Furthermore, we test for long-run causality between our variables. It is important to identify the direction of causation between variables that are cointegrated to inform policy prescription. We find that a unidirectional causation exists running from the independent variables, i.e., *Sg* and *I*, to the current account balance (*CAB*); results are shown in Table 4.14.

Table 4.14: Long run causality

Dependent variables	Error correction term	t-statistic
CAB	-0.153**	2.334
I	0.076	0.045
Sg	0.143**	2.427

Notes: level of significance, ** p<0.05

Fully Modified Ordinary Least Squares (FMOLS) and Dynamic Ordinary Least Squares (DOLS)

To test the robustness of our ARDL long-run relationships, we proceed and estimate the long run relationship between *CAB*, *I* and *Sg* using the fully modified ordinary least squares (FMOLS) method of Pedroni (2000) and the dynamic ordinary least squares (DOLS) method of Kao and Chiang (2000). The DOLS method augments an OLS panel cointegrating regression with cross-section leads and lags of the regressors to cater for specific endogeneity and serial correlation. Whilst the FMOLS relies on the calculated long run covariances of the dependent variable and serial correlation term, which are then used to calculate the modified dependent variable and serial correlation correction terms. Moreover, the FMOLS is ideal when one or more of the variables are endogenous. The FMOLS and DOLS methods respectively use a non-

parametric and parametric approach to autocorrelation. The advantage of using these models is that one is able to allow for cross-section heterogeneity, pooled estimates and group average of statistics across cross-sections. However, the FMOLS grouped mean estimator is consistent over the weighted and pooled estimators if there is heterogeneity in the cointegrating relationships (Pedroni, 2000).

The results of DOLS and FMOLS estimation methods are presented in Table 4.15. We find that an increase in investment results in a decrease in the current account balance whilst an increase in the budget balance or government savings increases the current account balance. According to the DOLS, on average a 1 percent increase in investment generates a current account deficit of about 0.96 percent. This result confirms the presence of a near perfect capital mobility in terms of the movement of investment funds. However, we fail to find such support in terms of government budget financing. Our results suggest that a 1 percent increase in government savings will generate a current account surplus of 0.46 percent; on the contrary, this implies that more than half of government deficit financing is local and only 46% is financed internationally. This finding suggests a lack of capital mobility in government debt financing and a lack of a co-movement between the government budget balance and the current account balance, i.e., a rejection of the twin deficit hypothesis (TWDH).

Table 4.15: FMOLS and DOLS results for the whole sample: Dependent variable: *CAB*

	FMOLS		DOLS	
	pooled	grouped	pooled	Weighted pooled
I	-0.555	-0.888	-0.977	-0.956
	(0.091)***	(0.115)***	(0.105)***	(0.061)***
Sg	0.409	0.317	0.494	0.454
	(0.117)***	(0.114)***	(0.114)***	(0.049)***

Notes: level of significance, *** p<0.01

Furthermore, our finding suggests a two-tiered market for private finance and sovereign finance with differing conditions attached to each market. Perhaps, the lack of capital mobility in the sovereign financing could be due to differences in risk profiles amongst countries as opposed to private agents. To further understand this disparity, we test for differences in country settings by subdividing our sample based on institutions, capital openness and level of development in Tables 4.16-4.17.

4.4.3 Subsample analysis

To further debunk the link between institutional settings and capital mobility, we investigate the role of differences in the institutional environment.

a) Capital openness

We use the Chinn-Ito capital openness index (Chinn & Ito, 2006). The capital openness[35] (ka_open) index is a de jure measure of financial openness for a country. This index codifies the level of restrictions on financial transactions across borders. The ka_open index ranges from 0-1, with smaller values reflecting restrictive controls on cross-border financial transactions and larger values reflecting a free movement of financial transactions. We split our sample into two groups 'less open' and 'more open' based on the median score for ka_open, with less open referring to values less than the median and more open representing values equal and greater than the median. A simple t-test of mean differences reveals that there are significant differences in sample means of all our variables based on the level of capital openness (see Table 4.16, first panel). We note that 'more' open economies have on average a current account surplus, relatively less domestic investment and large government budget deficits compared to 'less' open economies.

Table 4.16: test of mean difference: capital openness and institutional quality

	Capital Openness index			Institutional quality (IQ)		
	Less Open	**More Open**		**Low IQ**	**High IQ**	
	Mean	Mean	p-value (difference)	Mean	Mean	p-value (difference)
CAB	-0.301	1.548	0.035	-0.766	2.127	0.002
I	24.881	21.752	0.009	23.403	22.452	0.263
Sg	-1.1067	-2.626	0.009	-2.330	-1.934	0.507

Notes: median value for Capital Openness is 1.

The subsample regression analysis (Table 4.17) mimics the results from the t-test of mean differences; we find that the impact of domestic investment on the current account balance is qualitatively similar for the subsamples ('less' vs 'more' open). The impact of domestic investment is similar for the subsamples analysed, i.e., we find that there is capital mobility in both

[35]This should not be confused with capital mobility which has nothing to do with financial restrictions but a concept that also captures the de facto free movement of capital across borders in pursuit of greater returns.

subsamples. A difference in the degree or level of capital openness has no impact on the mobility of investment capital across countries and groups. However, we find differences in our regression coefficients when we look at the impact of government savings on the current account amongst subsamples. In the 'less' open economies group we find no association between government savings and the current account; i.e., there is no capital mobility in the financing of government debt and the TWDH is refuted. Perhaps, this is due to the difficulties and fear of not being able to withdraw one's capital from these financially restrictive countries hence a reluctance to buy government-issued debt by foreign investors. This finding is corroborated in Shen and Yang (2012) who note that when capital mobility is low budget deficits have no effect on the current account. On the contrary, we find a significant and positive impact of government savings on the current account balance for the 'more open' subsample. This finding resonates with the magnifying role of financial openness and development; this makes it easier for the government to finance its budget through local and foreign debt (Chinn & Ito, 2007).

Table 4.17: Subsample analysis, capital openness, Institutional quality and level of development (FMOLS pooled estimates): Dependent variable: *CAB*

	Capital Openness		**Institutional Quality (IQ)**		**Level of Development**	
	less open	*more open*	*Low IQ*	*High IQ*	NonOECD	OECD
I	-0.617	-0.61	-0.535	-0.706	-0.643	-0.567
	(0.136)***	(0.108)***	(0.222)***	(0.194)***	(0.161)***	(0.107)***
Sg	0.155	0.552	0.216	0.536	0.273	0.484
	(0.139)	(0.148)***	(0.179)	(0.154)***	(0.174)	(0.147)***

Notes: level of significance, *** p<0.01

b) Institutional quality

Furthermore, we split the sample based on the quality of institutions of each country. We find mean-differences in *CAB* at the 1% level of significance and find no significant difference in the means of *I* and *Sg* (shown in Table 4.16, second panel). The institutional quality subsample results are qualitatively similar to the capital openness subsample results. We find that the sample with better institutional quality has on average a current account surplus, less domestic investment and less government budget deficits.

In Table 4.17, second panel, the impact of domestic investment is larger for the 'high' *IQ* subsample, i.e., we find that there is more capital mobility in the group that has better institutions.

A difference in the quality of institutions has an impact on the mobility of investment capital across countries and groups. Similarly, we find differences on the impact of government savings on the current account amongst subsamples. In the 'low' *IQ* group, we find no association between government savings and the current account; i.e., there is no capital mobility in the financing of government debt. This could be due to a perceived high risk of default from these countries with low institutional quality and systems of control, and hence, a reluctance to buy government-issued debt by foreign investors. On the contrary, we find a significant and positive impact of government savings on the current account balance. Based on the FMOLS estimates, we find that for a percentage change in government savings, a 0.55 percentage change in the current account balance is generated. These results are qualitatively similar to those of the capital openness subsample analysis.

c) Level of development

Furthermore, in Table 4.17, third panel, we do a subsample analysis based on the level of development (OECD and non-OECD). Results suggest that in developed nations, there is a long run relationship between *CAB* and *Sg*. Government budget deficits are financed from international sources with 48.4% of the deficit-financed from the world market or slightly less than half of the deficit is financed from the world market in developed countries. This result resonates with findings in Miller and Russek (1989) where it is noted that the TWDH only exists under a system of flexible exchange rates which is synonymous with free market enterprise and effective government regulation found in developed countries. A majority of the OECD countries have de facto flexible exchange rates. On the contrary, the TWDH is not confirmed for developing nations. Therefore, we find no support for TWDH in developing nations. This finding corroborates the results found in Afonso, Huart, Jalles, and Stanek (2018) where the TWDH was not confirmed for low income countries. Perhaps, a lack of a significant relationship between *CAB* and government saving (*Sg*) is the role of aid a form of external financing given to developing countries as budgetary support.

4.5 Conclusion

This chapter investigated the long run relationship between the current account balance, domestic investment and government saving for a panel of 48 countries by means of panel cointegration techniques. Our results suggest that capital mobility for private financing and public

financing is different and, possibly, subject to different factors. We find private investment to be highly mobile and a major contributor to current account balance movements in our sample of countries and across different subsamples, i.e., based on levels of development, financial openness and the quality of institutions. This finding is at odds with the FH findings which suggest that capital mobility decreases with the level of development countries; we find investment capital to be mobile across countries, regardless of whether the level of development of the country.

However, differences in capital mobility are found with regards to government debt financing across countries. Across our subsamples, we find that there is capital mobility in developed nations and countries with better institutions. This result implies that governments of these countries enjoy financing from international sources and can easily finance their budget deficits without siphoning domestic savings away from investment. Furthermore, we find support for TWDH in this group of countries, i.e., government budget deficits translate into current account deficits. This finding resonates with work done in La Porta et al. (1998) and Shleifer and Wolfenzon (2002) who posit that countries with the strongest legal protection of investors and better rule of law, i.e., mostly developed countries, have higher capital mobility than their counterparts, i.e., developing countries, and enjoy larger shares of externally financed investment relative to the internally funded investment. It would seem the pressures from the government budget deficit and domestic investment reinforce each other in generating a current account deficit. Furthermore, we find no support for the TWDH in developing countries and for countries with poor institutions. This result suggests that governments in these countries finance most of their budget deficits through local channels. This result is unsurprising given that capital seems to flow towards areas with perceived less risk. This suggests that current account deficits in developing countries are as a result of private agents' decisions and not driven by government budget deficits.

Furthermore, our results show that the FH puzzle (capital mobility) can be mitigated (increased) with an improvement in a country's institutional environment. Based on the findings of this chapter, countries with better quality institutions appear to enjoy higher capital mobility and larger external financing (for private and public needs). From an institutional economics perspective, this finding suggests that better and effective governance leads to a better outcome for the country, given that domestic investment is the driver of productivity. Therefore, it encourages countries to improve the quality of governance institutions which has a signalling effect on owners of capital who finance investment and output growth. That is, countries that have

the best quality of institutions are also those that have more capital mobility in both private and sovereign finance. In this study, the quality of institutions has a negative moderating effect on the correlation between domestic savings and investment so that countries with better institutions enjoy larger shares of domestic investment relative to the share of domestic savings and this finding supports work by institutional economists (see for example, Fidrmuc, 2003; North, 1987; Ozmen, 2004).

Our findings have several policy implications. Firstly, governments should strengthen their host country factors especially the political-economic environment to attract capital. This entails strengthening governance institutions that affect private agents' decision making. Developing countries need to improve market friendly policies and reinforce institutions that are linked to investor protection. Secondly, current account deficits seem to be largely driven by private agents' decision making and a natural market phenomenon that warrants no government intervention, i.e., current account targeting, since the deficit will eventually iron itself out as the economy moves towards equilibrium over time.

Chapter Five:

5 Conclusions and Recommendations

5.1 Summary

This thesis focuses on the role of quality of institutions on the relationship between government spending and macroeconomic variables, namely, output growth and the current account balance, using data over the period 1970 to 2015. In chapter 2, we examined the link between government spending and output growth and the role of institutional quality. We used pooled Ordinary Least Squares (OLS) and the three stage least squares (3SLS) with seemingly unrelated errors (SUR) on a panel of 71 countries for the period 1970-2015. The results, generally, show that there is a negative relationship between government expenditure and per capita output growth whilst institutional quality has a positive effect on per capita output growth. The study further finds that institutions have a moderating effect on the government expenditure and growth relationship. Government expenditure has a positive effect on output growth when the institutional quality variable is interacted with government expenditure proxies. Our main finding in this chapter is that institutional quality mitigates the decreasing effect of government expenditure on output growth; the negative effects of government expenditure on output growth are reversed in countries with better institutional quality. This suggests that government expenditure has a detrimental effect on the growth of output; however, its effect can be mitigated by improving governance and regulatory control over government expenditure programs. This implies that there is a need to develop policies to strengthen institutions that have an impact on the effectiveness of government expenditure programs. Future areas of study should consider disaggregated institutional quality measures to identify those facets of governance that improve the efficacy of government expenditures. Moreover, potential areas of study would involve identifying those expenditure categories that generated the least negative effects on output growth.

In chapter 3, we estimated the optimal size of government and the role of institutional quality on a sample of 63 countries over the period 1970-2015. We used time series and panel regression methods to determine the optimal size of government spending for countries, regions and for the whole sample. Our results confirm the existence of a non-linear relationship between the share of government expenditure to output and the growth of output, thus, confirming the existence of an optimal size of government in an economy. However, we note that the optimal size

of government varies across countries and regions. We further find evidence that the difference in the optimal size of government is attributable to the differences in the levels of development and institutional arrangements – with developed countries and better institutions experiencing a smaller optimal size of government compared to their counterparts. Findings in Chapter 3 suggest that better institutions and higher levels of development mitigate the negative effects of government expenditure on output growth through a minimisation of the scope and scale of government activities, i.e., government size. Perhaps, an improvement in the quality of institutions reduces corruption, public agency problems and other rent-seeking activities, and eventually so does the size of government. Similarly, the levels of oversight and bureaucratic accountability, and monitoring pick up with a superior level of development, and hence, a minimal size of government is attained in an economy characterised by better governance. This implies that governments need to minimise the size of their government in an economy to its most basic form, i.e., public goods production. This is achievable with a framework of enhanced institutional arrangements via which government growth can be curtailed or minimised. Governments must, therefore, strengthen their governance structures. Furthermore, we find that the government size and output relationship has two optimal points—points below a size of 11.6% at which the critical mass and positive effects are greatest and points above 19.2% at which the increasing negative returns are greatest. The main policy recommendation from this study is that an adherence to a strict level of government size for all countries is not appropriate; the optimal size of government is country specific but ideally should be less than 11.6%. Future studies would have to identify specific institutional variables that have a direct effect on the optimal size of government.

Chapter 4 investigates the Twin Deficits Hypothesis (TWDH) and the role of institutional quality using data drawn from a sample of 48 countries, for the period 1995-2013. Using the national income accounting decomposition and the approaches in Feldstein and Horioka (1980) and Fidrmuc (2003), we investigated the role of institutional quality and capital mobility on the current account deficits and the government budget deficits (TWDH) nexus. We applied OLS, fixed effects, random effects regressions and panel cointegration techniques in our analysis.

Given that current account deficits are thought to be driven by government budget deficits (Abell, 1990), it is important to investigate the role of capital mobility in the financing of government debt. If it is easy to finance government budget deficits on the international market, we would expect the current account balance to move to a deficit as well. This study makes a

distinction between private debt and public debt financing and we find that private investment is highly mobile and a major contributor to current account balance movements in our sample of countries and robust to subsamples analysis. This finding is contrary to Feldstein and Horioka (1980) findings. Conversely, differences in capital mobility are found with regards to government debt financing across countries. Across our subsamples, we find that there is capital mobility in developed nations, and countries with better institutions. This result implies that governments of these countries enjoy financing from international sources and can easily finance their budget deficits without siphoning domestic savings away from investment. Furthermore, we find support for TWDH in this group of countries, i.e., government budget deficits translate into current account deficits. This finding resonates with work done in La Porta et al. (1998) and Shleifer and Wolfenzon (2002) who posit that countries with the strongest legal protection of investors and better rule of law, i.e., mostly developed countries, have higher capital mobility than their counterparts, i.e., developing countries, and enjoy larger shares of externally financed investment relative to the internally funded investment.

Furthermore, we find no support for the TWDH in developing countries and for countries with poor institutions. This result suggests that governments in these countries finance most of their budget deficits through local channels. This result is unsurprising given that capital seems to flow towards areas with perceived less risk. This suggests that current account deficits in developing countries are as a result of private agents' decisions and not driven by government budget deficits.

The policy implications of our findings in chapter 4 include: (1) governments should strengthen their host country factors especially the political-economic environment to attract capital which is a major driver of economic growth. This entails strengthening governance institutions that affect private agents' decision making; (2) in developing countries, the current account deficits seem to be largely driven by private agents' decision making and a free market phenomenon that warrants no government intervention, i.e., current account targeting and fiscal consolidation, since the deficit will eventually iron itself out as the economy moves towards equilibrium over time; and (3) developed countries' current account deficits seem to be influenced significantly by budget deficits and there might be a need, from time to time, to reign on government borrowing to avoid a current account crises. This can be achieved through fiscal rules

and fiscal responsibility laws which are also supported by well-functioning and independent treasury and central bank.

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