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The determinants of the structure of government expenditure in Africa

by

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Nyamongo Esman Morekwa

SUMMARY

The determinants of the structure of government expenditure in Africa

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Supervisor	**Prof. Niek J. Schoeman**
Department	**Economics**
Degree	**PhD (In Economics)**

This study investigates the determinants of the structure of public budgets in Africa using a panel econometrics approach. Data for 28 countries was collected covering the period 1995-2004. The determinants of the spending behaviour of these governments are analysed with the specific objectives to: identify the factors that determine the structure of government spending; identify a framework that explains the structure of government spending; specify and estimate a model that explains the allocation of the public budget and finally, to make policy recommendations on the basis of the findings.

A number of hypotheses are tested, namely: an increase in the level of corruption would tilt the budget allocation towards sectors such as defence and general public services; an increase in the level of political instability would cause a shift in the budget allocation to sectors that seek to secure government's political power; an increase in political liberty results in a shift in the budget towards those sectors favouring citizens' preferences, such as education, health and social security and services; an increase in the public debt leads to a shift in the budget towards expenditure on economic services; and the mere presence of

International Monetary Fund (IMF)-supported programmes in a country plays an instrumental role in the distribution of the budget.

The main findings are the following:

The proportions of the public budget devoted to education, health and public services had been on an upward trend during the period 1995-2004 while that of defence and 'other' remained high but declined. The share of the public budget allocated to economic services remained large but showed substantial volatility. On average, general public service expenditures account for the largest share of the public budget, while health and social welfare services account for the lowest share.

The results show that corruption is associated with high levels of general public services and 'other spending while it is negatively correlated to education, health and social welfare spending. Evidence to support the notion that high levels of corruption are associated with large budget allocations to the economic services category seems to be ambiguous. Also, the findings on the role of corruption in twisting the budget towards higher levels of expenditure on defence are not conclusive which contradicts the findings of similar studies.

Furthermore, countries that suffer from political instability tend to allocate a larger slice of their budgets to the general public services and defence spending categories while countries that are politically stable tend to allocate more of their budgets to the education and social welfare sectors. However, there is no strong evidence to support the role of political instability in health spending. It is found that in those countries where human rights are acknowledged and the political process is more transparent, a larger share of the budget is allocated to social welfare spending.

The role of IMF programmes in budget allocation reveals that countries that have implemented IMF programmes tend to allocate less of their budgets to defence and 'other' spending while increasing the budget allocation to education, health, social welfare and economic services. Furthermore, the budget allocation to general public services is shown to be affected by changes in the IMF programmes. Also, irrespective of the corruption status of a country, the IMF programmes tend to cause spending to move away from defence. In the case of education spending, it is found that countries that are exposed to IMF programmes tend to allocate a larger share of their budgets to education than those countries without such programmes.

Budget priorities of neighbouring countries with regard to defence expenditure positively affect a home country's defence budget allocation. This is also true with regard to the number of military personnel per capita of the population which is found to correlate positively with the share of defence expenditure in the budget. Lastly, the coefficient of public debt is unambiguously positive in the economic services and health expenditure categories which may suggest that countries that have high levels of public debt tend to allocate more resources to these sectors.

Based on these findings an 'ideal' distribution of a budget based on the economically most successful countries in Africa is proposed. According to this framework it is ideal, in the African context, to allocate not more than 21 per cent of the public budget to general public services; 8 per cent to defence and 18 per cent to 'other' spending. A minimum of 18 per cent should be allocated to education; 10 per cent to health; 11 per cent to social welfare and 18 per cent to economic services.

For policy purposes the following are noted: Firstly, for an 'ideal' budget allocation to be achieved in the African context, measures must be put in place to control the level of corruption. These may include the following:

i. Anti-corruption legislation: Countries that have legislated anti-corruption laws should ensure that they enforce these laws.
ii. Public officers' ethics law: Countries that have not legislated laws relating to a code of ethics for public officials are recommended to do so. Such laws would include requiring public officers to declare their wealth and to disclose any interests that they may have in private investments.
iii. Anti-corruption institutions: Existing institutions such as parliamentary committees on public finance and investment should be strengthened and if non-existent should be established and entrenched in the constitutions of the respective countries.

Secondly, to ensure optimal public choice that reflects the preferences of the citizens, the government should ensure that political stability is a high priority on its development agenda. Governments should establish early warning systems to enable them to address instability before it degenerates into civil unrest and war. Measures to deal with any instability should be put into place, for example the parties involved in a conflict should be brought together in order that they may enter into a dialogue. At the continental level, peace efforts under the African Union (AU) should be encouraged to ensure that problems on the continent can be resolved by its leaders without recourse to outside support.

Thirdly, accountability is also important in the internal allocation of the budget. Governments must be informed about collective and individual needs, listen to the voice of the public and embrace transparency and true accountability to its citizens. This can be achieved through:

i. Government openness with regard to its fiscal policies.
ii. The establishment of information and communication offices where anyone seeking information regarding public matters can get assistance.

iii. The retraining of the police and other security personnel on matters related to public relations since, in Africa, many of the human rights abuses are committed by the police.

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CHAPTER ONE: INTRODUCTION AND BACKGROUND

1.1 Introduction

This chapter presents detailed background information about the structure of public budgets in Africa and about trends in relevant governance indicators. This information is crucial for the discussion in subsequent chapters on how to determine the structure of a public budget. This chapter also presents the problem statement, the objectives of the study, the hypotheses to be tested and finally the outline of the study.

1.2 Background

The structure of public budgets has attracted considerable attention among economists since the seminal work of Samuelson (1954). This attention has recently been fuelled by the recognition that the nature and structure of a budget has an important role to play in economic growth. For example, the model developed by Devarajan, Swaroop and Zou (1996) shows the link between public expenditure and growth, and the conditions under which a change in the composition of expenditure leads to a higher steady-state growth rate of the economy. Barro (1990) also points out that the composition of government expenditure is decisive in the economic growth process depending on its composition by function, with spending on productive sectors tending to influence growth positively and non-productive spending tending to increase social welfare.

A recent trend is visible in the literature not only linking the composition of government spending to economic growth but also exploring possible perceived reasons for such allocations by fiscal policy makers. For example, Mauro (1998) investigates the effects of corruption on the composition of government spending in a number of less developed countries. He finds that corruption has a negative, significant and robust relationship with spending on education. He further notes

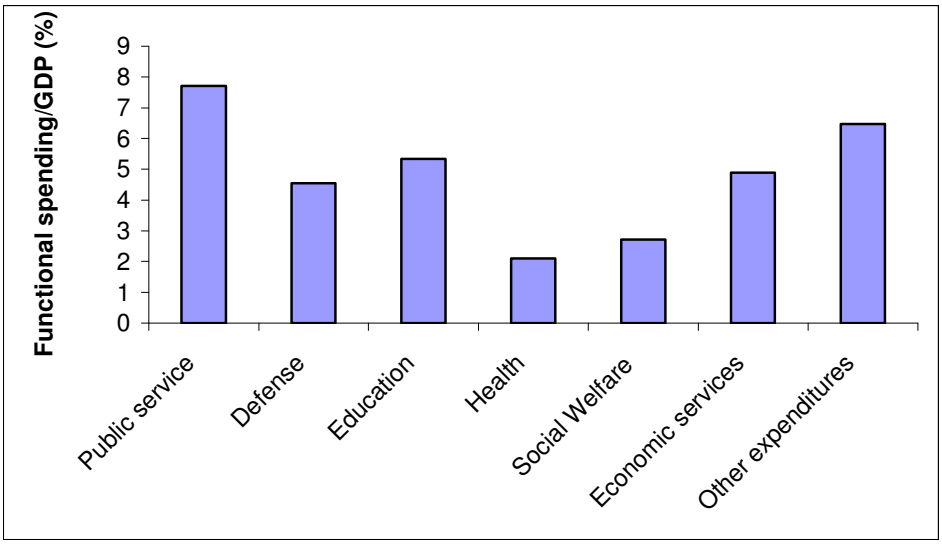
that corrupt governments find it easier to collect bribes on some spending items than on others and therefore tilt the budget in favour of those sectors where high kick-backs can be made. Other studies focus on the role of political and civil liberties on the internal allocation of public budgets, for example, the work by Nader (1994), which finds that among the functional categories of spending, the budget shares of health and social security are positively related to levels of political liberty while the opposite is true for the defence budget.

Both globally and in Africa in particular, the structure of budgets has changed significantly in the past three decades. Davoodi et al, (2001) argues that this is because of major developments in the international arena, notably the end of the Cold War, which led to a major shift away from defence spending towards other productive and social spending that positively affect economic growth and the welfare of people. Other studies, such as Mahdavi (2004), argue that the change in structure of government spending that has been witnessed in the past three decades is caused by changes in the debt burden. Higher debt burdens force government spending away from the productive and social sectors to debt service payments.

1.3 Review of public spending and public debt performance in Africa

This section reviews the key features of public budgets and public debt in Africa during the period 1995-2004. It is divided into three parts. Part 1.3.1 focuses on the distribution of public budgets and part 1.3.2 focuses on trends in public budget components and public debt and selected governance indicators.

1.3.1 Distribution of public budgets



Source: www.imf.org/external/country/index.htm

Figure 1: Average distribution of public budget/GDP ratios in Africa: 1995-2004

Figure 1 shows the average distribution of the Gross Domestic Product (GDP) to various functional spending categories in public budgets in Africa during the period 1995-2004. The figure shows that the public service spending category accounts for the highest share of the GDP (7.7%), followed by the 'other' spending category (6.5%). Among the social sector spending categories, education accounts for the highest share of the GDP (5.3%), nearly double the share of the health and social welfare spending categories. The economic services spending category stands at 4.9% of the GDP, while defence spending amounts to 4.5%. It can be seen that the public budget allocation in Africa during this period was tilted towards public services, defence and education. The internal allocation of the public budget is shown in Figure 2.

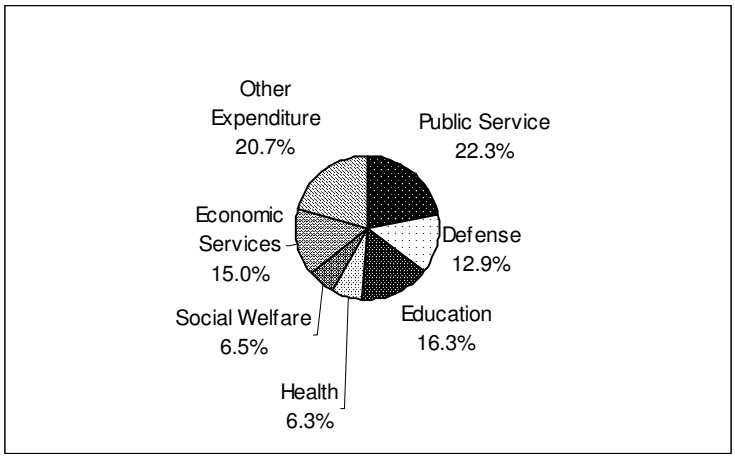


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Figure 2: Average distribution of public budget in Africa: 1995- 2004

Figure 2 shows the average distribution of the public budget components for the period 1995-2004. During this period, general public services spending dominated all other spending categories, accounting for 22.3% of total public spending. It is followed closely by 'other' spending that accounts for 20.7%. Defence spending remains high during this period, accounting for 12.9% of the budget. This is not surprising given the situation in the continent in the 1990s when countries such as Angola, Rwanda, Ethiopia and Eritrea spent massively on defence in order to restore stability. Africa devoted few resources to the economic services sector (15.0%), which probably explains the dismal growth performance posted in the continent during this period. Spending in the social sectors shows that education had the highest allocation (16.3%), probably because governments in the continent recognised the role of education in development and therefore devoted more public resources to the sector. The education sector's high allocation may also be attributed to the fact that the provision of education in many countries in Africa is in the hands of the public sector, which requires a sizeable budget. The health budget accounted for only 6.3%, probably because of higher private sector participation in health care. Social welfare spending accounted for 6.5% of the public budget.

1.3.2 Trends in the public budget and public debt[1]

This section presents the trends of the various components of the public budget and public debt during the period 1995-2004.

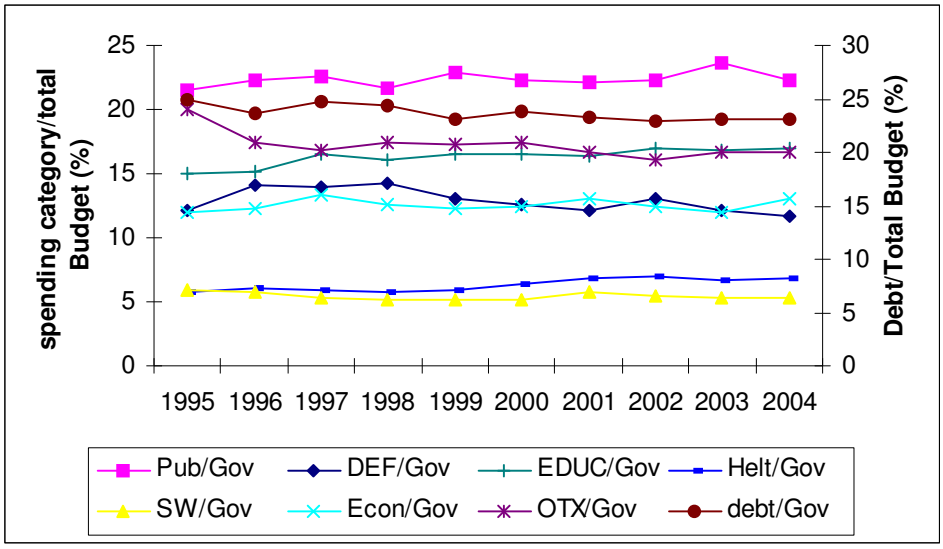

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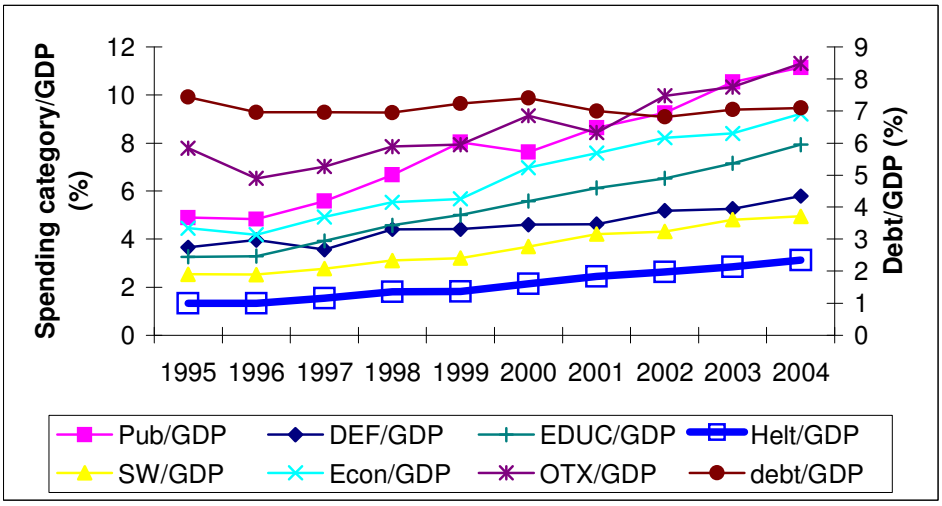
Figure 3: Trends in the ratio of specific budget votes and debt (% of public budget): 1995- 2004



Source: www.imf.org/external/country/index.htm

Figure 4: Trends in ratio of specific budget votes and debt (as % of GDP): 1995- 2004

[1] The Debt/Total Budget (%); and Debt/GDP (%), shown in Figures 3 and 4 are divided by 10.

Figure 3 shows the trends of public budget votes and public debt expressed as shares of the total public budget. From the figure it can be seen that Public Services spending (Pub/Gov) remained one of the prominent spending items during the entire period. It stood at 21.6% in 1995, rising marginally to 22.3% by 2004. The overall growth was modest at 0.4%, with the highest expansion being during 2003 (6.0%) and the lowest expansion during 2004 (–5.7%). Public services spending as a share of the GDP (Pub/GDP) and as shown in Figure 4, averaged 7.7% and more than doubled during the period 1995-2004. These findings are not surprising in Africa during this period because the bulk of Public Services spending includes most of the spending related to civil servants' wages and salaries. In addition, during this period the Public Sector Reform (PSR) programme introduced by the World Bank was in place and the funds provided by the Bank for this programme were, in most countries, included in the public services spending category. This is a likely explanation why the public services spending category had the highest allocation during this period.

The average defence spending as a share of the total public budget (DEF/Gov) remained high but declined over this period. It was highest in 1998 at 14.2% of the budget, however, it followed a declining trend and by 2004, it had reached its lowest point at 11.6% share of the budget. It declined by an average of –0.15% during this period. The greatest expansions were recorded in 1996 (15.6%) and 2002 (7.6%) while the greatest decline was posted in 1999 (–9.3%). Defence spending as a share of the GDP (DEF/GDP) averaged 4.5% and grew by 58.3% during this period. Although defence spending as a share of the total budget declined only marginally during this period, it is an indication of a fiscal discipline that recognised that defence spending was not productive and therefore that resources should be channelled away to sectors of the economy that spurred economic growth. The declining trend of defence spending in the public budgets may have been as a result of the Breton Woods institutions' prescriptions or as a result of relative peace in the respective countries that may then have occasioned a shift in the budget towards growth enhancing sectors.

The share of education spending (EDUC/Gov) in the total public budget enjoyed sustained growth during the period 1995-2004. In 1995, it accounted for 14.9%; however, by 2004 the share had increased to 17.0% of the total public budget. On average, education spending accounted for 16.3% and 5.3% of the total public budget and the GDP, respectively. The average growth rate of education spending as a part of the total budget stood at 1.5% during the entire period, with the highest expansion recorded in 1997 (8.7%) and the lowest in 1998 (-2.9%). The sustained growth of the budget share of education spending may have been occasioned by the realisation that the sector plays a very important role in human capital accumulation and any cuts from other sectors such as defence may have been channelled to this sector to stimulate human capital accumulation.

The portion of health spending as a part of the total public budget (Helt/Gov) remained less than 10% but recorded sustained growth over the entire period. The share of health spending was highest in 2002 at 6.9% but it declined marginally to 6.7% in 2004. The lowest share of health spending was posted in 1995 (5.7%). In terms of growth, the sector grew by 2.1% during this period, with the lowest expansion recorded in 2003 (-3.4%) while the highest expansion was in 1996 (5.3%). Health spending as a share of the GDP (Helt/GDP) averaged 2.1%. During this period, the health spending budget share benefited at the expense of other sectors.

Social welfare spending as a share of the total public budget (SW/Gov) was on a declining trend during the entire period, except in 2001, when it increased by 10.5%. It may be noted that after 2001, although the share of social welfare in the public budget was declining, it showed signs of stabilising up to 2004. During the entire period, the share of social welfare spending averaged 6.5% and declined by –1.1%. On the other hand, social welfare as a share of the GDP (SW/GDP) averaged 2.7% and nearly doubled during this period. The declining share of social welfare spending in the budget is an area of concern as it is an

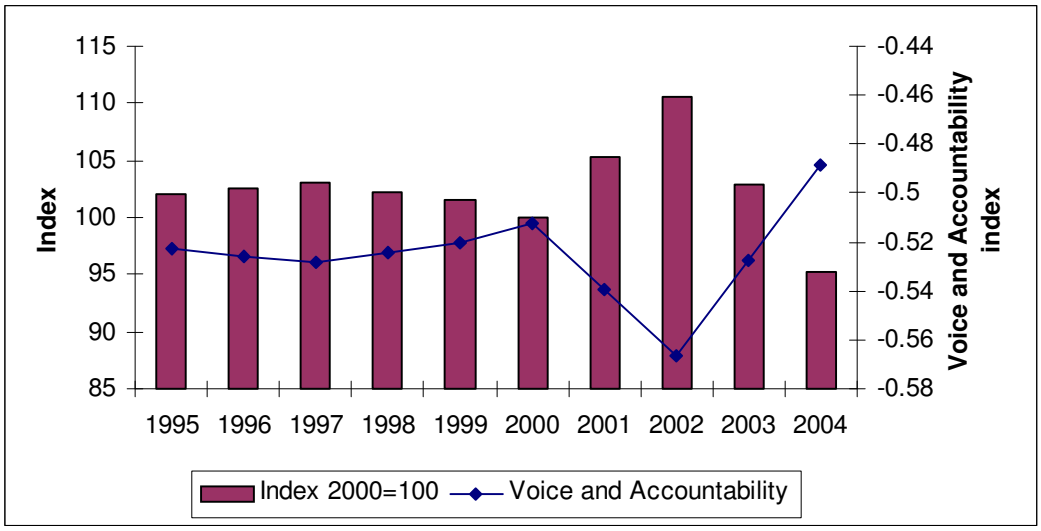
indication of the relatively low priority that governments give to social welfare programmes.

The proportion of economic services spending related to the total public budget (Econ/Gov) remained relatively stable during this period. It was highest in 1997 at 16.0% of the public budget. It followed a declining trend up to 1999, before rising to 15.6% in 2001. The lowest share was reported in 2003 (14.4%). It grew modestly by 1.1% with the highest growth posted in 2003 (9.3%). Economic services spending as a share of the GDP (Econ/GDP) averaged 4.9%.

The 'other' spending category remained very high. Over the entire period, it declined as a percentage of the public budget (OTX/Gov), but increased as a share of the GDP (OTX/GDP). The share of the total public debt as a part of the GDP (debt/GDP) averaged 70.9% and declined by 4.5% during this period. As a share of the total public spending (debt/Gov), the total public debt stood at an average of 236.8% and declined by 7.6%.

1.3.3 Review of governance indicators

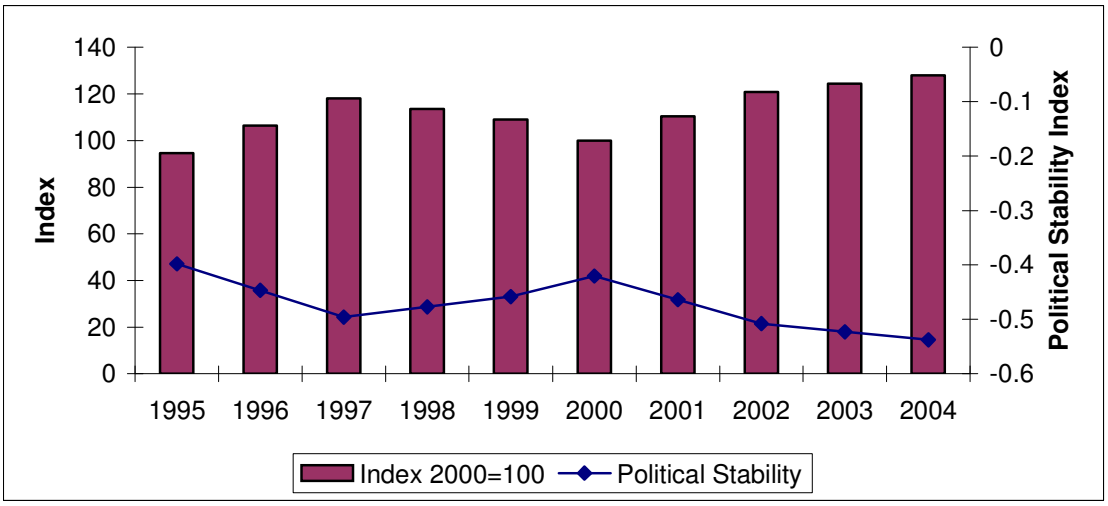
This sub-section seeks to present an analysis of the various measures of governance because, as argued in the literature reviewed, they play a very important role in determining the internal structure of public budgets. The measures used in this study are from the World Bank and are explained below.



Source: www.worldbank.org/wbi/governance/puts/govmatters+html

Figure 5: Trends in the voice and accountability index in Africa: 1995-2004

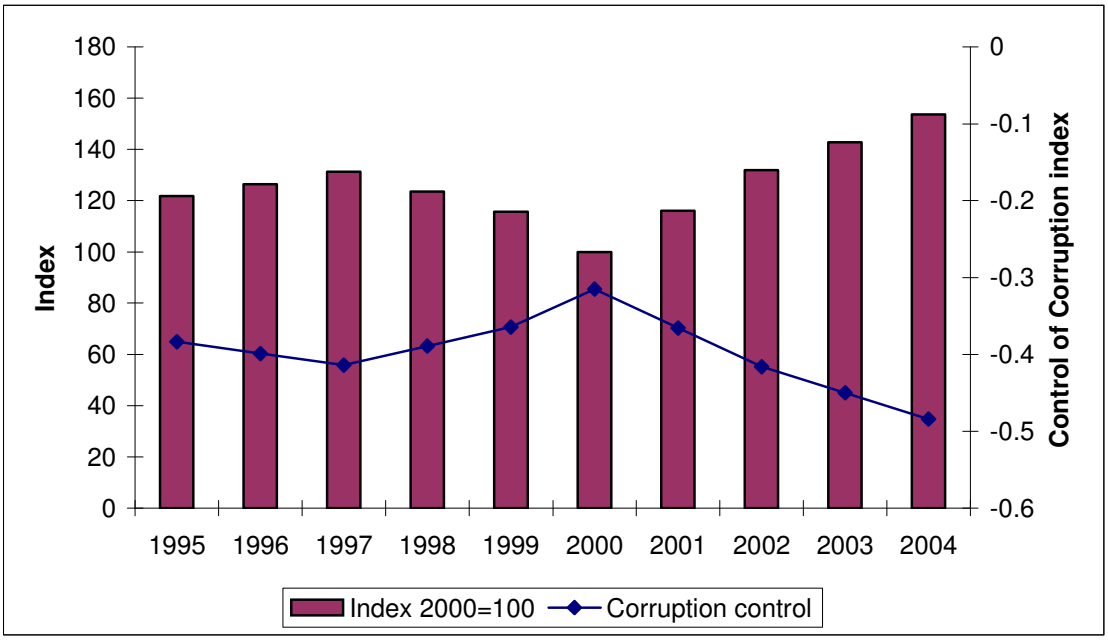
On average the voice and accountability index remained negative for the entire period 1995-2004, which suggests that countries on the continent were largely insensitive to calls for greater accountability from their citizens. From the figure it is evident that the voice and accountability index improved gradually from 1995 to 2000, it nose-dived to an all-time low in 2002 increasing again.



Source: www.worldbank.org/wbi/governance/puts/govmatters+html

Figure 6: Trend of political stability index in Africa: 1995- 2004

Political stability in Africa has traditionally been an area of concern and remained as such during the period 1995-2004. From Figure 6 it can be seen that, on average, political stability worsened among the countries in our sample. The index stood at –0.40 in 1995, it deteriorated, and by 2004 it had reached a low point of –0.50. During this period the political stability index averaged –0.47.



Source: www.worldbank.org/wbi/governance/puts/govmatters+html

Figure 7: Trends of the corruption control index in Africa: 1995- 2004

It is evident that, on average, the continent performed very poorly as the index remained negative during this period. The corruption control index showed a downward trend during the entire period except during 1997-2000, when it improved before plunging even further.

1.4 Objectives of the study

The broad objective of this study is to investigate the determinants of the spending behaviour of African governments. The specific objectives include:

1. To identify the factors that determine the structure of government spending.
2. To identify a framework that explains the structure of government spending.
3. To specify and estimate a model that explains the allocation of public budget.
4. To make policy recommendations on the basis of this model.

1.5 Research statement

The processes for determining how to raise, allocate and spend public resources constitute one of the foundations of government in the sense that the way public resources are used is a major determinant of the achievement of public policy objectives. In this regard a pool of literature exists that tries to link government spending priorities with growth (Barro 1990; Devarajan *et al*. 1996), including the determinants of the structure at national and local government levels (Mahdavi, 2004; Mendes & Sousa 2004; Takero 1999; Mauro 1998; Gramlich & Rubinifeld 1982; Bergstrom & Goodman 1973; Bocherding & Deacon, 1972). However, the role of governance, particularly that of corruption and political instability, in the internal allocation of the budget has not been extensively investigated in Africa where matters regarding corruption and political liberties are so critical, that in the worst cases donors have withdrawn their funding from various programmes.

Most of the available studies on government spending fall into three categories. Firstly, those studies that focus on the determinants of aggregate government spending and one component of that spending (Davoodi, *et al.* 2001). Secondly, those that study the various spending components in isolation, for example, the determinants of military spending, health spending and education spending. Although these studies use either time series analysis or panel analysis, they have, however, failed to address the fact that these components of the public budget cannot be analysed separately. And thirdly, a few studies have used

purely cross-section methods to address this problem (Mauro 1998; Nader 1994; Kwame & Gerdtham 1992). However, most of the studies, particularly the panel studies, are not focused exclusively on the African continent. Instead, they pick a few countries from Africa as a sub-sample, leading one to suggest that the findings and conclusions arrived at in these studies do not necessarily accurately reflect African circumstances.

In view of the above gaps in the existing literature, this study is unique in several respects. Firstly, it seeks to analyse the determinants of government spending in Africa in general and proceeds to categorise the countries into specific groups. This will ultimately assist in establishing whether or not the structure of expenditure in Africa is driven by those specific groupings. Secondly, the dependent variables in the functional classification[2] of government spending used in this study are the shares of total public budget and of the GDP. Many of the studies that have analysed government spending do so by using the spending category as a share of the GDP, however, as noted by Nader (1994), using the ratio of spending category to total spending is also important because fiscal policy makers are rarely concerned with the ratio of a specific spending category to the GDP when making fiscal decisions. Instead, they are sensitive to the relative share of each expenditure category to the total budget. By using this approach, the study's model is closer to the real policy making process.

1.6 Hypotheses of the study

In this study a number of hypotheses will be tested, however, emphasis will be placed on those that relate to corruption, political instability, civil liberties, public debt and the impact of IMF-supported adjustment programmes in the allocation of the public budget. The hypotheses to be tested are the following:

[2] A number of studies have given different definitions to functional classifications, for a summary of this see appendix A1.3.

1. An increase in the level of corruption would tilt the budget allocation towards sectors such as defence and general public services.
2. An increase in the level of political instability would occasion a shift in the budget allocation towards sectors that help to secure the government's political power.
3. An increase in political liberty leads to a shift in the budget towards those sectors favouring citizens' preferences, such as education, health and social security and services.
4. An increase in the public debt leads to a shift in the budget towards economic services.
5. The mere presence of IMF-supported programmes in a country plays an instrumental role in the distribution of the budget.

1.7 Scope of the study

This study seeks to analyse the factors that determine the allocation of the public budget in Africa over the period 1995-2004 for 28 countries in Africa for which data is available.

1.8 Conclusion

The review, in Section 1.2.3, of the budget allocations over the period 1995-2004, shows that the shares of public spending devoted to education, health and public services were on an upward trend during this time. Defence spending and 'other' spending remained high but declined during this period. The share of the public budget allocated to economic services remained significant but fluctuated from year to year. On average, general public services spending accounted for the highest share of the budget, while health and social welfare spending accounted for the lowest share. Governance indicators, namely the political stability, corruption control, and voice and accountability indices worsened during the period under investigation.

1.9 Outline of the dissertation

The rest of the dissertation is structured as follows: Chapter 2 discusses the theoretical and empirical literature that focuses on the determinants of the structure of the budget; Chapter 3 discusses the methodology, which encompasses the theoretical framework and the model to be estimated; Chapter 4 reports on the empirical results of the general public services spending category; Chapter 5 discusses the estimation results on defence spending; Chapter 6 reports on the empirical results of education spending. Chapter 7 discusses the empirical results of health spending; Chapter 8 discusses the empirical results of social welfare spending; Chapter 9 discusses the estimation results of economic services spending; Chapter 10 reports on the results for 'other' spending; Chapter 11 contains further econometric estimations performed within the systems panel econometrics framework; Chapter 12 discusses a proposed 'ideal budget' allocation in Africa; and Chapter 13 concludes with some policy recommendations.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter seeks to review both the theoretical and empirical literature with a view to revealing the theoretical underpinning of the public budget allocation and the empirical work that has been conducted in this part of public economics. The chapter has three sections. Section 2.2 discusses the theoretical literature that explains the allocation of the public budget. Section 2.3 discusses the empirical literature available on governance, strategic debt accumulation and the other determinants of the public budget. Finally, Section 2.4 offers an overview of the theoretical and empirical literature with a view to identifying the factors prominent in the literature that seek to explain the allocation of the public budget. These factors or variables are then discussed in subsequent chapters.

2.2 Theoretical literature review

This section discusses the theoretical literature that seeks to explain the allocation of the public budget. It addresses the theories that have been advanced, including those related to the allocation of the budget under direct and representative democracies and under benevolent dictatorships.

2.2.1 Public choice under different political systems

In democratic societies the choices of public spending allocation rests with the citizens. In exercising their franchise the citizens can act via direct democracy or representative democracy. Under direct democracy it is assumed those without representation vote directly on public choices. In this regard any choice of allocation of public spending rests with the citizens directly. In exercising their franchise under direct democracy, a number of methods are suggested, among others:

The Unanimity Approach: Formalisation of this method is due to Lindahl (1919-1958). Since then a number of economists have expanded on the concept, in most cases linking it to pareto optimality. Arrow (1951) describes pareto optimality as unanimity of individual preferences while Buchanan (1967) shows that unanimity is the counterpart of pareto optimality and goes on to treat pareto optimality and unanimity as one in his later work (Buchanan 2004). According to this method a decision on whether or not to provide a public good requires a unanimous vote, that is, for a public choice to be made there must be 100% support for the decision. The main strength of this approach is the fact that it takes community minorities into account and it leads to pareto optimal outcomes. The major limitation of this model is the lack of feasibility of the unanimity rules. The rules state that the level of public service provision should be agreed upon unanimously, this is not the case in practice. The other drawback is that it assumes that individuals vote sincerely, which is also not necessarily the case in real life situations. It may also take a long time to agree on the contribution of each member of the community and therefore this method can lead to delays in decisions regarding public goods provision. In view of these limitations, the majority voting approach should be considered.

The Majority Voting Approach: This method is fundamental in public choice literature. It proposes a voting arrangement for the provision of any public goods and that the provision of such public goods should be undertaken if one more than half of the citizens vote for it. However, the majority decision approach does not always yield clear-cut results and it is affected by the voting paradox, that is, multi-peaked preferences. In order to address the problem of multi-peaked preferences, the median voter theorem is used, which guarantees single peaked preferences. In this case, the outcome of majority voting reflects the preferences of a median voter.

The Logrolling Approach: This system allows people to trade votes and therefore to indicate how strongly they feel about various issues. It has the potential to reveal the intensity of preferences and to establish a stable equilibrium. The compromises that are embedded in this system are necessary for a democratic system to function. Although logrolling has been used for a long time in public choice, its earliest formalisation was by Tullock (1959), who argued that it leads to socially inefficient policies, especially when a smaller majority is required to pass a public policy. However, Buchanan and Tullock (1962), show that logrolling is socially efficient because it allows legislators to express their individual intensity of preferences over a public choice.

In reality, however, public choice decisions are exercised through representative democracy. Direct democracy suffers from the fact that it is a simplified version of government. Realistically, government elicits the citizens' preferences from them and uses these preferences in making decisions. In this case it is important to note that the governing is done by the people – politicians, bureaucrats, and others. This, therefore, requires that the behaviour of those people who govern must be examined. In a representative democracy, the main assumption is that the individuals who act as the representatives of the people seek not only to work for the advantage of the people who elected them, but also to optimise their own self-interests.

Bureaucrats play a very prominent role in a representative democracy. Although they are not elected, they provide valuable technical expertise and are responsible for the administration of government. In this regard, they may exercise their self-interests by tilting the budget in a manner that suits these interests, that is, towards those sectors of the economy where it is easy to obtain bribes. The self-interests of politicians and bureaucrats both, therefore, influence public budget outcomes.

The other form of government discussed in this study is that of a benevolent dictatorship. Under a dictatorship, individual preferences are not given consideration. The dictator makes the public expenditure decisions that he/she feels are best for the citizens.

2.2.2 Public choice and strategic debt accumulation

It is assumed that in all three political systems described above, the government finances its budget through taxation. However, in an event where the government seeks to finance the budget through other sources of revenue, the situation changes to that of borrowing to finance its expenditures and budget allocations. The models of strategic debt accumulation are credited to Tabellini and Alesina (1990) whose paper considers an economy in which policymakers with different preferences alternate in office as a result of elections. In these circumstances government debt is used strategically by each policymaker to influence the choices of his/her successors. If different policymakers disagree about the desired composition of government spending between two public goods, the economy exhibits a deficits bias, that is, the debt accumulation is higher than it would have been had a social planner made the spending decisions. The larger the degree of polarisation between alternative governments, the larger the equilibrium level of debt and the less likely that the current government will be re-elected.

Beetsma and Bovenberg (2002) sought to investigate the extent to which the European Monetary Union's (EMU) monetary policy impacts on national fiscal policies. This was done by investigating the interaction between centralised monetary policy and decentralised fiscal policy in a monetary union which has heterogeneous countries. They found that discretionary monetary policy suffers from failure to commit. Moreover, heterogeneous decentralised fiscal policy makers impose externalities on each other through the influence of their debt policies on common monetary policy. These imperfections, they found, could be

alleviated by adopting shock-contingent inflation targets and shock-contingent debt targets.

Beetsma and Bovenberg (1999), sought to analyse debt accumulation in a monetary union. They found that if discretionary monetary policy gives rise to an inflation bias, monetary unification boosts the accumulation of public debt. The additional debt accumulation, they found, harms welfare if governments are sufficiently myopic. In the case of myopic governments, debt ceilings play a useful role in avoiding excessive debt accumulation in a monetary union and allowing a conservative, independent central bank to focus on price stability. With supply shocks, monetary unification results in excessive variability of public debt. A debt target that constrains stabilisation policy helps to prevent this.

2.3 Empirical literature

This section reports on empirical literature that seeks to explain the determinants of the public budget. It is divided into two parts. The first part addresses literature that explains the allocation of the public budget as determined by governance. The second part discusses alternative literature on the determinants of the allocation of public budget.

2.3.1 Literature on governance and public budget allocation

Recently, Delavallade (2006) studied the effects of corruption on the distribution of public spending in 64 developing countries. Using the three-stage least squares method and found that public corruption distorts the structure of public spending by reducing the portion of social expenditures (education, health and social protection) and increasing the funds dedicated to public services and order, fuel and energy, culture, and defence. It was also found that compared to corruption, civil and political rights play a stronger role in affecting defence spending.

Aidt, Jayasri and Loukoianova (2006) sought to investigate the relationship between public spending and the spread of democracy in Western Europe during the period 1830-1938. They used a data set of 12 countries. Their main findings were firstly, that a gradual lifting of socio-economic restrictions on the voting franchise contributed to the growth of government spending mainly by increasing spending on infrastructure and internal security; secondly, that female suffrage had a weak positive effect on government spending through spending on health, education and welfare; and thirdly, that the change in the voting system from majority to proportional rule which occurred in 10 of the countries in the sample did not contribute to growth in government spending and curtailed spending on health, education and welfare.

In order to test whether or not corruption is related to military expenditure, Sanjeev, De Mello and Sharan (2001) used data from four different sources for up to 120 countries covering the period 1985-98. This was done using panel regression techniques. The results from this study suggest that corruption is indeed associated with higher military expenditure as a share of both the GDP and total government expenditure, as well as with arms procurement in relation to the GDP and government spending. This led them to conclude that defence spending can be considered when determining governance indicators. There is strong evidence that cuts in military spending can enhance growth, which therefore suggests that higher corruption can reduce growth through higher military spending.

Kimenyi and Mbaku (1995) studied the relationship between rents, military elites and political democracy using a panel approach. Their main finding was that in autocratic regimes the military elite is in a position to extract rents, because without the support of the military, governments are in general not able to survive. They confirmed that, for developing countries, a negative relationship exists between monetary transfers to the military and the degree of democracy.

Kwame and Gerdtham (1992) sought to investigate the determinants of health care expenditure in Africa using a cross section approach. The paper investigated the relationship between certain socio-economic and demographic factors and per capita health care expenditure in Africa. Their main findings were that the GNP per capita, the percentage of births attended by health staff and the foreign aid received per capita together accounted for 78.3% of the variance in health care expenditure. In addition, per capita GNP was the most significant factor explaining differences in health care expenditure. Contrary to the findings of studies based on data from the Organisation for Economic Co-operation and Development (OECD), this study found that income elasticity is close to unity, while aid was consistently significant and positive in all the models that they estimated. Other variables, including the crude birth rate and the percentage of the population less than 15 years of age were not, however, significant.

Among less developed countries where the level of transparency and accountability is low, the structure of public spending has been guided by rent seeking behaviour. Mauro (1998) found that the predatory behaviour of corrupt politicians and other senior public servants distorts the composition of government expenditure in such a manner that those sectors where they are more likely to obtain rent with less risk of being noticed are heavily financed at the expense of other sectors. For example, he found that corrupt governments tend to support expenditure on the procurement of defence equipment and up-to-date technology where the probability of negative political consequences is low. Health, education and welfare grants expenditure is neglected as the public can detect malpractice more easily in these sectors.

Tanzi and Davoodi (2000) investigated the channels through which corruption affects growth such as the impact of corruption on enterprises, on the allocation of talent, and on investment and the allocation of public finance. Their main findings were as follows: firstly, and in contrast with Mauro's findings, higher levels of corruption tend to be associated with higher levels of public investment

when the government revenue-GDP ratio is included as a explanatory variable; secondly, more corruption tends to reduce government revenue, and, thus also reduces the resources available to finance spending, including public investment; thirdly, high levels of corruption tend to reduce expenditure for operation and maintenance; and finally, higher levels of corruption tend to be associated with poor quality of infrastructure, thus reducing the economic value of the existing infrastructure and its contribution to output. The study shows that corruption can indeed have powerful effects on both the quantity and the quality of public investment. The paper discusses in detail the factors that make public investment a particularly vulnerable area to corruption and especially to political corruption.

Nader (1994) sought to investigate the effect of political liberty on budgetary policy using a cross-section approach in a sample of 67 countries. His major findings were that among the functional categories of expenditures, the budget shares of health and social security are positively related to the level of political liberty while the opposite is true for the defence budget. Furthermore, he used an economic classification of public expenditures and found that capital expenditure and current expenditure on goods and services are negatively associated with political liberty. He also found that the relative size of government expenditure to GDP varies systematically with the index of political liberty but in a non-linear manner.

Tait and Heller (1982) identified six categories of factors that might influence the allocation of government expenditures. While pointing to technological, sociological and environmental factors in explaining cross-country differences, they, however, ignored political institutions. In another study Heller and Diamond (1990) acknowledged the central role of political institutions but failed to use them in their analysis.

2.3.2 Literature on public debt accumulation and public budget allocation

In a bid to investigate the shifts in the composition of government spending in response to external debt, Mahdavi (2004) examined the effects of external public debt on the composition of public spending in a sample of 47 developing countries for the period 1972-2001. The study specified a system of equations that described government expenditure by economic function. The relative spending shares of six economic categories in several different samples were processed using several estimation methods. The study found support for the adverse effect of the debt burden on African sub-samples where the debt burden was relatively high. It was further found that among the components of current expenditure, the increased debt burden shifted the odds against non-wage goods, services, subsidies and transfers, while leaving the share of the politically sensitive category 'wages and salaries', unscathed in most cases.

As external debt servicing increases, developing countries are forced to re-evaluate programmes in an effort to curtail government spending. Lonney (1986) attempted to examine this issue by looking at the character of the sector adjustments that took place in the main functional areas of the Argentinean government expenditure from 1961-1982. He found that, in general, social services, particularly education and health along with public administration, bore the brunt of the government's rising debt service problem. The social sectors suffered further due to regime changes, with military regimes tending to cut back allocations to the social sectors even more severely than normal debt service constraints would have warranted.

Axel (2006) investigated the role of globalisation on taxes and social spending among OECD countries during the period 1970-2000. This study used an unbalanced panel because some countries did not have data for the entire period. The study used panel estimation techniques and found that there were significant fixed country and period effects in all his model specifications. The

main findings of the study were that globalisation was found to be negative but insignificant in the estimations involving total government expenditure and social spending. It was also found that a high social dependence ratio could be associated with low levels of government expenditure (both total and social expenditure), the relationship was not, however, significant. Finally it was found that the unemployment rate and the size of government employment were positive and significant in explaining both total government spending and social spending.

The role of foreign aid on fiscal behaviour in development was investigated by Ouattara (2006) using a panel approach over the period 1980-2000. The study used a fixed effects model and found that public investment was positively related to aid flows. In addition, aid flows were found to exert a positive impact on government developmental expenditures and a negative impact on non-developmental expenditures. It was further found that aid flows did not discourage revenue collection and that borrowing was complimentary to aid flows.

Countries that are involved in excessive fiscal expansion tend to find it increasingly difficult to finance their budgets using only the available tax revenues. They therefore resort to borrowing either from the domestic and/or foreign market. This suggests that as public debt increases, a steady shift will be observed away from expenditures on economic and social sectors towards interest payments. As suggested by Krugman (1988), in his debt-overhang hypothesis, an increase in the debt burden beyond a certain limit may generate a disincentive for governments to carry out macroeconomic reforms and increase public investment.

2.3.3 Literature on other determinants of public budget allocation

Jonakin and Stephens (1999) investigated the impact of adjustment and stabilisation policies on infrastructure spending in Central America during the 1980s and 1990s. They noted that the countries in Central America during this period experienced protracted fiscal crises and debt repayment problems which resulted in the implementation of structural adjustment agreements. In their study they compared the periods before and during the crises in the region. They found that the shares of government spending on human and capital formation, particularly infrastructure, dropped precipitously during the adjustment period. At the same time, the shares devoted to defence and subsidy categories as well as those for interest payments on external debt generally registered notable gains.

Davoodi *et al.* (2001) sought to investigate the relationship that exists between military spending, the peace dividend, and fiscal stabilisation for 130 countries for the 1972-1994. This was conducted using a panel estimation procedure. The study adopted a public choice approach for analysing the relationship between military spending and overall government spending. The main focus of the paper was to dissect the causes of the peace dividend, which they found could be divided into global, regional and national factors. The study found that the easing of international and regional tensions and the existence of IMF-supported adjustment programmes were systematically related to lower military spending and a higher non-military spending in total government outlays. It was also found that the easing of international and regional tensions since the end of the Cold war and the existence of IMF-supported adjustments programmes accounted for 66%, 26%, and 11% of the decline in military spending, respectively. It was further found that fiscal adjustment related to IMF-supported programmes led to a larger cut in military spending.

Much of the empirical literature involving the majority voting system stems from the work of Bocherding and Deacon (1972) who sought to estimate the demand

for services of non-federal governments. This study was based on cross-sectional data for the year 1962 for 44 states in the United States of America. Their study involved estimating eight specific services: local education, higher education, highways, health and hospitals, police, fire, sewers and sanitation, and parks and recreation. Each of these services was estimated separately as a function of the average personal income of the state residents, the state population, the degree of urbanisation and the state land areas. They found that the estimated income elasticity was in accord with that reported in other studies. They also found price elasticity to be significantly negative; this was not in support of the literature of that time that had frequently found the price elasticity for higher education and highways to be positive but uniformly insignificant.

Bergstrom and Goodman (1973) utilised a framework similar to that of Bocherding and Deacon (1972) to analyse the private demand for public goods. They used a cross-section approach, obtaining demographic data from the 1960 population census and expenditure data from the 1962 census of governments. Their estimated income elasticity was positive and significant, while the price elasticity was significant and negative.

To test the relevance of the Tiebout and median-voter hypothesis, Gramlich and Rubinifeld (1982) utilised a micro approach to estimate the demand for public services. They used cross-sectional data which included 2,001 households in the state of Michigan, randomly sampled immediately after Michigan's 1978 tax-limitation vote. It was found that while income and price elasticity were similar to those obtained from aggregate data, positive income elasticity appeared to arise because public services were distributed in a pro-rich manner. It was also found that a relatively small variance occurred in spending demands among urban and suburban communities in metropolitan areas with substantial public service variety. This suggested that the Tiebout mechanism worked.

Takero (1999) sought to investigate the relevance of the median voter to Japanese prefectural finance. He tested this hypothesis by estimating the demand functions of local public goods in each prefecture. His finding was that the median voter hypothesis was supported in prefectural finances, and that voter preferences affected the outcome of gubernatorial elections, that is, a governor's re-election probability. He concluded that when considering the centralised prefectural government system in Japan, these results indicated that central government management of prefectural expenditures via inter-regional grants ultimately reflected jurisdictional median voter preferences.

2.4 Summary and conclusions

The literature reviewed falls into two categories. The first category is that of literature that focuses on the role of governance indicators, such as corruption, rule of law, political stability and rights in the internal structure of the budget. Most of the available literature in this category tends to focus on individual components of the budget, particularly, defence, health, education and infrastructure spending. From these studies it is concluded that the various indicators of governance have a fundamental role to play in the internal structure of the budget. It was found that corruption tilts the budget in favour of defence and infrastructure and against all other spending categories and that political instability causes a budget shift in favour of defence spending.

The second category of literature focuses on those studies that analyse the allocation of the budget. These studies identify demographic factors such as population size, dependency ratio and density as fundamental in explaining the allocation of spending. Also identified are the size of government and the level of development of the country. Many of these studies also emphasise the role of IMF-supported programmes in the allocation of the budget and argue that in countries where the IMF lends support, budgets are structured in favour of the social sectors and against defence spending.

The literature review has identified the variables that are fundamental in the estimation of a model that can be used to explain the allocation of government spending across various functional components.

CHAPTER THREE: METHODOLOGY

3.1 Introduction

This chapter presents the theoretical framework and the model employed in this study. It is divided into six sections. Section 3.2 discusses the theoretical framework used in this study. Section 3.3 deals with a discussion of the factors that determine the structure of the public budget and presents a model to be estimated. Section 3.4 discusses the diagnostic tests that are conducted on the reported results. In Section 3.5 the estimation procedure employed in this study is discussed while Section 3.6 contains information on the data type and sources.

3.2 Analytical Framework

This study will use a modified and extended version of the model developed by Hewitt (1992, 1993). The original model was used to analyse the determinants of government spending on the military by identifying government spending categories as being military spending and non-military spending. In effect it adopted a public choice framework for analysing the relationship between military spending and overall government spending.

The current study extends this model by applying this framework to analyse any type of spending by partitioning government spending into the various functional categories of government spending and extending it to include debt accumulation. Accordingly, the relationship between corruption and functional spending is modeled as follows:

Let government spending, G, be a composite of the functional spending category, g_i, such as military spending, health spending or education spending and 'other' spending g_j[3], such that:

$$G = g_i + g_j \qquad 1$$

In this study the model developed by Hewitt (1992, 1993) and used by Sanjeev *et al.* (2001) is expanded on by recognising the fact that government spending is financed through taxation and through borrowing. For ease of exposition, no distinction is made between domestic and foreign debt. This suggests that the government budget constraint in period t (t=0,1) can be approximated (Beetsma & Bovenberg 1999, 2002) as:

$$G_1 = T_1 + [(1+r)d_0 + d_1] + k\pi \qquad 2a$$

where G_1 is the government spending in period 1 and $k\pi$ is the seigniorage revenue. Debt at time t=1 is stated as $D_1 = d_1 + (1+r)d_0$, where D is the accumulated debt, which is the sum of the debt accumulated in the current period (d1) plus the debt of the previous period together with the interest thereon. If we exclude seigniorage, $k\pi$, the government budget constraint is approximated as:

$$G_1 = T_1 + D_1 \qquad 2b$$

We also assume that the tax function, T, is stated as follows:

$$T_1 = \tau Y_1 \qquad 0 \le \tau \le 1 \qquad 3$$

In order to maximise the welfare function we assume that it follows a utility function expressed as a Cobb-Douglas utility function:

[3] In this case, g_j is the total spending outlay less the spending on the g_i^{th} category.

$$U(C, g_i, g_j) = C^{\beta} g_i^{\gamma} g_j^{\delta} \quad 4$$

This utility function is assumed to be twice-continuously differentiable on private consumption (C) and government spending (G), with $U_f > 0$ and $U_{ff} < 0$ for $f = C, G$, where $\delta = 1 - \beta - \gamma$. Finally, for simplicity, we assume no private investment and also omit time indices for notational simplicity. The corruption free model is founded on the conventional utility maximisation problem stated as:

$$\text{Max } U(C, g_i, g_j) = C^{\beta} g_i^{\gamma} g_j^{\delta} \quad 5$$

Subject to

$$Y = C + G \text{ and } G = g_i + g_j \quad 6$$

The optimal values of the above problem, which in this case is regarded as a 'corruption free' optimal solution, require[4]:

$$\frac{g_i}{Y} = \frac{\gamma}{\beta}(1-\tau) - \frac{\gamma}{\beta}\left[\frac{d_1}{Y} + \frac{(1+r)d_0}{Y}\right], \text{ and } \frac{g_i}{G} = \frac{\gamma}{\beta}(1-\gamma)\frac{Y}{G} - \frac{\gamma}{\beta}\left[\frac{d_1}{G} + (1+r)\frac{d_0}{G}\right] \quad 7a$$

and

$$\frac{g_j}{Y} = \frac{\delta}{\beta}(1-\tau) - \frac{\delta}{\beta}\left[\frac{d_1}{Y} + \frac{(1+r)d_0}{Y}\right], \text{ and } \frac{g_j}{G} = \frac{\delta}{\beta}(1-\gamma)\frac{Y}{G} - \frac{\delta}{\beta}\left[\frac{d_1}{G} + \frac{(1+r)d_0}{G}\right] \quad 7b$$

In equation 7a, if tax rate τ is given, the share of spending category g_i, in income and total government spending, depends on the parameters of the utility functions γ and β. Similarly, in equation 7b, for a given level of tax rate τ, the proportion of the 'other' spending category, g_j, to income and total government expenditure depends on the parameters of the utility functions δ and β. This, therefore, suggests that a lower γ relative to β, leads to a decrease in g_i

[4] The way these optimal solutions have been obtained is available in Appendix A3.1.

relative to private consumption. The same is true for a lower value of δ relative to β, which also leads to a decrease in g_j relative to private consumption.

As shown in the model used by Sanjeev, *et al.* (2001), the effect of corruption on the structure of the public budget can be studied via its effect on the parameters of equations 7a and 7b. In this regard, the association between corruption and a specific functional spending category is described as follows: Let the parameters of the utility function γ, β and δ be affected by corruption Z such that equation 7a and 7b become:

$$\frac{g_i}{Y} = \frac{\gamma(Z)}{\beta(Z)}(1-\tau) - \frac{\gamma(Z)}{\beta(Z)}[\frac{d_1}{Y} + \frac{(1+r)d_0}{Y}] \qquad 8a$$

and

$$\frac{g_i}{G} = \frac{\gamma(Z)}{\beta(Z)}(1-\gamma)\frac{Y}{G} - \frac{\gamma(Z)}{\beta(Z)}[\frac{d_1}{G} + (1+r)\frac{d_0}{G}] \qquad 8b$$

and

$$\frac{g_j}{Y} = \frac{\delta(Z)}{\beta(Z)}(1-\tau) - \frac{\delta(Z)}{\beta(Z)}[\frac{d_1}{Y} + \frac{(1+r)d_0}{Y}] \qquad 8c$$

and

$$\frac{g_j}{G} = \frac{\delta(Z)}{\beta(Z)}(1-\gamma)\frac{Y}{G} - \frac{\delta(Z)}{\beta(Z)}[\frac{d_1}{G} + \frac{(1+r)d_0}{G}] \qquad 8d$$

Differentiating equations 8a and 8b, with respect to corruption, Z, yield:

$$\frac{\partial(g_i/Y)}{\partial Z} = (1-\tau)\left[\frac{\gamma_Z\beta - \beta_Z\gamma}{\beta^2}\right] - [\frac{d_1}{Y} + \frac{(1+r)d_0}{Y}]\left[\frac{\gamma_Z\beta - \beta_Z\gamma}{\beta^2}\right] \qquad 9a$$

and

$$\frac{\partial(g_i/G)}{\partial Z} = (1-\tau)\frac{Y}{G}\left[\frac{\gamma_Z\beta - \beta_Z\gamma}{\beta^2}\right] - [\frac{d_1}{G} + \frac{(1+r)d_0}{G}]\left[\frac{\gamma_Z\beta - \beta_Z\gamma}{\beta^2}\right] \qquad 9b$$

and differentiating equations 8c and 8d, yield:

$$\frac{\partial(g_i/Y)}{\partial Z} = (1-\tau)\left[\frac{\delta_Z\beta - \beta_Z\delta}{\beta^2}\right] - \left[\frac{d_1}{Y} + \frac{(1+r)d_0}{Y}\right]\left[\frac{\delta_Z\beta - \beta_Z\delta}{\beta^2}\right] \qquad 9c$$

and

$$\frac{\partial(g_i/G)}{\partial Z} = (1-\tau)\frac{Y}{G}\left[\frac{\delta_R\beta - \beta_R\delta}{\beta^2}\right] - \left[\frac{d_1}{G} + \frac{(1+r)d_0}{G}\right]\left[\frac{\delta_R\beta - \beta_R\delta}{\beta^2}\right] \qquad 9d$$

where $\gamma_Z = \frac{d\gamma}{dZ}$, $\beta_Z = \frac{d\beta}{dZ}$ and $\delta_Z = \frac{d\delta}{dZ}$. In this case,

$\frac{\partial(g_i/G)}{\partial Z} > 0$ and $\frac{\partial(g_i/Y)}{\partial Z} > 0$ if $\frac{\gamma_Z}{\gamma} > \frac{\beta_Z}{\beta}$.

and

$\frac{\partial(g_j/G)}{\partial Z} > 0$ and $\frac{\partial(g_j/Y)}{\partial Z} > 0$ if $\frac{\delta_Z}{\delta} > \frac{\beta_Z}{\beta}$.

In view of the above, it can be seen that corruption affects the parameters in the utility function causing a higher g_i spending category as long as the utility maximiser perceives an increase this expenditure outlay as an opportunity to use public spending for private benefit[5]. In light of the above:

$$\frac{g_i}{Y} = f_1(\beta,\gamma,\tau,Z,\frac{D}{Y}) \text{ and } \frac{g_i}{G} = f_2(\beta,\gamma,\tau,Z,\frac{Y}{G},\frac{D}{G}). \qquad 10$$

Because β,γ,τ and Z are not directly observable, the impact of corruption on the g_i spending category can be estimated as follows:

[5] As noted by Tanzi (1998), the simplest and most popular definition of corruption is that it is the abuse of public power for private benefit. The abuse of public power is not necessarily for one's private benefit but may be for the benefit of one's party, class, friends, family and so on. In fact, in many countries some of the proceeds of corruption go towards financing the activities of the political parties.

$$\left(\frac{g_i}{Y}\right)_{jt} = \lambda_0 + \lambda_1 Z_{jt} + \lambda_2\left(\frac{D}{Y}\right)_{jt} + \lambda_3 K_{jt} + \varepsilon_{jt} \qquad 11a$$

and

$$\left(\frac{g_i}{G}\right)_{jt} = \varpi_0 + \varpi_1 Z_{jt} + \varpi_2\left(\frac{G}{Y}\right)_{jt} + \varpi_3\left(\frac{D}{G}\right)_{jt} + \varpi_4 K_{jt} + \varepsilon_{jt} \qquad 11b$$

t is a time index and j indexes the countries in the panel, $(\frac{g_i}{Y})_{jt}$ is the ratio of the g_i spending category to the GDP, $(\frac{g_i}{G})_{jt}$ is the ratio of the g_i spending category to total government spending, $(\frac{G}{Y})_{jt}$ is the ratio of government spending to the GDP, Z_{jt} is a corruption indicator, $(\frac{D}{G})_{jt}$ and $(\frac{D}{Y})_{jt}$ are, respectively, the ratios of the public debt to the total public budget and the GDP, K_{jt} is a vector of the state variables which are discussed in detail in Section 3.2 and ε_{jt} is the error term.

By estimating equations 11a and 11b, a link can be created between the various components of the public budget as a share of the total public budget and of GDP. Equation 12 enables us to understand the role of corruption in the size of the public budget:

$$\frac{G}{GDP} = \frac{g_i/GDP}{g_i/G} \qquad 12$$

where g_i/GDP is the proportion of the GDP allocated to each public economic function, g_i/G is the share of the i[th] economic category in the total public budget and G/GDP is the total government spending's share of the GDP.

Equation 12 shows that the relationship of the total public budget to the GDP can be understood better by focusing on the shares of the components of the budget as shares of the total public budget and of the GDP. In which case, an increase in a component of the public budget as a share of the GDP accompanied by an increase of the same component as a share of the total public budget will unambiguously increase the amount of the public budget. In the literature (see Delavallade, 2006), the effect that corruption on the size of the total public budget is referred to as the quantity effect of corruption, while the effect of corruption on the distribution of the public budget is referred to as the allocation effect.

Using Equation 12, inferences are possible regarding the effect of corruption on overall government expenditure in relation to the GDP. Information concerning functional government expenditure as a share of total expenditure and of the GDP is useful in making inferences about the overall effect of corruption on the total budget as a share of the GDP. In this regard if the estimated coefficients of corruption are positive when the dependent variable is expressed as a share of the total expenditure and the GDP, it implies that the effect of corruption on functional expenditure will unambiguously lead to significant increases in total government expenditure relative to the size of the economy (GDP). However, if the estimated coefficients yield mixed signs they are bound to be either indeterminate or insignificant regarding the effect of corruption on the overall budget (Delavallade, 2006).

3.3 The Model

3.3.1 Selected factors that impact on the composition of budget spending

In terms of the determinants, there exists a pool of literature, as outlined in Chapter 2, which seeks to explain the composition of government spending. In this section we briefly discuss the factors identified in the literature that explain

some or all of the functional classifications identified in Table A1.3 in the appendix.

3.3.1.1 Level of corruption

As suggested by Krueger (1974), large bribes are likely to be available in conjunction with items produced by firms operating in markets where the degree of competition is low. Further more, the illegal nature of corruption and the ensuing need for secrecy imply that corrupt officials will choose goods whose exact value is difficult to monitor (Mauro 1998). It is, therefore, expected that corrupt regimes will have a tendency to tilt their budget towards sectors that procure goods and services that are specialised and have high, up-to-date technology content. Therefore, as suggested by Mauro (1998), corrupt politicians may be expected to spend more public resources on those items on which it is easier to levy large bribes while keeping those bribes secret. It is therefore expected that sectors such as defence and economic services be positively related to corruption. Other sectors such as education, health and social welfare are expected to be negatively related to corruption. However, the relationship between corruption and general public services spending may not be known from the outset.

3.3.1.2 Political characteristics

In the literature some arguments were found stating that the internal allocation of the public budget is largely driven by the political characteristics of a country, as measured by the level of political and civil rights enjoyed by its citizens and the level of transparency of the government. As argued by Mahdavi (2004), it is generally agreed that certain civil liberties increase the degree of public participation in and scrutiny of the resource allocation process within the public sector. Economies that are characterised by dictatorships require massive support from the military to prevent attempts on the government. The military

budget in non-democratic regimes may therefore reflect the government's demand for protective services (Kimenyi & Mbaku 1995), however, as the economy becomes more liberal and accountable, there is a tendency to re-allocate the budget towards those spending categories that the public would prefer. For example, as suggested by Nader (1994), as political liberties increase there appears a shift in the budget towards health and social security. Thus, it is expected that repressive regimes will tilt the budget toward defence and public services spending, while the liberal ones tilt the budget in favour of social sectors and economic services.

3.3.1.3 Political instability

Political instability or threats thereof are very important in the allocation of the budget. As suggested in the literature, a country that is under constant threat of instability tends to allocate the budget in favour of those functional categories that seek to restore stability. This is the case whether the political system in the country is democratic or dictatorial. It is, therefore, expected that countries that are under threat of or are experiencing political instability will spend more of their budgets in favour of the general public services sector and of the defence sector. Less budget allocation will be made to the social and economic sectors of the economy. For example, countries that have a history of coups, social unrests, and ethnic tensions tend to spend more on the military and on administration. On the other hand, politically stable countries tend to spend more on those sectors where social returns are high, such as education, health and economic services.

3.3.1.4 Public debt

In the models developed by Tabellini and Alesina (1990), debt accumulation is instrumental in the allocation of the public budget. This is supported in the literature by Mahdavi (2004), who found that external debt has an important role to play in the allocation of the public budget, increasing the shares of some

sectors of the budget while starving other sectors. For example, higher levels of public debt will tend to enhance the shares of the economic services, health and education functional categories because the funds generated through external and internal loans are usually channelled to these sectors.

3.3.1.5 Level of income

In what has come to be known as Wagner's law, Aldoph Wagner (1883-1953) hypothesised that government spending would increase in the course of development to a modern society. This relationship, as argued in the literature (Mahdavi 2004), reflects a greater role for the government as the economy becomes more complex and the demand for public goods and social programmes rises. On this basis therefore, we may infer certain changes in the composition of public spending as the role of the public sector changes during the long-term process of development. For example, in the early stages of development the government may be involved in virtually all the sectors of the economy, however, as the private sector develops, the government tends to withdraw from some sectors and focus instead on the provision of pure public goods. It is, therefore, expected that as income increases the public budget will be biased towards those functions that the private sector cannot efficiently provide. Such sectors include defence, public services, economic services and social welfare. It is thus expected that level of income will be positively related to these sectors while negatively related to education and health.

3.3.1.6 Demographic characteristics: population, structure and urbanisation

As suggested in the existing literature and theories, the size of the population of a country, its geographical distribution, the degree of urbanisation and the structure of the population have an important role to play in the internal allocation of that country's budget. For example, as argued by Bergstrom and Goodman

(1973) the percentage of the population above 65 years of age is important in determining the structure of government spending. Following the life cycle hypothesis, persons who are over 65 years of age tend to spend a larger portion of their current income on current consumption than younger people spend, this suggests that if the demand for public goods as a proportion of total goods does not decline with age, then one would expect an older person to demand a larger quantity of public goods than a younger person with the same income and tax share.

3.3.1.7 Size of government

The relative size of the government is important in determining the structure of the budget. As observed by Mahdavi (2004), the relative size of government serves to capture the effects of more cyclical factors, such as changes in the tax base and government non-tax revenues. It is also argued that the size of government is associated with factors that may impact on the composition of total spending. These factors include the level of corruption, exposure to external risks such as trade shocks and exposure to internal risks such as political instability and social conflicts.

3.3.1.8 IMF-supported programmes

The central role of the IMF's fiscal policy advice to its members has largely remained that of improving the public spending mix by urging governments to transform their budgets in favour of productive spending and reduce the share of unproductive spending. Since structural adjustment is linked macroeconomic consistency framework, it is expected that countries that are implementing IMF reforms will tend to tilt their budgets in favour of the social sectors and economic services. The functional categories of general public services and defence are expected to be negatively affected by such IMF reform programmes.

3.3.2 Model specification

In view of the framework discussed in section 3.1 and the previous discussion, the general basic equations for the relative share of the i^{th} functional category for the j^{th} country at time t are stated as:

$$\left(\frac{g_i}{G}\right)_{jt} = \alpha_i + \beta_i(Lypc)_{jt} + \gamma_i(Lgov)_{jt} + \delta_i(DEM)_{jt} + \eta_i(POL)_{jt} + \lambda_i(Acc)_{jt} + \kappa_i(Cor) + \omega_i(IMF) + \hbar_i\left(\frac{D}{G}\right) + \mu_{ijt} \quad 13a$$

and

$$\left(\frac{g_i}{Y}\right)_{jt} = \alpha_i + \beta_i(Lypc)_{jt} + \delta_i(DEM)_{jt} + \eta_i(POL)_{jt} + \lambda_i(Acc)_{jt} + \kappa_i(Cor) + \omega_i(IMF) + \hbar_i\left(\frac{D}{Y}\right) + \mu_{ijt} \quad 13b$$

Lypc is the real per capita GDP that serves as a proxy for the level of development; Lgov is the ratio of the total government spending to the GDP that measures the relative size of the government; DEM is a vector of demographic characteristics such as population, population structure, density and urbanisation; POL is the political instability index which measures the extent of any political instability in the country; Acc is the Voice and Accountability Index, which measures the extent of political and civil rights and of democracy in a country; and Cor is the corruption control index which measures the state of corruption in a country. IMF is the IMF dummy which stands proxy for the degree of reform in a country.

Equation 13a, which depicts the spending by category as a percentage of the total public budget imposes the following adding up constraint:

$$\sum_{i=1}^{7}\left(\frac{g_i}{G}\right)_{jt} = \sum_{i=1}^{7}\alpha_i + \sum_{i=1}^{7}\beta_i(GDPK)_{jt} + \sum_{i=1}^{7}\gamma_i(GEXGDP)_{jt} +$$
$$\sum_{i=1}^{7}\delta_i(DEM)_{jt} + \sum_{i=1}^{7}\eta_i(POL)_{jt} + \sum_{i=1}^{7}\lambda_i(LIB)_{jt} + \sum_{i=1}^{7}\kappa_i(KOPT)_{jt} \qquad 14$$
$$+\sum_{i=1}^{7}\omega_i(IMF)_{jt} + \sum_{i=1}^{7}\tau_i\left(\frac{D}{G}\right)_{jt} + \sum_{i=1}^{7}\mu_{jt} = 1$$

Equation 14 implies that the error terms in various equations are correlated because relative spending shares in the j[th] country at time t must necessarily add up to unity. This adding up restriction has implications on the estimated parameters of Equation 14 as follows:

$$\sum_{i=1}^{7}\beta_i = \sum_{i=1}^{7}\gamma_i = \sum_{i=1}^{7}\delta_i = \sum_{i=1}^{7}\eta_i = \sum_{i=1}^{7}\lambda_i = \sum_{i=1}^{7}\kappa_i = \sum_{i=1}^{7}\omega_i = \sum_{1=1}^{7}\tau_i = 0 \qquad 15a$$

The restriction also has implications with regard to the error term, since for the j[th] country in period t, underestimation of the share of one of the spending categories is associated with overestimation of the remaining shares, the sum of the error terms from all the share equations will be zero. This is formally stated as:

$$\sum_{i=1}^{7}\mu_i = 0 \qquad 15b$$

In view of equation 15a, which imposes restrictions on the estimated parameters of the share equations and equation 15b, which gives the expected value of the errors from the share equations it then follows that:

$$\sum_{i=1}^{7}\alpha_i = 1 \qquad 15c$$

This therefore, suggests that the error terms across the share equations comprise a system of seemingly unrelated equations. As suggested by equation

15b, the sum of the error terms from the system of equations will sum to zero, which implies that since our system comprises of seven equations only six will be independently estimated and the seventh one will be recovered by using the restrictions suggested above.

3.4 Diagnostic tests

To test the validity of the estimated models in Chapters 4-11, a battery of diagnostic tests is required, the tests are discussed in this section.

3.4.1 Testing the joint validity of fixed effects

Before reporting the estimation results on panel econometrics, the joint validity of fixed effects needs to be tested. This test is conducted to decide whether or not the cross sections that are included in the study can be pooled. Traditionally, panel estimation involved pooling all the members of the cross section and then estimating them. Concern regarding whether or not the members of this panel had similar enough characteristics to warrant estimation as a pool occasioned this test. In panel econometrics, literature testing for suitability for pooling or, the validity of the fixed effects model, is based on the F-statistics. In this regard the null hypothesis to be tested is that each individual cross section is not unique and, therefore, the members of the panel can be pooled together. The alternative hypothesis is that the individual members of the panel have unique characteristics and are therefore cannot be pooled. The F-test conducted in this exercise uses the residual sum of the squares of the restricted model (pooled model) and those from the unrestricted model (fixed effects model)[6]. The null and alternative hypotheses are formally stated as:

[6] Where N is small we use the Least Squares Dummy Variable (LSDV) estimation results. It is important to note that while N stands for number of cross sections and T stands for time periods, if one is interested in treating time periods as cross sections, then the F test can be adjusted appropriately by interchanging N and T.

$$H_0 : \mu_1 = \mu_2 = ... = \mu_{N-1} = 0$$
$$H_A : \mu_1 \neq \mu_2 \neq ..... \neq \mu_{N-1} \neq 0 \quad (16)$$

and the F-test statistic is given as:

$$F = \frac{(RRSS - URSS)/(N-1)}{URSS/(NT - N - K)} \sim F_{(N-1),(NT-N-K)} \quad (17)$$

Where RRSS is the restricted sum of squares and URSS is the unrestricted sum of squares. N is the number of cross-sections, T is the number of time periods and K is the number of parameters to be estimated.

The null hypothesis of no individual effects (suitability for pooling) is accepted when the test statistic is less than the appropriate critical value. Accepting the null hypothesis admits estimation of a pooled model and rejection of the null hypothesis leads to estimation of the fixed effects model.

3.4.2 Testing for random effects

Testing for random effects is also conducted to establish whether or not there are individual random effects that must be taken care of rather than estimating the model using a pooled or fixed effect approach. The test for random effects is conducted using the Lagrange Multiplier (LM) test. This test is conducted by first estimating the restricted model (pooled model), obtaining the residual sum of squares, which is then utilized in the LM test statistic. In this case the null hypothesis is that there are no random effects and the alternative is that there are random effects. This is formally stated as:

$$H_0 : \sigma_\mu^2 = 0$$
$$H_A : \sigma_\mu^2 \neq 0 \quad (18)$$

and the LM test statistic is stated as:

$$LM = \frac{NT}{2(T-1)}\left[\frac{\sum_{n=1}^{N}\left[\sum_{t=1}^{T} e_{it}\right]^2}{\sum_{n=1}^{N}\sum e_{it}^2} - 1\right]^2 \sim \chi^2(1) \qquad 19$$

The LM value obtained from the above expression is compared with a chi-square with 1 degree of freedom. A test statistic value less than the critical chi-square with one degree of freedom leads to acceptance of the null hypothesis, thus admitting estimation of a pooled model, rejecting the null hypothesis leads to estimation of the random effects model.

3.4.3 The choice between a fixed effects model and a random effects model

Section 3.4.1 explains how a decision is taken when one is confronted with a choice between a pooled model and a fixed effects model while Section 3.4.2 explains the decision with regard to choosing between a pooled model and a random effects model. In a situation where the pooled model is not accepted, in Section 3.4.1 a fixed effects model is preferred while a random effects model is preferred in Section 3.4.2. If the results in Sections 3.4.1 and 3.4.2 prefer fixed effects and random effects models respectively, a decision has to be taken regarding the model to use. As suggested by Baltagi (2001) there is controversy in the literature regarding the appropriate model to use. In this regard a test suggested by Hausman (1978), which is based on the difference between the fixed and random effects estimators, is utilised to identify the preferred model.

3.5 Estimation procedure

The estimation is done within the panel econometrics framework at two levels. Firstly, equations 13a and 13b are estimated in a manner that allows each of the

spending categories to be estimated independently of the other categories. In so doing, I am able to allow for the inclusion of the determinants that are specific to each of the spending categories both as a share of the total public budget and of the GDP.

Secondly, equation 13a is estimated in a manner consistent with the systems estimation and the results are reported in a separate chapter. In view of the expected simultaneity in Equation 13a, estimations will be conducted within a system panel framework in a manner consistent with the Seemingly Unrelated Regression (SUR) estimation method proposed by Zellner (1962).

3.6 Description of the data

3.6.1 Data sources and type

This study seeks to investigate the spending behaviour of African governments for the set of countries listed in Appendix A1.2 over the period 1995-2004. The variables used in this study are as follows:

- The general public service, defence, education, health, social welfare, economic services, and 'other' spending sectors are the dependent variables. They are expressed as a ratio of the total public budget and of the GDP in the various estimations. The data is obtained from IMF country reports which are obtained from www.imf.org/external/country/index.htm.
- The variable, the 'defence spending of neighbouring countries' is obtained by finding the average defence spending of a country's neighbours. It is expressed as a ratio of the total public budget and of the GDP. The data is obtained from IMF country reports which are obtained from www.imf.org/external/country/index.htm
- The corruption control index, political stability index, and voice and accountability index are the governance indicators used in this study to proxy, respectively, corruption, political stability and freedom and

transparency of government. These indicators are obtained from the World Bank at www.worldbank.org/wbi/governance/puts/govmatters+html.

- The variables, 'population size', 'population density' and 'urbanisation rates' have been obtained from the World Bank: African Development Indicators, various issues.
- The variables, 'size of government', 'level of income' (GDP) and 'external debt' have been obtained from the World Bank: African Development Indicators, various issues.
- The IMF dummy is constructed on the basis of information available from the IMF. A country is assigned a value of 1 if IMF programmes have been implemented in a given year and a value of 0 if not. Data for constructing this dummy is obtained from www.imf.org/external/country/index.htm
- The variable 'military personnel per 1000 people' is the proxy for the staffing levels of the defence department. The data is obtained from the Stockholm International Peace Research Institute (SIPRI).

3.6.2 Choice of governance indicators

A number of organisations produce governance data using different methodologies and for diverse reasons; these data sets have been used by various studies touching on governance matters. In this study we use the World Bank data set for the following reasons: firstly, the World Bank data set is obtained from the data collected by 31 firms that construct governance indicators which makes it a hybrid index encompassing all the attributes of these individual indicators; secondly, individual firms use different methodologies to construct their indices for different uses. The World Bank data set performs better in this regard because it is drawn from many different sources which makes it more reliable overall; thirdly, the number of countries and territories used by individual firms is less than the number available from the World Bank database. For example, the Political & Economic Risk Consultancy uses only 10 countries, the Political Risk Services uses 140 countries and Afrobarometer uses 18 countries.

Furthermore, there is no guarantee that the countries covered in these individual data sets include the countries of interest in this study; fourthly, while some firms report data for many countries they only started doing so recently, these data sets are therefore not suitable for this study which requires a long time series.. For example, IJET Travel International covers 167 countries, but only for 2004. Using data from these individual sources would have reduced the number of countries in this study because, besides being limited in terms of coverage they are also limited in terms of the periods covered; fifthly, compared to, for example the Corruption Perception Index (CPI) of Transparency International (TI), the World Bank data set is superior because it does not use lagged data when current data is not available, which is what TI does when constructing the CPI (Kaufmann, Kraay and Mastruzzi. 2006).

The governance indicators developed by the World Bank are constructed using data from 31 different sources as shown in Appendix A1.4. From these sources the World Bank constructs six categories of governance indicators for 213 countries and territories: voice and accountability; political stability and absence of violence; control of corruption; rule of law; effectiveness of government; and regulation quality. In this study the first three are of interest and are discussed in detail below.

3.6.2.1 Corruption control index

The corruption control index is a proxy for the level of corruption. It captures the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as a 'capture' of the state of elites and their private interests. It is constructed in such a way that a country which demonstrates the least effort in the fight against corruption (and therefore a higher level of corruption) is assigned a value of -2.5 while one showing a greater effort in fighting corruption (and therefore a lower level of corruption) is assigned a value of +2.5.

3.6.2.2 Political stability index and absence of violence

The political stability index is a proxy for the level of political stability in a country. It measures perceptions of the likelihood that the government will be destabilised or overthrown by unconstitutional or violent means, including political violence and terrorism. The political stability index is constructed in such way that a country which is most politically unstable is assigned a value of -2.5 while one that is politically stable is assigned a value of +2.5.

3.6.2.3 Voice and accountability index

The voice and accountability index measures the extent to which a country's citizens are able to participate in selecting their government, as well as the level of freedom of expression, freedom of association and freedom of the media. The voice and accountability index is constructed in such way that a country which ranks poorly in voice and accountability is assigned a value of -2.5 while one that is ranked highly is assigned a value of +2.5.

3.7 Univariate analysis

The role of descriptive statistics is well documented in econometrics literature. Descriptive statistics show the individual characteristics of the variables that are used in the estimations. These include knowledge of the first, second and third order moments. More importantly, aspects such as skewness, kurtosis and consequently normality are exposed. Table 1 contains summary descriptive statistics of the dependent variables used in this study[7].

[7] Descriptive statistics of other variables are presented on Appendix 2.

Table 1: Descriptive statistics of the ratio of dependent variables as ratios of the total public budget

	General public services	Defence	Education	Health	Social welfare services	Economic services	Other
Mean	22.37	12.88	16.30	6.30	6.54	15.02	20.72
Median	21.46	9.01	17.71	5.96	3.84	12.82	18.75
Maximum	58.91	65.84	41.52	15.78	24.84	51.73	85.39
Minimum	3.28	1.53	1.19	1.00	0.17	0.68	0.85
Std. Dev.	10.57	11.33	6.75	2.79	6.54	10.88	15.39
Skewness	0.46	2.17	-0.24	0.71	1.20	1.33	1.06
Kurtosis	2.52	7.88	2.96	3.40	3.34	4.55	4.42
Jarque-Bera	12.43	498.24	2.79	25.45	68.08	110.31	75.33
Probability	0.00	0.00	0.25	0.00	0.00	0.00	0.00
Sum	6262.37	3606.02	4563.90	1762.96	1830.00	4206.16	5801.08
Sum Sq. Dev.	31154.00	35810.96	12703.50	2165.12	11921.53	33035.17	66113.28
Observations	280.00	280.00	280.00	280.00	280.00	280.00	280.00
Cross sections	28.00	28.00	28.00	28.00	28.00	28.00	28.00

Table 1 shows the descriptive statistics for the dependent variables as a share of the total public budget. From the table it is evident that the mean budget allocation to the general public services functional category had the highest allocation. The highest share in this category was reported at 58.9% while the minimum was 3.3%. However, the second moments show that this variable is both skewed and has a kurtosis of 2.52, with the Jarque-Bera statistic showing that the variable is not normally distributed. The 'other' category was second highest and the second moments show that the variable is not normally distributed. The budget allocation for defence stood at 12.9%, for education at 16.3%, for health at 6.3%, for social welfare at 6.5% and for the economic services sector, at 15.02%. The other statistics show that all the variables, except the budget share for education are not normally distributed. This, therefore, suggests that these variables need transformation to approximate normality (Hamilton 1992).

Table 2: Description statistics of dependent variables as ratios of GDP

	General public services	Defence	Education	Health	Social welfare	Economic services	Other
Mean	7.72	4.55	5.34	2.10	2.71	4.89	6.47
Median	5.21	2.11	4.78	1.70	0.94	3.64	3.97
Maximum	37.51	37.96	32.59	13.71	25.86	29.10	35.68
Minimum	0.58	0.12	0.31	0.09	0.03	0.16	0.09
Std. Dev.	7.08	6.10	4.36	1.70	4.19	4.56	7.18
Skewness	1.84	2.98	2.38	2.40	2.95	1.97	1.82
Kurtosis	6.37	13.18	11.97	13.47	13.60	8.03	5.82
Jarque-Bera	291.21	1623.76	1204.68	1549.06	1717.55	477.28	246.67
Probability	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sum	2161.37	1273.63	1495.11	589.24	759.06	1368.04	1812.55
Sum Sq. Dev.	13995.26	10379.75	5302.37	807.22	4899.87	5809.58	14368.73
Observations	280.00	280.00	280.00	280.00	280.00	280.00	280.00
Cross sections	28.00	28.00	28.00	28.00	28.00	28.00	28.00

Table 2 shows the dependent variables expressed as shares of the GDP. From the table it is evident that the budget share for public services accounts for 7.7%, while the health category accounts for 2.1% of the GDP. The other descriptive statistics suggest that all the variables suffer from either positive or negative skewness. The Kurtosis measurements, which show whether the variables are peaked or not and the levels thereof, show that all the variables are peaked. The Jarque-Bera statistics show that these variables are not normally distributed.

3.8 Summary

In this chapter the methodology used in this study has been discussed. A public choice framework is adopted which is consistent with Sanjeev *et al.* (2001) and adds value by including public debt. The functional spending categories that are used have been identified the factors that are identified in the literature that explain these functional spending categories are discussed. The chapter also

discusses the econometric estimation procedures and the diagnostic tests performed on all the estimated models. Lastly, the chapter discusses the data type and sources and gives a brief overview of the descriptive statistics of the dependent variables.

CHAPTER FOUR: GENERAL PUBLIC SERVICES SPENDING

4.1 Introduction

This chapter presents the estimation results for the general public services spending category. The bivariate analysis based on the relationship between general public services spending and governance indicators is discussed in Section 4.2 while Section 4.3 reports the estimation results. Section 4.4 summarises the main findings.

4.2 The relationship between general public services spending and governance

Figure 8 shows the relationship between general public services spending and the corruption control index. From the figure it is apparent that the most corrupt countries are Eritrea, Gambia and Nigeria while the least corrupt ones are Botswana, Morocco, Mauritius, Namibia and South Africa.

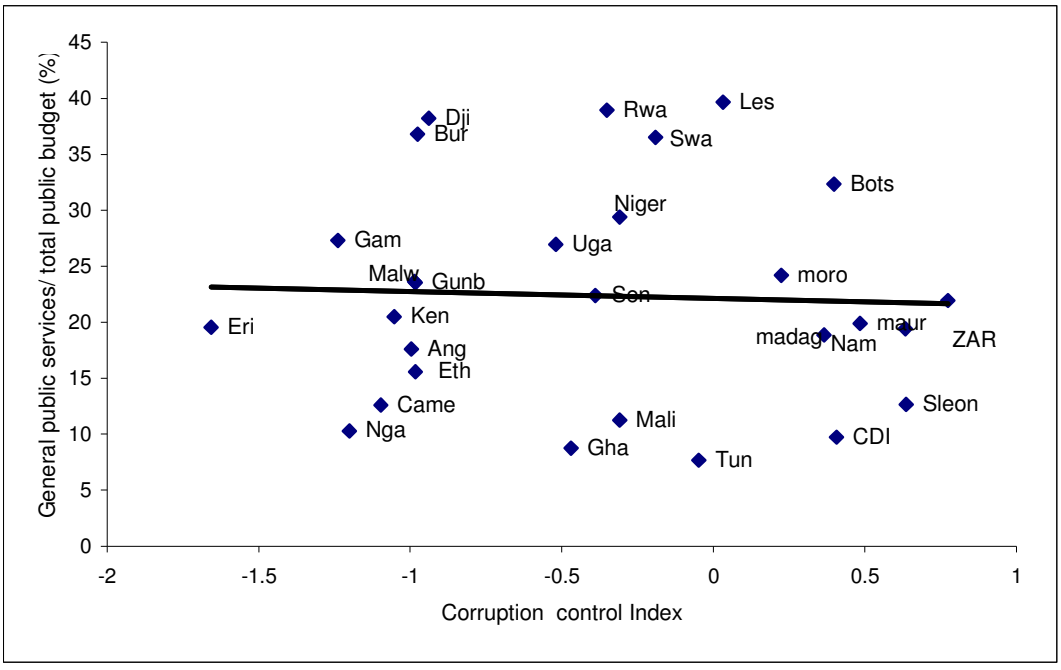


Figure 8: Corruption control index and general public services spending

It is also evident from the figure that Ghana and Tunisia allocate the lowest shares of their public budgets to general public services while Djibouti, Rwanda and Lesotho exhibit larger general public service budget allocations. Overall, there appears to be a negative but weak relationship between general public services spending and the corruption control index among the countries included in the sample.

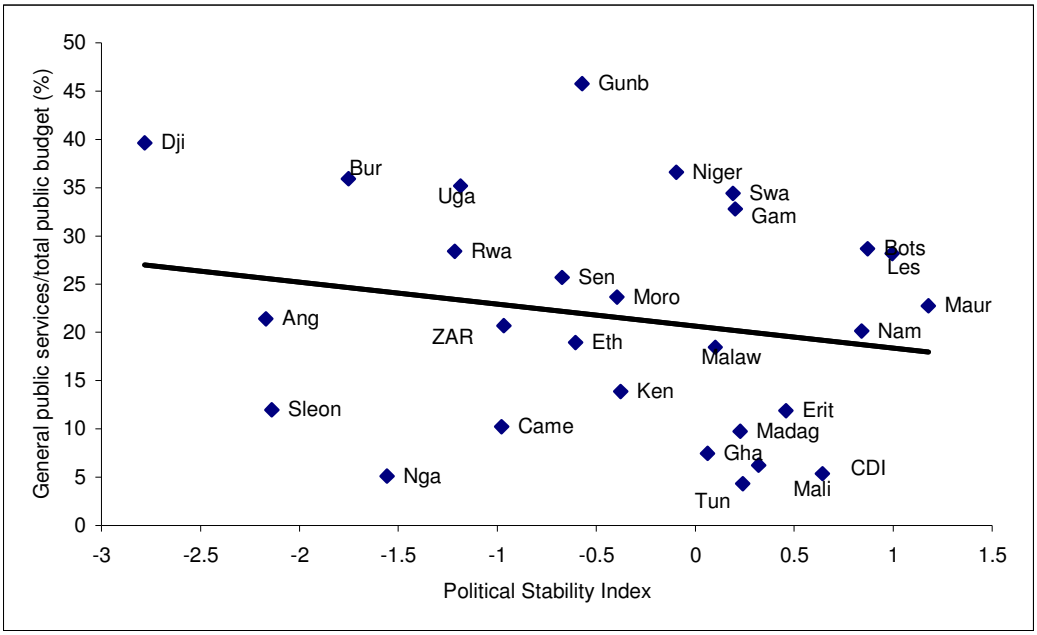


Figure 9: Political stability index and general public services spending

Figure 9 shows the relationship between the political stability index and general public services spending. From the figure it appears that Guinea Bissau, Djibouti, Burundi and Niger allocate the largest shares of their budgets to general public services while Nigeria, Tunisia and Mali allocate the smallest shares. It is also evident from the figure that Djibouti, Burundi, Angola and Sierra Leone are ranked poorly in terms of political stability. Botswana, Lesotho, Namibia and Mauritius are ranked highly in terms of political stability among the countries studied. It can be seen that a negative relationship exists between general public services budget allocations and the political stability index. This suggests that countries that are politically stable tend to allocate a smaller amount to the

general public services sector. This may be explained by the fact that when there is political instability, higher allocations will be made to public order, security and safety not only to safeguard the public, but also to give the ruling elite a sense of security.

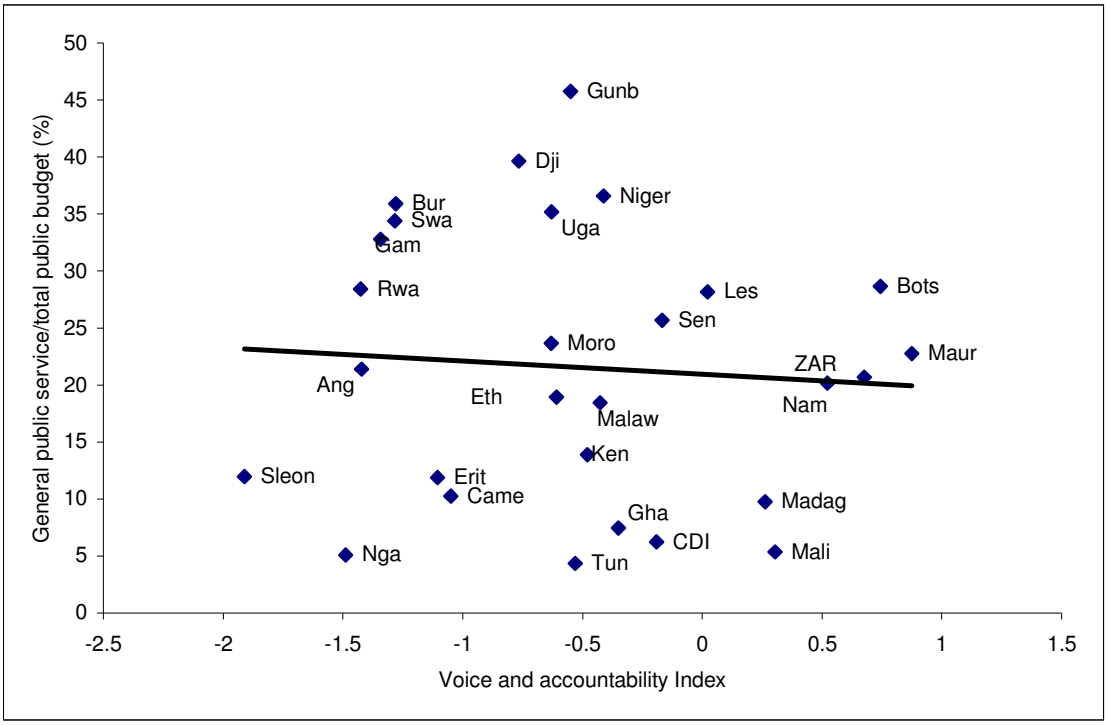


Figure 10: Voice and accountability index and general public services spending

In Figure 10, it is observed that the countries that allocate the largest budget amounts to general public services and are ranked poorly in terms of the voice and accountability index include Burundi, Swaziland, Gambia and Rwanda. Countries that are accountable to their citizens and are receptive to democracy (the voices of their citizens) tend to allocate a smaller part of their budget to the provision of general public services.

These results provisionally suggest that countries that are generally corrupt, politically unstable and have a poor accountability and human rights record, tend to allocate a larger portion of their budgets to general public service spending.

Further analysis is conducted by splitting the sample into two sub-samples with the first sub-sample including all those countries with a below average corruption control index during the period 1995-2004, and the second sub-sample comprising of countries that are less corrupt with a corruption control index above the full sample average during the same period. The scatter plots in Figures 11 and 12 show the nature of the relationship between general public services spending and the corruption control index in the two sub-samples.

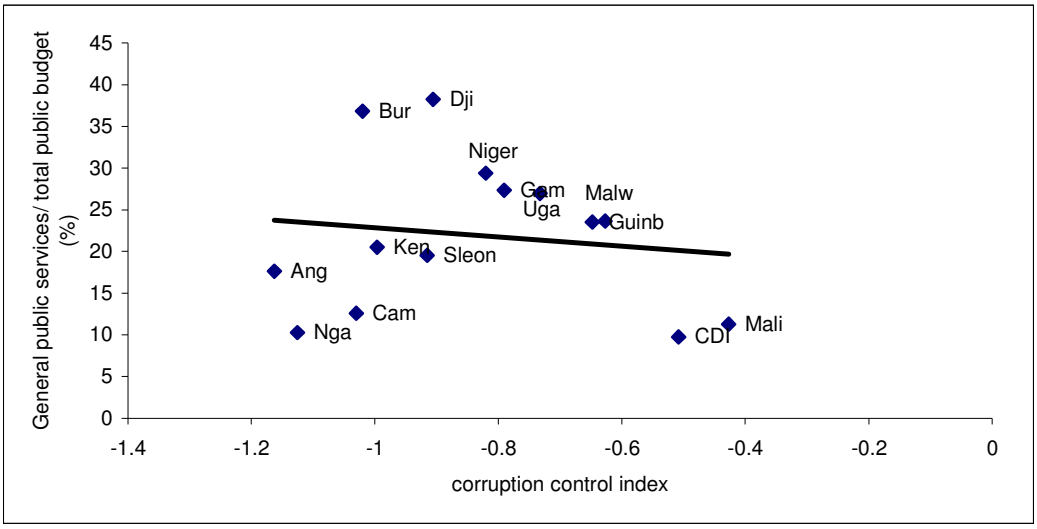


Figure 11: Corruption control index and general public services spending as a ratio of the total budget: 'most corrupt' sub-sample

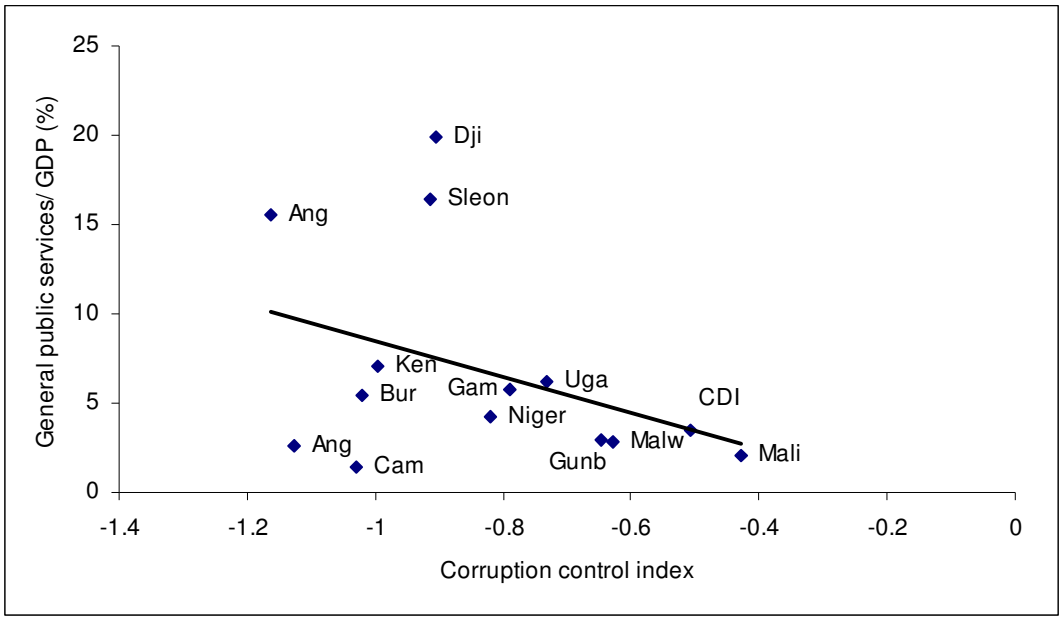


Figure 12: Corruption and general public services spending as a ratio of GDP: 'most corrupt' sub-sample

Figure 11 shows the relationship among the most corrupt countries in the sample between general public services spending as a share of the total public budget and a corruption control index. It is evident that among the most corrupt countries there exists a negative relationship between the corruption control index and general public services spending. Further analysis shows that the relationship appears to be stronger than that of the general case. Figure 12 shows the relationship between general public services spending as a share of the GDP and the corruption control index. It is noted that in the case of countries that are generally corrupt, the relationship between the corruption control index and ratio of general public services spending to the GDP is stronger.

As far as the less corrupt countries in the sample are concerned, Figures 13 and 14 show a very weak relationship between general public services spending and the corruption control index. In Figure 13 there appears to be a negative but weak relationship between the corruption index and general public services spending as a share of the total public budget. On the other hand, Figure 14 shows that there is a very weak but positive relationship between the corruption

control index and general public services spending as a share of the GDP. This may suggest that the effect of corruption in the general public services category is indeterminate.

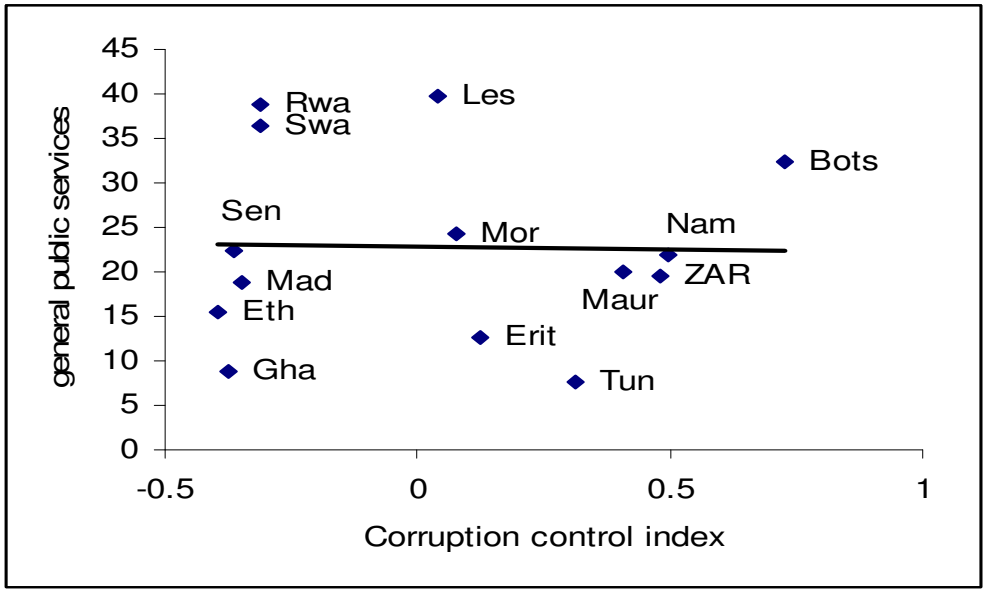


Figure 13: Corruption control index and general public services spending as a ratio of the total budget: 'less corrupt' sub-sample

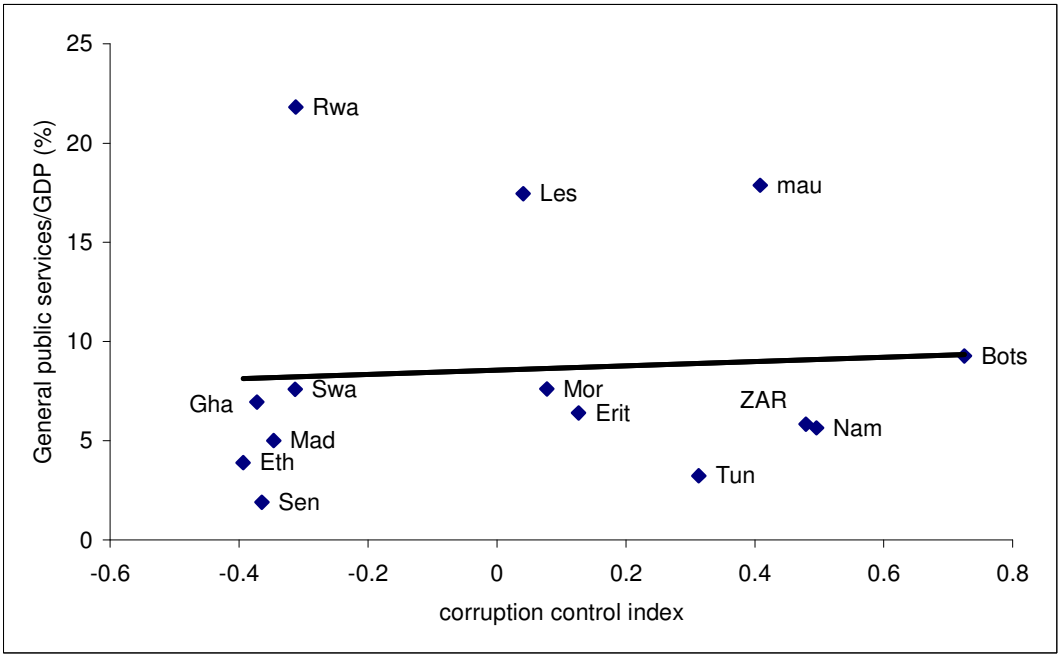


Figure 14: Corruption control index and general public services spending as a ratio of the GDP: ' less corrupt' sub-sample

4.3 Estimation results of general public services spending

This section reports the estimation results based on the full sample (Table 3) and the sub-samples (Tables 4 and 5).

The estimations of general public service spending both as a share of the total public budget and of the GDP are reported in Tables 3 to 5. Columns 1 and 5 report estimations in which the corruption control index is incorporated as the only measure of the quality of governance. It is found that corruption is negative and significant at a 5% level of testing in the estimation based on the share of the total budget, while it is positive and insignificant in the case where the dependent variable is expressed as a ratio of the GDP. Columns 4 and 8 report results in which all the governance indices are entered as explanatory variables. It is found that in both cases the estimated coefficients of the corruption control index are negative but not significant at conventional levels of testing.

From the tables it is evident that in both sub-samples the coefficient of the corruption control index is negative, but only significant in 2 out of 4 estimations. The negative sign obtained in the majority of these estimations is an indication that high levels of corruption are associated with high levels of spending on general public services. These results are plausible because many of the expenditures on general public services are normally salaries that go to the personnel involved in public administration, enforcement of law and order and maintenance of security. This, therefore, suggests that low levels of corruption are associated with low levels of spending in this category.

Table 3: Estimation results of general public services spending: Full sample

	Dependent variable as a share of the total public budget				Dependent variable as a share of GDP			
	PM	PM	PM	PM	PM	PM	PM	PM
Cor	-0.061*** (-3.036)			-0.015 (-0.683)	0.017 (0.560)			0.129*** (3.617)
Pol		-0.059*** (-5.635)		-0.083*** (-6.609)		-0.129*** (-7.162)		-0.196*** (-10.328)
Acc			-0.044 (-0.029)	0.086*** (4.493)			0.030 (1.301)	0.105*** (3.929)
Lden	-0.023** (-2.231)	-0.052*** (-2.669)	-0.033 (-1.581)	-0.015 (-0.716)	0.135*** (5.241)	0.089*** (3.077)	0.141*** (5.302)	0.143*** (4.913)
Lgov	0.398** (4.756)	0.394*** (4.724)	0.403*** (4.551)	0.292*** (3.441)				
Ldebt	-0.023* (-1.625)	0.003 (0.238)	-0.023* (-1.623)	0.014 (0.999)	0.032 (1.159)	0.046* (1.617)	0.024 (0.869)	0.061** (1.961)
Lpop	0.333*** (7.419)	0.244*** (5.782)	0.281*** (6.441)	0.218*** (4.825)	0.166 (1.552)	0.044 (0.503)	0.130 (1.207)	-0.108 (-1.222)
Lypc	0.155*** (5.134)	0.146*** (5.313)	0.104*** (3.477)	0.110*** (3.379)	0.240*** (4.805)	0.285*** (6.059)	0.193*** (3.160)	0.095 (1.580)
IMF	0.222*** (2.771)	0.229*** (2.848)	0.197** (2.359)	0.159** (2.066)	-0.037 (-1.267)	-0.057** (-2.046)	-0.0536* (-1.848)	-0.064** (-2.136)
IMF*Lgov	-0.337** (-2.572)	-0.354*** (-2.699)	-0.303** (-2.228)	-0.259** (-2.076)				
Lurb	-0.518*** (-12.304)	-0.452*** (-11.372)	-0.471*** (-11.392)	-0.442*** (-10.703)	-0.308*** (-2.963)	-0.256*** (-2.696)	-0.274*** (-2.599)	-0.197** (-2.123)
C	1.739*** (10.662)	1.946*** (13.315)	1.947*** (11.392)	2.176*** (12.734)	0.657*** (2.575)	1.047*** (5.854)	0.831*** (2.938)	2.199*** (8.101)
R^2	0.97	0.97	0.97	0.97	0.87	0.86	0.85	0.84
Adj. R^2	0.97	0.97	0.96	0.97	0.87	0.85	0.85	0.84
N	28	28	28	28	28	28	28	28
T	10	10	10	10	10	10	10	10
Diagnostic tests								
F stat	0.486	0.756	0.864	1.004	2.600	2.376	2.410	2.623
Hausman test	16.52 [0.0568]	16.77 [0.0525]	13.26 [0.1513]	18.53 [0.0700]	135.74 [<0.0001]	131.63 [<0.0001]	147.00 [<0.0001]	152.51 [<0.0001]

*** Significant at 1%; ** significant at 5%; and * significant at 10%; t-statistics in bracket. PM is the pooled model.

Table 4: Estimation results of general public services spending as a ratio of total spending

	'Most corrupt' sub-sample				'Less corrupt' sub-sample			
	REM	REM	REM	REM	PM	PM	PM	PM
Cor	-0.052 (-1.532)			-0.067* (-1.815)	-0.081*** (-3.094)			-0.031 (-0.876)
Pol		0.001 (0.049)		0.002 (0.094		-0.100*** (-4.791)		-0.092*** (-3.187)
Acc			-0.039 (-1.131)	-0.053 (-1.407)			-0.041** (-2.075)	-0.003 (-0.108)
Lden	-0.227 (-0.076)	0.497 (0.166)	0.689 (0.231)	2.668** (2.546)	0.120*** (7.323)	0.120*** (8.438)	0.116*** (6.636)	0.114*** (6.975)
Lgov	0.112 (0.791)	0.122 (0.857)	0.154 (1.085)	0.114 (0.797)	0.108 (1.189)	0.291*** (3.043)	0.264*** (2.914)	0.248** (2.123)
Ldebt	0.203** (2.571)	0.198** (2.475)	0.199** (2.512)	0.209*** (2.635)	0.079*** (5.303)	0.089*** (7.160)	0.077 (5.361)	0.085*** (6.172)
Lpop	0.263 (0.874)	0.344 (1.135)	0.364 (1.221)	0.313 (1.037)	0.657*** (8.258)	0.267*** (2.625)	0.600*** (6.623)	0.277*** (2.632)
Lypc	0.445*** (3.129)	0.525*** (3.908)	0.530*** (3.949)	0.442*** (3.101)	0.402*** (9.425)	0.253*** (5.893)	0.373*** (9.373)	0.276*** (5.226)
IMF	0.190*** (2.197)	0.210** (2.394)	0.223** (2.587)	0.207** (2.320)	-0.132 (-1.234)	-0.010 (-0.072)	-0.055 (-0.097)	-0.033 (-0.268)
IMF*Lgov	-0.324** (-2.448)	-0.381*** (-2.717)	-0.394*** (-2.847)	-0.354** (-2.498)	0.772 (1.613)	0.043 (0.214)	0.162 (0.977)	0.104 (0.484)
Lurb	1.973*** (3.207)	1.947*** (2.861)	1.989*** (3.215)	2.020*** (2.921)	-0.772*** (10.241)	-0.452*** (-5.351)	-0.679*** (-8.109)	-0.452*** (-5.312)
C					0.306 (1.328)	1.553*** (5.519)	0.367* (1.667)	1.438*** (1.439)
R^2	0.90	0.93	0.93	0.96	0.98	0.98	0.98	0.97
Adj. R^2	0.89	0.93	0.91	0.95	0.97	0.97	0.97	0.96
N	14	14	14	14	14	14	14	14
T	9	9	9	9	10	10	10	10
Diagnostic tests								
F stat	9.696	12.365	14.090	13.750	0.355	0.497	0.561	0.657
Hausman test	14.89 [0.0941]	13.37 [0.1466]	11.22 [0.2611]	15.17 [0.1748]	29.37 [0.0006]	34.31 [<0.0001]	17.72 [0.0386]	18.54 [0.0498]

*** Significant at 1%; ** significant at 5%; and * significant at 10%; t-statistics in bracket. PM is the pooled model and REM is the random effects model.

Table 5: Estimation results of general public services spending as a ratio of GDP

	'Most corrupt' sub-sample				'Less corrupt' sub-sample			
	FEM	FEM	FEM	FEM	PM	PM	PM	PM
Cor	-0.018 (-0.270)			-0.012 (-0.154)	0.106** (1.988)			0.119** (1.961)
Pol		-0.054 (-1.533)		-0.088** (-2.131)		-0.088** (-2.538)		-0.077** (-2.010)
Acc			0.078 (1.291)	0.150** (2.163)			0.074** (2.459)	0.033 (0.913)
Lden	0.604*** (2.849)	0.452** (2.606)	0.613*** (2.973)	0.613*** (2.973)	0.495*** (2.743)	0.089** (2.078)	0.102** (2.372)	0.093** (2.207)
Ldebt	0.075 (0.450)	-0.006 (-0.040)	0.049 (0.304)	0.040 (0.253)	0.096** (2.527)	0.091** (2.294)	0.088** (2.268)	0.096** (2.423)
Lpop	0.263*** (6.621)	0.233*** (6.925)	0.255*** (6.565)	0.227*** (6.388)	0.768*** (5.334)	1.218*** (6.957)	0.889*** (5.941)	1.166*** (6.341)
Lypc	-1.221*** (-4.578)	-1.239*** (-5.019)	-1.185*** (-4.492)	-1.182*** (-4.670)	0.412*** (6.343)	0.515*** (8.112)	0.366*** (5.038)	0.434*** (5.182)
IMF	0.003 (0.075)	0.002 (0.068)	-0.060 (-0.220)	-0.022 (-0.595)	0.010 (0.122)	-0.058 (-1.179)	-0.060 (-1.175)	0.010 (0.144)
Lurb	2.733*** (7.965)	2.371*** (7.891)	2.641*** (7.891)	2.295*** (7.251)	-0.895*** (-6.418)	-1.237*** (-8.068)	-1.007*** (-6.908)	-1.204*** (-2.113)
C					-0.317 (-1.018)	-1.462*** (-3.452)	-0.244 (-0.712)	-1.130** (-2.113)
R^2	0.37	0.33	0.37	0.37	0.97	0.97	0.94	0.95
Adj. R^2	0.33	0.29	0.33	0.31	0.97	0.96	0.93	0.94
N	14	14	14	14	14	14	14	14
T	9	9	9	9	10	10	10	10
Diagnostic tests								
F stat	20.355	23.466	27.768	27.847	0.365	0.357	0.586	0.354
Hausman test	727.64 [<0.0001]	77.71 [<0.0001]	155.87 [<0.0001]	96.06 [<0.0001]	85.81 [<0.0001]	83.28 [<0.0001]	100.65 [<0.0001]	109.68 [<0.0001]

*** Significant at 1%; ** significant at 5%; and * significant at 10%; t-statistics in bracket. PM is the pooled model and FEM is the fixed effects model.

Among the most corrupt countries there exists a negative but insignificant relationship between corruption and general public services spending. However, among the less corrupt countries the corruption control index is positive and significant. This tends to suggest that as a country becomes less corrupt, it allocates less of its resources to the general public services spending category. It is also established that irrespective of its corruption status, as a country becomes more politically stable, it tends to allocate less of its resources to general public services.

The generally negative signs of the corruption control index[8] when the dependent variable is expressed as a share of total expenditure accompanied by positive coefficients when the dependent variable is expressed as a share of the GDP, has consequences for the overall effect of corruption in this sector on overall government expenditure. These findings show that the role of corruption in this sector may be insignificant in terms of yielding large changes in the full sample and in the less corrupt sub-sample. However, in the case of the 'most corrupt' sub-sample the estimated coefficients are negative in both cases which suggest that corruption in the general public services category will lead to substantial increases in the overall budget.

The political stability index is used in the estimation of Columns 2 and 6. In this case it is found that the estimated coefficients of the index are negative and significant at the 1% level of testing. In Column 4 it is found significant at the 1% level of testing while in Column 8 it is significant at the 10% level of testing. While the estimated coefficient of the political stability index is positive and insignificant among the most corrupt countries, it is, however negative and significant among the less corrupt countries. These results, therefore, suggest that the level of political stability is important in the allocation of the public budget to the general

[8] Table A1.4 in the appendix summarises the signs of the corruption control index from the various estimations in this study.

public services. This is plausible because matters involving internal security rest with the police department, which is an integral component of public order and security. The increased allocation may be through two avenues; firstly, if instability is anticipated at the start of the financial year, adequate provision will be made to accommodate for such expenditures. Secondly, if instability is unanticipated, such expenditures will be accommodated by trimming the budgets of other votes and/or a supplementary budget.

The role of one of the governance indicators, voice and accountability, is tested in Columns 3 and 7. In both cases the estimated coefficients of the index are found insignificant with different signs. However, in Columns 4 and 8, it is found to be positive and significant at the 1% level of testing and at the 5% level, respectively. The estimated coefficient of the voice and accountability index is negative and insignificant among the most corrupt countries while it is significant in the less corrupt category. Surprisingly, the estimated coefficient of the voice and accountability index is positively related to general public services spending, although some of the estimated models do not have significant coefficients. This may be explained by the fact that irrespective of pressure from rights groups, the internal security of the state is a high priority. This suggests that the voice and accountability of government is instrumental in the allocation of the budget regarding general public services with a larger allocation associated with improved levels of human rights and accountability to the government.

In all the estimations a number of other variables are included. In the estimations of general public services spending as a share of the total public budget and of the GDP, population density is used as one of the explanatory variables and it is found positive and significant at the 1% level of testing. This finding is in line with research by Sanz and Velázquez (2002) and Marlow and Shiers (1999), who found a positive relationship between population density and general public services spending. This suggests that as the country becomes more densely populated, the demand for general public services increases. This is plausible

because as the population density increases, so will the demand for public administration, law, safety and order services. Population size is also found to be positively correlated to general public service spending as a share of the total public budget and is statistically significant, which also agrees with the research by Sanz and Velazquez (2002). This suggests that as the size of the population increases there is a tendency for the government to channel more funds to cater for the increasing population.

It is found that as the size of government increases, the budgetary allocation to general public services declines. Columns 1-3 show that the estimated coefficients of total government spending to the GDP are significant at the 1% level of testing while column 4 shows that the coefficients are significant at the 5% level. While the estimated coefficients of the size of government are positive across the sub-samples, they are however not significant in the 'most corrupt' sub-sample. In the 'less corrupt' sub-sample the estimated coefficients are significant in 3 out of 4 cases. This suggests that larger governments tend to allocate a large share of their budgets to general public services. This suggests that as a country develops into a modern society it needs an increasing share of its budget to support the activities that fall in the category of general public services.

It is also found that the estimated coefficients of income per capita are positive and significant at the 5% level of testing, which supports the findings of Sanz and Velazquez (2002). In the sub-samples it is found that the estimated coefficients of income per capita are positive and significant in the 'most corrupt' sub-sample while insignificant in the 'less corrupt' sub-sample, suggesting that among the less corrupt countries, the level of economic development is not instrumental in tilting the budget to the general public services category.

The estimated coefficients of the IMF dummy have different signs depending on the sub-sample. In the 'most corrupt' sub-sample it is found that the IMF dummy

is positive and significant in all the estimations, suggesting that IMF programmes are instrumental in the allocation of the budget to general public services. However, among the less corrupt countries it is negative and not significant at the conventional levels of testing, which implies that while IMF programmes are important, they have a weak influence on the allocation of resources to general public services. Furthermore, among the most corrupt countries, the interaction term is negative and significant at the conventional levels but with a strong indication of resilience, as the estimated elasticity is less than unity. Among the less corrupt countries the interaction term is positive and not significant. The insignificant coefficient suggests that with IMF programmes in place in developing countries, general public service spending does not decline as speedily as total government spending does as a share of the GDP.

The relationship between public debt and general public services spending is positive and significant in approximately all the estimations. This suggests that irrespective of the corruption status of a country, a higher public debt is associated with higher levels of general public services spending, implying that some of the public debt is channelled to the public services sector. Such funds may be destined for public service reform programmes and modernisation of the internal security structures. While public debt was found insignificant in the 'most corrupt' sub-sample, it was positive and significant among the 'less corrupt' sub-sample.

4.4 Summary of the main findings

From the results above, the following observations can be made: firstly, there is a positive correlation between the level of general public services spending and the level of corruption, which suggests that countries that are corrupt tend to allocate a larger share of their budgets to the general public services sector, while those that are perceived to be less corrupt tend to allocate less of their budgets to general public services; secondly, it is found that countries that are politically

more stable allocate a smaller share of their budgets to general public services, there is, however, no clear cut evidence regarding the role of voice and accountability; thirdly, demographic characteristics and the relative size of government are also found to positively influence the budget allocation to general public services; fourthly, a higher level of economic development is found to be positively correlated to general public services spending while public debt is not prominent in determining this budget allocation; fifthly, the IMF structural adjustment programmes are negatively correlated to general public services spending and during the period 1995-2004, general public services spending did not seem to be resilient.

CHAPTER FIVE: DEFENCE SPENDING

5.1 Introduction

This chapter analyses the determinants of defence spending. It is divided into three sections. Section 5.2 is devoted to the preliminary investigation of the relationship between defence spending and the various governance indices. Section 5.3 analyses the determinants of defence spending. This is done by first analysing defence spending as a group and secondly by dividing the countries into those that are most corrupt and those that are less corrupt. Finally, section 5.4 presents the main findings.

5.2 The relationship between defence spending and governance

This section analyses the relationship between defence spending and governance indicators.

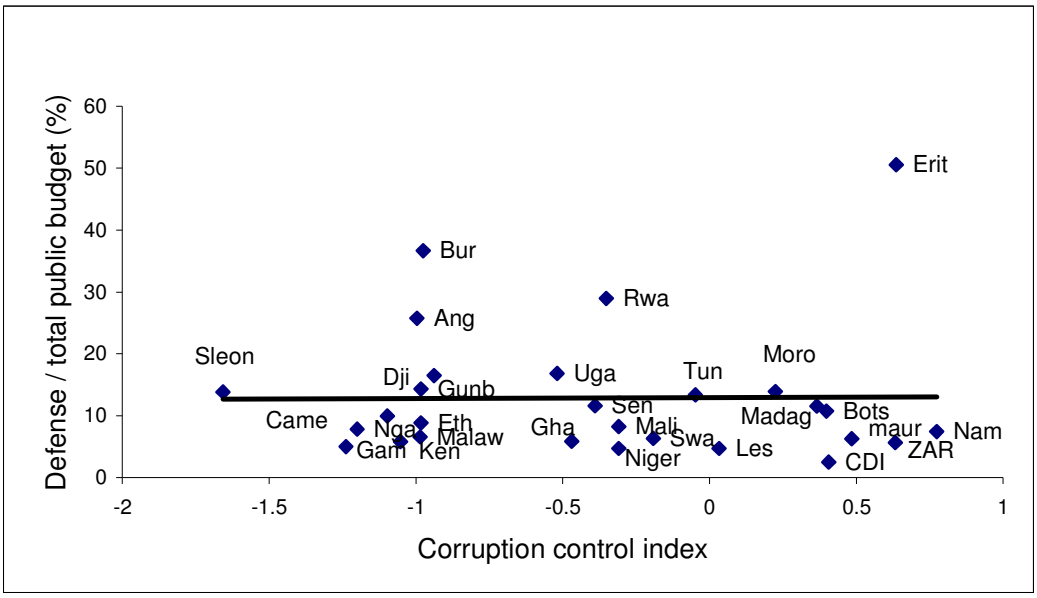


Figure 15: Corruption control index and defence spending

Figure 15 shows a very weak negative relationship between the corruption control index and the budget allocation to defence spending. Sierra Leone and

Cameroon are the most corrupt countries although they posted modest budget allocations to defence. On the other hand, South Africa and Namibia are the least corrupt countries with even lower portions of their budgets devoted to defence. While Eritrea, Burundi, Angola and Rwanda allocated more than 20% of their budgets to defence, a vast majority of the countries in the sample posted a smaller budget allocation to defence.

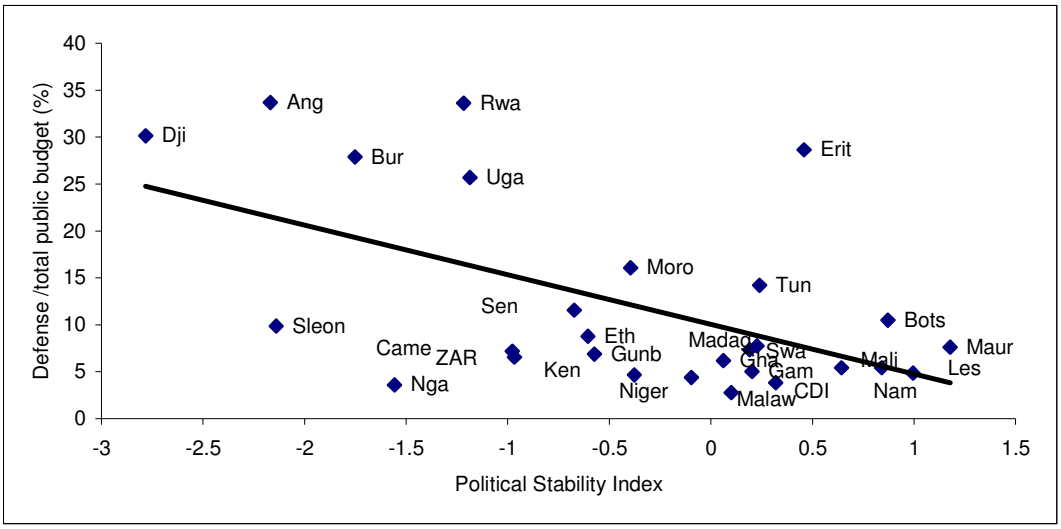


Figure 16: Political stability index and defence spending

Figure 16 shows the relationship between the political stability index and defence spending. Countries that are politically stable tend to allocate less of their budgets to defence. From the figure it is apparent that countries such as Angola, Rwanda, Eritrea, Djibouti, Burundi, and Uganda which show high levels of political instability are also associated with larger budget allocations to defence. For example, Rwanda and Burundi allocated large share of their budgets to defence during the period 1995-2004, partly because they were engaged in conflicts with their neighbours and also battling with militia groups. Similarly, Uganda was involved with rebels in the northern part of the country and Angola had to fund the war against UNITA rebels. Eritrea was also involved in an ongoing border dispute with Ethiopia. Although Djibouti was not involved in any armed conflict, it may have been spending more on defence because of the

hostile surrounding environment, particularly to the south, where Djibouti borders the lawless state of Somalia. It is important to note that Morocco and Tunisia are also large spenders on defence although they are not perceived as politically unstable. In Morocco, the POLISARIO rebels are fighting for the independence of Western Sahara, while there is evidence that Tunisia supports the rebels militarily which explains why the defence spending of these two countries are relatively high.

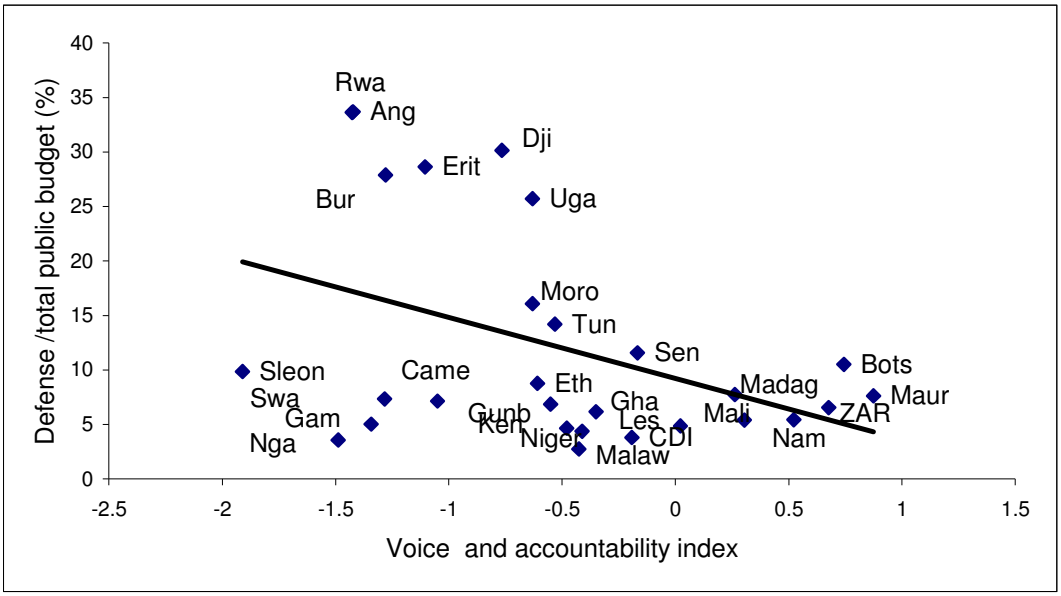


Figure 17: Voice and accountability index and defence spending

Figure 17 shows the relationship between defence spending and the voice and accountability index. It is found that countries that are more accountable tend to allocate a smaller part of their budgets to defence. Countries with little respect for accountability and the voice of the people (democracy) are Rwanda, Angola, Burundi, Eritrea, Djibouti and Uganda. Incidentally, these are the same countries that were found to be politically unstable and, therefore, to be allocating a large share of their budget to defence. This may be because matters regarding the security of the state, particularly the financing of wars, are legislated. Such legislation, to a large extent, does not compel the government to inform the

public as to how much is spent and other related issues. Even when parliament inquiries into these matters the government's response is stated in camera.

Further analysis of the relationship between defence spending and the voice and accountability index is conducted by splitting the sample into two categories, 'most corrupt' and 'less corrupt', the findings are illustrated in Figures 18 to 21.

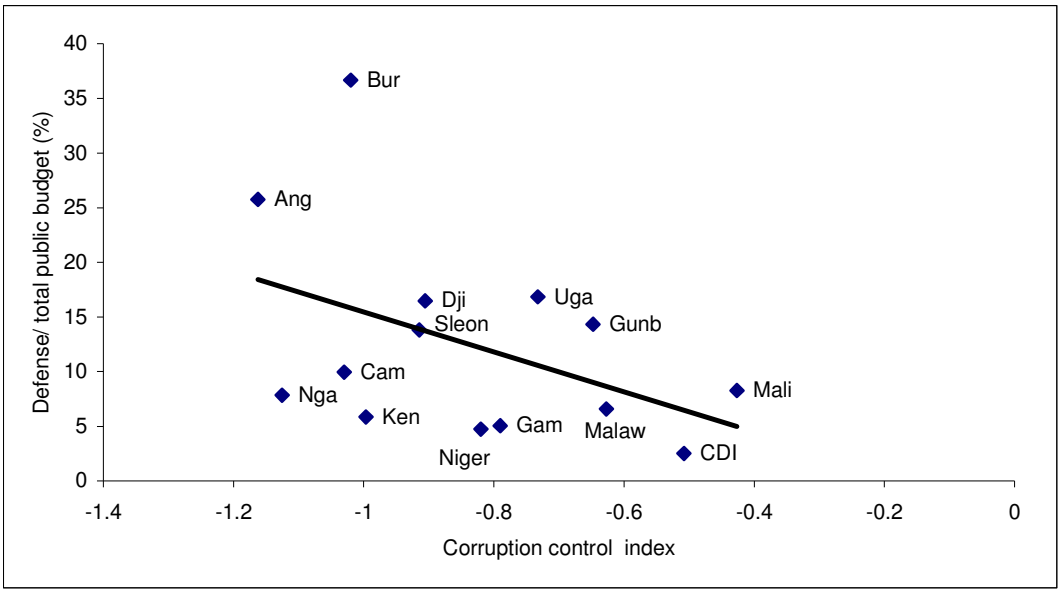


Figure 18: Corrution control index and defence spending as a ratio of the total budget: ' most corrupt' sub-sample

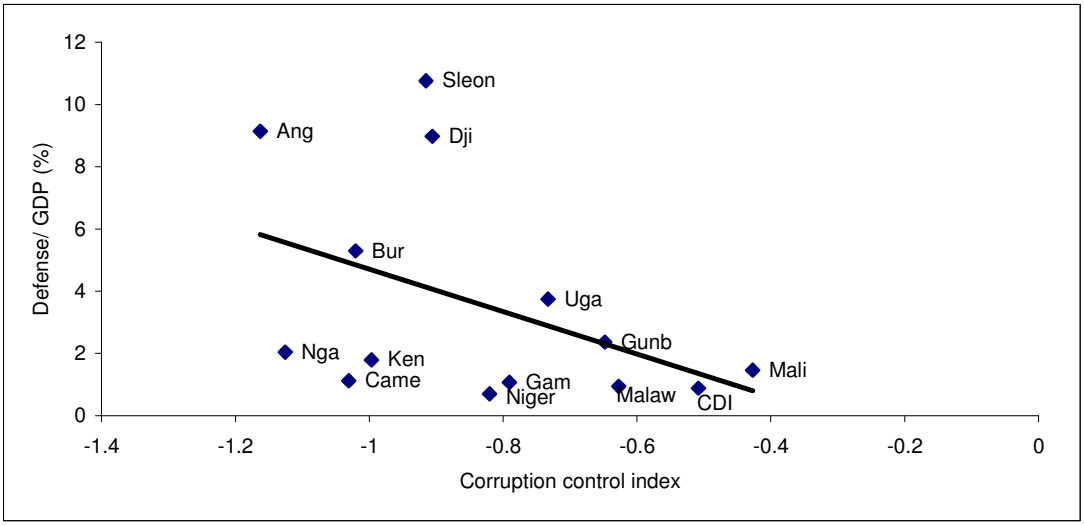


Figure 19: Corruption control index and defence spending as a ratio of the GDP: 'most corrupt' sub-sample

From Figures 18 and 19 it is apparent that while in the full sample case (Figure 15) there appears to be a weak negative relationship, in the 'most corrupt' sub-sample there appears to be a very strong negative relationship between the corruption control index and defence spending both as a share of the total public budget and of the GDP. This tends to suggest that while it is true that corrupt governments spend larger shares of their budgets on defence, the relationship is especially evident amongst the most corrupt countries.

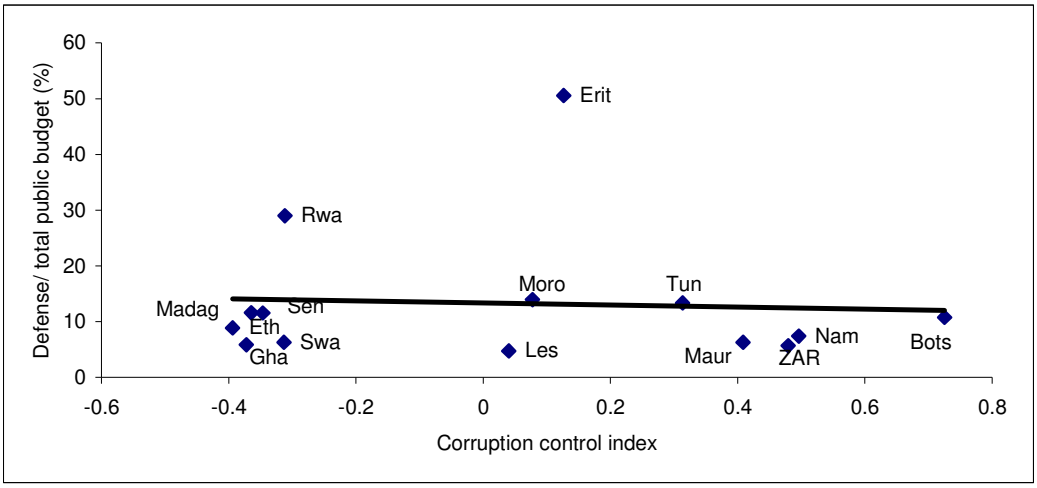


Figure 20: Corruption control index and defence spending as a ratio of the total budget: ' less corrupt' sub-sample

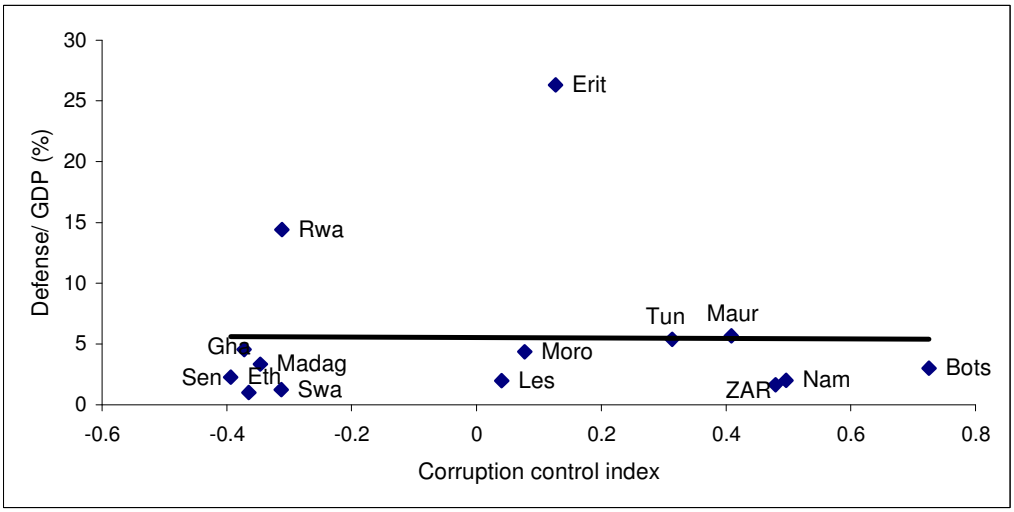


Figure 21: Corruption control index and defence spending as a ratio of the GDP: 'less corrupt' sub-sample

Figures 20 and 21 show the relationship between the corruption control index and defence spending among the less corrupt countries. The weak relationship that is seen in the full sample is replicated in this group. This suggests that among the less corrupt countries there is no strong evidence of corruption shifting the budget to defence. This is a very important finding which suggests that if one is to identify a corrupt country it can be assumed that a larger share of its budget would be allocated to defence.

5.3 Estimation results of defence spending

The estimation results are reported as follows. Table 6 contains the full sample estimation results, Tables 7 and 8 give the results for the 'most corrupt' and 'less corrupt' sub-samples.

The full and sub-sample estimation results of defence spending are reported as a share of the total public budget and of the GDP. From the tables it can be seen that in all the estimations where the dependent variable is defence spending as a share of total public budget, the null hypothesis of the suitability for pooling is accepted and, therefore, all estimations reported are based on pooled ordinary least squares (OLS). The estimations where the dependent variable is defence spending as a share of GDP follow fixed effect model specifications.

From the estimation results it is apparent that the corruption control index is negative and significant in all the estimations in the full sample. The estimations based on defence spending as a share of the total public budget are found to be negative and significant at the 1% level of testing. Similar results were found by Sanjeev, *et al.* (2001) where a high level of corruption is associated with high levels of defence spending in the public budget. Where the dependent variable is a share of the GDP, similar results were found, these results are also consistent the study by Sanjeev, *et al.* (2001). These findings therefore suggest that high levels of corruption in defence have a strong impact on overall government

expenditure. This implies that if the objective of the government is to reduce the size of expenditure in relation to the GDP in conformity with the IMF's macroeconomic consistency framework, then reducing expenditure on defence will help to achieve this objective.

The sub-sample estimations produce both similarities and differences in the estimated coefficients. Among the most corrupt countries, the coefficients are negative and significant in most of the estimations. This finding is consistent with those for the full sample estimations, which suggests that high levels of corruption in defence in these countries will unambiguously increase the level of overall government expenditure. However, among the 'less corrupt' sub-sample, where the dependent variable is the share of the total public budget, the coefficients are positive and significant at the 10% level only in one case. Estimations with the dependent variable as the share of the GDP for the same countries yield negative and significant coefficients. In all these estimations there are no significant differences in terms of the magnitudes of the estimated coefficients. The mixed signs found in the 'less corrupt' sub-sample have important implications. This suggests that the impact of corruption on the size of the public budget in these countries is indeterminate. A positive sign is countered by a negative sign which points to ambiguity with regard to how corruption affects total public spending.

Table 6: Estimation results of defence spending

	Dependent variable as a ratio of total public budget				Dependent variable as a ratio of GDP			
	PM	PM	PM	PM	FEM	FEM	FEM	FEM
Cor	-0.086*** (-3.736)			-0.96*** (-3.730)	-0.057*** (2.654)			-0.103*** (3.509)
Pol		-0.023* (-1.680)		-0.101*** (-6.097)		-0.045** (-2.487)		-0.111*** (-5.193)
Acc			0.080*** (5.199)	0.092*** (5.316)			0.113*** (4.825)	0.140*** (4.561)
Ldefn	0.088** (2.213)	093** (2.216)	0.050 (1.349)	0.046 (1.344)	0.250*** (6.507)	0.239*** (5.973)	0.319*** (7.952)	0.254*** (5.669)
Lmp	0.390*** (6.227)	0.379*** (14.466)	0.472*** (16.913)	0.390*** (12.798)	0.163** (2.561)	0.221*** (3.163)	0.291*** (3.945)	0.196*** (2.708)
Lgov	-0.240** (-2.562)	-0.394*** (-3.997)	-0.245*** (-2.598)	-0.456*** (-4.813)				
Ldebt	-0.018 (-1.391)	-0.014 (-1.083)	-0.013 (-1.080)	0.017 (1.285)	0.304*** (4.421)	0.237*** (3.632)	0.261*** (3.859)	0.376*** (5.015)
Lypc	-0.237*** (-8.505)	-0.143*** (-5.767)	-0.251*** (-9.265)	-0.226*** (-8.226)	-0.318* (-1.821)	-0.253 (-1.397)	-0.131 (-0.737)	-0.254 (-1.306)
IMF	-0.381*** (-4.318)	-0.471*** (-5.122)	-0.407*** (-4.446)	-0.581*** (-6.615)	-0.001 (-0.016)	-0.032** (-2.009)	-0.018 (-1.292)	-0.038* (-1.841)
IMF*Lgov	0.730*** (5.052)	0.871*** (5.822)	0.750*** (5.046)	0.987*** (6.997)				
Lurb	0.043*** (3.544)	0.030** (2.169)	0.042*** (3.724)	0.016 (1.345)	2.384*** (19.303)	2.380*** (9.484)	2.473*** (21.993)	2.358*** (15.773)
C	1.067*** (9.929)	0.934*** (9.530)	1.116*** (9.696)	1.357*** (11.881)				
R^2	0.95	0.96	0.96	0.96	0.98	0.98	0.98	0.97
Adj. R^2	0.95	0.96	0.95	0.96	0.97	0.97	0.97	0.96
N	28	28	28	28	28	28	28	28
T	10	10	10	10	9	9	9	9
Diagnostic tests								
F stat	0.969	1.124	1.243	1.365	13.979	14.867	14.986	15.015
Hausman test	37.24 [<0.0001]	33.86 [0.0001]	35.73 [0.0001]	33.75 [0.0002]	104.85 [<0.0001]	104.73 [<0.0001]	107.73 [<0.0001]	116.96 [<0.0001]

*** Significant at 1%; ** significant at 5%; and * significant at 10%; t-statistics in bracket. PM is the pooled model and FEM is the fixed effects model.

Table 7: Estimation results of defence spending as a ratio of the total public budget

	'Most corrupt' sub-sample				'Less corrupt' sub-sample			
	PM	PM	PM	PM	PM	PM	PM	PM
Cor	-0.016 (0.434)			-0.082* (-1.665)	0.012 (0.352)			0.063* (1.891)
Pol		-0.026 (-0.943)		-0.049 (-1.497)		0.011 (0.478)		0.035 (1.602)
Acc			-0.005 (-0.239)	-0.011 (-0.345)			-0.073*** (-4.060)	-0.086*** (-4.936)
Ldefn	0.581*** (10.175)	0.554*** (9.401)	0.571*** (9.983)	0.559*** (9.422)	0.043 (0.764)	0.022 (0.406)	0.046 (0.921)	0.037 (0.048)
Lgov	-0.622*** (4.497)	-675*** (-4.829)	-0.638*** (-4.804)	-0.703*** (-4.694)	-0.138 (-0.924)	-0.093 (-0.683)	-0.260** (-2.085)	-0.160 (-0.768)
Ldebt	0.041 (1.511)	0.041 (1.477)	0.044 (1.569)	0.024 (0.799)	0.055*** (4.093)	0.052*** (3.883)	0.052*** (4.635)	0.043*** (3.309)
Lmp	0.468*** (14.053)	0.422*** (6.954)	0.470*** (13.661)	0.375*** (5.575)	0.438*** (11.021)	0.452*** (11.125)	0.381*** (9.526)	0.382*** (9.619)
Lypc	-0.740*** (-11.118)	-0.717*** (-9.684)	-0.740*** (-11.146)	-0.691*** (-8.917)	-0.070* (-1.693)	-0.069*** (-2.071)	0.048 (1.230)	-0.014 (-0.318)
IMF	-0.432*** (-3.660)	-0.457*** (-3.987)	-0.432*** (-3.865)	-0.518*** (-4.356)	-0.460*** (-3.475)	-0.461*** (-3.506)	-0.524*** (-4.113)	-0.497*** (-3.925)
IMF*Lgov	0.702*** (3.692)	0.759*** (3.986)	0.711*** (3.882)	0.840*** (4.261)	1.037*** (4.733)	1.043*** (4.932)	1.196*** (5.852)	1.169*** (5.608)
Lurb	0.164*** (9.451)	0.140*** (4.445)	0.164*** (9.413)	0.122*** (3.303)	-0.000 (-0.007)	0.001 (0.026)	-0.013 (-0.858)	0.007 (0.443)
C	1.376*** (9.541)	1.508*** (6.255)	1.376*** (6.735)	1.649*** (6.070)	0.945*** (6.070)	0.934*** (6.195)	0.747*** (4.830)	0.751*** (4.766)
R^2	0.96	0.97	0.97	0.96	0.99	0.99	0.99	0.99
Adj. R^2	0.95	0.96	0.96	0.95	0.98	0.99	0.99	0.99
N	14	14	14	14	14	14	14	14
T	10	10	10	10	10	10	10	10
Diagnostic tests								
F stat	0.124	0.132	0.235	0.465	0.456	0.587	0.656	0.565
Hausman	18.04 [0.0347]	21.89 [0.0092]	11.93 [0.3176]	93.79 [<0.0001]	2.47 [0.8364]	9.74 [0.3718]	39.86 [<0.0001]	37.60 [<0.0001]

*** Significant at 1%; ** significant at 5%; and * significant at 10%; t-statistics in bracket. PM is the pooled model and FEM is the fixed effects model.

Table 8: Estimation results of defence spending as a ratio of GDP

	'Most corrupt' sub-sample				'Less corrupt' sub-sample			
	FEM	FEM	FEM	FEM	PM	PM	PM	PM
Cor	-0.117* (-1.672)			-0.254*** (-2.780)	-0.146** (1.976)			-0.217*** (2.864)
Pol		-0.195*** (-4.476)		-0.322*** (-6.613)		0.014 (0.345)		0.026 (0.614)
Acc			0.120* (1.657)	0.261** (3.282)			-0.072 (-1.448)	-0.140*** (-3.022)
Ldefn	0.285*** (3.031)	0.221** (2.427)	0.264*** (2.834)	0.234** (2.515)	-0.068 (-0.899)	-0.014 (-0.187)	-0.095 (-1.263)	0.135* (1.691)
Lgov								
Ldebt	1.020*** (5.541)	1.168*** (6.572)	1.060*** (5.840)	1.306*** (6.941)	0.191*** (5.658)	0.173*** (5.389)	0.142*** (4.264)	0.141*** (3.680)
Lmp	0.844*** (6.141)	0.623*** (4.399)	0.876*** (6.281)	0.523*** (3.498)	0.643*** (10.593)	0.604*** (10.567)	0.565*** (7.356)	0.513*** (6.771)
Lypc	-0.418* (-1.802)	-0.423* (-1.858)	-0.422* (-1.820)	-0.255 (-1.018)	-0.072 (-0.991)	0.011 (0.156)	0.036 (0.499)	-0.056 (-0.756)
IMF	-0.062 (-1.375)	-0.062 (-1.431)	-0.084* (-1.794)	-0.101** (-2.684)	0.072 (0.919)	0.044 (0.533)	0.054 (0.712)	0.073 (0.866)
IMF*Lgov								
Lurb	0.373*** (3.033)	0.238* (1.917)	0.359*** (2.926)	0.247* (1.706)	-0.145*** (-3.941)	-0.149*** (-3.071)	-0.130*** (-3.463)	-0.088* (-1.822)
C					1.084*** (4.068)	0.893*** (3.192)	0.780*** (2.926)	0.801*** (2.741)
R^2	0.23	0.30	0.24	0.38	0.78	0.78	0.80	0.80
Adj. R^2	0.21	0.25	0.20	0.34	0.76	0.77	0.79	0.78
N	14	14	14	14	14	14	14	14
T	10	10	10	10	10	10	10	10
Diagnostic tests								
F stat	24.978	27.867	29.987	30.745	32.263	29.488	30.857	31.985
Hausman test	102.57 [<0.0001]	102.98 [<0.0001]	103.53 [<0.0001]	97.86 [<0.0001]	47.76 [<0.0001]	46.99 [<0.0001]	61.94 [<0.0001]	65.30 [<0.0001]

*** Significant at 1%; ** significant at 5%; and * significant at 10%; t-statistics in bracket. PM is the pooled model and FEM is the fixed effects model.

The estimated coefficients of the political stability index are also found to be negative and significant at the conventional levels of testing in all the estimations for the full sample. This result suggests that as a country becomes more politically stable, it tends to allocate a smaller part of its budget to defence. This is plausible because political instability in a country requires the involvement of the military to restore stability. These results are consistent with Kimenyi and Mbaku (1995), who find that as a country becomes more politically instable, the ruling elite tend to favour military expenditure in order to provide and guarantee security. These results, therefore, suggest that as a country becomes politically stable it shifts resources away from defence to other productive sectors of the economy and so the country enjoys the fruits of peace.

In the sub-sample estimations, the coefficients of political stability in those estimations where the dependent variable is expressed as a share of the total public budget are found to be negative and insignificant among the most corrupt countries, and positive and insignificant amongst the less corrupt countries. In those estimations where the dependent variable is expressed as a share of the GDP, the coefficients are negative and significant at the conventional levels in the 'most corrupt' sub-sample but positive and insignificant in the 'less corrupt' sub-sample.

Surprisingly, in this study it is found that as a country becomes more accountable and receptive to the voice of its people, it tends to spend more on defence. One explanation for this phenomenon could be the fact that defence is a pure public good, therefore, for citizens to enjoy their freedom and human rights, they need more resources to be channelled into defence. The voice and accountability index coefficients are negative in all the estimations where the dependent variable is the share of the total budget, but significant in the 'less corrupt' sub-sample. However, the coefficients of the voice and accountability index are positive in the 'most corrupt' sub-sample for those cases where the dependent

variable is expressed as a share of the GDP, but negative and not unanimously statistically significant in the 'less corrupt' sub-sample.

The coefficients for defence spending of neighbouring countries are found to be positive and significant in most of the estimations. This suggests that the spending behaviour of a country with regard to defence is greatly influenced by the spending behaviour of its neighbouring countries. This is particularly the case for countries located in regions characterised by regional tensions, where the actions of neighbours are closely monitored. Also, during the period under review, many of the countries included in the sample were involved in reform programmes emphasising the importance of lower spending on defence. These results are consistent with Davoodi, *et al.* (1999), and Sanjeev, *et al.* (2001), which find that a country spends less on defence if its neighbours spend less. The coefficients of defence spending by neighbouring countries are largely positive and significant for the 'most corrupt' sub-sample. For the 'less corrupt' sub-sample all except one estimation produce results that are insignificant, which in most cases have unexpected signs.

The coefficients of the number of military personnel per 1000 people are positive and significant at the conventional levels in all the estimations. This suggests that as a country employs more military personnel, it tends to spend more on defence. This result is consistent with Sanjeev, *et al*. (2001), which finds that a country with a high density of military personnel will inevitably spend more of its budget on defence. In the sub-sample estimations, the coefficients obtained for the size of military personnel per 1000 people are positive and significant at the 1% level of testing. However, the coefficients obtained from the estimations where the dependent variable is expressed as a share of the GDP exceed those from estimations where the dependent variable is expressed as a share of the total public budget.

The size of government is found to be negative and significant at the conventional levels of testing, which suggests that as the size of a government increases relative to the GDP, its priorities shift away from defence spending. The coefficient of the size of government is found to be negative for all the sub-samples, but highly significant for the most corrupt countries while largely insignificant for the less corrupt countries. Further analysis reveals that the estimated coefficients are larger for the most corrupt countries compared to the less corrupt countries. This result fails to support Davoodi, *et al.* (2001), which finds that large governments are associated with higher levels of defence spending. However, Sanjeev*, et al*. (2001) reports mixed results in various estimations. The model of defence spending as a share of the total public budget used in that study yielded negative coefficients, which is consistent with our results.

The estimated coefficients of public debt in the estimation of defence spending as share of the total budget have mixed signs but in all cases are not significant. The estimations where the dependent variable is expressed as a share of the GDP show that public debt is positively related to defence. In the sub-samples, the estimations in which the dependent variable is expressed as a share of the public budget show that the coefficients of public debt are not significant among the most corrupt countries although positive.

Among the less corrupt countries, the estimated coefficients are found to be significant at the 1% level of testing and the magnitude of these coefficients are larger than those of the most corrupt countries. In the estimations where the dependent variable is expressed as a share of the GDP, the estimated coefficients of public debt are positive and significant at the 1% level. However, in these estimations, the magnitude of the coefficients is higher for the 'most corrupt' sub-sample compared to those obtained for the 'less corrupt' sub-sample. This result suggests that an increasing proportion of public debt is channelled to the defence budget. This is plausible in the African context where

many foreign countries provide aid to countries specifically meant to build capacity in the military with regard to training and procurement of equipment.

The estimated coefficients of the GDP per capita are consistently negative. They are significant in all the estimations where the dependent variable is the share of the public budget. In estimations where the dependent variable is the share of the GDP, the coefficients are significant at the 10% level in only one case. In the 'most corrupt' sub-sample the coefficients of the GDP per capita are negative and significant in all cases. However, in the 'less corrupt' sub-sample, the estimated coefficients have mixed signs, and some are not significant at the conventional levels of testing. These results, therefore, suggest that as the level of income increases, defence spending is not favoured. These results are largely in agreement with those of Sanjeev, *et al.* (2001). However they conflict the results of Davoodi, *et al.* (2001), which reports that income per capita is positively related to defence spending. Our results are plausible in the African context because as a country becomes more developed it tends to allocate more resources to those sectors that offer more direct economic benefits to its citizens.

The IMF dummy is found to be negative and significant in most of the estimations, which suggests that during a period in which a country has implemented IMF programmes it tends to allocate a lesser part of its budget to defence. For the 'most corrupt' sub-sample, the coefficients of the IMF dummy are negative and significant at the conventional levels of testing. However, for those cases in the 'less corrupt' sub-sample where the dependent variable is the share of the total public budget, the estimated coefficients are negative and significant at the conventional levels of testing. The coefficients are positive and not significant in those cases where the dependent variable is the share of the GDP.

The interaction term is found to be positive as expected and significant at the 1% level in all the estimations for the full sample. However, a look at the estimated

coefficients shows that they are smaller than unity, which implies that defence spending remains largely resilient among the countries investigated. The interaction term is positive and significant at the conventional levels of testing in all the cases in the sub-sample estimations. All the coefficients for the 'most corrupt' sub-sample are less than unity while those for the 'less corrupt' sub-sample are greater than unity. This suggests that defence spending is resilient among the most corrupt countries while not resilient among the less corrupt countries.

The coefficients for urbanisation are positive and largely significant. However, these findings are in conflict with those of Sanjeev, *et al*. (2001), which reports the urbanisation rate as negative. The coefficients of urbanisation however yield different signs in different estimations. They are positive and significant in cases where the dependent variable is the share of the total public budget and of the GDP for the 'most corrupt' sub-sample. For the 'less corrupt' sub-sample the coefficients are negative and insignificant in cases where the dependent variable is the share of the public budget, but negative and significant in cases where the dependent variable is the share of the GDP, at the conventional levels of testing. This gives credence to the findings of Sanjeev, *et al.* (2001), namely that a negative relationship exists between the urbanisation rate and defence spending.

5.4 Summary

The following observations can be made from the above discussion. The role of corruption in the allocation of public budget funds to defence cannot be conclusively stated. However, countries that are politically unstable tend to allocate a larger part of their budgets to defence spending. The voice and accountability variable has a negative impact on allocation to defence, with countries with a high level of accountability allocating smaller proportions of their budgets to defence and vice versa. The decisions of neighbouring countries as to spending on defence positively affect a country's budget allocation to defence.

The same is true for number of military personnel, which is found to be positively correlated with defence spending.

The role of public debt in the allocation of public budget to defence can also not be clearly stated, as most estimation results have negative and insignificant coefficients. In the case of the most corrupt countries, the estimated coefficients of public debt are positive and statistically insignificant. However, among the less corrupt countries, the estimated coefficients of public debt are also positive and significant at 1% level of testing. The coefficient of the level of development, which is proxied by the level of income per capita, is negative and significant at the conventional levels of testing in most of the estimations. It has also been established that the estimated coefficients of income per capita are consistently negative in all the estimations in the sub-samples. In the most corrupt countries, the estimated coefficients are negative and significant at 1% level of testing. In less corrupt countries, the estimated coefficients of income per capita are significant at the conventional levels.

The IMF dummy is found to be negative and significant at 1% level of testing in the estimations of defence spending as a share of the total public budget. This may imply that, irrespective of a country's corruption status, IMF programmes tend to shift resources away from defence.

CHAPTER SIX: EDUCATION SPENDING

6.1 Introduction

This chapter analyses the determinants of public budget allocation to education. The chapter is divided into three sections. Section 6.2 presents a preliminary analysis of the relationship between education spending and various governance indices, Section 6.3 explains the estimation results and Section 6.4 reports the main findings.

6.2 The relationship between education spending and governance

Figure 22 shows the relationship between a corruption control index and education spending as a ratio of the total public budget. From the figure it appears that, of the most corrupt countries, Kenya and Sierra Leone devote a larger share of their public budgets to education while Nigeria, Gambia and Angola allocate the least.

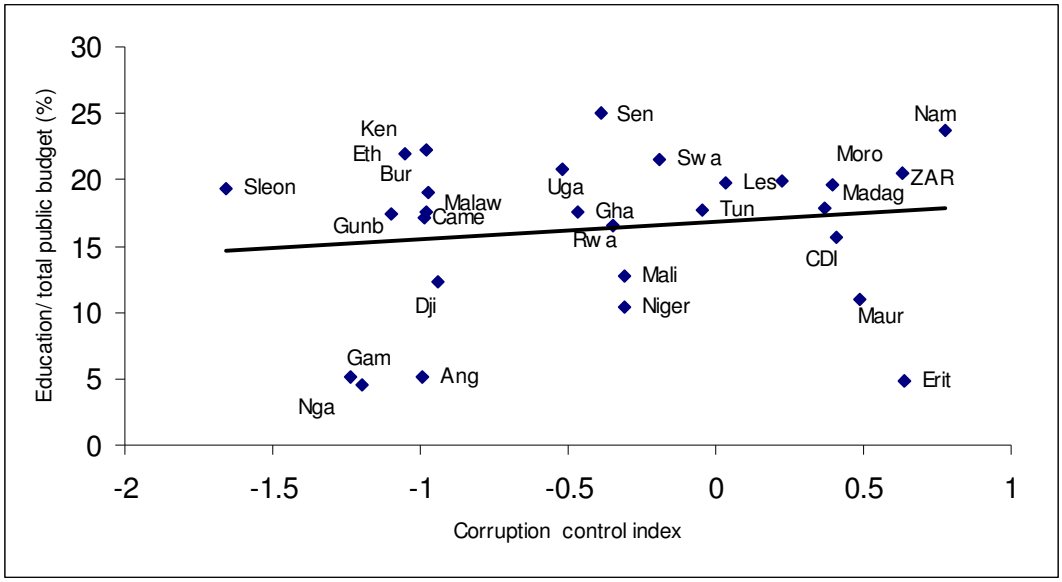


Figure 22: Corruption control index and education spending as a ratio of the total budget

Among the less corrupt countries, Namibia, South Africa, Madagascar and Morocco devote the largest shares of their public budget to education while Mauritius and Eritrea allocate the least. Generally, there appears to be a weak positive relationship between the corruption control index and education spending, which suggests that countries that are less corrupt tend to allocate a larger share of their budgets to education.

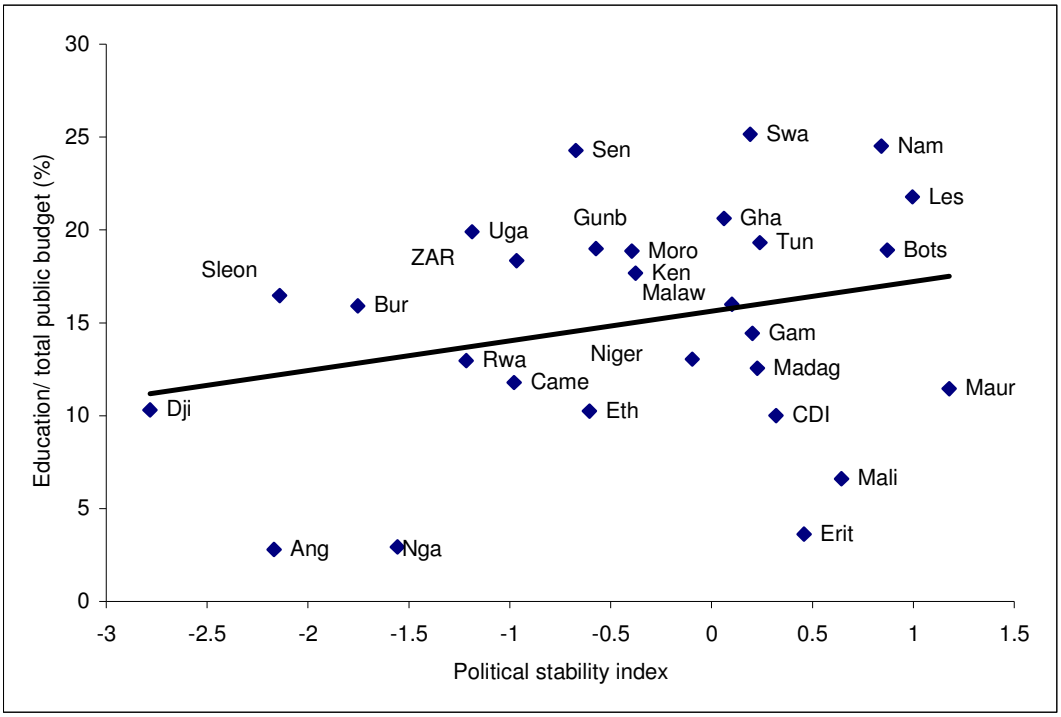


Figure 23: Political stability index and education spending as a ratio of the total budget

Figure 23 shows the relationship between the political stability index and education spending as a ratio of the total public budget. From the figure it appears that of the most politically unstable countries, Angola, Nigeria and Djibouti devote the smallest shares of their budgets to education, with Sierra Leone and Burundi allocating larger budgets. On the other hand, among the more stable countries, Swaziland, Namibia, Lesotho and Botswana allocate the largest shares of their budgets to education while Mauritius, Mali and Eritrea

allocate the smallest shares. Generally, there is a positive relationship between the political stability index and education spending, which suggests that as a country becomes more politically stable it spends more on education. This may be because politicians lose their appetite for human capital formation if threatened by political instability.

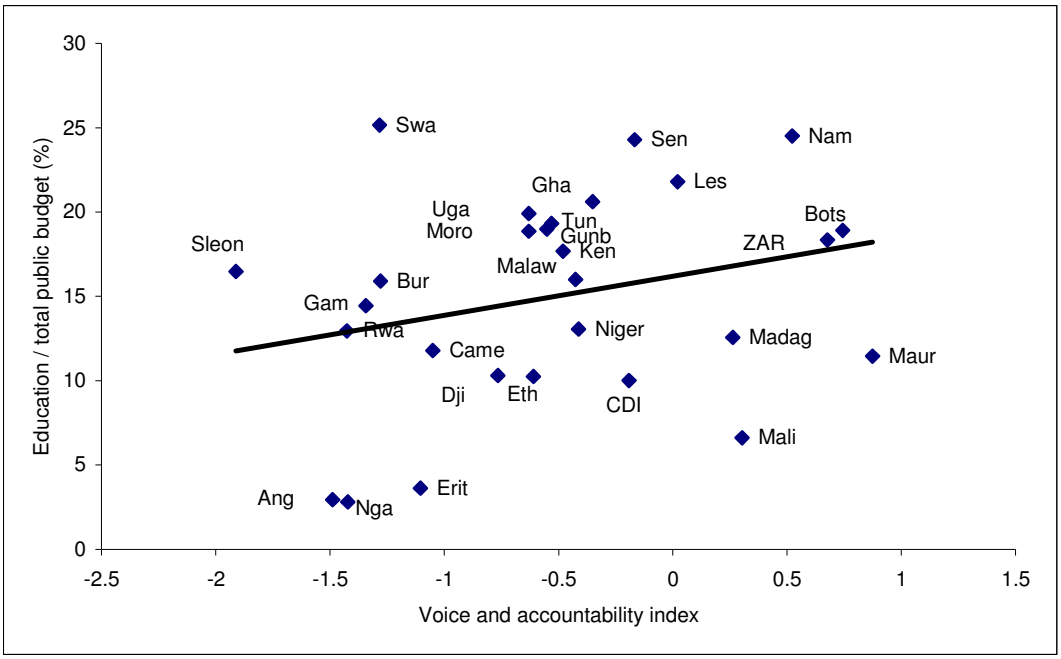


Figure 24: Voice and accountability index and education spending as a ratio of the total budget

Figure 24 shows the relationship between the voice and accountability index and education spending. From the figure it is evident that countries that rank poorly in terms of voice and accountability allocate a smaller share of their budgets to education; Angola, Nigeria and Eritrea have the smallest allocations, while Sierra Leone, Swaziland and Gambia allocate larger shares of their budgets to education. On the other hand, among countries that rank highly in terms of voice and accountability, Namibia, Senegal and Lesotho allocate the largest shares of their budgets to education while Mali and Mauritius allocate the least. It is also evident from the scatter plot that on average a positive relationship exists between the voice and accountability index and education spending, which

suggests that countries that allow people to express themselves freely and are transparent and accountable allocate larger shares of their budgets to education.

Considering these results, the sample can be divided into two, namely the 'most corrupt' sub-sample and the 'less corrupt' sub-sample. The resulting plots are presented in Figures 25-28.

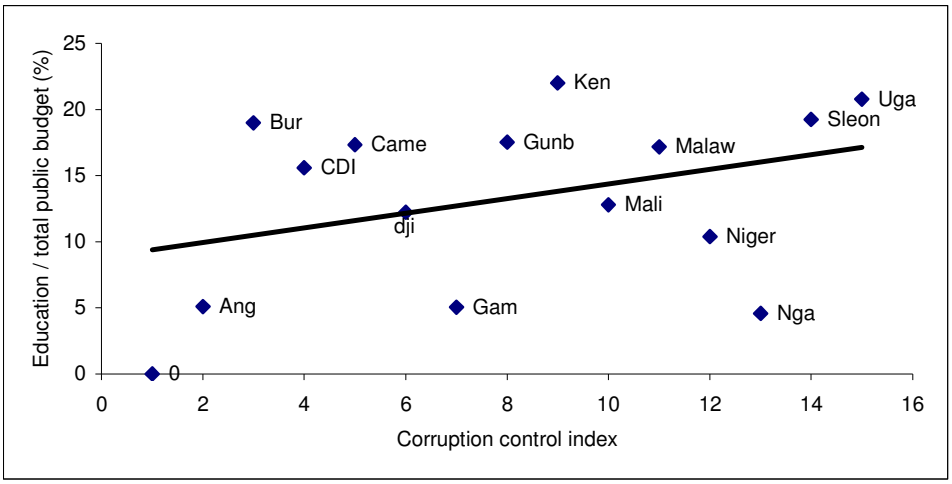


Figure 25: Corruption control index and education spending as a ratio of the total budget: 'most corrupt' sub-sample

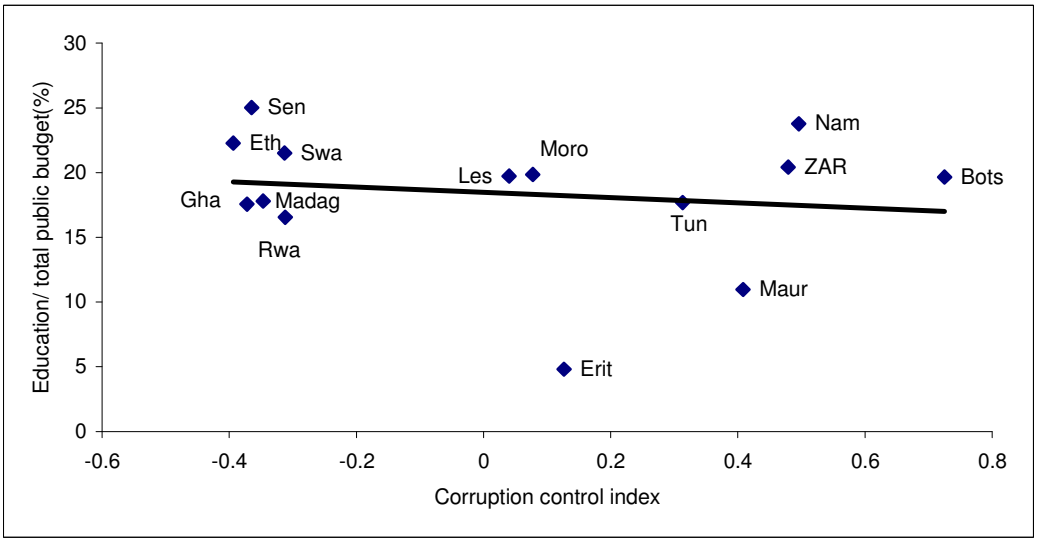


Figure 26: Corruption control index and education spending as a ratio of the total budget: ' most corrupt' sub-sample

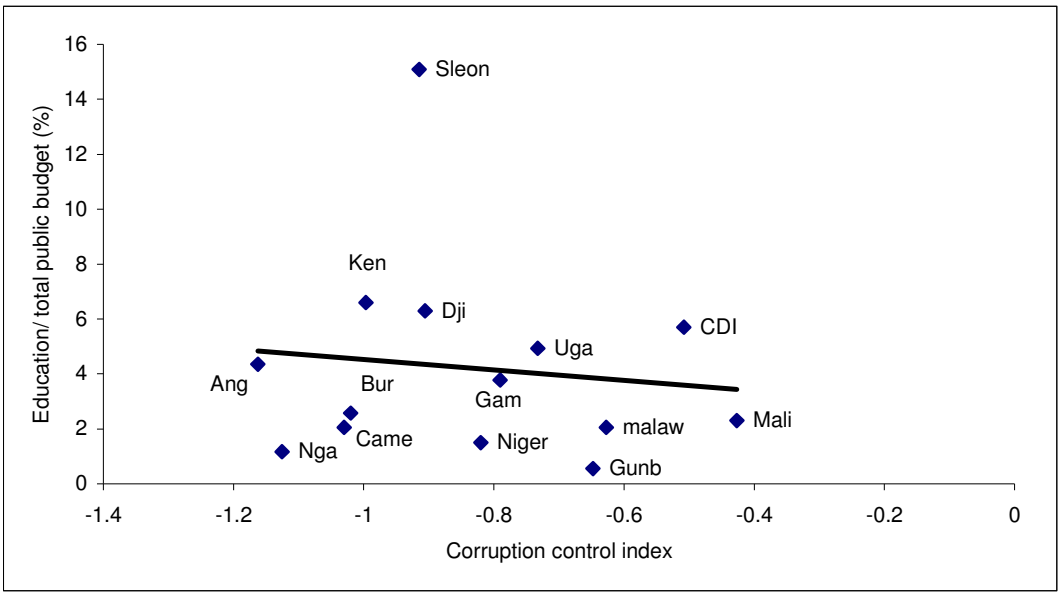


Figure 27: Corruption control index and education spending as a ratio of the total budget: 'less corrupt' sub-sample

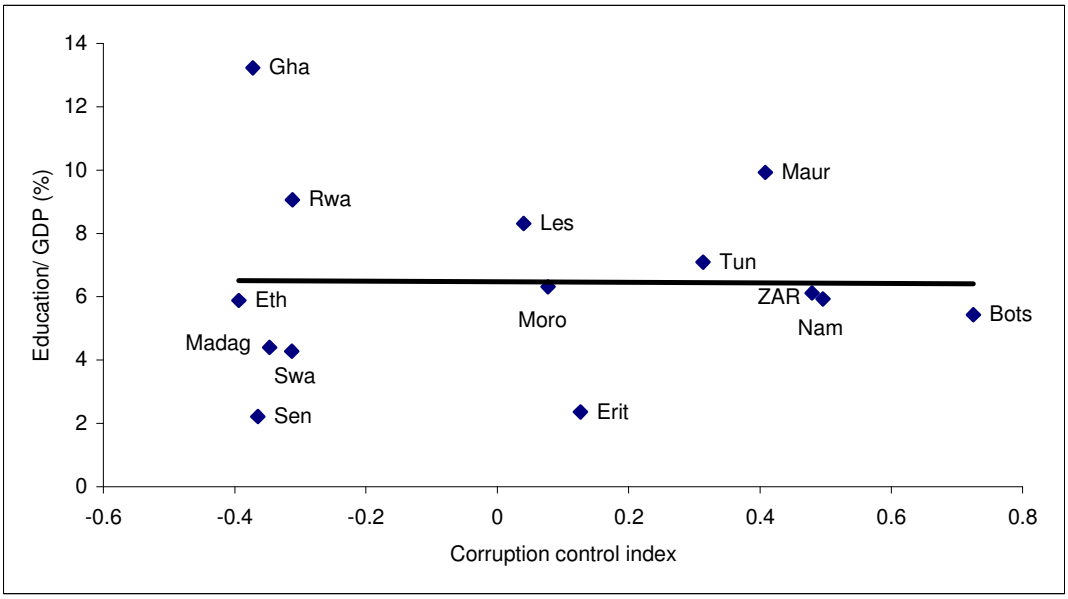


Figure 28: Corruption control index and education spending as a ratio of the GDP: 'less corrupt' sub-sample

From Figures 25-28 the following observations can be drawn. Firstly, among the most corrupt countries, the corruption control index is positively correlated to education spending as a share of the total public budget, which suggests that the less corrupt countries tend to allocate larger shares of their budgets to education.

Confirming this, the relationship between education spending as a share of the GDP and the corruption index is found to be negative, though weak. Secondly, among the less corrupt countries, there appears to be a negative but weak relationship between the corruption control index and education spending.

6.3 Estimation results of education spending

This section analyses estimation results on education spending as a share of the total public budget and as a share of the GDP. The models are first estimated with each of the governance indices individually, before using them jointly. This makes controlling for the importance of each of the governance indicators possible.

Tables 9-11 show the estimation results of the share of education spending in the total public budget and the GDP. The shares that education spending makes up in total public spending and in the GDP are estimated and the results reveal that the estimated coefficients of the corruption control index are unambiguously positive across all estimations in the full sample. This result is found to be significant at the conventional levels of testing.

However, in the estimations where the dependent variable is a share of the total budget, the estimated coefficients are positive and insignificant for the most corrupt countries, and negative and significant for the least corrupt countries. In contrast, in the estimations where the dependent variable is expressed as a share of the GDP, the estimated coefficients are negative and insignificant for the most corrupt countries, and positive and significant for the least corrupt countries. This result suggests that high levels of corruption are associated with low education spending. This result is consistent with Mauro (1998), who suggests that corruption constrains expenditure on education because in most instances the education budget is used for salaries and wages, and is therefore difficult to manipulate for private gain.

The results of our study overall suggest that among the sub-sample estimations, the consequence of corruption in education on overall government expenditure is either insignificant or indeterminate.

Table 9: Estimation results of education spending: full sample

	Dependent variable expressed as a share of public budget				Dependent variable expressed as a share of the GDP			
	PM	PM	PM	PM	FEM	FEM	FEM	FEM
Cor	0.067*** (3.198)			0.086*** (3.137)	0.013** (2.353)			0.044* (1.676)
Pol		-0.002 (-2.03)		-0.011 (-0.767)		-0.100*** (-3.774)		-0.149*** (-5.097)
Acc			0.001 (0.0483)	-0.028 (-1.507)			0.060* (1.677)	0.140*** (3.198)
Lden	-0.034** (-2.387)	-0.038** (-2.437)	-0.034* (-1.901)	-0.041** (-2.366)	0.588*** (5.179)	0.569*** (4.963)	0.607*** (5.283)	0.592*** (5.221)
Ldebt	0.014* (1.809)	0.012 (1.176)	0.011 (1.307)	0.008 (0.686)	0.063 (0.953)	0.044 (0.682)	0.056 (0.839)	0.008 (0.125)
Lgov	0.457*** (5.569)	0.467*** (5.688)	0.427*** (5.685)	0.498*** (5.072)				
Lpop14	0.100*** (2.660)	0.134*** (3.310)	0.140*** (3.478)	0.086** (2.111)	0.209** (2.078)	0.234** (2.378)	0.203** (2.016)	0.217** (2.245)
Lypc	0.065* (1.895)	0.159*** (5.876)	0.159*** (4.930)	0.086*** (2.620)	0.223* (1.730)	0.272** (2.107)	0.203 (1.558)	0.228* (1.785)
IMF	0.266*** (3.176)	0.347*** (3.952)	0.304*** (3.442)	0.374*** (3.927)	0.004 (0.154)	0.007 (0.245)	0.002 (0.081)	0.024 (0.882)
IMF*Lgov	-0.423*** (-3.033)	-0.536*** (-3.669)	-0.459*** (-3.168)	-0.558*** (-3.640)				
Lurb	-0.078** (-2.337)	-0.120*** (-3.396)	-0.126*** (-3.599)	-0.071** (-1.987)	0.696*** (5.981)	0.697*** (6.030)	0.692*** (5.899)	0.662*** (5.796)
C	0.724*** (5.479)	0.484*** (3.963)	0.491*** (3.359)	0.640*** (3.795)				
R^2	0.99	0.99	0.99	0.99	0.18	0.21	0.18	0.24
Adj. R^2	0.99	0.98	0.99	0.98	0.15	0.20	16	0.21
N	28	28	28	28	28	28	28	28
T	10	10	10	10	10	10	10	10
Diagnostic tests								
F test	2.596	2.780	2.607	2.978	14.898	12.475	14.876	16.876
Hausman test	12.85 [0.1693]	13.09 [0.1585]	11.37 [0.2513]	11.65 [0.3906]	128.11 [<0.0001]	224.21 [<0.0001]	161.91 [<0.0001]	249.95 [<0.0001]

*** Significant at 1%; ** significant at 5%; and * significant at 10%; t-statistics in bracket. PM is the pooled model and FEM is the fixed effects model.

Table 10: Estimation results of education spending as a ratio of the total public budget

	'Most corrupt' sub-sample				'Less corrupt' sub-sample			
	PM	PM	PM	PM	PM	PM	PM	PM
Cor	0.008 (0.164)			0.008 (0.123)	-0.067*** (-2.939)			-0.062*** (-3.031)
Pol		-0.056*** (-2.746)		-0.115*** (-3.299)		-0.054*** (-2.968)		-0.046*** (-2.967)
Acc			0.017 (0.485)	0.127** (1.993)			-0.088*** (-7.382)	-0.063*** (-5.161)
Lden	0.159*** (4.108)	0.085** (2.032)	0.179*** (3.507)	0.169*** (3.068)	-0.122*** (-7.639)	-0.137*** (-8.519)	-0.169*** (-11.553)	-0.171*** (-12.350)
Ldebt	0.068** (1.995)	0.078*** (2.671)	0.072** (2.209)	0.137*** (3.495)	-0.014* (-1.804)	-0.002 (-0.201)	-0.006 (-0.899)	0.001 (0.118)
Lgov	0.478*** (2.858)	0.558*** (3.409)	0.462*** (2.747)	0.401** (2.322)	0.636*** (5.499)	0.725*** (6.180)	0.881*** (8.109)	0.750*** (6.782)
Lpop14	-0.001 (-0.016)	0.083 (1.194)	-0.020 (-0.224)	-0.002 (-0.025)	-0.012 (-0.318)	-0.085** (-2.089)	-0.007 (-0.197)	-0.051 (-1.339)
Lypc	-0.005 (-0.068)	-0.039 (-0.683)	-0.006 (-0.084)	-0.102 (-1.434)	0.056 (1.356)	0.007 (0.183)	0.112*** (2.873)	0.129*** (3.006)
IMF	0.321** (2.099)	0.508*** (3.511)	0.298** (1.939)	0.315* (1.871)	0.198* (1.651)	0.370*** (3.011)	0.442*** (3.762)	0.446*** (3.737)
IMF*Lgov	-0.441* (-1.766)	-0.696*** (-3.075)	-0.408* (-1.665)	-0.417* (-1.614)	-0.303* (1.642)	-0.631*** (-2.896)	-0.633*** (-3.204)	-0.687*** (-3.364)
Lurb	-0.111 (-1.261)	-0.162** (-2.245)	-0.094 (-1.066)	-0.131 (-1.522)	0.045 (1.463)	0.081*** (2.668)	0.038 (1.316)	0.053* (1.873)
C	1.206*** (3.683)	1.036*** (3.682)	1.204*** (3.750)	1.464*** (4.793)	0.757*** (4.317)	1.113*** (6.020)	0.503*** (2.936)	0.723*** (3.897)
R^2	0.93	0.96	0.94	0.94	0.99	0.99	0.99	0.99
Adj. R^2	0.92	0.95	0.93	0.93	0.99	0.98	0.99	0.99
N	14	14	14	14	14	14	14	14
T	10	10	10	10	10	10	10	10
Diagnostic tests								
F test	0.29876	0.56744	0.46585	0.7095789	2.78967	2.48576	3.09689	3.176578
Hausman test	9.96 [0.3539]	9.51 [0.3914]	14.55 [0.0684]	17.49 [0.0943]	8.50 [0.4850]	1.33 [0.9882]	9.98 [0.3521]	6.06 [0.8690]

*** Significant at 1%; ** significant at 5%; and * significant at 10%; t-statistics in bracket. PM is the pooled model.

Table 11: Estimation results of education spending as a ratio of the GDP

	'Most corrupt' sub-sample				'Less corrupt' sub-sample			
	PM	PM	PM	PM	PM	PM	PM	PM
Cor	-0.082 (--1.141)			-0.084 (-1.190)	0.118** (2.561)			0.110** (2.150)
Pol		-0.234*** (-9.263)		-0.222*** (-6.828)		0.135*** (3.696)		0.151*** (3.851)
Acc			-0.079 (-1.356)	0.049 (0.771)			0.032 (1.333)	-0.034 (-1.508)
Lden	0.187*** (4.376)	0.071 (1.475)	0.159*** (2.656)	0.107* (1.820)	0.171*** (6.525)	0.173*** (5.704)	0.165*** (5.685)	0.190*** (6.328)
Ldebt	-0.079 (-1.039)	0.489*** (4.372)	-0.070 (-0.871)	0.492*** (4.462)	-0.030 (-1.046)	-0.044 (-1.395)	-0.037 (-1.274)	-0.052* (-1.639)
Lpop14	0.269* (1.762)	0.017 (0.119)	0.383** (2.373)	0.039 (0.269)	0.139* (1.746)	0.378*** (5.429)	0.219** (2.534)	0.419*** (4.073)
Lypc	0.497*** (3.019)	0.346** (2.536)	0.298* (0.201)	0.423*** (2.821)	0.243*** (3.860)	0.299*** (5.429)	0.303*** (4.801)	0.299*** (4.515)
IMF	0.006 (0.137)	-0.037 (-1.087)	0.010 (0.201)	-0.049 (-1.244)	0.199*** (3.785)	0.247*** (4.575)	0.188*** (3.520)	0.290*** (4.983)
Lurb	0.303* (1.732)	-0.074 (-0.417)	0.435** (2.334)	-0.097 (-0.539)	-0.066 (-0.956)	-0.215*** (-2.743)	-0.128* (-1.709)	-0.239*** (-3.111)
C	-1.146** (-2.363)	-1.233*** (-3.727)	-0.704* (-1.657)	-1.500*** (-3.747)	-0.740** (-2.401)	-1.488*** (-4.356)	-1.007*** (-3.283)	-1.651*** (-4.196)
R^2	0.71	0.88	0.66	0.89	0.94	0.89	0.89	0.87
Adj. R^2	0.69	0.87	0.64	88	0.94	0.88	0.88	0.86
N	14	14	14	14	14	14	14	14
T	10	10	10	10	10	10	10	10
Diagnostic tests								
F test	2.48565	2.57846	2.7645	3.15738	0.13252	0.14567	0.57464	0.4987
Hausman test	42.22 [<0.0001]	11.33 [0.0788]	41.43 [<0.0001]	13.08 [0.0227]	86.88 [<0.0001]	101.07 [<0.0001]	86.22 [<0.0001]	110.60 [<0.0001]

*** Significant at 1%; ** significant at 5%; and * significant at 10%; t-statistics in bracket. PM is the pooled model.

The political stability index is unambiguously negative and significant in most of the full sample estimations. The estimations for the sub-samples yield coefficients with mixed signs. If the dependent variable is seen as the share of the total public budget, the coefficients are negative and significant in all sub-samples. However, when the dependent variable is a share of the GDP the results are mixed, with the 'most corrupt' sub-sample showing negative and significant coefficients and the 'less corrupt' sub-sample yielding positive and significant coefficients. This result suggests that as a country becomes more politically stable, less of its public budget is devoted to education. This may be because in politically unstable countries the government is the sole provider of education since political instability discourages private investment in education,

while as a country becomes more stable, private investment in education increases which may encourage governments to cut their allocation.

The voice and accountability index produces mixed signs in the estimations. In those estimations where the dependent variable is the share of the total public budget, the voice and accountability index has mixed signs and is not significant at the conventional levels of testing. Similarly, in the estimations where the dependent variable is the share of the GDP, the coefficients have mixed signs and are insignificant in all estimations for the sub-sample. The positive and significant coefficient shows that a high level of voice and accountability is positively related to education spending. This is because as a country becomes more open and transparent, particularly with regard to its fiscal policy, the budget allocation priorities reflect socio-priorities such as education more and more closely.

The estimated coefficients for the size of the government are found positive and significant at the 1% level of testing in all the estimations in both the full sample and the sub-samples. This may suggest that if a country maintains a large public sector relative to the GDP, it tends to allocate a larger portion of its budget to education; increasing demand for education prompts governments to employ more educational staff and increase investment in educational structures such as schools. Significantly, however, the estimated coefficients are higher among less corrupt countries than both the 'most corrupt' sub-sample and the full sample. This may suggest that in less corrupt countries education spending is more responsive to changes in the size of government than in more corrupt countries.

In the full sample estimations, the coefficients of public debt are largely insignificant in all the estimations. The same is true for the 'less corrupt' sub-sample, where the estimated coefficients have mixed signs and are largely insignificant at the conventional levels of testing. In contrast, in the 'most corrupt' sub-sample public debt has the expected positive sign and is statistically

significant in most cases. Those estimations with negative coefficients are found to be insignificant. These results, therefore, suggest that in less corrupt countries no significant public debt resources are channelled to education while there is strong evidence to the contrary among the most corrupt countries.

Estimation coefficients for population density consistently have negative or positive signs in the full sample estimation, depending on whether the dependent variable is the share of the total public budget or of the GDP. In those cases where the dependent variable is the share of the total public budget, the estimated coefficients are negative and significant at the conventional levels. Similar results are reported in the 'less corrupt' sub-sample. However, in those cases where the dependent variable is the share of the GDP, the estimated coefficients are found to be positive and significant at the conventional levels of testing with the same results being replicated in all the sub-samples.

As expected, the proportion of the population that is under 14 years old is positively related to education spending in all estimations for the full sample. However, in those cases where the dependent variable is the share of the total public budget, the estimation coefficient is negative and insignificant in all the sub-samples. However, for the sub-samples the estimated coefficients where the dependent variable is the share of the GDP are positive and significant at the conventional levels of testing. The positive signs imply that as the proportion of the population within the 0-14 age group increases, so does the demand for education.

In the full sample, the estimated coefficients of the GDP per capita are positive and significant in all the estimations except one. However, for the sub-samples, when the dependent variable is the share of the budget the estimated coefficients have unexpected negative signs for the 'most corrupt' sub-sample. The coefficients are significant in almost half of the estimations for the least corrupt countries. In contrast, when the dependent variable is the share of the GDP, all

the coefficients of the GDP per capita have the expected positive sign. This suggests that as a country develops it tends to increase its spending on education.

The role of IMF programmes in tilting budgets towards spending on education is also established in the full sample estimations, where all the estimated coefficients are positive. However, in those cases where the dependent variable is the share of the GDP the estimated coefficients are insignificant, while in those cases where the dependent variable is the share of the total budget they are highly significant. Further analysis reveals that in all cases where the dependent variable is the share of total budget, the IMF dummy is positive and significant in the 'most corrupt' sub-sample, and where the dependent variable is the share of the GDP the IMF dummy is negative and insignificant. The coefficients are significant and positive for all estimations for the 'less corrupt' sub-sample. These results, therefore, suggest that the IMF programmes play a prominent role in the allocation of public resources to the educational sector, particularly among less corrupt countries.

Estimated coefficients of the IMF interaction variable are negative and significant in the full sample, with the coefficients less than unity for all the estimations. This implies that in the full sample education spending is resilient. When the sample is divided into the 'most corrupt' and 'less corrupt' sub-samples, no significant differences emerge. In all the sub-samples the estimated coefficients are negative as expected and the coefficients are less than unity, which is consistent with the full sample results. However, it is worth noting that although education spending appears resilient, the 'less corrupt' sub-sample portrays relatively higher estimated elasticities in all cases, which implies that education spending is relatively less resilient in less corrupt countries.

6.4 Summary

In general, the coefficients of the corruption control index are positive and significant in all the estimations for the full sample, which suggests that countries that are corrupt tend to spend a lower proportion of their budgets on education. The coefficient for the political stability index is negative and significant in most of the estimations in the full sample. Similar results are obtained for the sub-samples, except in the 'less corrupt' sub-sample when the dependent variable is the share of the GDP, in which case the estimated coefficients are positive and sometimes significant. The role of voice and accountability is not very prominent in deciding the budget allocation in favour of education. The coefficients for size of government are positive and significant at the 1% level.

The demographic variables, including population density and proportion of the population between 0-14 years, play an important role in motivating budget allocations to education. Surprisingly, the coefficients of the public debt variable, in approximately all the estimations, are not significant at the conventional levels of testing, though the majority of the estimations show a slight positive relationship between public debt and education spending. The coefficient of income per capita is positive and significant in all the estimations.

Lastly, the IMF dummy is positive in all the estimations. These results suggest that countries that have implemented IMF programmes (adjusting countries) tend to allocate a larger portion of their budgets to education compared to those not involved in such programmes. The coefficient of the interaction term is negative and significant at the conventional levels of testing. The estimated coefficients are less than unity, which implies that the rate of increase of education spending as a share of the total public budget is lower than the decline in the total public budget-to–GDP ratio. Therefore, education spending is resilient in the adjusting countries. These results suggest that countries which have implemented IMF

programmes tend to have resilient education spending compared to those without such IMF programmes.

CHAPTER SEVEN: HEALTH SPENDING

7.1 Introduction

This chapter presents the estimations and analyses of the determinants of government spending on health. It is divided into three sections. Section 7.2 explores the relationships between the various governance indices and health spending, Section 7.3 presents the estimation results and Section 7.4 presents a summary of the major findings.

7.2 The relationship between health spending and governance

Figure 29 clearly shows that of the most corrupt countries, Nigeria, Cameroon and Burundi allocate smaller slices of their budgets to health. In contrast, Sierra Leone and the Gambia are ranked as corrupt but allocate larger shares of their budgets to health.

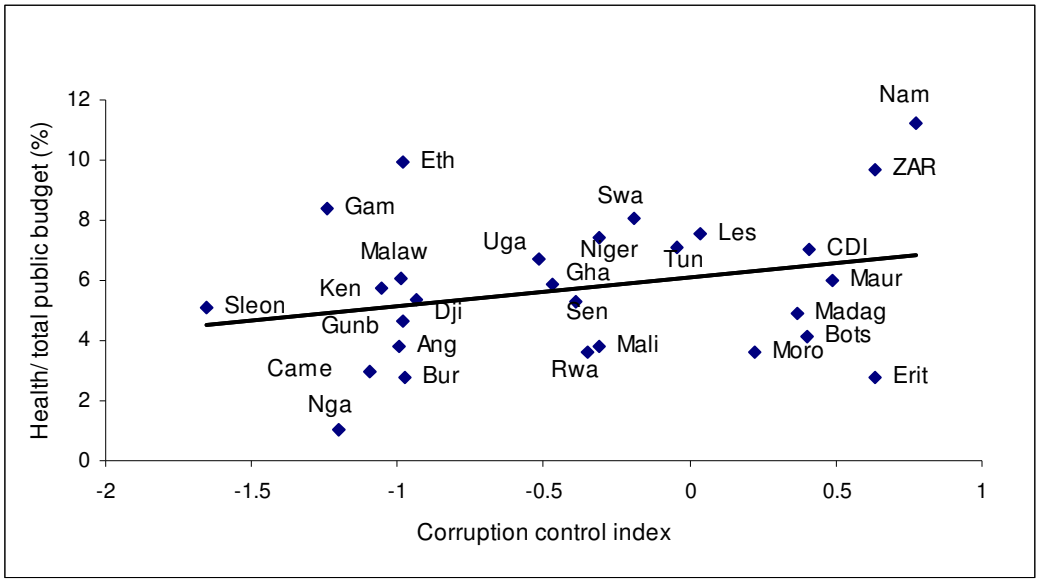


Figure 29: Corruption control index and health spending as a ratio of the total budget

Among the less corrupt countries, Namibia and South Africa allocate larger shares of their budgets to health than Morocco, Botswana and Madagascar, who allocate smaller shares of their budgets to health. On average, Ethiopia, Namibia and South Africa allocate more than 8% of their budgets to health, while Nigeria, Cameroon, Burundi and Eritrea allocate less than 3% of their budgets to health. A positive relationship is evident between the corruption control index and health spending, implying that countries that are less corrupt tend to allocate larger shares of their budgets to the health sector and vice versa.

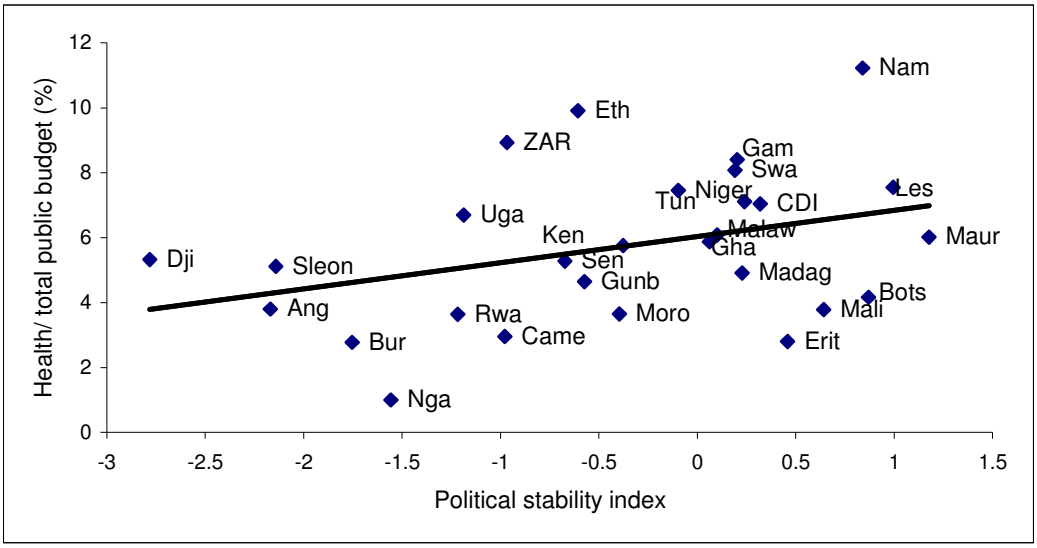


Figure 30: Political stability index and health spending as a ratio of the total budget

A positive relationship is found between health spending and the political stability index. This suggests that countries that are politically stable allocate larger shares of their budget to health compared to politically unstable countries. For example, Nigeria, Burundi and Angola are the most politically unstable countries, and spend less than 4% of their budgets on health. Exceptions are Djibouti and Sierra Leone, which allocate more than 4% of their budgets to health. Amongst the more politically stable countries, Namibia and Lesotho allocate more than 10% and 7%, respectively. Overall, Namibia is the best performer, while Nigeria is the worst performer in terms of share of budget allocated to the health sector.

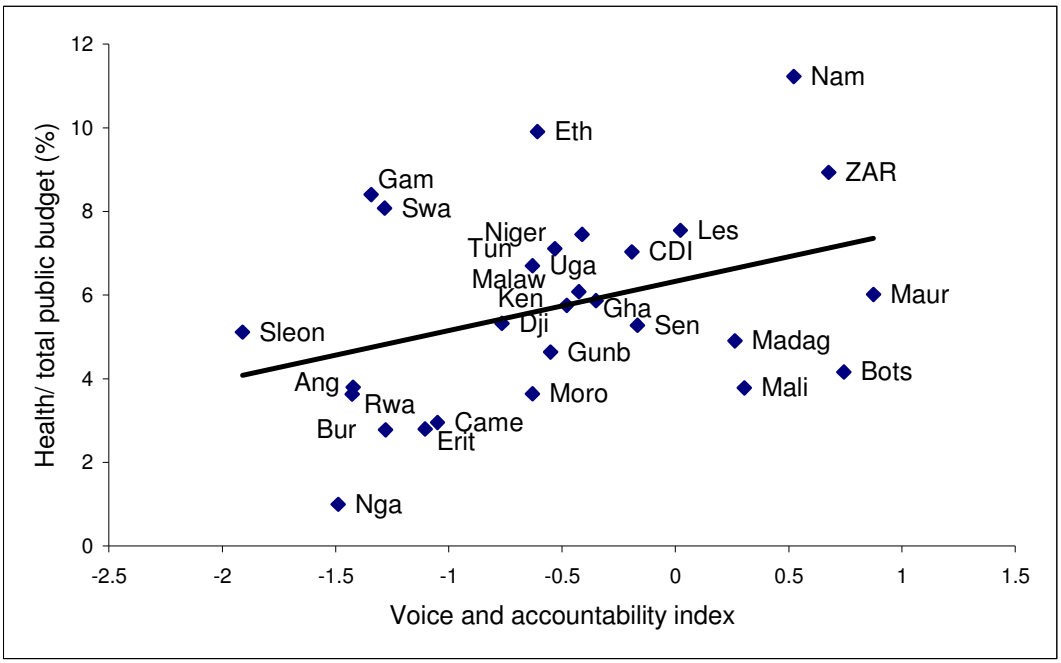


Figure 31: Voice and accountability index and health spending as a ratio of the total budget

Figure 31 clearly shows that countries that have little respect for human rights and accountability tend to devote a smaller share of their budgets to the health sector. Sierra Leone remains the worst performer with regard to voice and accountability, but allocates a relatively larger share of its budget to health compared to countries such as Nigeria and Eritrea, which allocate less than 4% of their budgets to health. Namibia and South Africa are the best performers, allocating more than 8% of their budgets to health. Further analysis requires partitioning the sample into the most corrupt countries and the least corrupt countries, as shown in Figures 32 -35.

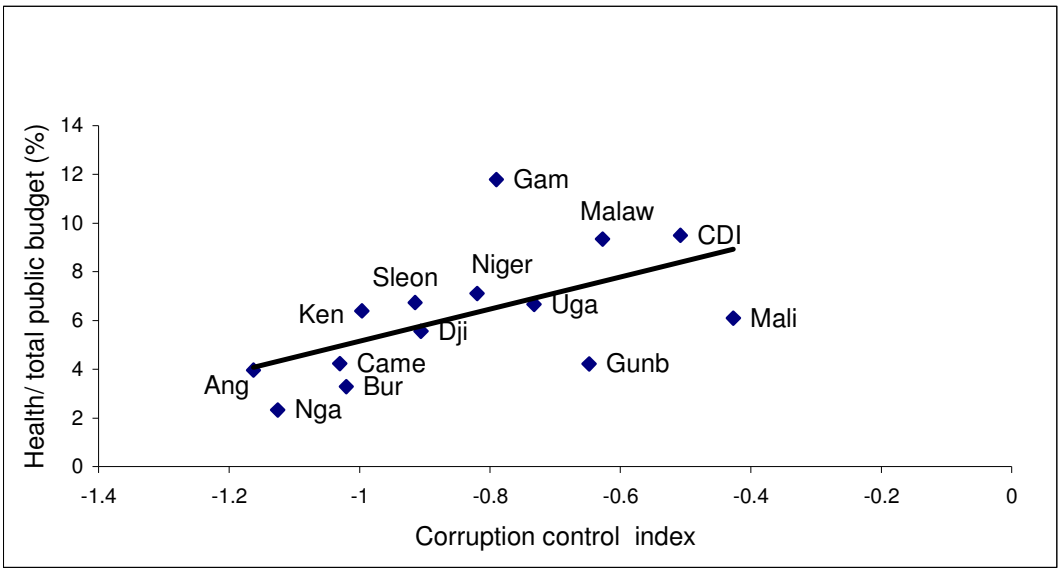


Figure 32: Corruption control index and health spending as a ratio of the total budget: 'most corrupt' sub-sample

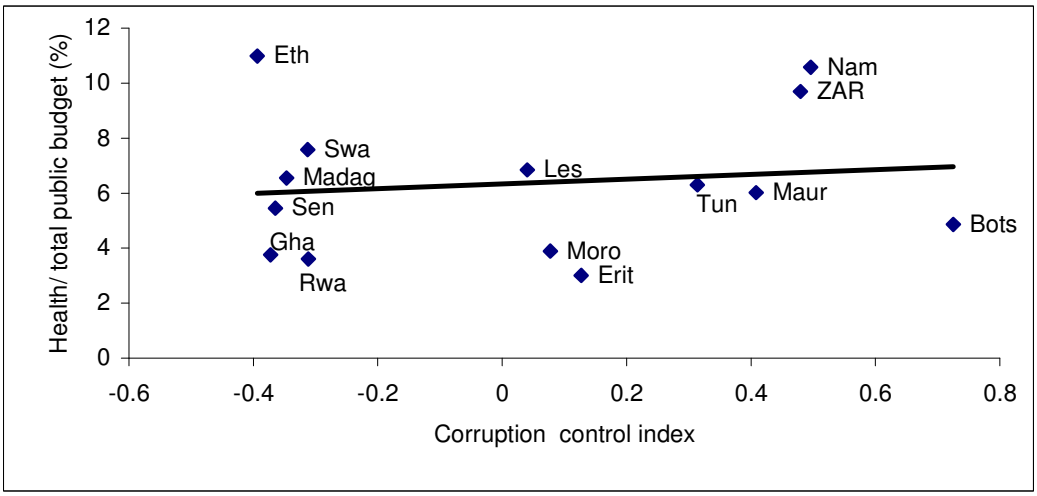


Figure 33: Corruption control index and health spending as a ratio of the GDP: 'most corrupt' sub-sample

Figure 32 shows the relationship between the corruption control index and health spending in the most corrupt countries in our sample. The positive relationship seen in the full sample is clearly replicated in this sub-sample. Figure 33 shows the relationship between the corruption control index and health spending as a share of the GDP. In this case only a weak positive relationship is apparent between these variables. In the less corrupt sub-sample the relationship between

health spending as a share of the total budget is positive but weak, which suggests that the relatively strong relationship seen in the full sample may be due to the strong influence of the 'most corrupt' sub-sample. Further analysis shows that the 'less corrupt' sub-sample has a positive and strong relationship between the corruption control index and health spending, as shown in Figures 34 and 35.

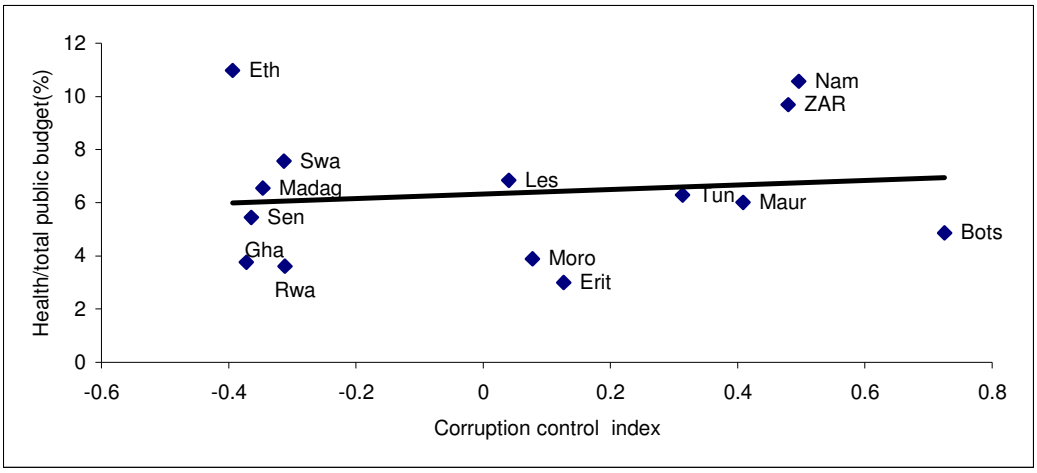


Figure 34: Corruption control index and health spending as a ratio of the total budget: 'less corrupt' sub-sample

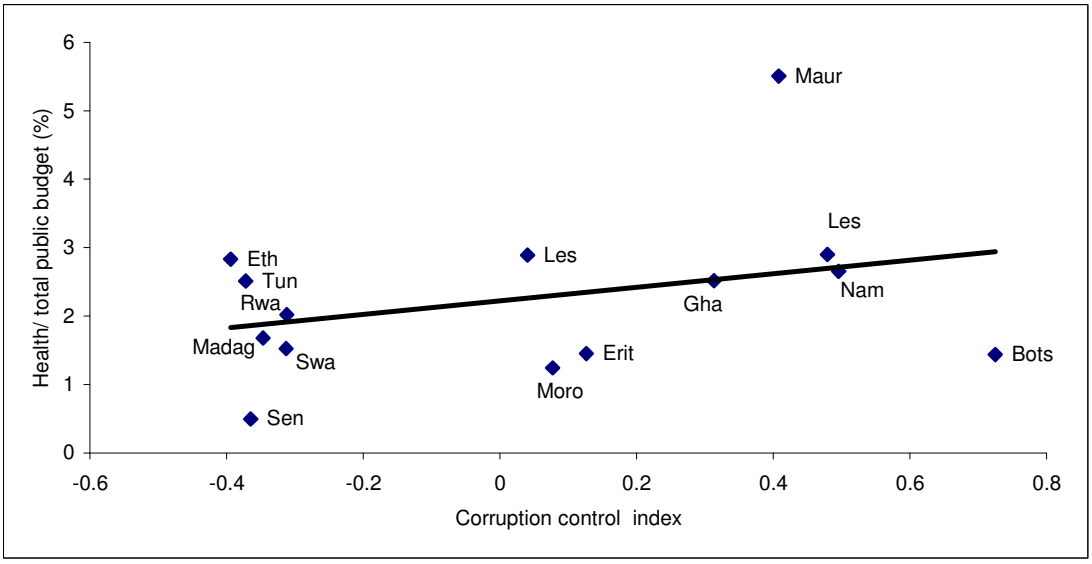


Figure 35: Corruption control index and health spending as a ratio of the GDP: 'less corrupt' sub-sample

7.3 Estimation results for health spending

This section reports the estimation results for health spending as a share of the total public budget and of the GDP, respectively. The estimation results are shown in Tables 12-14.

The estimations show that in all cases where the dependent variable is the share of the public budget, the coefficients of the corruption control index are not significant and have mixed signs. In the 'most corrupt' sub-sample the coefficients are positive and significant in 50% of the cases, while in the 'least corrupt' sub-sample they are negative and statistically insignificant at the conventional levels of testing. In contrast, in estimations in which the dependent variable is expressed as a share of the GDP, for the full sample the coefficients of the corruption control index are positive and significant at the conventional levels of testing. When the sample is split, all the coefficients of the corruption control index have the expected positive signs but are statistically insignificant at the conventional levels of testing. This suggests that corruption affects budget allocation to the health sector negatively; when the level of corruption is high, governments tend to allocate fewer budgetary resources to this sector because it offers relatively few opportunities for personal gain. Running a health sector involves relatively little of the capital expenditure that offers for a chance for corruption.

The coefficients of the political stability index are positive and significant at the conventional levels of testing in the full sample estimations. The results are consistent in almost all the sub-sample estimations. This outcome suggests that as a country becomes more politically stable, it tends to spend more of its budgetary resources on health. During periods of political instability, sectors such as general public services and defence receive relatively more resources to support political processes at the expense of the social sectors such as health. However, as a country becomes stable, resources are transferred from defence

to the social sectors. This finding supports the studies of Davoodi *et al.*,2001; Clements, Gupta and Schiff, 1997; and Gupta, McDonald and Ruggiero, 1998, who find that during peace periods the share of budget resources allocated to socio-economic expenditure increases compared to military spending.

The coefficients for the voice and accountability index are positive and significant in three of four cases in the full sample estimations. In the 'most corrupt' sub-sample, all the estimated coefficients have the expected positive sign and are significant at the conventional levels of testing. However, in the 'least corrupt' sub-sample all the coefficients have the expected positive signs but are not significant in three out of four cases. The estimated coefficients are found to be positive when the dependent variable is the share of the total public budget and of the GDP. This result suggests that as a country becomes more accountable and receptive to the voice of its people, it tends to spend more of its budget on health. A more cynical explanation could be that governments allocate a relatively larger share of the budget to the health sector with a view to securing another term in office. Whatever the reason, this result supports Nader's (1994) finding that countries that are politically liberal tend to allocate a larger part of their budgets to the health sector.

Table 12: Estimation results of health spending: full sample

	Dependent variable expressed as share of the public budget				Dependent variable expressed as share of the GDP			
	PM	PM	PM	PM	PM	PM	PM	PM
Cor	0.013 (0.750)			-0.030 (-1.520)	0.046* (1.815)			0.104*** (3.610)
Pol		0.035*** (3.755)		0.053*** (4.242)		0.037** (2.527)		0.066*** (4.758)
Acc			0.010 (0.993)	0.019* (1.694)			0.043** (2.287)	0.037** (2.469)
Lden	-0.137*** (-9.859)	-0.142*** (-10.351)	-0.134*** (-9.151)	-0.137*** (-9.761)	0.213*** (6.558)	0.174*** (5.484)	0.216*** (6.887)	0.198*** (5.645)
Ldebt	0.040*** (3.230)	0.030** (2.414)	0.039*** (3.044)	0.017 (1.216)	0.095*** (4.269)	0.057** (1.963)	0.078*** (2.838)	0.037 (1.108)
Lgov	0.486*** (7.489)	0.492*** (7.944)	0.483*** (8.053)	0.508*** (7.171)				
Lpop	0.199*** (4.391)	0.136*** (3.234)	0.208*** (4.753)	0.143*** (3.302)	0.367*** (4.269)	0.309*** (3.907)	0.425*** (5.275)	0.381*** (5.086)
Lypc	0.173*** (5.919)	0.132*** (4.708)	0.176*** (6.545)	0.144*** (4.864)	0.058 (1.104)	0.129*** (2.746)	0.036 (0.747)	0.053 (0.997)
IMF	0.493*** (7.225)	0.505*** (7.507)	0.482*** (7.470)	0.541*** (7.575)	0.073** (2.243)	0.006 (0.196)	0.004 (0.117)	0.016 (0.474)
IMF*Lgov	-0.825*** (-7.304)	-0.838**** (-7.569)	-0.803*** (-7.591)	-0.880*** (-7.575)				
Lurb	-0.218*** (-5.546)	-0.163*** (-4.484)	-0.232*** (-5.989)	-0.158*** (-4.272)	0.348*** (4.014)	0.270*** (3.208)	0.382*** (4.686)	0.327*** (4.022)
C	0.238 (1.529)	0.460*** (3.244)	0.246* (1.672)	0.324** (2.074)	0.181 (0.783)	0.097 (0.514)	0.439*** (1.990)	0.392* (1.890)
R^2	0.98	0.96	0.95	0.97	0.89	0.75	0.68	0.91
Adj. R^2	0.98	0.96	0.95	0.97	0.88	0.74	0.68	0.91
N	28	28	28	28	28	28	28	28
T	10	10	10	10	10	10	10	10
Diagnostic tests								
F test	1.7665	1.8676	1.89756	1.9576	0.3546	0.45436	0.5465	0.65764
Hausman test	32.43 [0.0002]	32.52 [0.0002]	32.43 [0.0002]	29.50 [0.0001]	161.95 [<0.0001]	344.42 [<0.001]	388.96 [<0.0001]	521.96 [<0.0001]

*** Significant at 1%; ** significant at 5%; and * significant at 10%; t-statistics in bracket. PM is the pooled model.

Table 13: Estimation results of health spending as a ratio of the total public budget

	'Most corrupt' sub-sample				'Less corrupt' sub-sample			
	PM	PM	PM	PM	PM	PM	PM	PM
Cor	0.121** (2.517)			0.027 (0.479)	-0.033 (-1.335)			-0.039 (-1.490)
Por		0.065*** (4.151)		0.022 (0.859)		0.035* (1.869)		0.039* (1.651)
Acc			0.156*** (4.763)	0.114** (2.024)			0.021 (1.425)	0.010 (0.632)
Lden	0.081** (2.265)	0.062* (1.863)	0.160*** (3.885)	0.136*** (2.800)	-0.112*** (-6.659)	-0.111*** (-6.631)	-0.111*** (-6.526)	-0.109*** (-6.497)
Ldebt	0.156*** (6.580)	0.134*** (5.170)	0.214*** (9.994)	0.187*** (5.136)	-0.039*** (-2.801)	-0.041*** (-2.769)	-0.035** (-2.385)	-0.044*** (-2.816)
Lgov	0.095 (0.703)	0.203* (1.612)	-0.020 (-0.141)	0.021 (0.139)	0.857*** (6.813)	0.740*** (6.490)	0.740*** (6.144)	0.707*** (6.149)
Lpop	-0.116 (-1.438)	0.149* (1.778)	0.296*** (3.383)	0.260** (2.580)	0.145 (1.479)	0.215** (2.108)	0.168*** (1.799)	0.243** (2.325)
Lypc	0.058 (0.927)	0.072 (1.009)	-0.020 (-0.285)	0.007 (0.088)	0.043 (0.702)	0.061 (1.078)	0.042 (0.711)	0.070 (1.208)
IMF	0.352*** (2.756)	0.471*** (3.988)	0.246** (2.025)	0.298** (2.020)	0.716*** (5.623)	0.671*** (5.366)	0.677*** (5.482)	0.647*** (5.192)
IMF*Lgov	-0.558** (-2.606)	-0.767*** (-3.741)	-0.426** (-2.075)	-0.298** (-2.064)	-1.408*** (-6.361)	-1.216*** (-5.581)	-1.283*** (-6.056)	-1.196*** (-5.493)
Lurb	-0.003 (-0.038)	0.051 (0.590)	0.141 (1.571)	0.125 (1.306)	-0.098 (-1.181)	-0.133* (-1.609)	-0.107 (-1.326)	-0.147* (-1.737)
C	1.142*** (4.259)	0.946*** (3.329)	1.568*** (5.661)	1.412*** (4.113)	0.120 (0.384)	-0.151 (-0.464)	0.077 (-1.326)	-0.255 (-0.746)
R^2	0.86	0.86	0.90	0.90	0.98	0.99	0.99	0.99
Adj. R^2	0.85	0.85	0.90	0.89	0.97	0.99	0.99	0.99
N	14	14	14	14	14	14	14	14
T	10	10	10	10	10	10	10	10
Diagnostic tests								
F test	0.4658	0.56487	0.35474	0.54754	1.92094	2.0678	2.19754	2.25453
Hausman test	55.37 [<0.0001]	51.62 [<0.0001]	39.10 [<0.0001]	37.60 [<0.0001]	3.33 [0.9498]	2.80 [0.9717]	2.43 [0.9826]	2.07 [0.9982]

*** Significant at 1%; ** significant at 5%; and * significant at 10%; t-statistics in bracket. PM is the pooled model.

Table 14: Estimation results of health spending as share of the GDP

	'Most corrupt' sub-sample				'Less corrupt' sub-sample			
	PM	PM	PM	PM	FEM	FEM	FEM	FEM
Cor	0.040 (0.584)			0.012 (0.163)	0.079* (1.678)			0.026 (0.473)
Pol		0.041 (1.146)		0.103** (2.494)		0.321*** (8.028)		0.290*** (6.099)
Acc			0.175*** (2.906)	0.245*** (3.551)			0.126*** (4.966)	0.018 (0.643)
Lden	0.830*** (3.700)	0.573*** (3.244)	0.815*** (3.899)	0.768*** (3.705)	0.317*** (7.880)	0.269*** (6.263)	0.304*** (7.641)	0.268*** (6.164)
Ldebt	0.301* (1.772)	0.241 (1.539)	0.292* (1.812)	0.354** (2.149)	-0.155*** (-4.595)	-0.149*** (-3.828)	-0.139*** (-4.081)	-0.144*** (-3.540)
Lpop	0.312*** (7.464)	0.269*** (7.894)	0.294*** (7.476)	0.279*** (7.101)	-0.027 (-0.221)	1.177*** (6.384)	0.125 (0.821)	1.090*** (5.367)
Lypc	-1.037*** (-3.798)	-1.108*** (-4.426)	-0.997*** (-3.780)	-0.980*** (-3.731)	0.082 (1.385)	0.307*** (4.493)	-0.010 (-0.154)	0.267*** (3.195)
IMF	-0.049 (-1.374)	-0.049 (-1.375)	-0.074** (-2.060)	-0.089** (-2.457)	0.0528 (0.950)	0.013 (0.273)	-0.069 (-1.279)	0.014 (0.244)
Lurb	0.345*** (9.655)	0.291*** (9.449)	0.322*** (9.416)	0.304*** (8.813)	0.112 (0.939)	-0.764*** (-4.993)	-0.062 (-0.425)	-0.714*** (-4.363)
C	-0.778*** (-3.071)	-4.068*** (-8.324)	-0.391 (-1.206)	-3.664*** (-5.960)				
R^2	0.45	0.38	0.45	0.47	0.92	0.75	0.92	0.75
Adj. R^2	0.42	0.34	0.43	0.43	0.92	0.74	0.91	0.73
N	14	14	14	14	14	14	14	14
T	10	10	10	10	9	9	9	9
Diagnostic tests								
F test	0.996	1.029	0.940	1.029	5.871	5.667	5.823	6.188
Hausman test	70.35 [<0.0001]	66.98 [<0.0001]	66.42 [<0.0001]	56.62 [<0.0001]	81.63 [<0.0001]	85.20 [<0.0001]	109.95 [<0.0001]	116.41 [<0.0001]

*** Significant at 1%; ** significant at 5%; and * significant at 10%; t-statistics in bracket. PM is the pooled model and FEM is the fixed effects model.

The estimated coefficients of the public debt are positive and significant in nearly all cases in the full sample. In the sub-samples, the results are mixed. In those estimations where the dependent variable is expressed as a share of the budget, the coefficients are positive and significant in the 'most corrupt' sub-sample and negative and significant in the 'less corrupt' sub-sample. Similarly, in those estimations where the dependent variable is expressed as a share of the GDP, the estimated coefficients are positive and significant in most cases for the 'most corrupt' sub-sample and negative and significant for the 'less corrupt' sub-sample at the conventional levels of testing. This result suggests that, except in the 'less corrupt' sub-sample, countries with high public debt tend to have a relatively larger share of their budgets allocated to health spending. These results are plausible because in Africa much foreign aid is sector-specific and mainly targeted at the health sector, particularly primary health.

The coefficients for the relative size of the government are found to be positive and significant at the conventional levels of testing in the full sample estimations. However, in the 'most corrupt' sub-sample the coefficients are statistically insignificant and sometimes have wrong signs, except for one case where it is positive and significant, as expected. In the 'less corrupt' sub-sample the estimated coefficients are positive and significant. Perhaps significantly, these coefficients are higher than those obtained in the full sample estimations. Therefore, these results suggest that, except for the most corrupt countries, a government that is relatively large compared to the size of the country's economy will tend to allocate a larger share of the budgets to health.

In the full sample the estimated coefficients of the GDP per capita are positive and significant at the conventional levels in most cases. This finding supports a number of studies in the literature, namely Frijters, Haisken-DeNew and Shields (2005), Gerdtham and Lothgrem (2000), Di Matteo and Di Matteo (1998), Blomqvist and Carter (1997) and Hansen and King (1996), who find that health spending is positively related to income level. In the sub-sample estimations, the results are mixed. When the dependent variable is expressed as the share of the public budget, the estimated coefficients are statistically insignificant with mixed signs for the 'most corrupt' sub-sample. Similar results are obtained for the 'less corrupt' sub-sample, where all the estimated coefficients are positive and statistically insignificant. On the other hand, when the dependent variable is expressed as the share of the GDP, for the 'most corrupt' sub-sample the estimated coefficients are negative and significant at the conventional levels of testing, and for the 'less corrupt' sub-sample they are positive. This result suggests that those countries with higher income per capita tend to allocate more resources to health.

The coefficients for population size are positive and significant at 1% level of testing in the full sample estimations. Similar results are found in the sub-samples, except in two cases where the estimated coefficients are negative and

significant at the conventional levels of testing. This implies that as a country's population increases, the government tends to allocate more of the budget to health. Other variables such as population density and urbanisation are largely significant but with mixed signs, both in the full sample and sub-sample estimations.

The role of IMF programmes as proxied by the IMF dummy yields a positive coefficient in all the estimations for the full sample. The estimated coefficients are significant in those cases where the dependent variable is expressed as a share of the total public budget, and statistically insignificant in all but one case where the dependent variable is expressed as a share of the GDP. Sub-sample analysis yields estimated coefficients for the IMF dummy that are consistently positive and significant in all cases where the dependent variable is expressed a share of the total budget.

The coefficients of the IMF interaction term are negative and significant in the full sample estimations. The estimated coefficients are found to be less than unity in all cases, which implies that a country busy implementing an IMF programme tends to increase its budget allocation to health. However, the rate of increase of this budget is less than the rate of decline of the size of the total public budget as a share of the GDP. Therefore, health spending appears to be resilient. Further analysis shows that all the estimated coefficients are negative and significant at the conventional levels of testing in all sub-samples. However, the estimated coefficients in the 'most corrupt' sub-sample are less than unity, suggesting that their health spending is resilient, but in the 'less corrupt' sub-sample are greater than unity, suggesting that the health spending of these IMF-supported countries is not as resilient.

7.4 Summary

The results show that the coefficients for the corruption control index are positive and significant in most cases, which suggests that less corrupt countries allocate a larger share of their budgets to health. However, overall, the impact of corruption on health spending seems to be ambiguous.

The estimated coefficients for the political stability index have mixed signs. This therefore also suggests an indeterminate effect of political instability on health spending. The estimated coefficients for the voice and accountability index are not significant and have mixed signs. The partitioned the sample also shows that the estimated coefficients are not all significant with the expected signs.

The coefficients for public debt are unambiguously positive, which may suggest that countries that have high public debts tend to allocate more of their expenditure to the health sector. Sub-sample analysis shows that among the most corrupt countries this pattern holds, with all the estimated coefficients significant at the conventional level of testing. Surprisingly, in the 'less corrupt' sub-sample, the coefficients of public debt are negative and significant at the conventional levels of testing.

The coefficients for the relative size of the government are found to be positive and significant in all the estimations both for the full sample and the sub-samples. The coefficients of the GDP per capita are positive and significant in most of the estimations for the full sample, but differ for the sub-samples. In the 'most corrupt' sub-sample the signs of estimated coefficients are positive in most cases, but negative when the dependent variable is expressed as a share of the public budget.

The coefficients of the IMF dummy are found to be positive and significant in those estimations where the dependent variable is expressed as a share of the

total public budget, and negative and insignificant in those cases where the dependent variable is expressed as a share of the GDP. Partitioning the sample shows that the estimated coefficients of the IMF dummy are consistently positive in both sub-samples when the dependent variable is expressed as a share of total public budget, but negative and significant when the dependent variable is expressed as a share of the GDP. The coefficients of the IMF interaction term are negative in all the estimations for the full sample and exceed unity, implying that health spending is not resilient among the adjusting countries.

CHAPTER EIGHT: SOCIAL WELFARE SPENDING

8.1 Introduction

This chapter presents an estimation of the determinants of social welfare spending. The chapter has three sections: Section 8.2 analyses the relationship between governance indices and social welfare spending, Section 8.3 contains the estimation results and Section 8.4 presents a summary of the main findings.

8.2 Relationship between social welfare spending and governance

Figure 36 shows the relationship between the corruption control index and social welfare spending. From the figure it is apparent that a positive relationship exists between the corruption control index and social welfare spending, which suggests that countries that are more corrupt devote a smaller share of their budgets to social welfare spending.

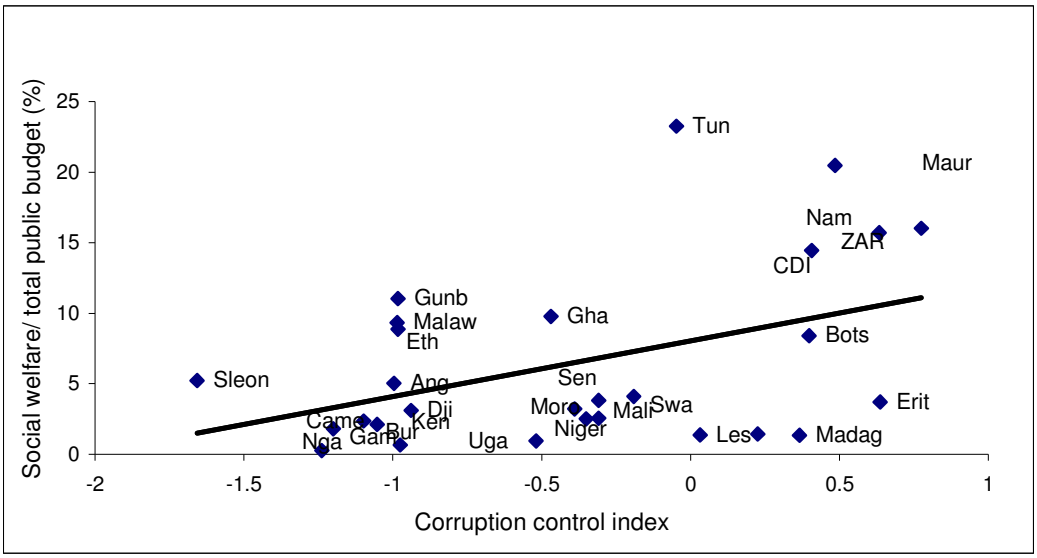


Figure 36: Corruption control index and social welfare spending as a ratio of the total budget

Notably, countries such as Sierra Leone, Nigeria, the Gambia and Cameroon are found to be the worst performers, while Tunisia, Mauritius, Namibia and South Africa appear to lead in allocating budget resources to social welfare.

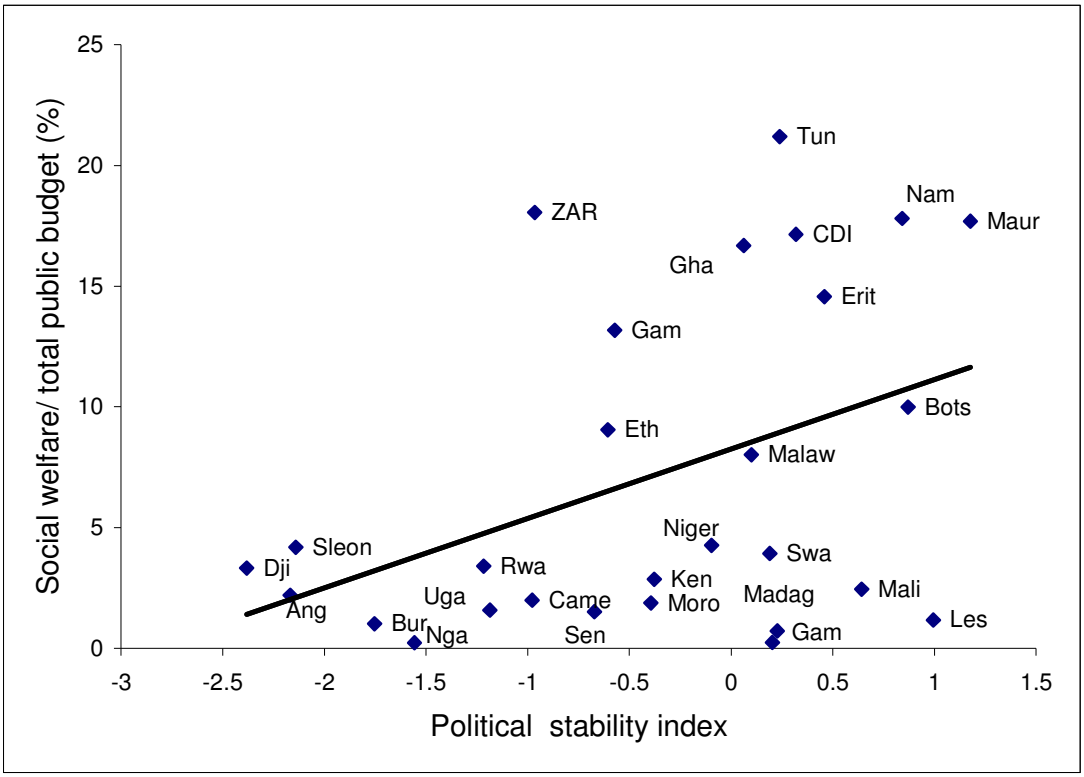


Figure 37: Political stability index and social welfare spending as a ratio of the total budget

Figure 37 clearly shows a positive relationship between the political stability index and social welfare spending, which suggests that countries that are politically stable tend to allocate a larger budget share to social welfare compared to less politically stable countries. In this case Djibouti, Angola, Sierra Leone and Burundi are the worst performers, while Mauritius, Namibia and Tunisia are found to exhibit high levels of political stability and social welfare spending.

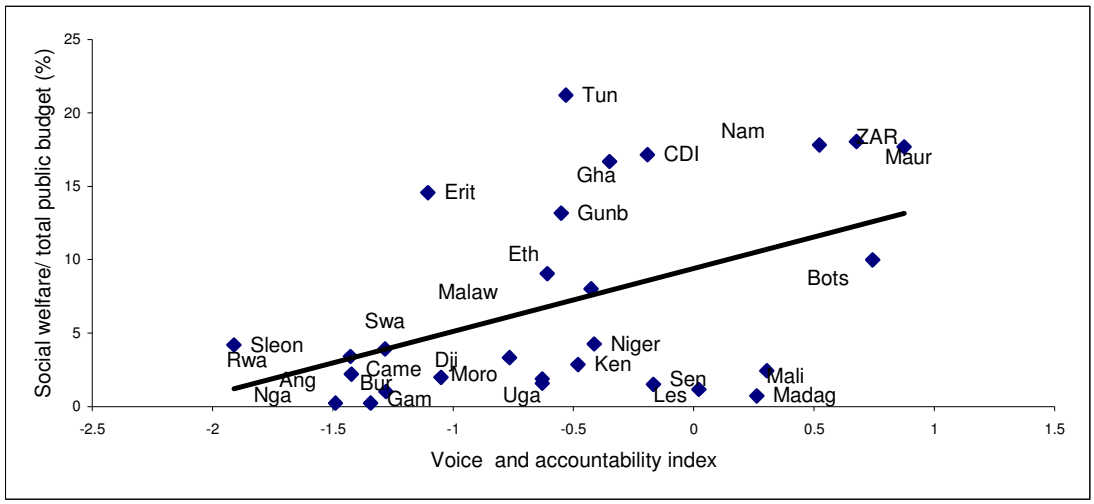


Figure 38: Voice and accountability index and social welfare spending as a ratio of the total budget

The role of voice and accountability in the allocation of the public budget to social welfare spending is shown in Figure 38. There seems to be a positive relationship between the level of voice and accountability and the budget allocation to social welfare. Further analysis is conducted by dividing the sample into more corrupt and less corrupt countries; the results are reported in Figures 39-42.

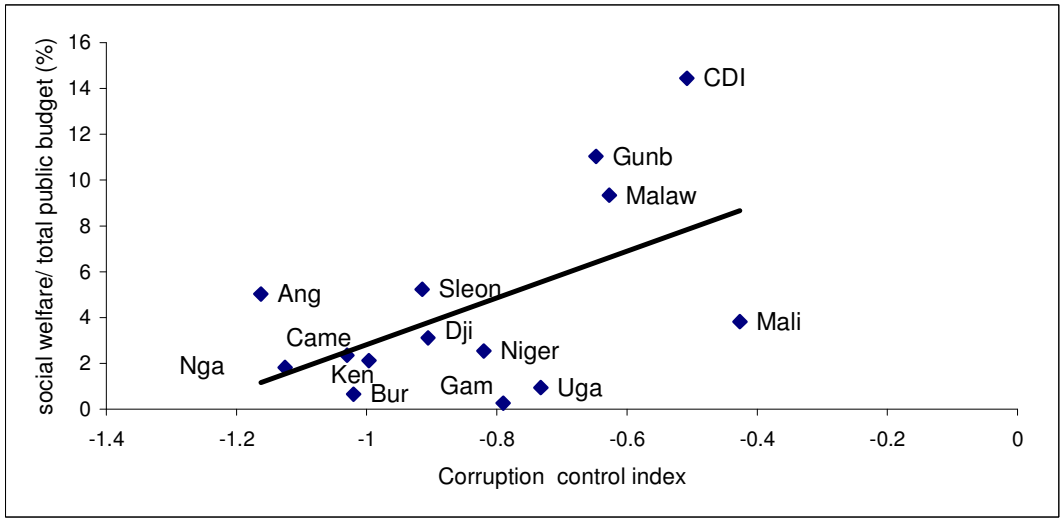


Figure 39: Corruption control index and social welfare spending as a ratio of the total budget: 'most corrupt' sub-sample

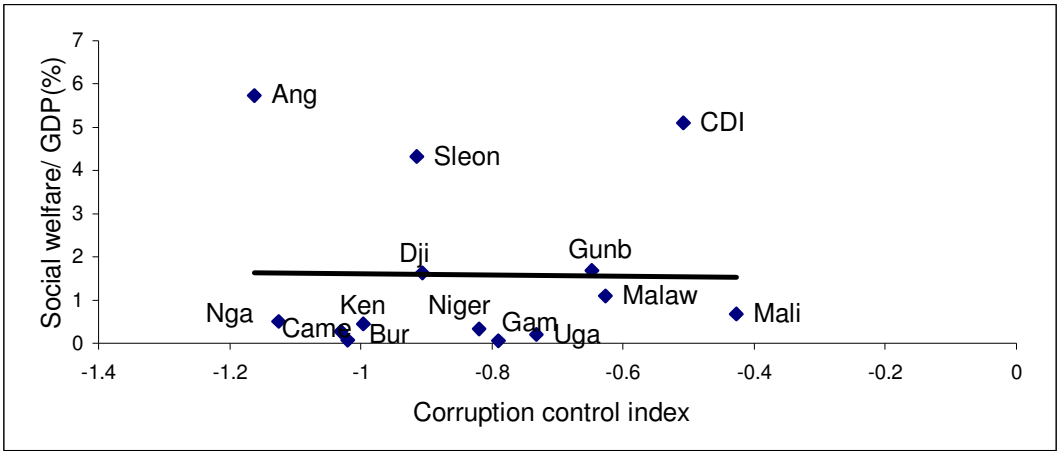


Figure 40: Corruption control index and social welfare spending as a ratio of the GDP: 'most corrupt' sub-sample

Figures 39 and 40 show the relationship between the corruption control index and social welfare as a share of the total public budget and of the GDP, respectively. While there appears to be a strong positive relationship between the corruption control index and social welfare spending as a share of the total public budget, there is very weak and negative relationship in the case where social welfare spending is expressed as a share of the GDP.

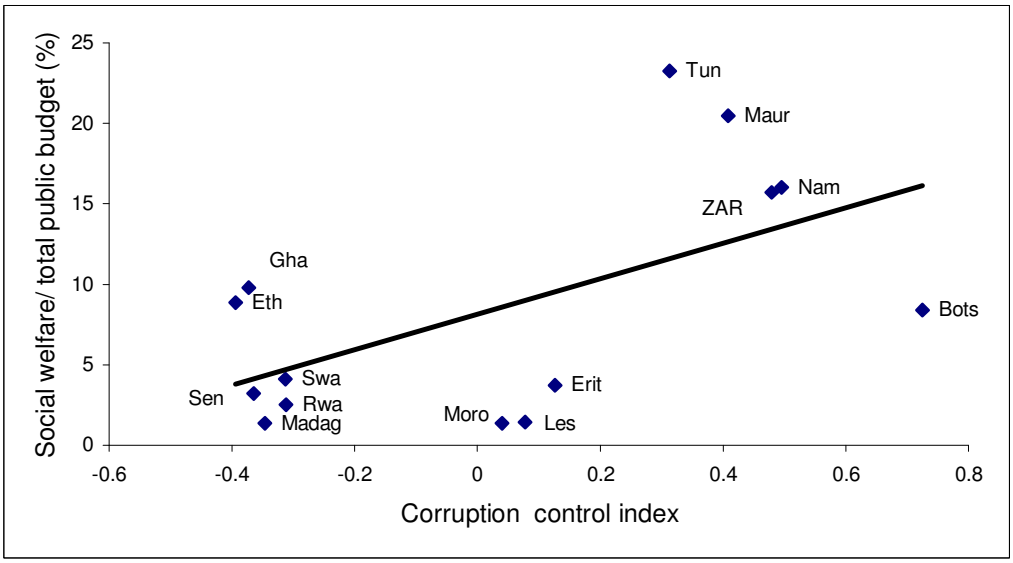


Figure 41: Corruption control index and social welfare spending as a ratio of the total budget: 'less corrupt' sub-sample

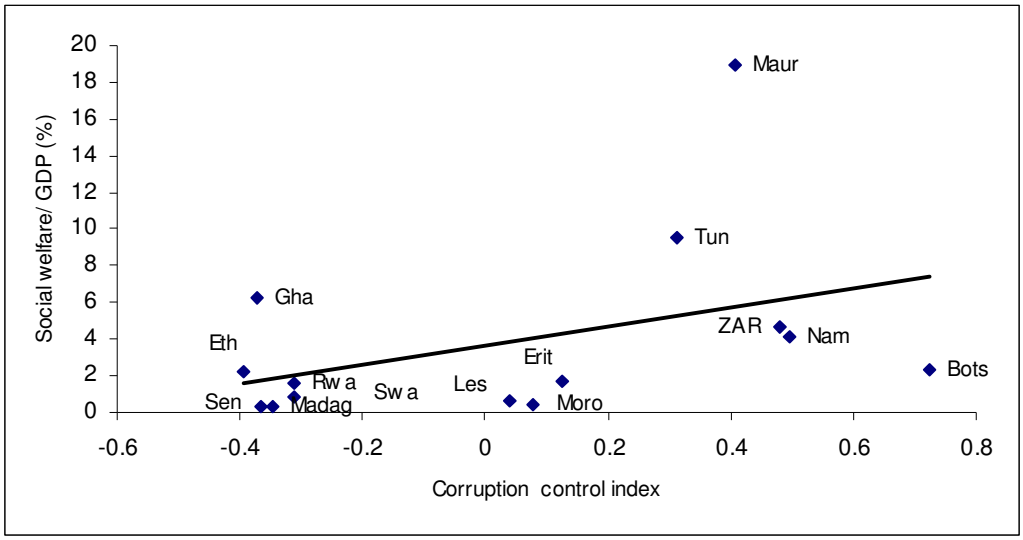


Figure 42: Corruption control index and social welfare spending as a ratio of the GDP: 'less corrupt' sub-sample

In the 'less corrupt' sub-sample, a strong positive relationship exists between social welfare spending and the corruption control index, both when social welfare spending is expressed as a share of total budget and as a share of the GDP. This result suggests that among less corrupt countries, social welfare spending is affected negatively by the magnitude of corruption in a country.

8.3 Estimation results of social welfare spending

This section reports estimation results of social welfare spending as a share of the total public budget and of the GDP. The estimation results are reported in Tables 15-17.

The estimated coefficients of the corruption control index are positive and largely significant in the full sample and the sub-sample cases. This suggests that corruption has a negative effect on the provision of social welfare. Put another way, as the level of corruption declines the budgetary resources allocated to social welfare increases; conversely, if corruption increases, the country's contribution to social welfare services declines. An explanation could be that

social welfare spending does not offer viable avenues for corruption. The positive signs obtained in all the estimations suggest that social welfare spending does not offer viable avenues for corruption, so corrupt activities may not be able to cause substantial changes in the overall budget.

The estimated coefficients of the political stability index are positively related to social welfare spending in the full sample estimations. However, in the sub-samples the results are mixed. In those cases where the dependent variable is the share of the public budget, the estimated coefficients for the 'most corrupt' sub-sample are positive and insignificant and for the 'less corrupt' sub-sample are positive and significant at the conventional levels of testing. Only the results for the 'less corrupt' sub-sample are therefore consistent with those obtained for the full sample. This suggests that higher levels of political instability are associated with lower levels of resource allocation to social sectors. This result agrees with previous results indicating that political instability causes a transfer of funds away from non-military expenditure.

In the full sample estimations, the coefficients for the voice and accountability index are positive, although some are not significant at the conventional levels of testing. In the sub-samples, in all cases in the 'most corrupt' sub-sample, the estimated coefficients are negative and largely significant at the conventional levels of testing. In the 'less corrupt' sub-sample the coefficients have mixed signs but are significant at the conventional levels of testing. These results are, therefore, not conclusive regarding the role of accountability in shifting the budget to social welfare. These results do however suggest that as the level of democracy and accountability increases, governments tend to structure their budgets in favour of social welfare, perhaps to increase their popularity. Again, the results confirm Niskanen's bureaucratic failure model (Rosen 2005: 127).

In the full sample estimations, the coefficients for government size have mixed signs and are not significant at the conventional levels of testing. In the 'most

corrupt' sub-sample, the coefficients are negative and significant in 50% of the cases, and have mixed signs in the 'less corrupt' sub-sample. This, therefore, suggests that the size of the government is not very instrumental in the internal allocation of the budget in favour of social welfare.

Table 15: Estimation results of social welfare spending: full sample

	Dependent variable expressed as share of the public budget				Dependent variable expressed as share of the GDP			
	PM	PM	PM	PM	REM	REM	REM	REM
Cor	0.288*** (6.430)			0.278*** (3.797)	0.177*** (2.818)			0.082 (1.236)
Pol		0.127*** (5.706)		0.553** (2.024)		0.124*** (2.849)		0.036 (0.753)
Acc			0.161*** (4.230)	0.238 (0.508)			0.306*** (4.781)	0.256*** (3.575)
Lden	-0.716* (-1.785)	-0.339 (-0.800)	-0.056 (-0.121)	-0.405 (-0.870)	0.489*** (2.301)	0.535** (2.479)	0.562*** (2.605)	0.576*** (2.697)
Ldebt	-1.020*** (-3.732)	-1.539*** (-5.556)	-1.236*** (-4.568)	-1.337*** (-4.668)	-0.183* (-1.664)	-0.265** (-2.449)	-0.172* (-1.616)	-0.165 (-1.498)
Lgov	0.232 (0.148)	-0.1027 (-0.648)	-0.299 (-1.684)	-0.134 (-0.075)				
Lpop65	0.704*** (6.748)	0.783*** (9.920)	0.901*** (8.976)	0.637*** (7.138)	0.858** (2.359)	-0.919** (2.498)	0.896** (2.492)	0.977*** (2.699)
Lypc	0.614*** (9.667)	0.747*** (13.271)	0.711*** (10.404)	0.588*** (8.409)	0.152 (0.684)	0.139 (0.619)	0.087 (0.389)	0.062 (0.282)
IMF	0.720*** (4.273)	0.822*** (5.027)	0.473** (2.371)	0.705*** (3.912)	0.004 (0.089)	0.010 (0.230)	-0.030 (-0.714)	-0.020 (-0.468)
IMF*Lgov	-1.368*** (-4.129)	-1.294*** (-4.677)	-2.438** (-2.377)	-1.122*** (-3.782)				
Lurb	-0.452*** (-4.443)	-0.441*** (-5.662)	-0.665*** (-6.928)	-0.372*** (-4.095)	1.258*** (3.852)	1.340*** (4.042)	1.244*** (3.874)	1.331*** (4.075)
C	-16.714*** (-7.818)	-22.476*** (-9.878)	15.830 (-5.769)	-17.345*** (-6.320)				
R^2	0.86	0.76	0.84	0.80	0.11	0.11	0.15	0.16
Adj. R^2	0.86	0.75	0.83	0.79	0.08	0.9	0.13	0.13
N	28	28	28	28	28	28	28	28
T	10	10	10	10	10	10	10	10
Diagnostic tests								
F test	2.487	2.763	2.847	2.985	20.123	23.876	22.563	23.987
Hausman test	30.67 [0.0003]	10.46 [0.3145]	8.40 [0.5900]	41.26 [0.0001]	23.99 [0.0005]	58.62 [0.0001]	30.65 [0.0001]	95.07 [<0.0001]

*** Significant at 1%; ** significant at 5%; and * significant at 10%; t-statistics in bracket. PM is the pooled model and REM is the random effects model.

Table 16: Estimation results of social welfare spending as a ratio of the total public budget

	'Most corrupt' sub-sample				'Less corrupt' sub-sample			
	PM	PM	PM	PM	PM	PM	PM	PM
Cor	0.362*** (3.026)			0.503*** (3.642)	0.102*** (3.035)			0.170*** (3.024)
Pol		0.032 (0.816)		0.022 (0.385)		0.202*** (5.618)		0.228*** (5.384)
Acc			-0.005 (-0.067)	-0.207*** (-2.078)			0.102*** (3.035)	-0.075* (-1.827)
Lden	-0.232** (-2.611)	-0.219** (-2.532)	-0.274** (-2.470)	-0.330*** (-3.303)	0.004 (0.071)	0.026 (0.546)	0.004 (0.071)	0.039 (0.805)
Ldebt	0.171** (2.521)	0.194*** (3.226)	0.194*** (2.797)	0.083 (1.042)	-0.091*** (-3.059)	-0.127*** (-3.989)	-0.091*** (-3.059)	-0.143*** (-4.497)
Lgov	-0.621** (-2.080)	-0.493* (-1.776)	-0.379 (-1.244)	-0.477 (-1.516)	-0.115 (-0.487)	0.019 (0.075)	-0.115 (-0.487)	0.406 (1.504)
Lpop65	0.596*** (2.688)	0.774*** (4.010)	0.677*** (3.115)	0.527** (2.290)	0.551*** (2.806)	0.661*** (3.449)	0.551*** (2.806)	0.555*** (2.873)
Lypc	-0.152 (-0.935)	-0.338** (-2.540)	-0.311** (-2.201)	-0.162 (-1.022)	0.453*** (3.954)	0.485*** (5.021)	0.453*** (3.954)	0.405*** (3.686)
IMF	0.280 (1.015)	0.388* (1.677)	0.468* (1.832)	0.334 (1.013)	0.767** (2.232)	0.734** (2.304)	0.767** (2.232)	0.842*** (2.651)
IMF*Lgov	-0.462 (-1.003)	-0.584 (-1.520)	-0.717* (-1.708)	-0.502 (-0.951)	-1.294** (-2.351)	-1.160** (-2.230)	-1.294** (-2.351)	-1.366*** (-2.618)
Lurb	0.594*** (3.055)	0.729*** (4.172)	0.651*** (3.399)	0.598*** (2.998)	-0.397** (-0.397)	-0.321* (-1.762)	-0.397** (-2.084)	-0.186 (-1.016)
C	0.993** (2.042)	1.125** (2.567)	1.024** (2.273)	0.771 (1.552)	-0.870*** (-2.759)	-2.097*** (-8.654)	-0.870*** (-2.759)	-2.357*** (-6.513)
R^2	0.58	0.62	0.65	0.49	0.98	0.93	0.98	0.95
Adj. R^2	0.55	0.60	0.63	0.45	0.98	0.92	0.98	0.94
N	14	14	14	14	14	14	14	14
T	10	10	10	10	10	10	10	10
Diagnostic tests								
F test	1.475	1.537	1.175	1.268	0.243	0.256	0.576	0.628
Hausman test	6.95 [0.6427]	7.10 [0.6266]	3.68 [0.9310]	7.86 [0.7259]	15.11 [0.0878]	16.58 [0.0558]	14.15 [0.1172]	12.53 [0.3254]

*** Significant at 1%; ** significant at 5%; and * significant at 10%; t-statistics in bracket. PM is the pooled model.

Table 17: Estimation results of social welfare spending as a ratio of the GDP

	'Most corrupt' sub-sample				'Less corrupt' sub-sample			
	PM	PM	PM	PM	PM	PM	PM	PM
Cor	0.531*** (4.016)			0.889*** (5.689)	0.407*** (4.429)			0.336*** (3.675)
Pol		-0.248*** (-4.273)		-0.282*** (-4.520)		0.495*** (9.729)		0.478*** (8.508)
Acc			-0.159* (-1.767)	-0.231** (-2.121)			0.181*** (3.333)	-0.078* (-1.654)
Lden	-0.277*** (-3.277)	-0.586*** (-6.764)	-0.462*** (-4.914)	-0.608*** (-5.550)	0.229** (1.991)	0.199* (1.868)	0.263** (2.135)	0.237** (2.380)
Ldebt	-0.277* (-1.642)	0.423** (2.291)	0.015 (0.099)	0.132 (0.668)	-0.114* (-1.646)	-0.186** (-2.571)	-0.151** (-2.010)	-0.169** (-2.514)
Lpop65	1.871*** (8.813)	0.997*** (3.978)	1.357*** (7.192)	1.332*** (4.920)	0.836** (2.540)	1.696*** (6.752)	0.954*** (2.793)	1.440*** (5.789)
Lypc	-0.870*** (-4.312)	-0.638*** (-3.106)	-0.580*** (-2.914)	-0.798*** (-4.062)	0.443*** (3.897)	0.524*** (4.875)	0.420*** (2.850)	0.433*** (4.011)
IMF	-0.018 (-0.254)	-0.066 (-0.814)	0.072 (0.953)	-0.057 (-0.657)	-0.122 (-1.189)	0.017 (0.185)	-0.268** (-2.417)	0.072 (0.721)
Lurb	1.815*** (7.068)	0.906*** (3.415)	1.303*** (5.807)	1.401*** (4.636)	-0.636** (-1.969)	-1.087*** (-4.459)	-0.754** (-2.246)	-0.883*** (-3.712)
C	1.757*** (3.919)	0.677 (1.229)	0.700 (1.501)	0.993* (1.760)	-1.764*** (-5.245)	-3.578*** (-11.026)	-1.493*** (-3.061)	-3.347*** (-7.567)
R^2	0.79	0.76	0.87	0.68	0.67	0.80	0.67	0.81
Adj. R^2	0.78	0.74	0.86	0.66	0.65	0.79	0.66	0.79
N	14	14	14	14	14	14	14	14
T	10	10	10	10	10	10	10	10
Diagnostic tests								
F test	1.1253	1.236	1.268	1.485	0.523	0.611	0.558	0.719
LM test	0.986	0.876	0.975	1.095	1.674	1.475	1.935	1.357
Hausman Test	6.81 [0.4485]	10.11 [0.1826]	4.23 [0.7530]	7.87 [0.5477]	6.02 [0.5375]	5.82 [0.5608]	8.73 [0.2724]	14.12 [0.1181]

*** Significant at 1%; ** significant at 5%; and * significant at 10%; t-statistics in bracket. PM is the pooled model.

As expected, the coefficients of per capita income are positive and significant at the conventional levels of testing in the full sample estimations, which implies that higher levels of economic development are associated with higher levels of social welfare spending. However, in the 'most corrupt' sub-sample, the coefficients are negative and significant in nearly all cases, which suggests that in more corrupt countries a higher level of economic development is associated with lower budget allocations to social welfare. In contrast, in less corrupt countries, consistent with the full sample, the estimated coefficients are positive and significant at the conventional levels of testing, which suggests that a higher level of development is associated with an increased share of the budget allocated to social welfare. These results support findings that show a positive

correlation between the provision of pure public goods and social welfare expenditure on measures such as child, disability, old age and other grants.

With regard to the role of public debt in tilting the budget towards social welfare, the coefficients are found to be negative and significant at the conventional levels of testing in the full sample estimations. In the sub-sample estimations, results are mixed depending on the definition of the dependent variable. Coefficients are positive in all cases where the dependent variable is the share of the total public budget, although not significant for any of the countries in the 'less corrupt' sub-sample. In contrast, coefficients are both positive and significant in all cases where the dependent variable is the share of the GDP. This result, therefore, points to the fact that public debt does not prompt social welfare spending, which is plausible since most foreign debt is specifically targeted at economic services sectors and specific social sectors such as education and health.

The estimated coefficients for the IMF dummy have mixed signs depending on the definition of the dependent variable. In the estimations where the dependent variable is the share of the total budget, coefficients are positive and significant in all cases. However, in those estimations where the dependent variable is expressed as a share of the GDP, coefficients have mixed signs which are not significant at the conventional levels in the full sample and sub-sample estimations. This, therefore, suggests that these results are inconclusive as to the role of the IMF in the allocation of public budget to social welfare.

The estimated coefficients of the IMF interaction term are negative for the full sample and greater than unity, which suggests that as the public budget as a share of the GDP declines, social welfare spending increases more rapidly. Further analysis shows that in the 'most corrupt' sub-sample, the estimated coefficients are negative but largely insignificant. This may suggest that IMF programmes fail to affect the share of social welfare spending in more corrupt countries. On the other hand, the estimated coefficients are negative and

significant in the 'less corrupt' sub-sample. The estimated elasticities are greater than unity which suggests that in less corrupt countries social welfare spending increases faster than the rate of decline of the total public budget to the GDP.

The segment of the population older than 65 years is found to be particularly strong in explaining the allocation of resources to social welfare spending. The coefficients are positive and significant at the conventional levels of testing for all the estimations. This is because social welfare programmes mainly target the elderly segment of the population and so as the size of the population segment in the age group 65 years and older increases, the allocation to social welfare spending increases. The coefficients of urbanisation and population density are found to be significant but with mixed signs in all cases.

8.4 Summary

The coefficients for the corruption control index are positive and significant in all the estimations. Those of the political stability index have mixed signs and are largely insignificant. The estimated coefficients for the voice and accountability index are insignificant with mixed signs in the full sample estimations. Also, the estimated coefficients for public debt are consistently insignificant with mixed signs depending on the definition of the dependent variable. The coefficients of the relative size of government are positive but not significant, for all the estimations. The coefficients of the level of economic development as proxied by the GDP per capita are positive and significant in all the estimations for the full sample. This pattern is replicated in the 'less corrupt' sub-sample but the 'most corrupt' sub-sample exhibits negative coefficients, which are largely not significant at the conventional levels of testing.

The coefficients of the size of the population segment over 65 years of age are positive in nearly all the cases in both the full sample and sub-samples. Other demographic characteristics such as population density and urbanisation rate are

largely significant but with mixed signs. The estimated coefficients of the IMF dummy have different signs depending on the definition of the dependent variable. When the dependent variable is expressed as a share of the budget, the estimated coefficients are positive and significant at the conventional levels of testing. However, when the dependent variable is expressed as a share of the GDP, the estimated coefficients are negative and not significant, in all cases. Further evidence shows that the estimated coefficients of the IMF interaction variable are negative and significant for the full sample as well as for the sub-samples. For the full sample, the estimated coefficients are greater than unity, which suggests non-resiliency of social welfare spending. For the sub-samples, resiliency is ambiguous.

CHAPTER NINE: ECONOMIC SERVICES SPENDING

9.1 Introduction

This chapter deals with the estimation of economic services spending. It is divided into three parts: Section 9.2 discusses the relationship between governance indices and economic services spending, Section 9.3 is devoted to estimation results and Section 9.4 presents a summary of the main findings.

9.2 Relationship between economic services spending and governance

This section presents scatter plots for the various governance indices and economic service spending as shown in Figures 43-49.

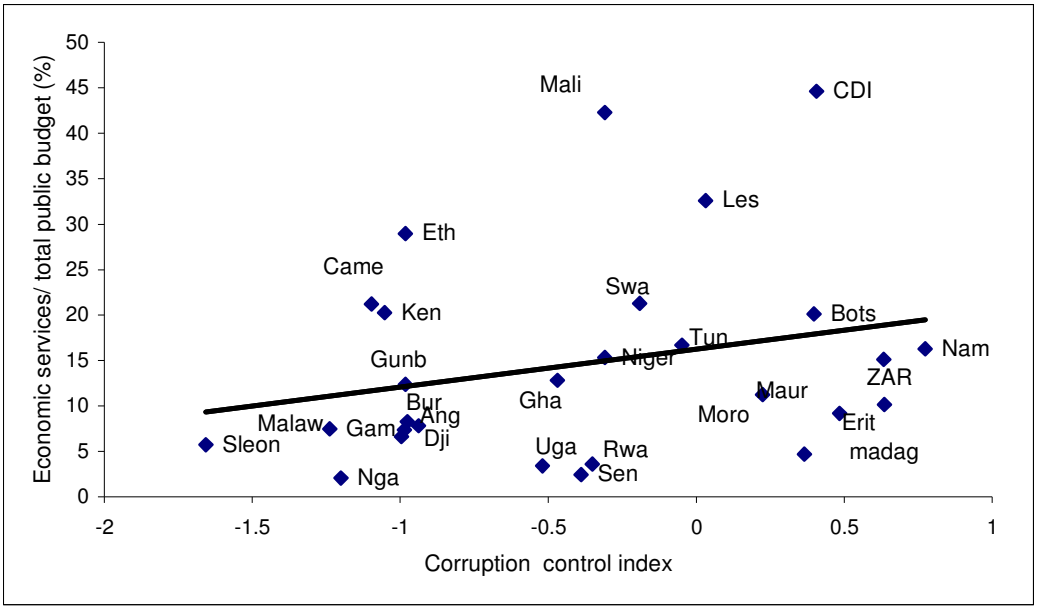


Figure 43: Corruption control index and economic services spending as a ratio of the total budget

Figure 43 shows the relationship between economic services spending and the corruption control index. It appears that Mali, Lesotho, Cote d'Ivoire and Ethiopia allocate the largest shares of their budgets to economic services, while Nigeria

allocates the least. It is also apparent that there is a weak positive relationship between the corruption control index and economic services spending. This suggests that countries that are less corrupt tend to allocate a larger share of their budgets to economic services.

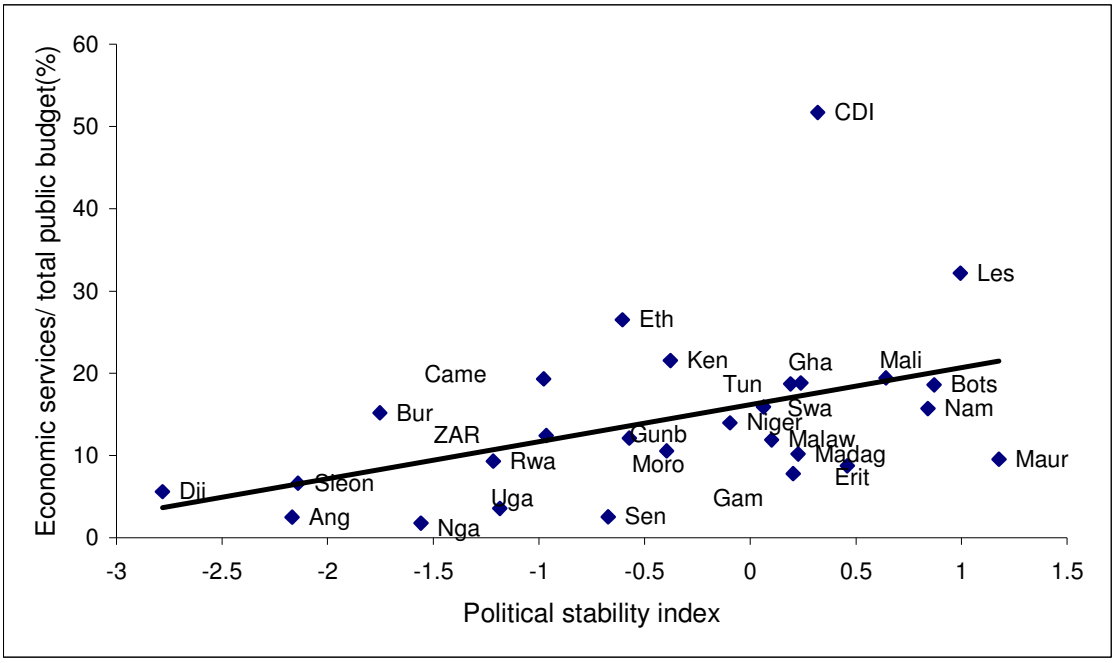


Figure 44: Political stability index and economic services spending as a ratio of the total budget

Level of political stability is found to be positively correlated to economic services spending. In other words, countries that are more politically stable tend to allocate a larger share of their budgets to economic services, while countries that are politically unstable tend to allocate a smaller part of their budgets to that sector. For the period under study, Angola, Sierra Leone, Djibouti and Burundi were the most politically unstable and spent the lowest budget share on economic services. Mauritius, Botswana, Lesotho and Cote d'Ivoire were more politically stable and spent a larger share of their public budgets on economic services.

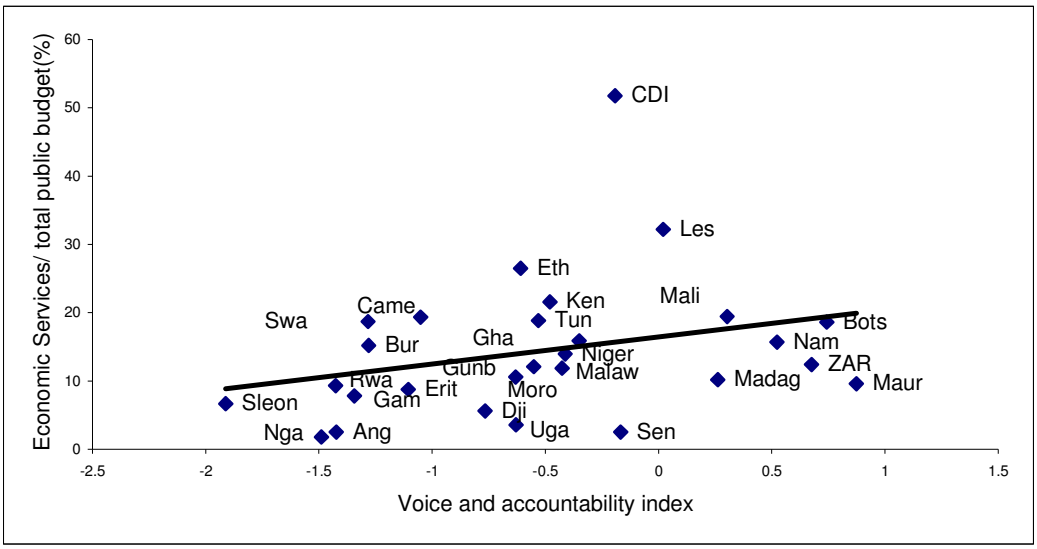


Figure 45: Voice and accountability index and economic services spending as a ratio of the total budget

Figure 45 clearly shows that countries that rank highly in terms of voice and accountability tend to allocate a larger share of their budgets to economic services, while repressive countries tend to allocate less of their budgets to this sector. To further explore these findings, the sample is divided into the most corrupt and the least corrupt countries, as shown in Figures 46-49.

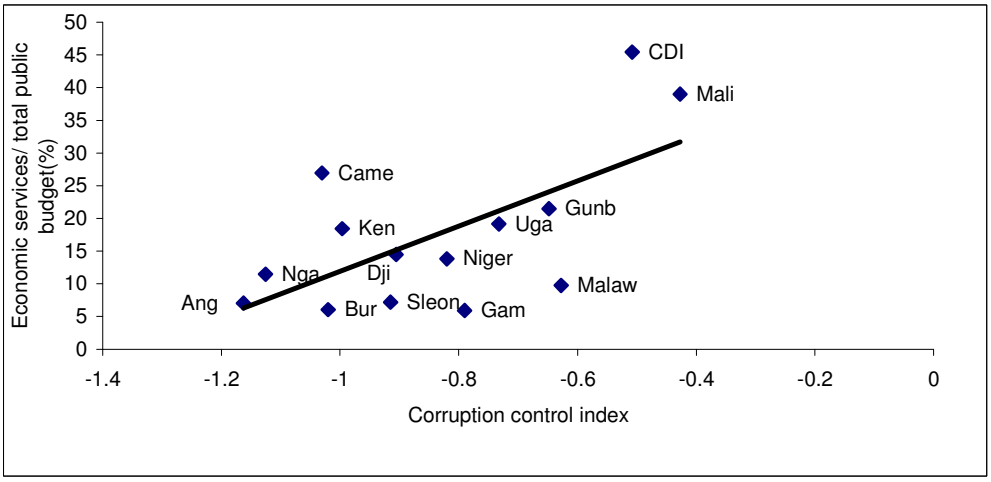


Figure 46: Corruption control index and economic services spending as a ratio of the total budget: 'most corrupt' sub-sample

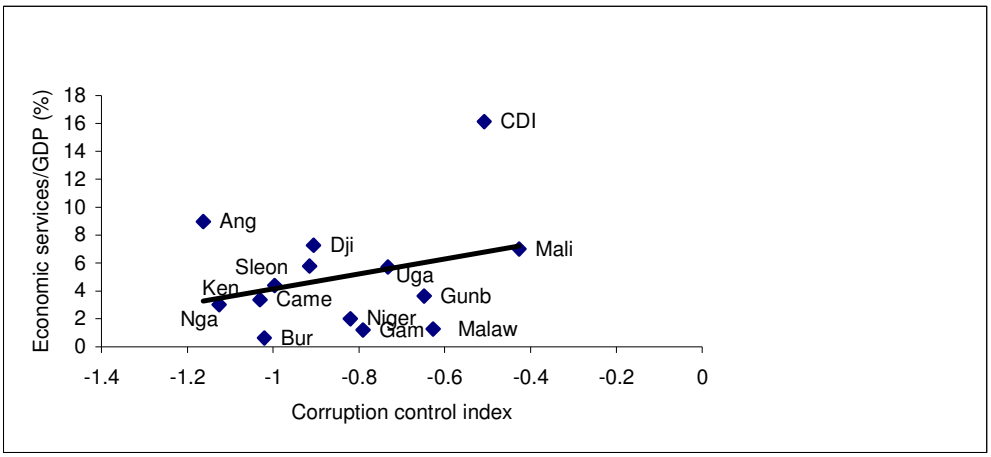


Figure 47: Corruption control index and economic services spending as a ratio of the GDP: ' most corrupt' sub-sample

Figures 46 and 47 show the relationship between the corruption control index and economic services spending in the 'most corrupt' sub-sample. These results are consistent with the full sample findings, namely that there is a negative relationship between the level of corruption and economic services spending. However, in the 'less corrupt' sub-sample, as shown in Figures 48 and 49, a negative and relatively weak relationship exists between the corruption control index and economic services.

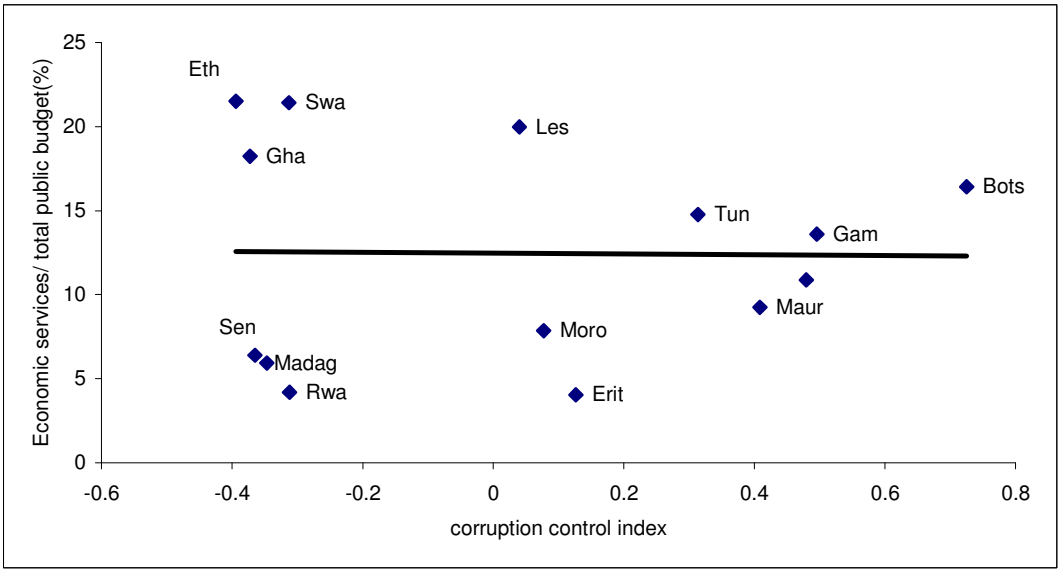


Figure 48: Corruption control index and economic services spending as a ratio of the total budget: 'less corrupt' sub-sample

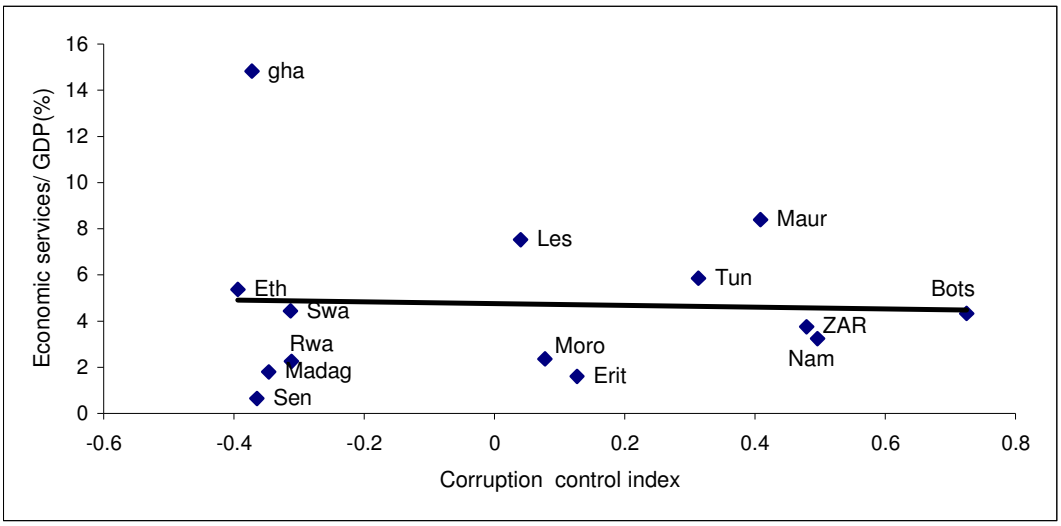


Figure 49: Corruption control index and economic services spending as a ratio of the GDP: 'less corrupt' sub-sample

9.2 Estimation results of economic services spending

This section reports the estimation results, as shown in Tables 18-20. In the full sample, the coefficients for the corruption control index have mixed signs. In the cases where the dependent variable is expressed as a share of the total public budget, the estimated coefficients are negative and significant at the conventional levels of testing, while they are positive and insignificant in the cases where the dependent variable is expressed as a share of the GDP. In the sub-sample estimations, the coefficients are not significant and have mixed signs for the 'most corrupt' sub-sample, and are positive and significant in three of the four 'less corrupt' sub-sample. These findings are to a large extent inconsistent with those of previous studies indicating that more corrupt countries generally spend larger shares of their budgets on economic services. However, the fact that the corruption control index is found to be negative suggests that corruption may have an influence on budget allocation to the economic services sector. Economic services include public works and all public programs that require heavy capital investment and, in most cases, sophisticated technology. Furthermore, competition to procure contracts in this sector tends to be

oligopolistic in nature and, therefore, corruption can easily occur in the procurement process.

For the full sample, the estimated coefficients of the political stability index are positive and significant at the conventional levels of testing in most cases. On the other hand, for the 'most corrupt' sub-sample, the estimated coefficients have mixed signs, with most being negative and significant at the conventional levels of testing. For the 'less corrupt' sub-sample the results are consistent with the full sample results. This, therefore, suggests that when a country is politically unstable it drains resources from the economic services sector and as it becomes more stable it increases the budgetary allocation to that sector. This is plausible because in times of political instability, a government tends to focus on the security of the state and not on infrastructural development. In estimations where the dependent variable is expressed as a share of the GDP, the coefficients are negative, but the relationship is not significant at the conventional levels of testing.

For the full sample, the estimated coefficients of the voice and accountability index have mixed signs. In those cases where the dependent variable is expressed as a share of the GDP, the estimated coefficients are positive and significant at the conventional levels of testing. For the 'most corrupt' sub-sample, all the estimated coefficients are positive, but not all of them are significant at the conventional levels of testing. For the 'less corrupt' sub-sample the estimated coefficients are significant but with mixed signs. These findings, therefore, suggest that the role of voice and accountability is not very pronounced in tilting the budget towards the economic services sector.

Table 18: Estimation results of economic services spending: full sample

	Dependent variable expressed as share of the total public budget				Dependent variable expressed as share of the GDP			
	PM	PM	PM	PM	FEM	FEM	FEM	FEM
Cor	-0.084** (-2.423)			-0.182*** (-5.194)	0.042 (0.645)			-0.058 (-0.844)
Pol		0.088*** (4.931)		0.141*** (6.802)		0.080* (1.857)		0.022 (0.445)
Acc			0.023 (1.090)	-0.046** (-2.349)			0.245*** (3.950)	0.255*** (3.554)
Lden	-0.221*** (-10.876)	-0.217*** (-10.595)	-0.218*** (-10.544)	-0.222*** (-11.818)	0.409*** (2.780)	0.436*** (2.995)	0.474*** (3.269)	0.502*** (3.328)
Ldebt	0.094*** (6.110)	0.069*** (4.098)	0.093*** (5.757)	0.062*** (3.761)	0.262** (2.593)	0.294 (2.948)	0.246** (2.513)	0.272*** (2.651)
Lgov	0.602*** (3.813)	0.706*** (4.745)	0.656*** (4.051)	0.594*** (3.762)				
Lpop	0.122 (1.193)	-0.084 (-0.908)	0.010 (0.103)	0.100 (1.118)	1.496*** (3.877)	1.511*** (3.946)	1.458*** (3.824)	1.490*** (3.764)
Lypc	0.254*** (3.948)	-0.004 (-0.072)	0.116** (1.913)	0.210*** (3.273)	0.316 (1.562)	0.360* (1.792)	0.437** (2.198)	0.436** (2.108)
IMF	0.895*** (5.449)	0.882*** (5.628)	0.855*** (4.996)	0.985*** (5.925)	0.087* (1.907)	0.081* (1.774)	0.116** (2.593)	0.117** (2.578)
IMF*Lgov	-1.499*** (-5.447)	-1.484*** (-5.565)	-1.451*** (-5.083)	-1.613** (-5.939)				
Lurb	-0.092 (-0.998)	0.134 (1.580)	0.019 (0.204)	-0.028 (-0.342)	1.675*** (4.876)	1.716*** (5.024)	1.630*** (4.817)	1.677*** (4.770)
C	0.034 (0.098)	0.745** (2.434)	0.492 (1.448)	-0.079 (-0.241)				
R^2	0.95	0.96	0.96	0.96	0.11	0.12	0.16	0.16
Adj. R^2	0.95	0.96	0.96	0.96	0.09	0.10	0.13	0.13
N	28	28	28	28	28	28	28	28
T	10	10	10	10	10	10	10	10
Diagnostic tests								
F test	2.354	2.165	2.457	2.476				
LM test	0.356	0.548	0.457	0.375				
Hausman test	33.88 [0.0001]	43.89 [0.0001]	35.74 [0.0001]	43.94 [0.0001]	42.07 [<0.0001]	56.27 [<0.0001]	78.14 [<0.0001]	84.22 [<0.0001]

*** Significant at 1%; ** significant at 5%; and * significant at 10%; t-statistics in bracket. PM is the pooled model and FEM is the fixed effects model.

Table 19: Estimation results of economic services spending as a proportion of the total public budget

	'Most corrupt' sub-sample				'Less corrupt' sub-sample			
	PM	PM	PM	PM	PM	PM	PM	PM
Cor	0.225*** (2.928)			0.082 (0.992)	-0.068 (-1.527)			-0.052 (-1.011)
Pol		0.094*** (3.397)		-0.038 (-0.904)		0.125*** (3.165)		0.183*** (4.061)
Acc			0.267*** (6.141)	0.291*** (4.134)			-0.061** (-2.601)	-0.102*** (-3.808)
Lden	-0.219*** (-4.291)	-0.220*** (-4.056)	-0.062 (-0.993)	-0.034 (-0.522)	-0.195*** (-9.535)	-0.191*** (-7.519)	-0.198*** (-10.031)	-0.211*** (-8.954)
Ldebt	0.064 (1.449)	0.059 (1.314)	0.190*** (4.600)	0.192*** (3.650)	0.077*** (5.457)	0.059*** (3.698)	0.077*** (5.670)	0.058*** (3.643)
Lgov	0.429** (1.919)	0.512** (2.253)	0.293 (1.356)	0.241 (1.099)	0.727*** (3.475)	0.800*** (3.735)	0.909*** (4.507)	0.822*** (3.597)
Lpop	0.236* (1.726)	0.171 (1.253)	-0.150 (-0.981)	-0.160 (-1.035)	-0.026 (-0.166)	0.241 (1.293)	-0.060 (-0.396)	0.365* (1.825)
Lypc	0.637*** (5.768)	0.601*** (5.607)	0.435*** (3.868)	0.419*** (3.633)	0.017 (0.186)	-0.003 (-0.037)	0.052 (0.587)	0.165* (1.657)
IMF	0.641*** (2.714)	0.823*** (3.942)	0.468** (2.201)	0.335 (1.406)	1.817*** (7.314)	1.787*** (7.763)	1.977*** (7.878)	1.854*** (7.758)
IMF*Lgov	-0.955** (-2.580)	-1.289*** (-3.859)	-0.795** (-2.351)	-0.573 (-1.526)	-3.305 (-8.026)	-3.145*** (-8.007)	-3.522*** (-8.628)	-3.185*** (-8.051)
Lurb	-0.026 (-0.195)	0.013 (0.097)	0.227* (1.613)	0.243* (1.710)	-0.071 (-0.525)	-0.215 (-1.480)	-0.051 (-0.382)	-0.294* (1.917)
C	-1.739*** (-3.616)	-1.575*** (-3.357)	-0.475 (-0.971)	-0.438 (-0.846)	1.545*** (3.388)	0.625 (1.075)	1.435*** 93.176)	-0.219 (-0.329)
R^2	0.84	0.87	0.95	0.94	0.97	0.95	0.97	0.96
Adj. R^2	0.84	0.86	0.95	0.93	0.96	0.94	0.97	0.95
N	14	14	14	14	14	14	14	14
T	10	10	10	10	10	10	10	10
Diagnostic tests								
F test	2.354	2.964	3.174	3.001	3.487	3.298	2.938	3.087
Hausman test	50.73 [<0.0001]	78.89 [<0.0001]	46.92 [<0.0001]	67.60 [<0.0001]	46.94 [<0.0001]	50.36 [<0.0001]	-	-

*** Significant at 1%; ** significant at 5%; and * significant at 10%; t-statistics in bracket. PM is the pooled model.

Table 20: Estimation results of economic services spending as a proportion of the GDP

	'Most corrupt' sub-sample				'Less corrupt' sub-sample			
	PM	PM	PM	PM	PM	PM	PM	PM
Cor	0.320***			0.319***	0.083			0.004
	(3.436)			(3.282)	(1.386)			(0.056)
Pol		-0.088**		-0.158***		0.459***		0.531***
		(-2.383)		(3.856)		(7.902)		(7.989)
Acc			0.115*	0.096			0.061*	-0.099***
			(1.788)	(1.296)			(1.790)	(-2.670)
Lden	-0.212***	-0.325***	-0.209***	-0.252***	0.139***	0.080**	0.109***	0.058
	(-3.818)	(-5.722)	(-3.203)	(-3.805)	(5.025)	(1.998)	(3.476)	(1.454)
Ldebt	-0.136	0.166	-0.036	0.206	0.006	-0.004	0.020	-0.011
	(-1.345)	(1.268)	(-0.386)	(1.495)	(0.212)	(-0.096)	(0.743)	(-0.256)
Lpop	0.758***	0.371*	0.515***	0.429**	-0.299	1.463***	-0.011	1.700***
	(4.106)	(1.874)	(2.898)	(2.284)	(-1.451)	(5.709)	(-0.047)	(6.094)
Lypc	0.267	0.471**	0.487**	0.430***	0.163*	0.471***	0.229**	0.630***
	(1.373)	(2.454)	(2.458)	(2.284)	(1.712)	(5.540)	(2.123)	(5.596)
IMF	-0.063	-0.079*	-0.094**	-0.104**	0.003	0.063	0.001	0.115
	(-1.284)	(-1.665)	(-1.990)	(-2.043)	(0.035)	(0.866)	(0.021)	(1.455)
Lurb	0.978***	0.561***	0.664***	0.621***	0.199	-1.080***	-0.080	-1.232***
	(4.936)	(2.728)	(3.612)	(2.777)	(1.091)	(-5.308)	(-0.394)	(-5.689)
C	-0.259	-1.503**	-0.859	-1.266*	0.588	-4.191***	0.217	-5.313***
	(-0.385)	(-2.067)	(-1.260)	(-1.835)	(1.098)	(-5.900)	(0.355)	(-6.156)
R^2	0.80	0.71	0.80	0.75	0.89	0.66	0.82	0.72
Adj. R^2	0.79	0.70	0.79	0.73	0.88	0.64	0.82	0.70
N	14	14	14	14	14	14	14	14
T	10	10	10	10	10	10	10	10
Diagnostic tests								
F test	2.384	2.475	2.483	2.589	2.514	2.478	2.568	2.723
Hausman test	128.72 [<0.0001]	72.85 [<0.0001]	113.95 [<0.0001]	123.68 [<0.0001]	13.25 [0.0663]	3.04 [0.8810]	137.46 [<0.0001]	44.98 [<0.0001]

*** Significant at 1%; ** significant at 5%; and * significant at 10%; t-statistics in bracket. PM is the pooled model.

The estimated coefficients for population density are positive and significant in all cases in the full sample and sub-sample estimations. This suggests that as population density increases, governments tend to devote an increasing share of their budgets to the economic services sector. Closely related to population density is urbanisation rate, which is also positive and significant at conventional levels in all cases both in the full sample and sub-sample estimations. These results suggest that as population density and urbanisation increase, governments allocate larger shares of their budget to the economic services sector. This may be because as a country becomes more urbanised, the demand for public utilities such as roads, water and sewage increases.

The estimated coefficients of population size are insignificant in the estimations where the dependent variable is expressed as a share of the budget and has mixed signs. However, in those cases where the dependent variable is expressed as a share of the GDP, the estimated coefficients are positive and significant at the conventional levels of testing. Further estimations for the sub-samples show that in the 'most corrupt' sub-sample, all the positive coefficients are also significant at the conventional levels, while all the negative coefficients are statistically insignificant. For the 'less corrupt' sub-sample, the results are largely similar to those obtained for the 'most corrupt' sub-sample. This, therefore, suggests that a larger population tends to compel a government to spend a larger share of its budget on economic services.

For the full sample, the coefficients of public debt are positive, although not significant in some cases. For the sub-samples, all the coefficients which have the expected positive signs are significant and those with the wrong signs are not significant. These results, therefore, suggest that as a country accumulates foreign public debt, a larger share of its budget goes to the economic services sector.

In those cases where the dependent variable is expressed as a share of the total public budget, the size of government is positively related to economic services sector spending, in the full sample. The same pattern is found in the sub-samples although the estimated coefficients are higher for the 'less corrupt' sub-sample than for the 'most corrupt' sub-sample. The positive relationship may be explained by the fact that large governments are plagued by several risks (Mahdavi, 2004), such as corruption and external shocks, which may lead to a larger share of the budget being spent on economic services.

For the full sample, the estimated coefficients of the level of income per capita are positive and significant at the conventional levels of testing. The results are similar in both the 'most corrupt' sub-sample and the 'less corrupt' sub-sample. This suggests that, as a country develops, it favours economic services spending. This finding is plausible because the economic services sector largely includes capital expenditures on infrastructure which the state must provide.

The estimated coefficients of the IMF dummy are positive and significant in all the estimations for the full sample. However, for the 'most corrupt' sub-sample, when the dependent variable is expressed as a share of the public budget, the estimated coefficients are positive, while when it is expressed as a share of the GDP the coefficients are negative. In contrast, for the 'less corrupt' sub-sample, when the dependent variable is expressed as a share of the total public budget, all the estimated coefficients are positive and significant at 1% level of testing, while when the dependent variable is estimated as a share of the GDP, the coefficients are not significant at the conventional levels of testing.

The estimated coefficients of the IMF interaction term are negative and significant for the full sample and greater than unity in all instances. Estimation results obtained in the sub-sample cases are consistent with those obtained for the full sample. However, the estimated coefficients for the 'most corrupt' sub-sample are less than unity, which suggests that in this sub-sample, the rate of

increase of economic services spending is lower than the rate of cuts in the total budget-to-GDP ratio, implying that these expenditures are resilient in IMF-supported countries for this period. In contrast, the estimated coefficients for the 'less corrupt' sub-sample are found to be greater than unity, which suggests that these expenditures are not resilient in cases where IMF programmes are implemented.

9.3 Summary

The results show that all the estimated coefficients of the corruption control index are negative and statistically insignificant, which suggests that countries that are corrupt tend to allocate a larger share of their budgets to economic services. However, these results are not conclusive. When the countries are divided into 'most corrupt' and 'less corrupt' sub-samples, the estimated coefficients are largely consistent with those obtained for the full sample. For the 'most corrupt' sub-sample the coefficients are negative and largely significant as expected. All these results, therefore, are not conclusive with regard to the role of corruption in budget allocation to economic services.

As expected, countries that are politically stable tend to allocate a higher share of their budgets to the economic services sector. The estimated coefficients of the voice and accountability index show mixed signs. This index appears to be insignificant in explaining economic services spending in the 'less corrupt' sub-sample, but is positive and significant for all cases in the 'most corrupt' sub-sample, which implies that the role of voice and accountability is more important in the budget allocation of more corrupt countries than in less corrupt ones.

The estimated coefficients of population density are negative and significant at the conventional levels of testing. These results are replicated in the sub-samples, where the estimated coefficients have mixed signs. Also, the estimated coefficients of the urbanisation rate have mixed signs and are insignificant in all

the estimations for the full sample. However, in the 'most corrupt' sub-sample estimations, they are positive and largely significant, while in the 'less corrupt' sub-sample they are negative and significant in most cases. Also, the estimated coefficients of population size are positively related to economic services, although they are not statistically significant at the conventional levels of testing.

The coefficients of level of development, which is proxied by the level of income per capita, are positive and significant at the conventional levels of testing in most of the estimations. The size of government is significant at 1% level and positive in all the estimations.

The role of the IMF variable in the allocation of the budget share to economic services was also tested. In those cases where the dependent variable is expressed as a share of the total public budget, the estimated coefficients are positive and significant at the conventional levels of testing. However, in those cases where the dependent variable is expressed as a share of the GDP, most of the estimated coefficients have unexpected signs and are insignificant. These results, therefore, suggest that the IMF programmes plays an important role in tilting the budget towards the economic services sector. The estimated coefficients of the interaction term are negative and significant at the conventional levels of testing. The coefficients of the public debt variable are positive and significant at the conventional levels of testing.

CHAPTER TEN: 'OTHER' SPENDING

10.1 Introduction

Chapter 10 concludes the analysis with the final expenditure category, namely 'other' spending. It is divided into three sections: Section 10.2 contains a graphical representation of the relationship between the various governance indices and 'other' spending, Section 10.3 is devoted to empirical estimation results and section 10.4 contains a summary of the findings.

10.2 Relationship between governance and 'other' spending

'Other' spending includes several expenditure items: first, transfers from the national government to local authorities, which includes recurrent and capital transfers; second, expenditures on public debt, which includes foreign and domestic debt repayment of principal and interest; and third, miscellaneous or indivisible expenditures. The relationship between the various governance indices and 'other' spending are shown in Figures 50-56.

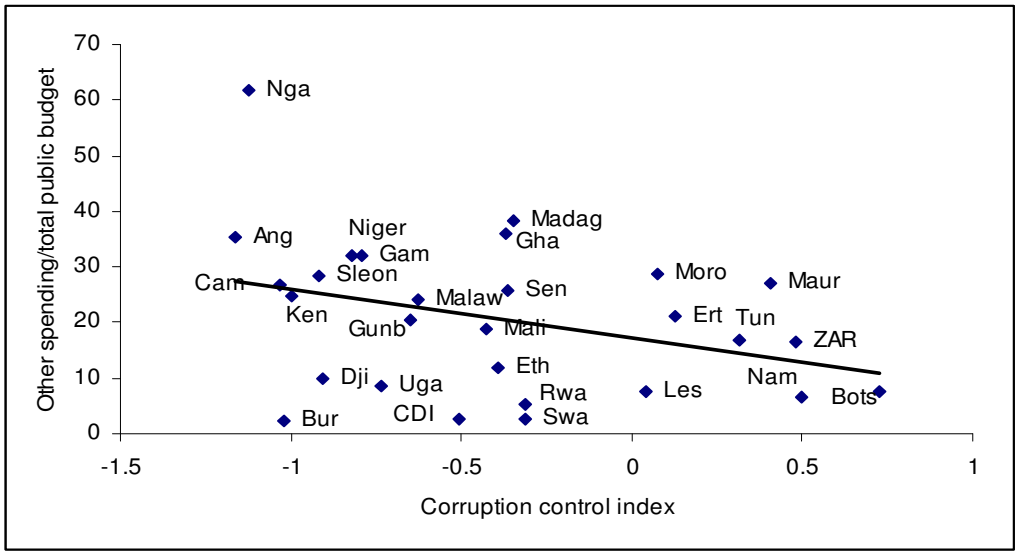


Figure 50: Corruption control index and 'other' spending as a ratio of the total budget

Figure 50 shows a weak negative relationship between the corruption control index and 'other' spending. This suggests that countries that are less corrupt tend to allocate smaller shares of their budgets to 'other' spending and vice versa. Nigeria, Angola, Niger and Sierra Leone are notoriously corrupt and allocate the largest budget shares to 'other' spending. In the 'less corrupt' sub-sample, Mauritius, Tunisia and South Africa allocate larger budget shares to 'other' spending, while Botswana and Namibia allocate the least.

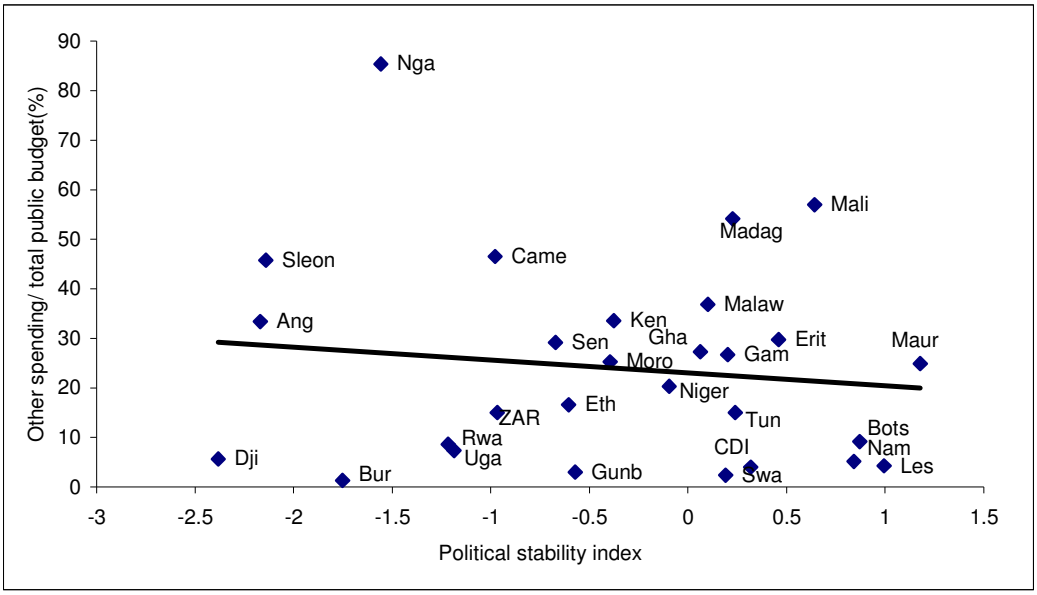


Figure 51: Political stability index and 'other' spending as a share of the total budget

Figure 51 shows the relationship between political stability index and 'other' spending as a share of the total public budget. A weak negative relationship can be seen between political stability index and 'other' spending, which suggests that countries that are politically more stable tend to allocate a smaller budget share to 'other' spending. Of the unstable countries, Nigeria, Sierra Leone, Cameroon and Angola have above average allocation to 'other' spending, while Djibouti and Burundi have below average allocations. Amongst the more politically stable countries, Madagascar and Mali allocate larger budget shares to 'other' spending while Namibia, Botswana and South Africa allocate the least.

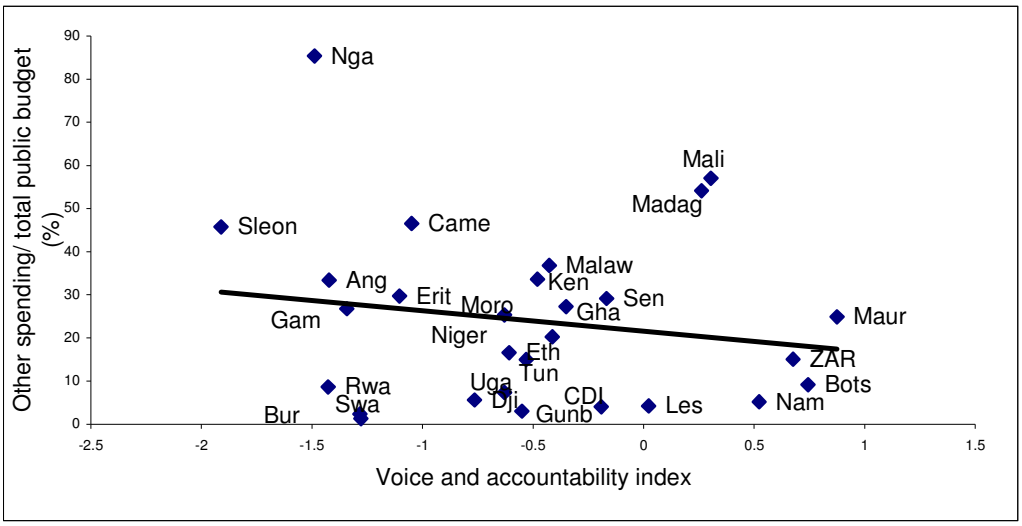


Figure 52: Voice and accountability index and 'other' spending as a share of the total budget

A negative relationship exists between the voice and accountability index and 'other' spending, as shown in Figure 52. The pattern seen with the political stability index is replicated here, with Nigeria and Sierra Leone allocating the largest budget share to 'other' spending amongst the most undemocratic and unaccountable countries and South Africa, Botswana and Namibia allocating the smallest budget shares among the most democratic and accountable countries.

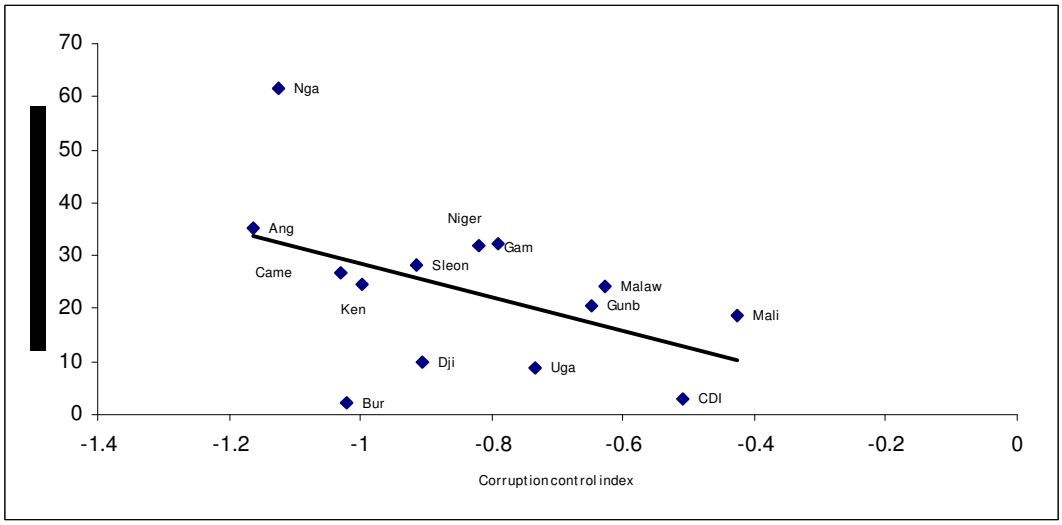


Figure 53: Corruption control index and 'other' spending as a share of the total budget: 'most corrupt' sub-sample

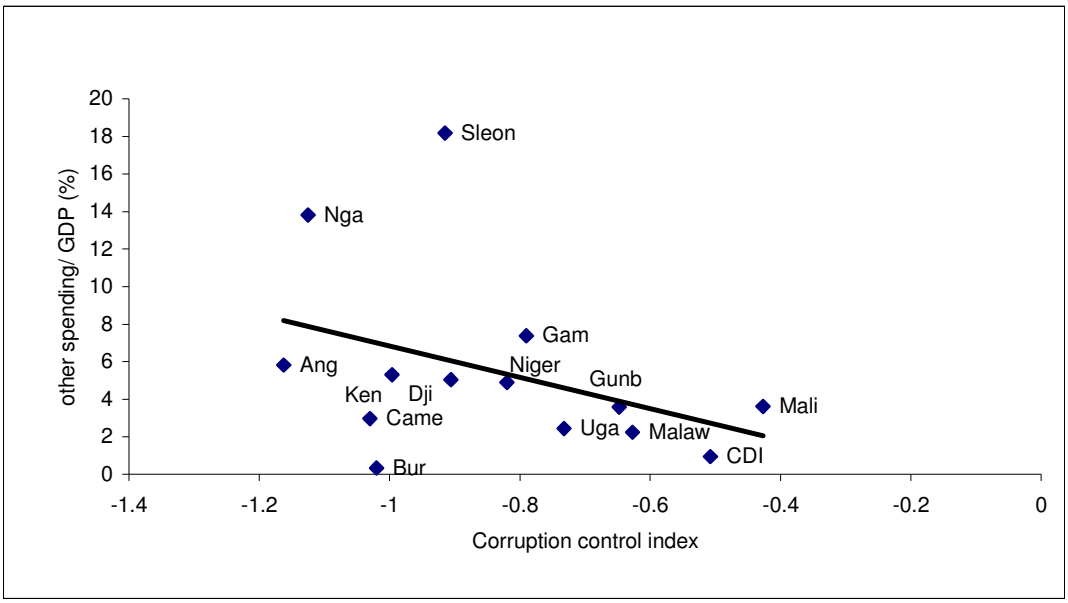


Figure 54: Corruption control index and 'other' spending as a share of the GDP: 'most corrupt' sub-sample

Figures 53 and 54 show the relationship between the corruption control index and ‘other’ spending in the ‘most corrupt’ sub-sample. There is a strong negative relationship between the index and ‘other’ spending. In the full sample (Figure 50) a negative relationship can be seen, which is replicated amongst the most corrupt countries. Figures 55 and 56 show the relationship between the corruption control index and ‘other’ spending in the full sample, which is a very weak relationship. Therefore, the weak relationship observed in the full sample is largely due to the spending behaviour of the less corrupt countries. This suggests that the more corrupt a country is the larger the budget share it allocates to ‘other’ spending. This is plausible because the bulk of ‘other’ spending consists of transfers from the national government to local authorities. Since corruption is found at all levels of government, a possible explanation of the results is that corruption at the local government level leads to higher transfers from the national government.

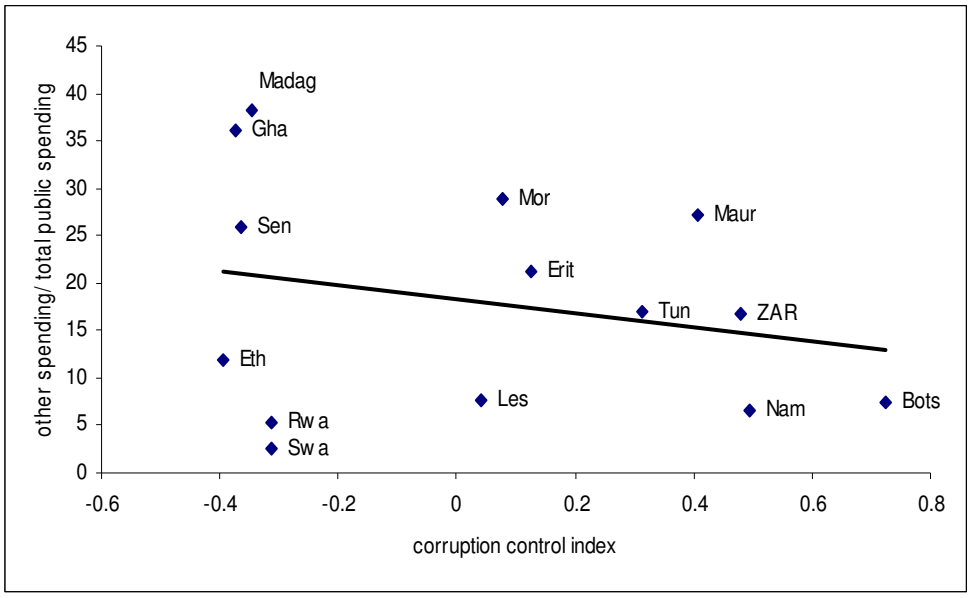


Figure 55: Corruption control index and 'other' spending as a ratio of the total budget: 'less corrupt' sub-sample

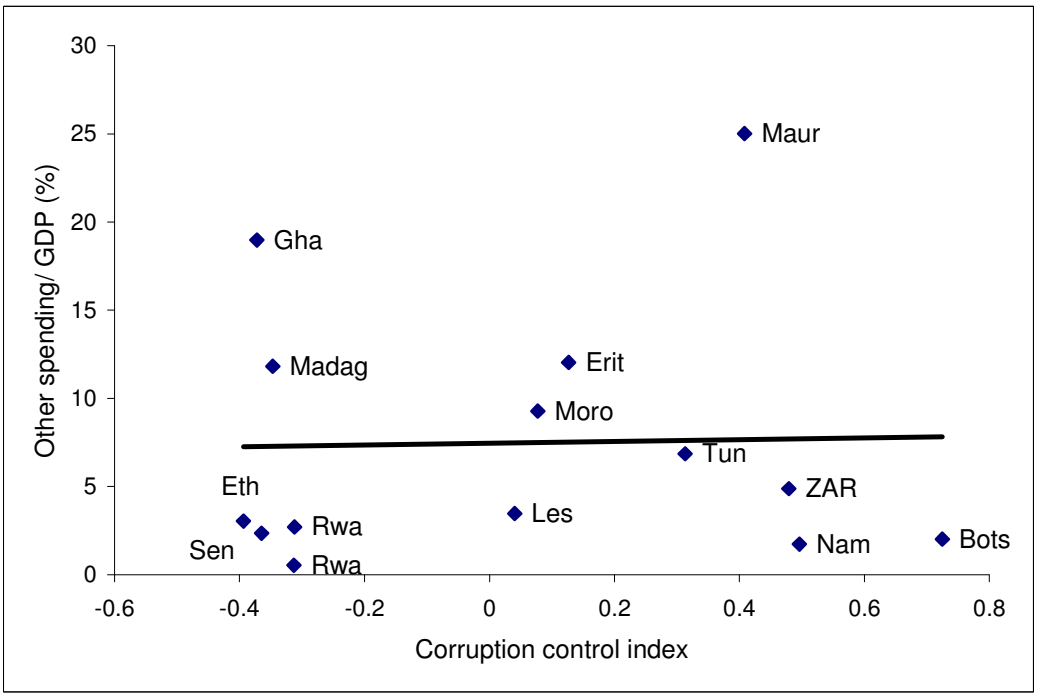


Figure 56: Corruption control index and 'other' spending as a ratio of the GDP: 'less corrupt' sub-sample

10.3 Estimation results of 'other' spending

This section reports the estimation results for 'other' spending as a share of the total public budget and of the GDP, as shown in Tables 21-23.

The estimation results for the category 'other' spending as a share of the public budget and of the GDP are reported in Tables 21-23. Those estimations where the dependent variable is expressed as a share of the public budget, the corruption control index is negative and significant at 1% level of testing. In those cases where the dependent variable is expressed as a share of the GDP, the coefficients are positive and significant at 1% level of testing. In those estimations where the dependent variable is expressed as a share of the public budget, the result suggests that as a country becomes less corrupt, it tends to allocate a smaller share of its budget to 'other' spending. In contrast, the results for cases where the dependent variable is expressed as a share of the GDP suggest that as the country becomes corruption-free, it tends to allocate more of its resources to 'other' spending.

The political stability index is found to be positively related to 'other' spending. This suggests that as a country becomes more stable, it tends to allocate more resources to 'other' spending. This is plausible because a country facing political problems will probably focus on security and so pass fewer resources on to other tiers of government or interest payments and capital redemption of both domestic and foreign loans.

Table 21: Estimation results of 'other' spending: full sample

	Dependent variable expressed as a share of the total public budget				Dependent variable expressed as a share of the GDP			
	PM	PM	PM	PM	PM	PM	PM	PM
Cor	0.106** (2.095)			-0.180*** (-3.294)	0.278*** (5.801)			0.208*** (4.246)
Pol		0.188*** (7.814)		0.175*** (5.619)		0.113*** (4.562)		0.060** (2.331)
Acc			0.234*** (6.956)	0.155*** (3.871)			0.157*** (4.685)	0.102*** (3.629)
Lden	0.123*** (2.823)	0.153*** (3.847)	0.201*** (4.760)	0.193*** (4.817)	0.317*** (7.883)	0.319*** (7.897)	0.374*** (8.364)	0.412*** (9.201)
Ldebt	-0.053* (-1.776)	-0.121*** (-4.263)	-0.051* (-1.867)	-0.114*** (-4.012)	-0.085** (-2.166)	-0.107*** (-2.882)	-0.070* (-1.928)	-0.118*** (-3.013)
Lgov	-0.425** (-2.342)	-0.375** (-2.308)	-0.721*** (-4.304)	-0.666*** (-3.939)				
Lpop	-1.104*** (-8.427)	-1.091*** (-9.723)	-1.149*** (-9.934)	-1.015*** (-8.728)	-1.445*** (-11.287)	-1.260*** (-10.433)	-1.290*** (-10.384)	-1.597*** (-11.431)
Lypc	-0.547*** (-6.466)	-0.659*** (-9.989)	-0.705*** (-9.794)	-0.630*** (-8.237)	-0.703*** (-8.578)	-0.457*** (-6.873)	-0.520*** (-7.631)	-0.802*** (-9.016)
IMF	-0.801*** (-4.088)	-0.742*** (-4.161)	-1.102*** (-5.881)	-0.9925*** (-5.281)	-0.073 (-1.581)	-0.051 (-1.228)	-0.122*** (-2.780)	-0.082* (-1.807)
IMF*Lgov	1.396*** (4.285)	1.325*** (4.466)	1.786*** (5.797)	1.562*** (5.281)				
Lurb	1.283*** (10.654)	1.342*** (12.887)	1.309*** (12.384)	1.254*** (11.837)	1.526*** (12.293)	1.379*** (11.121)	1.316*** (11.441)	1.664*** (12.345)
C	2.186*** (5.155)	2.071*** (5.896)	2.904*** (7.451)	2.137*** (5.349)	2.466*** (7.009)	1.423*** (4.772)	2.130*** (5.838)	2.853*** (7.143)
R^2	0.38	0.48	0.46	0.52	0.82	0.84	0.82	0.88
Adj. R^2	0.36	0.47	0.45	0.50	0.81	0.83	0.81	0.87
Diagnostic tests								
Hausman test	8.42 [0.4922]	15.92 [0.0683]	21.84 [0.0094]	29.56 [0.0019]	34.58 [<0.0001]	29.06 [0.0001]	25.35 [0.0007]	56.94 [<0.0001]

*** Significant at 1%; ** significant at 5%; and * significant at 10%; t-statistics in bracket. PM is the pooled model.

Table 22: Estimation results of 'other' spending as share of the total public budget

	'Most corrupt' sub-sample				'Less corrupt' sub-sample			
	PM	PM	PM	PM	PM	PM	PM	PM
Cor	-0.005 (-0.037)			-0.262** (-2.143)	0.185*** (2.671)			0.019 (0.273)
Pol		0.221*** (6.251)		0.397*** (7.831)		0.203*** (3.930)		0.072 (1.306)
Acc			0.151* (1.920)	-0.354*** (-3.294)			0.196*** (6.317)	0.170*** (4.579)
Lden	-0.071 (-0.814)	-0.014 (-0.189)	0.035 (0.352)	-0.259*** (-2.784)	0.226*** (5.572)	0.225*** (5.751)	0.277*** (7.383)	0.274*** (7.294)
Ldebt	-0.030 (-0.481)	-0.165*** (-2.899)	-0.004 (-0.060)	-0.299*** (-4.221)	-0.081** (-2.552)	-0.119*** (-3.785)	-0.095*** (-3.347)	-0.104*** (-3.490)
Lgov	-1.137*** (-3.520)	-1.276*** (-4.639)	-1.345*** (-4.120)	-0.735*** (-2.632)	0.330 (1.450)	0.064 (0.301)	-0.166 (-0.817)	-0.139 (-0.632)
Lpop	-1.319*** (-6.181)	-1.262*** (-6.813)	-1.465*** (-6.619)	-0.808*** (-4.006)	-1.574*** (-8.652)	-0.963*** (-4.343)	-1.319*** (-8.043)	-1.160*** (-5.334)
Lypc	-1.388*** (-7.026)	-1.172*** (-6.983)	-1.380*** (-7.334)	-0.905*** (-5.430)	-0.708*** (-6.443)	-0.513*** (-5.122)	-0.712*** (-7.681)	-0.679*** (-6.421)
IMF	-1.388*** (-3.989)	-1.488*** (-5.354)	-1.643*** (-4.859)	-0.668*** (-2.176)	-0.246 (-1.229)	-0.439** (-2.283)	-0.574*** (-3.182)	-0.679*** (-6.421)
IMF*Lgov	2.369*** (4.183)	2.461*** (5.377)	2.709*** (4.991)	1.281*** (2.625)	0.426 (1.213)	0.896** (2.576)	0.889*** (2.807)	0.948*** (2.847)
Lurb	1.503*** (7.194)	1.507*** (8.412)	1.629*** (7.698)	1.123*** (6.057)	1.659*** (10.676)	1.245*** (7.070)	1.453*** (10.325)	1.350*** (7.948)
C	4.834*** (6.703)	4.423*** (7.050)	5.221*** (7.159)	2.940*** (4.409)	2.979*** (5.244)	1.009 (1.514)	2.807*** (5.683)	2.257*** (3.249)
R^2	0.43	0.56	0.45	0.63	0.64	0.66	0.71	0.71
Adj. R^2	0.39	0.53	0.41	0.60	0.61	0.64	0.69	0.69
Diagnostic tests								
Hausman	21.66 [0.0100]	1.93 [0.9325]	0.32 [0.9914]	33.29 [0.0005]	5.06 [0.8295]	5.91 [0.7489]	9.43 [0.3989]	8.58 [0.6607]

*** Significant at 1%; ** significant at 5%; and * significant at 10%; t-statistics in bracket. PM is the pooled model.

Table 23: Estimation results of 'other' spending as share of the GDP

	'Most corrupt' sub-sample				'Less corrupt' sub-sample			
	PM	PM	PM	PM	PM	PM	PM	PM
Cor	-0.174**			-0.294***	0.181**			0.233***
	(-2.116)			(-3.148)	(2.070)			(2.627)
Pol		0.024		0.074		0.279***		0.183***
		(0.643)		(1.563)		(4.735)		(2.806)
Acc			-0.015	0.070			0.178***	0.125***
			(-0.334)	(1.103)			(4.771)	(3.587)
Lden	-0.201***	-0.140**	-0.148**	-0.128**	0.518***	0.532***	0.617***	0.600***
	(-4.146)	(-2.331)	(-2.357)	(-2.364)	(8.526)	(8.457)	(10.586)	(11.401)
Ldebt	0.418***	0.337***	0.396***	0.368***	-0.147***	-0.165***	-0.158***	-0.153***
	(4.034)	(3.053)	(4.165)	(2.894)	(-3.129)	(-3.199)	(-3.419)	(-3.323)
Lpop	-1.729***	-1.886***	-1.734***	-2.032***	-1.296***	-0.195	-1.486***	-0.790***
	(-12.646)	(-9.984)	(-12.794)	(-10.366)	(-7.625)	(-0.804)	(-8.002)	(-2.746)
Lypc	-1.422***	-1.478***	-1.333***	-1.624***	-0.487***	-0.192*	-0.692***	-0.609***
	(-11.461)	(-10.109)	(-11.799)	(-10.367)	(-4.751)	(-1.878)	(-6.109)	(-4.108)
IMF	-0.079*	-0.074*	-0.077**	-0.091*	-0.010	-0.015	-0.149*	-0.071
	(-1.678)	(-1.696)	(-2.115)	(-1.831)	(-0.128)	(-0.194)	(-1.825)	(-0.768)
Lurb	1.832***	1.997***	1.842***	2.084***	1.318***	0.501**	1.453***	0.962***
	(12.976)	(10.935)	(13.862)	(6.565)	(8.428)	(2.588)	(8.821)	(4.260)
C	3.754***	4.156***	3.604***	4.758***	1.918***	-1.285*	2.964***	1.018
	(6.697)	(5.967)	(6.583)	(6.535)	(4.068)	(-1.719)	(5.079)	(1.067)
R^2	0.92	0.94	0.96	0.92	0.87	0.86	0.86	0.87
Adj. R^2	0.91	0.92	0.93	0.91	0.86	0.85	0.85	0.86
Diagnostic tests								
Hausman test	26.57	29.64	27.75	21.93	25.01	29.44	61.24	35.05
	[0.0004]	[<0.0001]	[0.0001]	[0.0050]	[0.0008]	[<0.0001]	[<0.0001]	[<0.0001]

*** Significant at 1%; ** significant at 5%; and * significant at 10%; t-statistics in bracket. PM is the pooled model.

The voice and accountability index is found to produce coefficients that are positive and significant in all the estimations. This suggests that as a country becomes more transparent it tends to allocate an increasing share of its budget to 'other' spending. This is plausible because transfers to local authorities, for example, are more important in democratic governments than in less democratic ones. Low levels of transfer to local authorities by the national government imply

poor service delivery by local authorities, which may jeopardise the political position of the ruling party.

Population density and urbanisation are positively correlated to 'other' spending. This suggests that as a country becomes more populated and, therefore, urbanised it tends to increase budgetary allocations to 'other' spending. These results are plausible because a population increasing in size and urbanisation requires more funding at local government level. In many instances such expenditure is financed through transfers from the national government. Also, in some instances, governments have to assist with infrastructure expenditure at lower tiers of government.

The coefficients for size of government are found to be positive and significant in those estimations where the dependent variable is expressed as a share of the total public budget. This suggests that as a government becomes larger it tends to allocate more resources to 'other' spending. This result is plausible because the larger the government the more transfers there will be to be included in 'other' spending.

In all the estimations the coefficients of income per capita are negative and significant at the 1% level. This suggests that as a country develops, it tends to allocate less budgetary resources to the 'other' spending category. This result is plausible because as a country becomes more developed it tends to need local authorities that are more financially viable and therefore less reliant on the national government. This negative trend is also true for interest payments, because as a country develops, it tends more be self-sufficient in saving and so relies less on financial assistance from borrowed funds.

10.3 Summary

The coefficients of the corruption control index are negative and significant in all the estimations. In contrast, the coefficients of the political stability index are positive and significant at the conventional levels of testing, both for the full sample and the sub-samples. Similar results are obtained for the voice and accountability index. The estimated coefficients of population density are positive and insignificant. The size of government is found to be positive and significant at the 1% level. The size of the population is positively related to 'other' spending and significant at the 5% level of testing. The coefficients of the GDP per capita (level of economic development) are negative and insignificant at conventional levels of testing.

CHAPTER ELEVEN: PANEL SYSTEM APPROACH ESTIMATIONS

11.1 Introduction

In this chapter results from Chapters 4 to 10 are validated by conducting the estimations within a panel systems framework. Estimations are conducted using the iterative seemingly unrelated regression (ITSUR) procedure. Section 11.2 presents and discusses the estimations results and Section 11.3 contains the conclusions.

11.2 Panel systems estimation results

Table 24: Panel system estimation results

	General public services	Defence	Education	Health	Social welfare	Economic services	Other
Cor	-0.004 (-0.31)	0.004 (0.37)	0.036*** (4.02)	0.011** (2.87)	0.039*** (5.35)	-0.018 (-1.26)	-0.068 (n/a)
Ldefn	0.085*** (4.00)	0.125*** (6.37)	0.013 (0.87)	0.007 (1.07)	-0.018 (-1.43)	-0.007 (-0.27)	-0.205 (n/a)
Ldebt	-0.006 (-0.80)	-0.002 (-0.27)	-0.007 (-1.24)	0.002 (1.00)	-0.006 (-1.35)	0.035*** (3.77)	-0.016 (n/a)
Lgov	-0.106** (-2.32)	-0.413*** (9.80)	0.127*** (-3.91)	0.052*** (-3.82)	0.057** (-2.15)	-0.064 (-1.20)	0.347 (n/a)
Lpop	-0.094*** (-8.97)	-0.008 (-0.79)	0.013* (1.76)	-0.004 (-1.12)	0.011* (1.74)	0.003 (0.27)	0.079 (n/a)
IMF	-0.098 (-0.88)	-0.668*** (-6.44)	0.152* (1.91)	0.145*** (4.31)	-0.233*** (-3.58)	0.313** (2.38)	0.389 (n/a)
IMF*Lgov	0.074 (0.94)	0.491*** (6.73)	-0.122** (-2.18)	-0.105*** (-4.44)	-0.164*** (-3.57)	-0.235** (-2.54)	0.043 (n/a)
Lypc	-0.021 (-1.24)	-0.098*** (-6.39)	0.010 (0.84)	0.002 (0.39)	0.044*** (4.54)	0.063*** (3.24)	0.000 (n/a)
C	0.996*** (7.280)	-0.268** (-2.120)	0.231** (2.37)	0.152*** (3.70)	-0.000 (-0.00)	0.001 (0.01)	-0.112 (n/a)
R^2	0.33	0.50	0.16	0.12	0.40	0.12	-
Adj R^2	0.31	0.48	0.14	0.10	0.39	0.10	-

*** Significant at 1%; ** significant at 5%; and * significant at 10%; t-statistics in bracket.

The results in Table 24 show that corruption plays an important role in the allocation of public resources to different sectors on the budget. In the general public services spending category, the estimated coefficient of the corruption control index is negative and insignificant. Although not significant, it supports the

findings in Chapter 4 where the estimated coefficient was found to be negative and significant at the 1% level of testing in the full sample estimation. This finding, therefore, suggests that countries that suffer high levels of corruption tend to allocate a larger share of their budgets to general public services.

The estimated coefficient of the corruption control index is not significant and does not have the expected sign in the case of defence spending. This is in contrast to the findings in Chapter 5, where the estimated coefficient was found to be negative and significant at the conventional levels of testing. Thus, although corruption has been highlighted as one of the main factors prompting larger budget allocations to defence, available evidence is not conclusive.

The estimated coefficient of the corruption control index is found to be positive and significant at the 1% level in the case of education spending. This suggests that as a country becomes less corrupt, it tends to spend a larger share of its budget on education. This finding supports the results of Chapter 6, which suggest that education spending is greater in countries where corruption is not rampant. These findings further support those of Mauro (1998). The estimated coefficient of the corruption control index is positive and significant in the case of health spending, which supports the findings of Chapter 7. The social welfare spending category also seems to be positively correlated with the corruption control index, which supports the findings of Chapter 8. All these results, therefore, suggest that corrupt governments spend a smaller share of their budgets on social welfare.

The estimated coefficient of the corruption control index on the economic services spending category is negative, as expected. However, it is not significant at the conventional levels of testing. The negative sign obtained here supports the findings of Chapter 9, which suggests that economic services are affected by corruption.

Table 25: Panel system estimation results

	General public services	Defence	Education	Health	Social welfare	Economic services	Other
pol	-0.018** (-2.56)	-0.044*** (-7.42)	0.002 (0.41)	0.010*** (5.09)	0.017*** (4.10)	0.010 (1.23)	0.023 (n/a)
Ldefn	0.072*** (3.35)	0.095*** (5.17)	0.018 (1.12)	0.015** (2.37)	-0.002 (-0.18)	-0.001 (-0.05)	-0.197 (n/a)
Ldebt	-0.002 (-0.30)	0.007 (1.09)	-0.008 (-1.39)	-0.000 (-0.04)	-0.011** (-2.24)	0.033*** (3.51)	-0.019 (n/a)
Lgov	-0.093** (-2.11)	-0.458*** (-12.17)	0.096*** (2.93)	0.052*** (4.00)	0.037 (1.38)	0.090* (1.73)	0.276 (n/a)
Lpop	-0.101*** (-9.44)	-0.024*** (-2.61)	0.015* (1.87)	0.001 (0.18)	0.018** (2.78)	0.007 (0.53)	0.084 (n/a)
IMF	-0.067 (-0.60)	-0.754*** (-7.94)	-0.132 (-1.60)	0.157*** (4.80)	0.239*** (3.57)	0.344*** (2.61)	0.213 (n/a)
Imf*Lgov	0.052 (0.66)	0.553*** (8.29)	-0.108* (-1.87)	-0.114*** (-4.96)	-0.169*** (-3.60)	-0.258*** (-2.78)	0.044 (n/a)
Lypc	-0.008 (-0.57)	-0.057*** (-4.58)	0.035*** (3.26)	0.001 (0.30)	0.059*** (6.71)	0.040** (2.31)	-0.07 (n/a)
C	0.991*** (7.88)	-0.334*** (-3.11)	0.088 (0.95)	0.120*** (3.24)	-0.138* (-1.83)	0.088 (0.59)	0.185 (n/a)
R^2	0.34	0.58	0.11	0.18	0.38	0.12	-
Adj R^2	0.32	0.57	0.09	0.15	0.36	0.10	-

*** Significant at 1%; ** significant at 5%; and * significant at 10%; t-statistics in bracket.

Table 25 shows that the estimated coefficient of the political stability index is negative and significant at the 5% level of testing in the public services spending category. This supports the findings of Chapter 4 that the political stability index is negatively related to public services spending. Thus, countries that are politically stable tend to devote smaller shares of their public resources to general public services. The coefficient of the political stability index in the defence category is also negative and significant at the 1% level of testing. This supports the findings of Chapter 5 indicating that countries that are politically stable spend a smaller share of their budgets on defence.

Similar to the findings of Chapter 6, the estimated coefficient of the political stability index relative to education spending is not significant at the conventional levels of testing. However, the coefficient was found to be negative and insignificant in Chapter 6, but here positive and insignificant. This suggests that education spending may not be influenced very greatly by political stability in a country. In contrast, the estimated coefficient of the political stability index on

health spending is positive and significant at the 1% level of testing, which supports the earlier findings of Chapter 7. These findings are, therefore, conclusive and show that countries with low instability tend to spend less of their budgets on health and vice versa.

Confirming the findings of Chapter 8, the estimated coefficient of the political stability index is positive and significant at the 1% level in the case of social services spending. This finding, therefore, lends credence to other findings indicating that stable countries tend to allocate more resources to social development. However, the estimated coefficient is not significant at the conventional levels in the case of economic services spending.

Table 26 shows that the estimated coefficient of the voice and accountability index is not significant in the case of general public services spending. This confirms results reported in Chapter 4. In the case of defence spending, the coefficient is negative and significant, which contradicts the findings of Chapter 5, where the estimated coefficients were found to be positive at the conventional levels. Thus, the findings can give no conclusive indication of the role of the voice and accountability index in the allocation of budget to defence.

Table 26: Panel system estimation results

	General public services	Defence	Education	Health	Social welfare services	Economic services	Other
Acc	0.000 (0.00)	-0.039*** (-4.75)	0.005 (0.74)	0.007** (2.49)	0.010* (1.77)	0.007 (0.61)	0.010 (n/a)
Ldefn	0.084*** (3.91)	0.107 (5.59)	0.019 (1.18)	0.011* (1.68)	-0.010 (-0.73)	-0.005 (-0.20)	-0.206 (n/a)
Ldebt	-0.006 (-0.78)	-0.007 (-1.00)	-0.007 (-1.21)	0.003 (1.27)	-0.006 (-1.21)	0.003 (1.27)	0.020 (n/a)
Lgov	-0.109** (-2.47)	-0.399*** (-10.13)	0.091*** (2.82)	0.039*** (2.93)	-0.016 (-0.60)	-0.078 (-1.50)	0.472 (n/a)
Lpop	-0.094*** (-8.94)	-0.003 (-0.33)	0.013* (1.74)	-0.004 (-1.28)	0.010* (1.62)	0.002 (0.18)	0.076 (n/a)
IMF	-0.100 (-0.90)	-0.655*** (6.58)	-0.126 (-1.54)	0.135*** (4.00)	0.202*** (2.98)	0.323** (2.45)	0.221 (n/a)
IMF*Lgov	0.076 (0.97)	0.471*** (-6.73)	-0.102* (-1.78)	-0.096*** (-4.05)	-0.140*** (-2.92)	-0.240** (-2.59)	0.031 (n/a)
Lypc	-0.024 (-1.43)	-0.055*** (-3.78)	0.032*** (2.67)	0.003 (0.64)	0.064*** (6.35)	0.042** (2.17)	-0.062 (n/a)
C	1.012*** (7.78)	-0.399*** (-3.45)	0.101 (1.06)	0.129*** (3.29)	-0.129* (-1.63)	0.096 (0.63)	0.190 (n/a)
R^2	0.32	0.54	0.11	0.12	0.35	0.12	-
Adj. R^2	0.30	0.52	0.09	0.09	0.33	0.09	-

*** Significant at 1%; ** significant at 5%; and * significant at 10%; t-statistics in bracket.

In the case of education spending, the estimated coefficient of the voice and accountability index is positive but not significant at the conventional levels of testing. This finding confirms the results of Chapter 6, indicating strongly that public spending on education is not influenced by the level of accountability of a government. In the health spending category, the estimated coefficient is positive and significant at the 5% level of testing. In Chapter 7, similar results were reported, except that the estimated coefficient was not significant at the conventional levels of testing. Social welfare spending is positively correlated to the voice and accountability index. This finding is similar to that reported in Chapter 8. Similarly, the estimated coefficient is positive and insignificant in the case of economic services spending. This finding supports the results of Chapter 9. These findings suggest that public decisions on whether or not to allocate more resources to economic services are not affected by the level of transparency of a government and the extent to which it accommodates the voice of its people.

Other than the governance indicators discussed above, a number of other important findings can also be derived from Tables 24 to 26. The estimations show that defence spending of neighbouring countries has a strong positive influence on expenditure decisions on general public services and defence spending. This may be because as neighbouring countries increase their spending on defence, this heightens regional tension and prompts countries to increase their own defence spending. Such an increase in defence spending also spills over into increased expenditure on general public services which include the police and security departments.

Although public debt was found to be a highly significant factor in the estimations presented in Chapters 4-10, it is now only significant in the case of economic services spending. This is plausible in the African context, where most of the infrastructure projects undertaken by government such as road building, water systems and other public works are largely driven by borrowed capital.

The IMF dummy variable is found to be negative and significant in most cases in the general public services, defence and social services spending categories, which supports earlier findings. It is also positive for the education, health and economic services spending categories. This suggests that countries that implement IMF programmes tend to structure their public budgets in favour of education, health and economic services and against sectors such as general public services and defence spending.

Countries with IMF programmes are also found to lower their spending on public services and defence when the ratio of the public budget to the GDP is reduced. This supports the findings of Chapters 4-10. However, in this case the reduction is less than proportionate compared to the earlier results. Furthermore, spending on education, health, social welfare and economic services tends to benefit more when the overall budget is reduced relative to the GDP. Although these results conform with the findings of Chapters 5-10, the estimated elasticities are

relatively small, which suggests that all these budget components are resilient to changes in the ratio of the total public budget to the GDP.

In conformity with earlier findings, the estimated coefficients of the GDP per capita are negative in the case of the general public services and defence spending categories, which suggests that as countries develop they allocate a smaller share of their budgets to these categories. In contrast, the coefficients are positive for education, health, social welfare and economic services.

11.3 Concluding remarks

In essence, the purpose of this chapter was to validate the findings of Chapters 4-10. The results of the systems approach used in this chapter generally agree with those arrived at earlier. The most important points will now be briefly summarised.

Firstly, corruption tilts the budget in favour of defence, although the evidence is not conclusive. Also, countries that are less corrupt tend to allocate a larger share of their budgets to education, health and social services.

Secondly, political stability strongly affects budget allocations. Countries that suffer from instability allocate a larger share of their budgets to general public services and defence, while countries that are stable allocate more to the health and social welfare categories.

Thirdly, IMF programmes also tend to increase spending on social issues rather than on general public services and defence.

CHAPTER TWELVE: EXPLORING BEST PRACTICE IN PUBLIC BUDGET ALLOCATION

12.1 Introduction

This chapter seeks to link all the separate findings of Chapters 4-11, to find the governance indicators suited to finding the ideal budget allocation in the African context. The chapter is structured as follows: Section 12.2 discusses the criteria of an ideal budget allocation, Section 12.3 presents the public budget outcomes based on the criteria developed in Section 12.2 and Section 12.4 offers concluding remarks.

12.2 Criteria of public budget allocation

This section identifies those budget allocation criteria best suited for use in finding optimal budget allocation strategies. The criteria are then used to outline a benchmark budget distribution that may be useful for budget analysis, especially in a NEPAD context.

12.2.1 Corruption control

The discussions in Chapters 4-11 have clearly shown that the prevalence of corruption plays a prominent role in the allocation of public resources. Based on the statistical significance of this variable in terms of budget allocation, the countries used in this study are stratified according to the extent to which they comply. It is assumed that the top 25% of the countries are the best performers. Their average budget allocations over the period 1995-2004 are then presented as the ideal mix of budget decision reflecting limited interference from corruption.

The best performing countries with regard to corruption criteria include Botswana, Lesotho, Mauritius, Namibia, Tunisia, Morocco and South Africa.

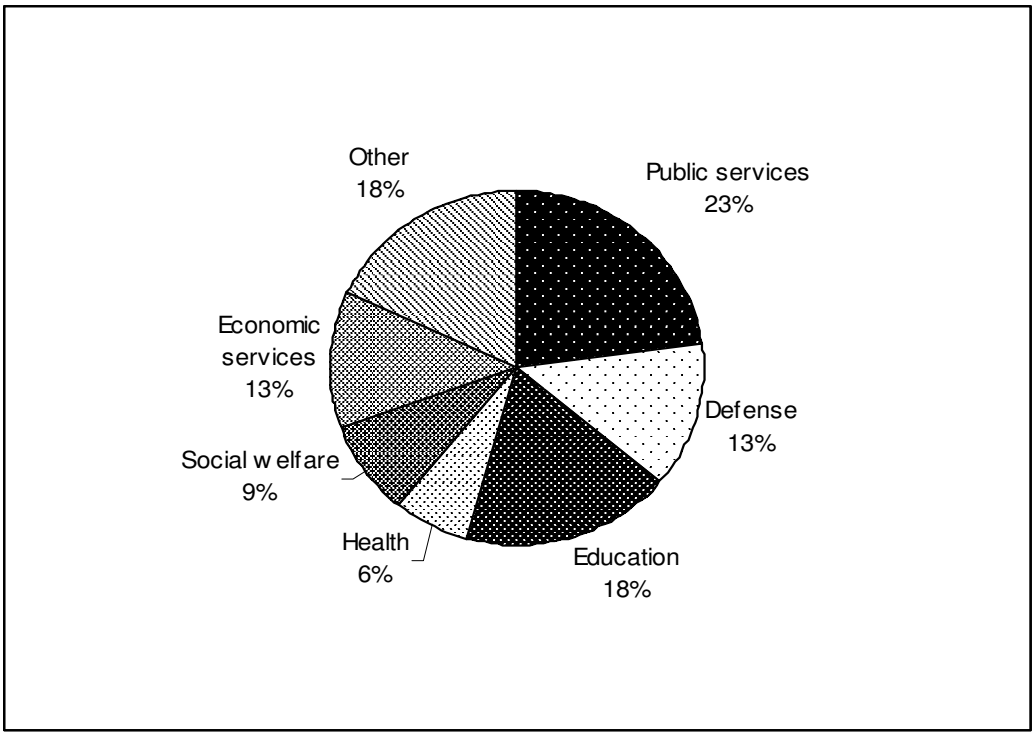


Figure 57: Ideal public budget structure in Africa based on the corruption control criteria

Analysis of the budget priorities of the countries in the sample show that, on average, the top 25% of the countries (characterised by corruption) allocate their public budgets in a manner shown in Figure 57. This suggests that, ignoring other governance indicators, the ideal public budget allocation to limit the impact of corruption would be to devote a maximum of 23% of the budget to public services, 13% to defence and 18% to 'other'. Expenditures on the latter categories should be regarded as the maximum levels since corrupt regimes tend to allocate more funds to defence and general public services. Any alteration of the public budget to allocate more than the proportions suggested in the structure will imply that the level of corruption in that country may be increasing and that urgent action should be taken to rectify the situation.

Minima of 18%, 6%, 9% and 13% for education, health, social welfare and economic services, respectively, are ideal in the African context. Thus, when expenditure priorities comply with these figures, corruption is probably limited.

12.2.2 Political stability

This criterion is analysed here as was the corruption-control index, and presented to reflect the spending behaviour of the top 25% best performers. Their priorities are then used as a basis for an 'ideal' budget structure. The top 25% include Botswana, Lesotho, Madagascar, Mauritius, Namibia, Tunisia and Mali. The ideal budget structure based on this criterion is presented in Figure 58.

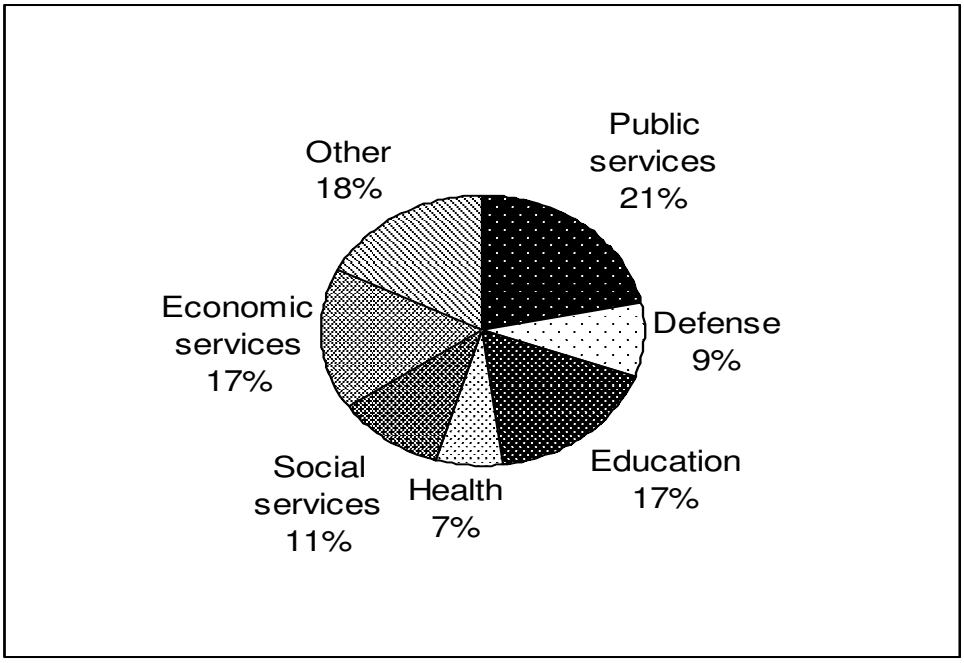


Figure 58: Ideal public budget allocation in Africa based on political stability criteria

The figure shows that spending on general public services, 'other' spending and defence should not exceed 21%, 18% and 9% of the budget, respectively. Any expenditure on these categories in excess of these figures may indicate political instability. The ideal allocation for education, health, social services and

economic services is at least 17%, 7%, 11% and 17%, respectively. To maintain these levels, political stability is a prerequisite.

12.2.3 Voice and accountability

Figure 59 portrays the effect of the voice and accountability index with the top performers in terms of this index determining the budget allocations to the different sectors. The top performers include Botswana, Lesotho, Madagascar, Mauritius, Namibia, South Africa and Mali.

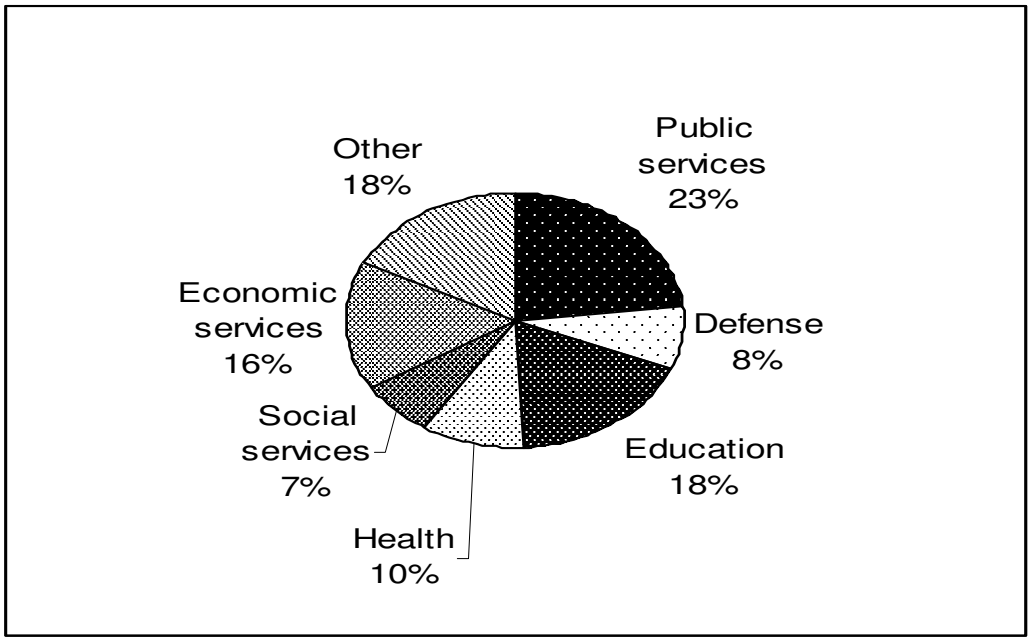


Figure 59: Ideal public budget allocation in Africa based on the voice and accountability criteria

Figure 59 clearly shows that a country with desirable levels of accountability and respect for the voice of its people should devote at least 18% of its budget to education, 10% to health, 7% to social services and 16% to economic services. A maximum of 23%, 8%, and 18% for general public services, defence and 'other' spending, respectively, is ideal.

12.2.4 Comprehensive criteria of budget allocation in Africa

The three preceding sections analyse the budgets of the best performing countries on the basis of three governance criteria in isolation. This section attempts to improve on the optimal budget allocations suggested in Sections 12.2.1-3 by using all three indicators jointly. The first step involves the selection the 25% best performing countries in each category. Then, based on this selection, those countries that perform best in all three criteria are selected. Third, those countries that comply with at least two of the conditions are selected. Fourth, the average budget allocations of these best performing countries in order are analysed and used to revise the optimal budget allocation.

The budget allocation based on the comprehensive criteria is shown in Figure 60.

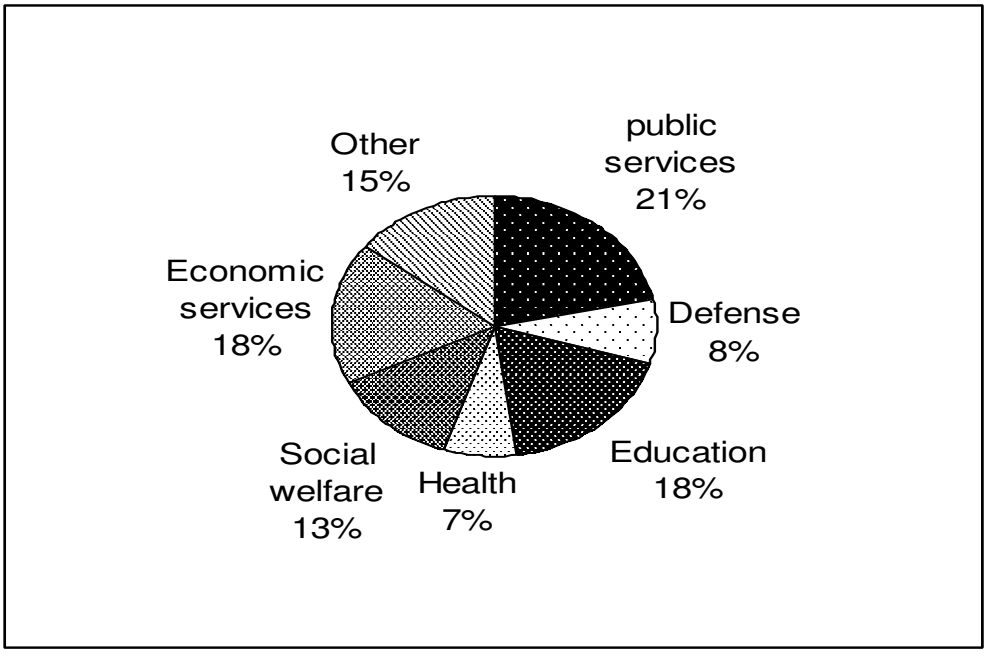


Figure 60: Ideal public budget allocation in Africa based on the comprehensive criteria

The figure shows that combining the criteria causes the budget allocation to shift drastically in the case of some spending categories. The maximum budget

allocation to general public services should not exceed 21%, which accords with the result when political stability alone is considered but which contradicts the results for both corruption control and voice and accountability. In the case of defence spending, the ideal margin for the combined criteria is 8% compared to 13% and 9% for corruption control and political stability, respectively, when considered separately. 'Other' expenditure is set at 15% by the analysis for the combined criteria, compared to 18% for all three criteria considered independently. The 'ideal' public budget should spend at least 18%, 7%, 13% and 18% on education, health, social welfare and economic services, respectively.

12.3 Summary of findings

The purpose of this chapter was to devise a 'template' for an 'ideal' budget distribution based on the most successful countries in Africa. The findings are that the ideal budget in the African context should not allocate more than 21% of the public budget to general public services; 8% to defence and 18% to 'other' spending. Instead, a minimum of 18% should be allocated to education; 10% to health; 11% to social welfare and 18% to economic services.

CHAPTER THIRTEEN: CONCLUSION AND POLICY RECOMMENDATIONS

13.1 Introduction

The purpose of this chapter is to offer policy recommendations based on the research results discussed in the preceding chapters. It is structured as follows: Section 13.2 summarises the conclusions related to the major findings of the study, Section 13.3 outlines some policy recommendations, Section 13.4 explains the limitations of the study and offers suggestions for further research in the same or related fields and, finally, Section 13.3 concludes the study.

13.2 Conclusions

The purpose of this study was to identify and investigate the determinants of the structure of public budgets in Africa. The analysis was carried out within a panel econometric framework at two levels. First, each of the functional categories of government spending is analysed using a single equation approach, with the dependent variables the functional categories of government spending expressed as shares of the total public budget and of the GDP (Chapters 4-10). Second, further estimations are conducted in Chapter 11 using an ITSUR systems approach.

These analyses yield the following important observations. Firstly the role of corruption in the allocation of the public budget is prominent in a number of functional categories. Most significantly, countries with lower levels of corruption tend to allocate larger shares of their budgets to the education, health and social welfare categories, while those that are corrupt tend to allocate a larger share of their budgets to defence and general public services categories.

Secondly, political stability is also shown to be important in determining public budget allocations across all the different categories. High levels of instability are

found to result in budget allocations that are biased towards general public services and defence, while greater stability are associated with higher allocations to education, health, social welfare and economic services.

Thirdly, improving the level of democracy in a country as reflected in the significance of the voice and accountability index, is found to improve the allocation of budget resources to the social and economic expenditure categories at the expense of defence spending.

Fourthly, the example set by neighbouring countries in their expenditure on defence plays an important role in the allocation of budget expenditure to defence. Large allocations to defence then cause further heightening of tension rather than ensuring peace in the region.

Fifthly, the role of IMF programmes is instrumental in the budget allocation process. Countries that have implemented IMF programmes tend to allocate fewer resources to defence and instead devote more to social and economic categories.

These findings about the role of corruption, political instability and lack of voice and accountability in budget allocation suggest an 'ideal' budget in which specific maximum shares are assigned to those spending categories that are negatively related to the governance indicators and specific minimum shares to those spending categories that are positively related to the indicators.

13.3 Policy recommendations

The findings of this study suggest that fiscal policy makers should take note of the following:

Firstly, for an ideal budget allocation to be achieved in the African context, measures must be put in place to control corruption. These may include the following:

- Anti-corruption legislation: countries that have anti-corruption laws should ensure that they enforce these laws.
- Public officers' ethics law: countries that have not legislated about codes of ethics for public officials are recommended to do so. Such laws should *inter alia* require public officers to declare their wealth and disclose any interests that they may have in private investments and their links with government.
- Anti-corruption institutions such as parliamentary committees on public finance and investment: these must be strengthened if they exist and established where they are lacking. Such institutions must be entrenched in the constitutions of their countries.

Secondly, to ensure optimal public choice, reflecting the preferences of citizens, governments should ensure that political stability is a high priority on its development agenda. Governments can address instability by establishing early warning systems so that they can address any problems before they degenerate into civil unrest and war. This may involve bringing together all the parties involved in a conflict in order to dialogue. At the continental level, peace efforts under the African Union (AU) should be encouraged to ensure that problems on the continent can be resolved by leaders without recourse to outside support.

Thirdly, voice and accountability must be held vital in internal budget allocation. Governments must embrace true accountability to citizens, being simultaneously transparent and informed about collective and individual needs. This can be achieved through:

- Openness with regard to fiscal policies;
- Establishment of information and communication offices where anyone seeking information about public matters can find assistance; and

- Provision of retraining for police and other security personnel on matters related to public relations, since in Africa many offences against human rights are committed by police.

Fourthly, in the spirit of greater economic and political integration, ideal budget allocation criteria must be devised to measure the extent of fiscal convergence of the member countries of existing regional blocs.

13.3 Limitations of the study

Although the objectives of this study were achieved, the research was constrained by the following limitations.

Firstly, although an attempt was made to obtain data for as many countries as possible, the required data could not be found for all the countries in Africa. Aggravating this problem, even for those countries for which data could be obtained, often time series were not sufficiently long for rigorous panel econometrics. For example, due to the short time nature of the data, it was not possible to conduct panel cointegration estimations.

Secondly, the data used in this study to proxy corruption, political instability and accountability have been compiled using highly subjective methods. Bias arising from the data collected may have influenced the results substantially.

13.4 Suggestions for future studies

Future research on this topic could focus on the following outstanding issues:

- The impact on the structure of the public budget of changes in the tax rate and base, which in this study are assumed to be stable, could be investigated, since it is possible that expenditure priories change with

changing levels of tax rate and base. Furthermore, such an analysis could focus on the sensitivity of expenditure priorities to changes in the tax base.

- The link between expenditure priorities and their socio-economic outcomes could be studied. While this study focuses on the role of governance in the priorities of government expenditure, it does not attempt to link priorities with the efficiency (cost-benefit) of these expenditures. Future research could explore whether these priorities impact positively or negatively on, for example, enrolment rates, literacy, infant mortality rate and life expectancy.
- The ballooning effect of corruption on the size of the budget requires further exploration. In this study the ways in which governance indicators such as corruption impact on the size of the public budget are not explicitly investigated. The possibility should be explored of using frameworks which endogenise total government expenditure in a model so that the effect of high levels of corruption on the total budget (the ballooning effect) is investigated.
- Governance indicators should be endogenised. Instead of treating corruption, political stability and human rights only as exogenous, further studies should endogenise these variables since, for example, endogenising corruption may unveil the factors that cause corruption in the public sector and show how these factors can be linked indirectly to the structure of the public budget.
- Expenditure priorities should be linked to macroeconomic outcomes. Theoretical and empirical evidence link optimal budget allocation to desirable macroeconomic outcomes. However, this approach was not followed in this study, as it was not part of the objectives. Due to the importance of the role of optimal budget allocation in macroeconomic performance, research could empirically test the role of budget allocation on macroeconomic outcomes in Africa.
- Lastly, when data becomes available, researchers interested in this area should conduct more analyses within the panel econometrics framework.

This includes *inter alia* panel analysis using a two-way error component model; dynamic panel data models; testing for panel unit roots; and cointegration analysis. These analyses would validate the findings of this research.

REFERENCES

Aidt, T.S.; Jayasri, D. & Loukoianova, E. 2006. Democracy comes to Europe: franchise extension and fiscal outcomes 1830-1938. *European Economic Review*, 50: 249-283.

Arrow, K. 1951. *Social Choice and Individual Values*. First Edition. Berlin: Wiley.

Axel, D. 2006. *The impact of globalization on the composition of government expenditures: evidence from panel data. CEsifo Working Paper No. 1755.*

Ball, N. 1984. Measuring third world security expenditure. *World Development*, 12(2):157-164.

Baltagi B.H. 2001. *Econometric Analysis of Panel Data.* Second Edition. Chichester: John Wiley & Sons.

Barro, R. 1990. Government spending in a simple model of endogenous growth. *Journal of Political Economy*. 106: 407-44.

Beetsma, R.M.W.J. & Bovenberg, A.L. 1999. Does monetary unification lead to debt accumulation? *Journal of Public Economics*, 74: 299-325.

Beetsma, R.M.W.J. & Bovenberg, A.L. 2002. *Strategic debt accumulation in heterogeneous monetary union. European journal of political economy. Vol. 19: 1-15.*

Bergstrom, T.C. & Goodman, R.P. 1973. Private demands for public goods. *American Economic Review*, 63: 280-296.

Bleaney, M., Kneller, R. & Gemmill, N. 1999. Fiscal policy and growth: evidence from OECD countries. *Journal of Public Economics*. 74: 171-190.

Blomqvist, A.G. & Carter, R.A.L. 1997. Is health care really a luxury? *Journal of Health Economics*, 16: 207-229.

Bocherding, T.E. & Deacon, R.T. 1972. The demand for the services of non-federal governments. *American Economic Review*, 62: 891-901.

Buchanan, J.M. 1967. *Public Finance in Democratic Process.* Chapel Hill: University of North Carolina Press.

Buchanan, J.M. 2004. The status of the status quo*. Constitutional Political Economy*, 15: 133-144.

Clements B., Gupta. S. & Schiff, J. 1997. What happened to the peace dividend*? Finance and Development*.

Davoodi, et al. 2001. Military spending, the peace devident and fiscal adjustment. *IMF Staff Papers,* 48(2): 290-316.

Devallade, C. 2006. Corruption and distribution of public spending in developing countries. Journal of Economics and Finance, 30: 222- 239.

Devarajan, S., Swaroop, V. & Zou, H. 1996. The composition of public expenditure and economic growth*. Journal of Monetary Economics*, 37:313-344.

Di Matteo, L. & Di Matteo, R. 1998. Evidence on the determinants of Canadian provincial government health expenditures: 1965-1991. J*ournal of Health Economics*, 17(2): 209-227.

Frijters, P.; Haisken-DeNew, J.P. & Shields, M.A. The causal effect of income on health: evidence from German reunification. *Journal of Health Economics*, 24: 997-1017.

Gerdthan, U.G. & Lothgrem, M. 2000. On stationarity and cointegration of international health expenditure and GDP. *Journal of Health Economics*, 19: 461-71.

Gramlich M.E. & Rubinifeld, D.L. 1982. Micro estimates of public spending demand functions and tests of the Tiebout and median-voter hypothesis. *Journal of Political Economy*, 90(3)

Hamilton, L.C. 1992. *Regression with Graphics: A Second Course in Applied Statistics*, Belmont, CA: Duxbury.

Hansen, P. & King. A. 1996. The determinants of health care expenditure: a cointegration approach. *Journal of Health Economics*, 15: 127-137.

Hausman, J.A. 1978. Specification tests in econometrics. *Econometrica*, 46: 1251-1271.

Heller, P.S. & Diamond, J. 1990. *International Comparisons of Government Expenditure Revisited: The Developing Countries, 1975-86, Occasional Paper No. 69*. Washington, D.C.: International Monetary Fund.

Hewitt, D.P. 1992. Military expenditures worldwide: determinants and trends, 1972-1988. *Journal of Public Policy*. 12(2): 112-152.

Hewitt, D.P. 1993. *Military Expenditures 1972-1990: The ReasonsBbehind the Post-1985 Fall in World Military Spending. IMF Working Paper WP/93/18*. Washington, D.C.: International Monetary Fund.

Jonakin, J. & Stephens, M. 1999. The impact of adjustment and stabilization policies on infrastructure spending in Central America. *North American Journal of Economics and Finance*, 10: 293-308.

Kaufman, D.A.K. & Mastruzzi, M. 2006. *Governance Matters V: Aggregate and Individual Governance Indicators for 1996-2006. World Bank Policy Research Paper No. 4012*.

Kimenyi, M.S. & Mbaku, J.M. 1995. Rents, military elites, and political democracy. *European Journal of Political Economy*, 11: 699-708.

Krueger. A. 1974. The political economy of a rent-seeking society. *American Economic Review*, 64 (3): 291-303.

Krugman, P. 1988. *Financing vs. forgiving a debt overhang*, Journal of Development Economics, 29: 253-268

Kwame P.G. & Gerdthan, U.G. 1992. *Determinants of health care expenditure in Africa: a cross-sectional study. World Development*, 20(2).

Mahdavi, S. 2004. Shifts in the composition of government spending in response to external debt burden. *World Development*, 32(7): 1139-1157.

Marlow, M.L. & Shiers, A.F. 1999. Do law enforcement expenditures crowd-out public education expenditures? *Applied Econometrics*, 31: 255-266.

Mauro, P. 1998. Corruption and the composition of government expenditure. *Journal of Public Economics*, 69: 263-279.

Nader, H. 1994. Budgetary policy and political liberty: a cross-sectional analysis. *World Development*, 22(4): 576-586.

Ouattara, B. 2006. Foreign aid and government fiscal behaviour in developing countries: panel data evidence. *Economic Modelling*, 23: 506-514.

Oxley, H. & Martin J.P. 1991. Controlling government spending and deficit: trends in the 1980s and prospects for the 1990s. *OECD Economic Studies*, 17: 145-189

Rosen, H.S. 2005. *Public Finance.* Seventh Edition, McGraw-Hill.

Samuelson, P. 1954. The pure theory of public expenditure. *Review of Economics and Statistics*, 36: 387-389.

Sanjeev, G; De Mello, L. & Sharan, R. 2001. Corruption and military spending. *European Journal of Political Economy*, 17.

Sanz, I. & Velázquez, F.J. 2002. *Determinants of the Composition of Government Expenditure by Functions, European Economy Group (EEG). Working Paper no.13.*

Tabellini, G. & Alesina, A.1990. Voting on the budget deficit. *American Economic Review*. 80: 37-49.

Tait, A.A. & Heller, P.S. 1982. *International Comparisons of Government Expenditure. Occasional Paper No. 10*, Washington D.C.: International Monetary Fund.

Takero, D. 1999. Empirics of the median voter hypothesis in Japan. *Empirical Economics*, 24: 667-691.

Tanzi, V. & Davoodi, H.R. 2000. *Corruption, Growth and Public Finances*. IMF Working Paper WP/00/182. Washington D.C.: International Monetary Fund.

Tanzi V. 1998. Corruption around the world: causes, consequences, scope and cures. *IMF Staff Papers*, 45(4).

Tullock, G. 1959. Some problems of majority voting. *Journal of Political Economy*, 67: 571-579.

United Nations. 2005. *Millennium Development Goals,* New York: United Nations.

World Bank. 1993. *World Development Report: Investing in Health*. Washington D.C.: World Bank.

World Bank. 1994. *World Development Report, 1994: Infrastructure and Development*. Washington D.C.: World Bank.

Zellner, A. 1962. An efficient method of estimating seemingly unrelated regressions and tests for aggregation bias. *Journal of the American Statistical Association*. 57: 348-68.

www.worldbank.org/wbi/governance/puts/govmatters+html

www.sipri.org/contents/publications/yearbooks.html

www.imf.org/external/country/index.htm

APPENDICES

Appendix A1

Appendix A1.1

The objective is to optimise

Max $U(C, g_i, g_j) = C^{\beta} g_i^{\gamma} g_j^{\delta}$ 1

subject to

$Y = C + G$, and $G = g_i + g_j$ 2

forming a Lagrangian expression:

$$L = C^{\beta} g_i^{\gamma} g_j^{\delta} + \lambda(Y - C - g_i - g_j) \quad 3$$

Differentiating equation 3 with respect to C, g_i, g_j, and λ and setting them equal to zero yields:

$$L_c = \beta C^{\beta-1} g_i^{\gamma} g_j^{\delta} - \lambda = 0 \quad 4$$

$$L_{g_i} = \gamma C^{\beta} g_i^{\gamma-1} g_j^{\delta} - \lambda = 0 \quad 5$$

$$L_{g_j} = \delta C^{\beta} g_i^{\gamma} g_j^{\delta-1} - \lambda = 0 \quad 6$$

$$L_{\lambda} = Y - C - g_i - g_j = 0 \quad 7$$

Equating equation 4 to equation 5 yields

$$C = \frac{\beta}{\gamma} g_i \quad 8$$

Substituting 8 into 7 yields

$$L_{\lambda} = Y - \frac{\beta}{\gamma} g_i - (g_i + g_j) = 0 \quad 9a$$

This is the same as

$$Y - \frac{\beta}{\gamma} g_i - G = 0 \quad 9b$$

But we know G=T+D, which implies that

$$G = \tau Y + [d_1 + (1+r)d_0] \quad 10$$

Substituting equation 10 into equation 9' yields

$$Y - \frac{\beta}{\gamma} g_i - \tau Y - [d_1 + (1+r)d_0] = 0 \qquad 11a$$

Solving for g_i in equation 11a yields the optimal values

$$g_i = \frac{\beta}{\gamma}(1-\tau)Y - \frac{\beta}{\gamma}[d_1 + (1+r)d_0] \qquad 11b$$

Dividing both sides of equation 11 by Y and then by G yields the corruption free solutions

$$\frac{g_i}{Y} = \frac{\gamma}{\beta}(1-\tau) - \frac{\gamma}{\beta}[d_1 + (1+r)d_0] \text{ , and } \frac{g_i}{G} = \frac{\gamma}{\beta}(1-\gamma)\frac{Y}{G} - \frac{\gamma}{\beta}[\frac{d_1}{G} + (1+r)\frac{d_0}{G}] \quad 12a$$

Repeating the above procedure we can obtain the optimal solutions for g_j as

$$\frac{g_j}{Y} = \frac{\delta}{\beta}(1-\tau) - \frac{\delta}{\beta}[d_1 + (1+r)d_0] \text{ , and } \frac{g_j}{G} = \frac{\delta}{\beta}(1-\gamma)\frac{Y}{G} - \frac{\delta}{\beta}[d_1 + (1+r)d_0] \quad 12b$$

Appendix A1.2: Countries included in the study

Angola	Ang
Botswana	Bots
Burundi	Bur
Cameroon	Came
Côte d'Ivoire	CDI
Djibouti	Dji
Ethiopia	Eth
Eritrea	Eri
Ghana	Gha
Guinea-Bissau	Gunb
Kenya	Ken
Lesotho	Les
Madagascar	Madag
Malawi	Malaw
Mali	Mali
Mauritius	Maur
Morocco	Moro
Namibia	Nam
Niger	Niger
Nigeria	Nga
Rwanda	Rwa
Senegal	Sen
Sierra Leone	Sleon
South Africa	ZAR
Swaziland	Swa
The Gambia	Gam
Uganda	Uga
Tunisia	Tun

Appendix A1.2: ‘Most corrupt’ countries

Angola
Burundi
Cameroon
Côte d’Ivoire
Djibouti
Guinea-Bissau
Kenya
Malawi
Mali
Niger
Nigeria
Sierra Leone
The Gambia
Uganda

Appendix A1.2: ‘Less corrupt’ countries

Botswana
Ethiopia
Eritrea
Ghana
Lesotho
Madagascar
Mauritius
Morocco
Namibia
Rwanda
Senegal
South Africa
Swaziland
Tunisia

Appendix A1.3: Functional classification of public budget

Classification of functions of government (COFOG)	Oxley and Martin (1991)	Bleaney, Kneller and Gemmill (1999)	Functional categories to be used in this study
General administration	Pure public goods	Productive	Public services
Public order and safety			
Defence			Defence
Health	Merit goods		Health
Education			Education
Housing			Economic services
Transport and communication	Economic services and others		
Other economic services		Non-productive	Other expenditures
Recreational, cultural and religious affairs			
Other non-classified functions			
Social welfare	Transfers		Social welfare

Appendix A1.4: Sources of governance data

Source	Publication	Code	Type	Public	Country Coverage
African Development Bank	Country Policy & Institutional Assessments	ADB	Poll	No	50
Afrobarometer	Afrobarometer Survey	AFR	Survey	Yes	18
Asian Development Bank	Country Policy & Institutional Assessments	ASD	Poll	Partial	26
Bertelsmann Foundation	Bertelsmann Transformation Index	BTI	Poll	Yes	119
Brown University's Center for Public Policy	Global E-Governance	EGV	Poll	Yes	192
Business Environment Risk Intelligence	Business Risk Service	BRI	Poll	Yes	50
Business Environment Risk Intelligence	Qualitative Risk Measure	QLM	Poll	Yes	115
Columbia University	State Capacity Project	CDU	Poll	Yes	108
Economist Intelligence Unit	Country Risk Service	EIU	Poll	Yes	120
European Bank for Reconstruction & Development	Transition Report	EBR	Poll	Yes	27
Freedom House	Countries at the Crossroads	CCR	Poll	Yes	30
Freedom House	Nations in Transition	FHT	Poll	Yes	27
Freedom House	Freedom in the World	FRH	Poll	Yes	192
Gallup International	Voice of the People Survey	GAL	Survey	Yes	69
Global Insight	Global Risk Service	DRI	Poll	Yes	111
Global Insight	Business Conditions and Risk	WMO	Poll	Yes	202
Heritage Foundation	Economic Freedom Index	HER	Poll	Yes	161
IJET Travel Intelligence	Country Security Risk Assessment	IJT	Poll	Yes	167
Institute for Management and Development	World Competitiveness Yearbook	WCY	Survey	Yes	49
International Research & Exchanges Board	Media Sustainability Index	MSI	Poll	Yes	19
Latinobarometro	Latinobarometro Surveys	LBO	Survey	Yes	18
Merchant International Group	Grey Area Dynamics	MIG	Poll	Yes	159
Political & Economic Risk Consultancy	Corruption Survey	PRC	Survey	Yes	10
Political Risk Services	International Country Risk Guide	PRS	Poll	Yes	140
Reporters Without Borders	Reporters Without Borders	RSF	Poll	Yes	165
State Department	Trafficking in People Report	TPR	Poll	Yes	149
State Department / Amnesty International	Human Rights Dataset	HUM	Poll	Yes	192
World Bank	Business Enterprise Environment Survey	BPS	Survey	Yes	27
World Bank	World Business Environment Survey	WBS	Survey	Yes	80
World Bank	Country Policy & Institutional Assessments	PIA	Poll	Partial	136
World Economic Forum	Global Competitiveness Report	GCS	Survey	Yes	117

Source: Adopted from Kaufman, *et al*. (2006)

Appendix 2: Descriptive statistics of the country data

Table A2.1: General public service spending as percentage of the total public budget

T=10	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Probability
Angola	17.61	17.55	33.19	3.57	8.76	0.17	2.53	0.14	0.933
Burundi	36.80	37.13	44.76	29.01	4.31	-0.03	2.98	0.00	0.999
Botswana	32.35	33.49	36.00	26.59	3.27	-0.63	1.98	1.09	0.579
Côte d'Ivoire	9.75	9.75	12.80	6.24	2.09	0.04	2.14	0.31	0.857
Cameroon	12.60	11.54	16.15	9.86	2.61	0.32	1.34	1.32	0.518
Djibouti	38.23	38.07	41.71	35.35	1.84	0.30	2.64	0.20	0.903
Eritrea	12.66	12.21	16.46	10.80	1.67	1.25	3.69	2.82	0.244
Ethiopia	15.58	15.01	19.52	12.70	2.50	0.49	1.73	1.06	0.588
Ghana	8.77	8.89	9.36	7.46	0.54	-1.49	4.53	4.66	0.097
The Gambia	27.32	28.57	32.78	16.93	4.70	-1.17	3.50	2.38	0.304
Guinea Bissau	23.53	19.22	45.77	13.10	11.83	1.09	2.68	2.02	0.364
Kenya	20.50	20.27	29.46	13.32	5.66	0.11	1.80	0.62	0.734
Lesotho	39.66	38.06	58.91	28.17	8.40	1.00	3.98	2.06	0.358
Morocco	24.19	23.76	27.44	21.73	2.03	0.55	2.02	0.90	0.637
Madagascar	18.86	18.97	28.33	9.75	6.22	0.02	1.63	0.78	0.678
Mali	11.28	11.85	13.46	5.35	2.43	-1.48	4.56	4.69	0.096
Mauritius	19.88	19.62	22.75	17.79	1.53	0.49	2.30	0.60	0.740
Malawi	23.64	23.29	35.24	18.45	4.87	1.32	4.26	3.56	0.169
Namibia	21.93	21.93	23.98	20.16	1.37	0.00	1.82	0.58	0.748
Niger	29.39	28.52	36.59	25.14	3.61	0.72	2.56	0.95	0.622
Nigeria	10.28	9.75	16.17	5.09	3.18	0.35	2.64	0.26	0.880
Rwanda	38.93	37.21	48.22	28.41	6.03	-0.05	2.19	0.28	0.870
Senegal	22.39	24.14	29.31	15.62	5.27	-0.21	1.47	1.05	0.590
Sierra Leon	19.54	21.09	23.35	11.96	4.06	-0.88	2.26	1.52	0.468
Swaziland	36.51	38.09	40.07	30.04	3.05	-0.91	2.87	1.38	0.501
Tunisia	7.69	8.05	10.28	3.28	2.30	-0.85	2.58	1.27	0.529
Uganda	26.96	25.40	35.20	21.90	5.04	0.66	1.79	1.34	0.512
South Africa	19.42	19.46	21.44	17.27	1.54	-0.21	1.62	0.86	0.650

Table A2.2: Defence spending as percentage of the total public budget

T=10	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Probability
Angola	25.75	31.41	36.30	6.40	10.88	-0.60	1.78	1.21	0.546
Burundi	36.66	36.79	46.62	27.88	4.60	0.36	4.35	0.97	0.615
Botswana	10.78	10.57	11.70	9.95	0.61	0.25	1.63	0.89	0.641
Côte d'Ivoire	2.51	2.28	3.81	1.53	0.77	0.46	1.94	0.81	0.665
Cameroon	9.95	7.27	16.03	3.79	4.64	0.30	1.41	1.20	0.549
Djibouti	16.48	14.62	30.15	2.82	8.73	0.11	2.09	0.37	0.832
Eritrea	50.53	51.51	65.84	28.64	10.87	-0.44	2.97	0.32	0.852
Ethiopia	8.86	8.77	10.55	7.98	0.67	1.57	5.43	6.57	0.037
Ghana	5.86	5.80	6.17	5.67	0.18	0.65	2.03	1.09	0.579
The Gambia	5.03	5.08	6.06	3.68	0.69	-0.42	2.65	0.35	0.841
Guinea Bissau	14.33	15.13	16.96	6.87	3.01	-1.69	4.91	6.30	0.043
Kenya	5.85	5.78	7.22	4.06	1.08	-0.09	1.94	0.48	0.786
Lesotho	4.74	4.79	5.56	3.73	0.56	-0.52	2.50	0.55	0.758
Morocco	13.94	13.63	16.08	12.87	1.10	0.70	2.26	1.04	0.595
Madagascar	11.57	12.37	14.84	3.68	3.42	-1.39	3.88	3.54	0.170
Mali	8.26	8.68	9.78	5.40	1.41	-0.93	2.72	1.46	0.482
Mauritius	6.29	6.10	7.62	5.67	0.58	1.27	3.73	2.90	0.235
Malawi	6.58	5.88	12.19	2.75	3.33	0.49	1.80	1.00	0.606
Namibia	7.43	7.38	9.03	5.42	1.22	-0.35	1.92	0.69	0.708
Niger	4.73	4.81	5.02	4.20	0.26	-1.02	2.89	1.76	0.416
Nigeria	7.84	7.17	11.42	3.57	2.47	-0.07	2.02	0.41	0.815
Rwanda	28.99	29.17	40.50	15.21	8.03	-0.27	2.01	0.53	0.767
Senegal	11.61	11.54	13.51	9.29	1.41	-0.25	1.86	0.65	0.724
Sierra Leon	13.82	14.16	16.37	9.86	1.83	-0.73	3.46	0.96	0.618
Swaziland	6.33	5.86	8.07	4.94	0.96	0.43	2.11	0.64	0.725
Tunisia	13.36	13.16	14.20	12.84	0.51	0.69	1.80	1.39	0.499
Uganda	16.85	14.33	27.30	12.24	5.42	1.17	2.72	2.32	0.314
South Africa	5.68	5.56	6.72	4.54	0.81	0.07	1.46	1.00	0.608

Table A2.3: Education spending as percentage of the total public budget

T=10	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Probability
Angola	5.08	5.00	8.70	2.14	2.03	0.17	2.19	0.32	0.852
Burundi	19.00	17.02	34.73	14.94	5.72	2.35	7.11	16.27	0.000
Botswana	19.66	19.75	20.92	18.47	0.83	0.02	1.64	0.77	0.680
Côte d'Ivoire	15.60	16.89	24.14	7.27	6.39	-0.09	1.42	1.06	0.589
Cameroon	17.35	20.25	23.70	8.24	6.52	-0.37	1.33	1.39	0.498
Djibouti	12.24	12.10	15.03	10.32	1.49	0.69	2.45	0.91	0.635
Eritrea	4.82	4.39	9.11	3.63	1.60	2.12	6.41	12.36	0.002
Ethiopia	22.27	21.70	41.52	10.25	9.28	0.59	3.02	0.57	0.751
Ghana	17.55	17.02	20.62	16.13	1.52	1.04	2.78	1.82	0.402
The Gambia	5.05	3.75	14.44	1.19	4.08	1.35	3.82	3.32	0.190
Guinea Bissau	17.53	17.57	19.94	14.27	1.64	-0.57	2.80	0.57	0.753
Kenya	22.01	22.07	26.87	17.24	3.26	-0.09	1.83	0.59	0.746
Lesotho	19.73	20.00	23.94	14.83	2.70	-0.44	2.53	0.41	0.813
Morocco	19.85	19.30	21.90	18.61	1.22	0.80	2.07	1.42	0.493
Madagascar	17.79	18.20	26.17	6.93	6.80	-0.19	1.53	0.97	0.617
Mali	12.79	13.12	15.33	6.61	2.58	-1.38	4.36	3.96	0.138
Mauritius	10.97	10.76	12.12	10.09	0.61	0.53	2.34	0.65	0.721
Malawi	17.17	17.04	23.84	11.40	3.73	0.26	2.38	0.27	0.872
Namibia	23.77	23.57	26.76	21.36	1.53	0.39	2.75	0.28	0.870
Niger	10.38	9.86	13.05	8.87	1.41	0.86	2.44	1.35	0.509
Nigeria	4.56	4.34	6.24	2.94	1.20	0.06	1.53	0.91	0.634
Rwanda	16.55	15.03	25.03	11.83	4.73	0.80	2.18	1.33	0.513
Senegal	25.01	25.33	27.96	21.20	1.91	-0.52	2.95	0.45	0.799
Sierra Leon	19.26	19.65	20.96	16.47	1.34	-0.81	2.89	1.11	0.574
Swaziland	21.51	20.30	25.35	19.37	2.25	0.82	2.15	1.44	0.488
Tunisia	17.67	17.62	19.32	16.69	0.83	0.73	2.63	0.95	0.623
Uganda	20.79	19.53	25.12	18.03	2.68	0.72	1.88	1.39	0.499
South Africa	20.43	20.41	21.96	18.35	1.00	-0.56	3.16	0.53	0.766

Table A2.4: Health spending as percentage of the total public budget

T=10	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Probability
Angola	3.96	3.88	5.70	1.43	1.35	-0.26	2.39	0.27	0.874
Burundi	3.28	2.95	5.83	2.50	0.94	2.21	6.71	13.91	0.001
Botswana	4.86	4.37	6.59	4.12	0.95	0.92	2.17	1.70	0.427
Côte d'Ivoire	9.49	9.71	11.04	7.04	1.27	-0.56	2.47	0.65	0.724
Cameroon	4.23	4.31	6.55	2.42	1.39	0.38	2.06	0.61	0.737
Djibouti	5.56	5.52	6.14	5.20	0.28	0.84	2.90	1.19	0.552
Eritrea	3.00	2.73	5.30	2.25	0.88	1.97	5.99	10.20	0.006
Ethiopia	10.98	10.88	14.32	8.35	1.71	0.30	2.76	0.17	0.918
Ghana	3.76	3.36	5.87	2.57	1.17	0.76	2.14	1.26	0.532
The Gambia	11.79	11.66	15.78	8.06	2.94	0.05	1.42	1.05	0.592
Guinea Bissau	4.22	4.22	5.77	2.44	0.91	-0.37	3.06	0.23	0.890
Kenya	6.39	6.41	7.23	5.40	0.68	-0.04	1.48	0.96	0.619
Lesotho	6.84	6.88	9.86	4.23	1.50	0.26	3.31	0.16	0.925
Morocco	3.89	3.90	4.51	3.37	0.39	0.17	1.74	0.72	0.699
Madagascar	6.55	6.58	8.77	3.92	1.53	-0.20	2.06	0.43	0.806
Mali	6.09	6.45	7.73	3.78	1.16	-0.75	2.78	0.95	0.622
Mauritius	6.02	6.02	6.54	5.62	0.24	0.71	4.07	1.32	0.518
Malawi	9.35	9.00	14.34	6.08	2.61	0.52	2.36	0.63	0.732
Namibia	10.57	10.47	11.22	9.90	0.44	0.18	1.88	0.58	0.749
Niger	7.11	7.32	8.80	5.86	0.86	0.22	2.78	0.10	0.952
Nigeria	2.33	2.05	4.42	1.00	1.14	0.52	2.11	0.77	0.679
Rwanda	3.61	3.71	4.54	2.34	0.70	-0.73	2.53	0.99	0.610
Senegal	5.45	5.33	6.78	4.64	0.70	0.65	2.27	0.92	0.631
Sierra Leon	6.74	7.43	8.54	2.88	1.93	-0.85	2.45	1.32	0.516
Swaziland	7.57	7.50	8.48	6.91	0.49	0.34	2.43	0.33	0.849
Tunisia	6.29	6.20	7.11	5.76	0.44	0.50	2.15	0.72	0.697
Uganda	6.66	6.92	8.33	5.10	1.01	-0.03	1.94	0.47	0.792
South Africa	9.69	9.64	10.34	8.93	0.49	-0.11	1.91	0.51	0.774

Table A2.5: Social welfare spending as percentage of the total public budget

	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Probability
Angola	5.03	4.82	9.81	1.43	2.95	0.39	1.87	0.80	0.67
Burundi	0.65	0.58	1.17	0.35	0.29	0.66	2.00	1.14	0.57
Botswana	8.41	8.21	9.99	7.11	1.04	0.35	1.67	0.94	0.63
Côte d'Ivoire	14.45	15.55	22.80	7.51	5.49	0.02	1.53	0.91	0.64
Cameroon	2.35	2.30	3.06	1.65	0.48	0.12	1.71	0.72	0.70
Djibouti	3.11	3.16	4.33	2.07	0.70	0.11	2.28	0.23	0.89
Eritrea	3.72	2.21	14.57	0.55	4.13	2.02	5.98	10.47	0.01
Ethiopia	8.87	9.03	10.33	5.90	1.24	-1.31	4.44	3.73	0.15
Ghana	9.78	8.37	17.59	6.11	4.12	1.12	2.75	2.13	0.34
The Gambia	0.26	0.27	0.31	0.17	0.04	-0.78	2.99	1.01	0.60
Guinea Bissau	11.04	11.81	14.86	5.79	2.75	-0.83	2.80	1.15	0.56
Kenya	2.12	2.03	3.33	1.02	0.71	0.31	2.13	0.47	0.79
Lesotho	1.37	1.41	1.67	0.98	0.19	-0.69	3.40	0.85	0.65
Morocco	1.43	1.55	1.88	1.00	0.30	-0.19	1.66	0.80	0.67
Madagascar	1.36	1.14	3.22	0.73	0.77	1.54	4.45	4.85	0.09
Mali	3.82	3.89	4.82	2.44	0.73	-0.52	2.43	0.59	0.75
Mauritius	20.48	20.33	23.69	17.69	1.70	0.26	2.66	0.16	0.92
Malawi	9.34	8.06	14.80	6.48	2.91	0.93	2.33	1.64	0.44
Namibia	16.03	16.38	18.96	13.27	2.06	-0.05	1.48	0.97	0.62
Niger	2.55	1.88	4.84	0.99	1.48	0.52	1.59	1.28	0.53
Nigeria	1.82	1.79	3.38	0.23	1.09	-0.01	1.55	0.88	0.65
Rwanda	2.51	1.47	8.04	0.78	2.28	1.55	4.45	4.87	0.09
Senegal	3.23	2.24	9.47	0.50	2.57	1.45	4.49	4.44	0.11
Sierra Leon	5.23	5.76	6.19	3.98	0.96	-0.36	1.23	1.52	0.47
Swaziland	4.11	3.86	5.61	3.21	0.74	0.97	2.87	1.56	0.46
Tunisia	23.26	23.58	24.84	21.20	1.29	-0.34	1.69	0.92	0.63
Uganda	0.94	0.77	1.66	0.56	0.42	0.79	2.07	1.41	0.50
South Africa	15.72	15.55	18.05	14.18	1.22	0.69	2.69	0.83	0.66

Table A2.6: Economic services spending as a percentage of the total public budget

	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Probability
Angola	7.05	5.88	22.50	1.43	5.97	1.84	5.70	8.68	0.01
Burundi	6.04	5.41	15.18	1.38	4.23	0.96	3.15	1.54	0.46
Botswana	16.43	16.20	20.26	12.63	2.60	0.17	1.95	0.51	0.78
Côte d'Ivoire	45.43	44.81	51.73	39.56	3.50	0.28	2.68	0.17	0.92
Cameroon	26.93	20.61	46.48	14.85	11.91	0.71	1.95	1.30	0.52
Djibouti	14.49	16.07	21.34	5.59	5.37	-0.51	1.89	0.94	0.62
Eritrea	4.05	1.96	10.14	0.68	3.79	0.74	1.75	1.56	0.46
Ethiopia	21.52	20.57	28.96	14.26	4.24	0.20	2.53	0.16	0.92
Ghana	18.23	19.00	22.64	12.81	2.67	-0.55	3.17	0.51	0.77
The Gambia	5.88	6.07	7.79	2.97	1.50	-0.69	2.58	0.87	0.65
Guinea Bissau	21.48	20.88	32.28	12.10	7.29	0.08	1.59	0.84	0.66
Kenya	18.41	18.23	24.31	12.39	3.50	-0.02	2.34	0.18	0.91
Lesotho	19.98	18.16	32.58	8.67	8.96	0.46	1.73	1.03	0.60
Morocco	7.85	7.36	11.30	4.27	2.43	0.28	1.92	0.62	0.73
Madagascar	5.92	5.60	10.18	2.58	2.11	0.44	3.01	0.32	0.85
Mali	39.02	41.17	45.90	19.42	7.70	-1.80	5.36	7.71	0.02
Mauritius	9.25	9.03	11.29	7.98	1.05	0.69	2.50	0.89	0.64
Malawi	9.78	7.92	14.71	5.80	3.31	0.43	1.49	1.25	0.54
Namibia	13.60	13.67	17.15	10.43	2.61	0.03	1.26	1.27	0.53
Niger	13.83	13.46	17.07	11.91	1.46	1.07	3.58	2.03	0.36
Nigeria	11.45	10.50	23.09	1.78	6.72	0.09	2.28	0.23	0.89
Rwanda	4.18	3.73	9.32	2.03	2.09	1.49	4.76	5.02	0.08
Senegal	6.39	3.85	22.45	2.43	6.15	2.01	5.84	10.12	0.01
Sierra Leon	7.18	7.74	8.05	5.43	0.97	-0.82	2.12	1.44	0.49
Swaziland	21.42	21.69	24.04	18.72	1.55	-0.30	2.76	0.18	0.92
Tunisia	14.77	14.55	18.83	12.48	1.94	0.81	2.93	1.09	0.58
Uganda	19.16	23.28	27.71	3.38	9.66	-0.76	2.01	1.37	0.50
South Africa	10.89	10.38	15.12	9.02	1.72	1.61	4.78	5.65	0.06

Table A2.7: 'Other' spending as percentage of the total public budget

	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Probability
Angola	35.30	31.49	59.03	23.40	12.87	1.23	2.91	2.53	0.28
Burundi	2.23	2.33	3.50	1.31	0.61	0.49	3.18	0.42	0.81
Botswana	7.51	7.79	9.19	4.94	1.19	-0.76	3.34	1.00	0.61
Côte d'Ivoire	2.77	2.88	4.65	1.27	1.25	0.11	1.46	1.01	0.60
Cameroon	26.60	20.92	46.55	10.89	12.85	0.33	1.69	0.90	0.64
Djibouti	9.89	10.48	15.16	1.64	4.16	-0.63	2.56	0.74	0.69
Eritrea	21.21	25.40	32.17	9.43	9.19	-0.31	1.34	1.31	0.52
Ethiopia	11.93	11.87	16.59	7.73	2.61	0.21	2.36	0.25	0.88
Ghana	36.06	37.79	41.15	27.32	5.09	-0.71	1.94	1.31	0.52
The Gambia	32.19	31.00	47.85	25.18	6.57	1.37	4.28	3.81	0.15
Guinea Bissau	20.35	21.03	40.80	3.00	11.02	0.21	2.66	0.12	0.94
Kenya	24.73	25.56	36.94	8.60	8.59	-0.37	2.33	0.42	0.81
Lesotho	7.67	6.33	22.85	2.08	5.76	1.98	6.10	10.51	0.01
Morocco	28.84	28.99	34.87	21.89	4.25	-0.13	1.80	0.63	0.73
Madagascar	38.27	32.50	65.87	20.99	15.37	0.58	1.96	1.01	0.60
Mali	18.73	13.38	57.01	7.83	14.88	1.87	5.51	8.49	0.01
Mauritius	27.11	26.65	30.73	24.74	2.11	0.40	1.77	0.90	0.64
Malawi	24.15	26.10	36.83	4.01	10.85	-0.54	2.12	0.80	0.67
Namibia	6.66	6.65	9.40	3.68	1.50	-0.28	3.46	0.22	0.90
Niger	32.00	32.46	39.79	20.31	6.44	-0.60	2.27	0.83	0.66
Nigeria	61.72	61.28	85.39	42.97	13.17	0.32	2.10	0.51	0.78
Rwanda	5.24	5.32	8.64	1.88	2.11	-0.21	2.27	0.30	0.86
Senegal	25.91	25.82	32.14	19.70	3.93	-0.09	1.99	0.44	0.80
Sierra Leon	28.23	24.38	45.76	19.52	9.43	0.87	2.29	1.46	0.48
Swaziland	2.55	2.73	3.17	1.64	0.46	-0.90	2.88	1.37	0.50
Tunisia	16.95	17.05	19.33	15.02	1.10	0.46	4.01	0.78	0.68
Uganda	8.64	9.08	12.92	0.85	3.23	-1.28	4.66	3.88	0.14
South Africa	16.67	17.35	18.53	13.62	1.71	-0.52	1.84	1.01	0.60

Table A.2.8: Population density (persons per square kilometre)

	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Probability
Angola	10.39	10.39	11.67	9.10	0.87	-0.01	1.76	0.64	0.73
Burundi	262.77	262.56	286.20	239.72	15.62	0.03	1.78	0.62	0.73
Botswana	2.94	2.93	3.25	2.64	0.20	0.10	1.92	0.51	0.78
Côte d'Ivoire	49.65	49.68	55.61	43.65	4.02	-0.01	1.78	0.62	0.73
Cameroon	31.64	31.62	34.78	28.52	2.10	0.01	1.78	0.62	0.73
Djibouti	27.23	27.00	29.97	25.02	1.71	0.30	1.78	0.77	0.68
Eritrea	39.98	40.04	44.55	35.39	3.11	-0.02	1.75	0.66	0.72
Ethiopia	63.58	63.54	70.60	56.53	4.70	0.01	1.80	0.60	0.74
Ghana	83.89	83.88	91.92	76.02	5.40	0.02	1.74	0.66	0.72
The Gambia	128.17	128.29	144.88	111.50	11.32	-0.01	1.74	0.66	0.72
Guinea Bissau	42.25	42.18	46.24	38.34	2.67	0.03	1.76	0.64	0.73
Kenya	52.24	52.28	57.57	46.89	3.59	-0.01	1.78	0.62	0.73
Lesotho	66.72	66.61	71.96	61.58	3.41	0.06	1.89	0.52	0.77
Morocco	63.80	63.79	68.48	59.12	3.15	0.00	1.77	0.63	0.73
Madagascar	26.17	26.29	29.30	22.87	2.18	-0.10	1.73	0.68	0.71
Mali	8.77	8.78	9.65	7.88	0.60	-0.02	1.75	0.66	0.72
Mauritius	581.47	581.63	610.56	552.71	19.57	0.01	1.76	0.64	0.73
Malawi	107.98	108.46	116.97	97.90	6.41	-0.17	1.79	0.66	0.72
Namibia	2.11	2.11	2.31	1.93	0.13	0.06	1.73	0.67	0.71
Niger	8.38	8.41	9.52	7.19	0.79	-0.07	1.75	0.67	0.72
Nigeria	137.63	137.69	152.94	122.17	10.30	-0.01	1.80	0.60	0.74
Rwanda	327.26	340.86	359.19	259.42	34.45	-1.14	2.82	2.18	0.34
Senegal	48.69	48.87	54.01	43.10	3.69	-0.09	1.76	0.65	0.72
Sierra Leon	69.57	69.56	76.11	62.97	4.40	0.00	1.80	0.60	0.74
Swaziland	59.83	60.02	67.09	52.33	4.93	-0.05	1.82	0.58	0.75
Tunisia	61.35	61.21	65.32	57.66	2.55	0.13	1.84	0.59	0.74
Uganda	111.12	111.19	124.59	97.51	9.10	-0.02	1.78	0.62	0.73
South Africa	34.76	34.77	37.52	32.04	1.82	0.04	1.85	0.55	0.76

Table A2.9: Government spending as a percentage of the GDP

	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Probability
Angola	57.35	54.81	82.60	42.80	12.61	0.66	2.46	0.84	0.66
Burundi	24.28	24.30	28.70	20.80	2.59	0.31	1.95	0.62	0.73
Botswana	38.54	38.80	44.07	32.80	4.03	-0.11	1.69	0.74	0.69
Côte d'Ivoire	19.63	19.55	24.50	15.56	2.95	0.14	1.86	0.58	0.75
Cameroon	17.76	17.90	19.28	16.00	1.25	-0.29	1.56	1.00	0.61
Djibouti	32.62	32.90	38.70	28.31	3.17	0.40	2.44	0.40	0.82
Eritrea	77.99	76.80	98.60	52.50	14.33	-0.24	2.21	0.35	0.84
Ethiopia	29.58	29.95	35.13	24.20	4.32	-0.09	1.44	1.03	0.60
Ghana	28.44	28.15	32.70	26.10	2.08	0.73	2.69	0.92	0.63
The Gambia	25.10	24.60	31.10	22.10	2.90	0.76	2.67	1.02	0.60
Guinea Bissau	34.50	33.70	42.10	25.10	6.24	-0.21	1.77	0.70	0.70
Kenya	25.76	26.45	29.30	22.20	2.49	-0.13	1.57	0.88	0.65
Lesotho	48.40	47.92	56.40	44.10	3.28	1.34	4.83	4.40	0.11
Morocco	30.54	30.70	32.40	28.10	1.44	-0.27	1.74	0.79	0.67
Madagascar	17.92	17.60	21.70	15.60	1.77	0.94	3.21	1.49	0.47
Mali	24.83	24.80	26.10	23.50	1.08	-0.01	1.33	1.16	0.56
Mauritius	24.39	24.24	27.00	23.30	1.01	1.81	5.78	8.70	0.01
Malawi	30.53	31.30	35.93	23.30	4.15	-0.63	2.30	0.85	0.65
Namibia	35.65	35.90	36.40	34.30	0.76	-0.93	2.43	1.58	0.45
Niger	16.62	16.90	18.62	12.90	1.76	-0.95	2.98	1.50	0.47
Nigeria	20.61	20.70	23.20	18.70	1.47	0.38	2.16	0.54	0.76
Rwanda	20.58	20.70	23.20	18.70	1.46	0.44	2.24	0.57	0.75
Senegal	20.82	20.95	22.10	19.00	1.10	-0.30	1.71	0.84	0.66
Sierra Leon	25.91	25.35	41.05	13.00	9.28	0.22	1.81	0.68	0.71
Swaziland	30.28	30.50	31.61	27.70	1.26	-0.88	2.73	1.32	0.52
Tunisia	32.18	31.95	35.50	30.07	1.68	0.84	2.78	1.18	0.55
Uganda	20.77	18.90	26.80	16.20	4.61	0.31	1.28	1.40	0.50
South Africa	27.10	26.20	33.30	19.44	4.67	-0.01	2.05	0.37	0.83

Table A2.10: GDP per capita (in US dollars)

	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Probability
Angola	491.23	490.60	525.08	444.44	31.14	-0.14	1.43	1.05	0.59
Burundi	135.60	141.87	162.51	103.87	18.22	-0.53	2.23	0.72	0.70
Botswana	3732.85	3806.13	4141.49	3192.95	360.00	-0.27	1.53	1.02	0.60
Côte d'Ivoire	750.59	748.47	786.41	714.62	23.19	-0.02	2.10	0.33	0.85
Cameroon	644.17	639.01	695.90	600.11	27.99	0.33	2.55	0.26	0.88
Djibouti	752.93	783.58	858.14	605.99	83.11	-0.71	2.12	1.15	0.56
Eritrea	167.35	172.02	180.98	145.94	11.34	-0.68	2.22	1.03	0.60
Ethiopia	114.86	113.54	125.50	102.24	7.37	-0.10	1.98	0.45	0.80
Ghana	408.72	410.50	440.38	373.33	22.31	-0.17	1.83	0.61	0.74
The Gambia	357.43	360.48	381.65	339.51	13.08	0.29	2.32	0.33	0.85
Guinea Bissau	218.34	207.72	268.07	188.83	26.20	0.95	2.47	1.61	0.45
Kenya	333.25	332.51	344.32	323.42	8.12	0.11	1.33	1.18	0.55
Lesotho	556.26	555.68	600.72	499.14	30.58	-0.27	2.36	0.29	0.87
Morocco	1379.12	1391.78	1435.71	1250.14	55.44	-1.33	3.96	3.34	0.19
Madagascar	239.30	237.07	253.06	233.31	6.04	1.31	3.67	3.04	0.22
Mali	283.65	291.12	303.44	256.36	16.98	-0.59	1.86	1.12	0.57
Mauritius	4069.32	4073.18	4687.12	3404.71	434.37	-0.12	1.77	0.65	0.72
Malawi	167.22	167.49	176.65	155.12	6.36	-0.31	2.51	0.26	0.88
Namibia	2373.80	2353.76	2579.90	2210.15	123.79	0.39	1.96	0.71	0.70
Niger	204.38	205.35	217.96	195.12	6.81	0.48	2.65	0.43	0.81
Nigeria	253.29	253.11	257.48	250.29	2.54	0.31	1.79	0.77	0.68
Rwanda	220.85	214.77	253.03	202.10	16.97	0.76	2.27	1.17	0.56
Senegal	590.63	599.94	628.58	539.36	30.90	-0.43	1.80	0.92	0.63
Sierra Leon	152.58	155.41	213.67	87.26	41.30	-0.10	2.07	0.38	0.83
Swaziland	1533.41	1535.23	1542.54	1516.26	7.72	-1.09	3.44	2.07	0.36
Tunisia	2392.16	2427.91	2697.83	2008.04	232.55	-0.30	1.80	0.75	0.69
Uganda	346.29	346.65	392.76	299.48	29.92	0.07	1.95	0.47	0.79
South Africa	3975.53	3983.12	4068.03	3862.80	54.91	-0.43	3.29	0.34	0.84

Table A2.11: Corruption control index

	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Probability
Angola	-1.16264	-1.14407	-0.996104	-1.44082	0.136312	-0.7312	2.77667	0.91188	0.63385
Burundi	-1.02024	-1.00513	-0.796786	-1.27238	0.140539	-0.2044	2.35504	0.24298	0.8856
Botswana	0.72491	0.789207	1.021934	0.398009	0.205648	-0.3163	1.87108	0.69778	0.70547
Côte d'Ivoire	-0.50815	-0.54174	0.406194	-1.00511	0.454268	0.76632	2.6662	1.02517	0.59895
Cameroon	-1.03036	-1.06198	-0.775783	-1.11022	0.106725	1.60626	4.30357	5.00812	0.08175
Djibouti	-0.90581	-0.91223	-0.722873	-1.1539	0.116624	-0.5819	3.40792	0.63369	0.72844
Eritrea	0.12662	0.172886	0.635994	-0.63599	0.410163	-0.5276	2.23827	0.70577	0.70266
Ethiopia	-0.39385	-0.28343	0.056887	-0.98283	0.345965	-0.4676	1.92938	0.84195	0.65641
Ghana	-0.3723	-0.39122	-0.171393	-0.46919	0.090758	1.08488	3.39532	2.02672	0.363
The Gambia	-0.79037	-0.78008	-0.522285	-1.23861	0.235275	-0.5936	2.32575	0.77676	0.67815
Guinea Bissau	-0.64798	-0.57995	-0.529736	-0.98283	0.141694	-1.461	4.07941	4.04289	0.13246
Kenya	-0.99641	-0.98834	-0.893503	-1.08761	0.064211	0.14217	1.85901	0.57613	0.74971
Lesotho	0.040341	0.030593	0.321541	-0.18493	0.143066	0.35805	2.88999	0.21871	0.89641
Morocco	0.077312	0.039888	0.374147	-0.10088	0.146815	0.7384	2.61051	0.97193	0.6151
Madagascar	-0.34659	-0.28353	0.365374	-0.79814	0.416421	0.21995	1.78009	0.7007	0.70444
Mali	-0.42695	-0.4841	-0.110887	-0.57885	0.155729	0.77111	2.49461	1.09744	0.57769
Mauritius	0.408221	0.402759	0.5874	0.20278	0.118226	-0.1249	2.12974	0.34158	0.843
Malawi	-0.62734	-0.63741	-0.20981	-0.98612	0.25597	0.18969	1.74258	0.71877	0.69811
Namibia	0.4958	0.482487	1.130656	0.164684	0.319483	0.60894	2.45416	0.74215	0.68999
Niger	-0.82008	-0.87158	-0.308725	-1.06036	0.216011	1.45883	4.26064	4.20916	0.1219
Nigeria	-1.12537	-1.10862	-1.005368	-1.31702	0.102145	-0.4826	2.14799	0.69056	0.70802
Rwanda	-0.31189	-0.35115	0.058288	-0.54506	0.168874	0.97133	3.49024	1.67261	0.43331
Senegal	-0.36473	-0.39437	-0.188215	-0.45005	0.083066	1.04886	2.93292	1.83538	0.39944
Sierra Leon	-0.91504	-0.79297	-0.72025	-1.65692	0.292909	-1.8916	5.23761	8.04998	0.01786
Swaziland	-0.31293	-0.19124	-0.126477	-0.95422	0.267097	-1.6942	4.40934	5.61121	0.06047
Tunisia	0.313236	0.323984	0.702239	-0.04759	0.235091	0.02015	2.11636	0.32602	0.84958
Uganda	-0.73258	-0.72644	-0.519199	-0.9183	0.137837	0.11897	1.7383	0.68688	0.70933
South Africa	0.479257	0.469421	0.633449	0.350178	0.081762	0.38434	2.62259	0.30554	0.85833

Table A2.12: Political stability index

	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Probability
Angola	-1.86677	-2.09582	-0.945155	-2.32332	0.464398	1.00692	2.55246	1.77327	0.41204
Burundi	0.841522	0.875012	0.903982	0.699643	0.071074	-1.0243	2.57224	1.82487	0.40155
Botswana	-1.98237	-2.00692	-1.752666	-2.13223	0.113439	0.71565	2.73043	0.88388	0.64279
Côte d'Ivoire	-0.70342	-0.68963	-0.460415	-0.97793	0.172313	-0.1565	1.886	0.55789	0.75658
Cameroon	-0.90149	-0.67954	0.319201	-2.27626	0.993944	-0.2306	1.47448	1.05833	0.5891
Djibouti	-2.06852	-1.96572	-1.421737	-2.78207	0.528721	-0.1662	1.36835	1.15534	0.5612
Eritrea	-0.08558	-0.16609	0.458996	-0.25732	0.217656	1.80396	5.02237	7.12795	0.02833
Ethiopia	-0.73345	-0.71851	-0.253447	-1.19785	0.329238	0.01329	1.55174	0.87424	0.64589
Ghana	0.450358	0.46109	0.632263	0.202199	0.12424	-0.4986	2.77358	0.43562	0.80428
The Gambia	-0.00493	-0.002	0.062209	-0.10358	0.04784	-0.6322	2.92715	0.66841	0.71591
Guinea Bissau	-0.7278	-0.65727	-0.412229	-1.13997	0.253768	-0.3506	1.70949	0.8988	0.63801
Kenya	-0.88375	-0.97169	-0.377129	-0.98218	0.200557	1.92818	5.19922	8.21173	0.01648
Lesotho	0.515646	0.51261	1.005738	-0.02644	0.342502	0.00758	2.02739	0.39425	0.82109
Morocco	0.009825	0.017693	0.227075	-0.28063	0.170417	-0.3129	1.99775	0.58171	0.74762
Madagascar	0.254038	0.238387	0.642825	-0.10426	0.23547	0.0821	2.06686	0.37404	0.82943
Mali	0.056782	0.113721	0.161719	-0.32513	0.149608	-1.9449	5.38858	8.68192	0.01302
Mauritius	1.146641	1.171164	1.265672	0.914726	0.109097	-1.042	3.08191	1.81236	0.40407
Malawi	-0.06232	-0.07772	0.163365	-0.39542	0.19484	-0.2162	1.77288	0.70535	0.70281
Namibia	0.293516	0.440757	0.840807	-0.56721	0.413561	-0.7937	2.91642	1.05297	0.59068
Niger	-1.42758	-1.49403	-1.033833	-1.77662	0.23741	0.2618	1.96703	0.55883	0.75623
Nigeria	-0.26847	-0.24441	-0.055338	-0.56067	0.154126	-0.4108	2.41445	0.42419	0.80889
Rwanda	-1.52527	-1.52609	-0.92283	-2.0639	0.35663	0.10336	2.10157	0.35413	0.83772
Senegal	-0.64307	-0.69404	-0.210198	-1.08428	0.328657	0.1718	1.54579	0.93033	0.62803
Sierra Leon	-1.8284	-1.78345	-1.323995	-2.38554	0.340378	-0.1709	1.87555	0.5755	0.74995
Swaziland	0.195116	0.214869	0.536006	-0.13828	0.1907	0.01802	2.69776	0.0386	0.98088
Tunisia	0.416789	0.422571	0.731854	0.160909	0.18747	0.18829	1.83177	0.62774	0.73061
Uganda	-1.22896	-1.22918	-0.951345	-1.47134	0.173776	0.14226	1.74003	0.69519	0.70638
South Africa	-0.47813	-0.35566	-0.134389	-0.96664	0.317369	-0.4105	1.53719	1.17242	0.55643

Table A2.13: Voice and accountability index

	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Probability
Angola	-1.30652	-1.33954	-1.017528	-1.42237	0.119578	1.5067	4.45664	4.66766	0.09692
Burundi	-1.40583	-1.42386	-1.133708	-1.6638	0.211575	0.13813	1.41182	1.08276	0.58194
Botswana	0.754242	0.756208	0.777313	0.728054	0.019319	-0.1828	1.44456	1.0638	0.58749
Côte d'Ivoire	-0.97186	-1.11571	-0.191443	-1.46432	0.436635	0.58117	1.97853	0.99769	0.60723
Cameroon	-0.96717	-0.95412	-0.767363	-1.17524	0.145445	-0.0504	1.58769	0.83533	0.65858
Djibouti	-0.70788	-0.71236	-0.560765	-0.8476	0.082652	0.14799	2.4763	0.15078	0.92738
Eritrea	-1.48543	-1.3348	-1.073758	-2.05255	0.41089	-0.3574	1.38921	1.29405	0.5236
Ethiopia	-0.89819	-0.92129	-0.609117	-1.13529	0.210583	0.15631	1.35609	1.16674	0.55802
Ghana	-0.13894	-0.13404	0.388211	-0.53334	0.303944	0.31632	1.89785	0.6729	0.7143
The Gambia	-1.04142	-1.05593	-0.587771	-1.34265	0.219499	0.71465	2.99666	0.8512	0.65338
Guinea Bissau	-0.60771	-0.60674	-0.335653	-0.85237	0.164464	0.095	1.99617	0.43491	0.80457
Kenya	-0.63943	-0.66726	-0.341283	-0.83997	0.169357	0.44442	1.8898	0.84274	0.65615
Lesotho	0.00387	-0.01295	0.282101	-0.15938	0.115441	1.24408	4.73587	3.83506	0.14697
Morocco	-0.48338	-0.49723	-0.30444	-0.63007	0.099069	0.34	2.2768	0.41059	0.81441
Madagascar	0.203907	0.256087	0.397024	-0.05408	0.160931	-0.3839	1.63745	1.01923	0.60073
Mali	0.302883	0.31812	0.381857	0.181325	0.062674	-0.6519	2.40668	0.85506	0.65212
Mauritius	0.974846	0.958303	1.213333	0.803828	0.120494	0.55802	2.66609	0.56544	0.75373
Malawi	-0.34154	-0.34717	-0.102888	-0.56027	0.1668	0.0752	1.5281	0.91214	0.63377
Namibia	0.393821	0.393825	0.522906	0.275965	0.080066	0.10522	1.89494	0.52727	0.76825
Niger	-0.40424	-0.29616	-0.067556	-0.99373	0.328201	-0.5575	1.89163	1.02988	0.59754
Nigeria	-1.02034	-0.8882	-0.652181	-1.4888	0.380059	-0.2463	1.25412	1.37114	0.5038
Rwanda	-1.40321	-1.45044	-1.094747	-1.5031	0.129582	1.61271	4.28573	5.0235	0.08113
Senegal	-0.12554	-0.13653	0.193561	-0.49381	0.252166	-0.0054	1.55746	0.8671	0.6482
Sierra Leon	-1.5333	-1.4818	-1.367983	-1.91092	0.161609	-1.3513	3.98639	3.44884	0.17828
Swaziland	-1.17321	-1.19145	-0.916734	-1.44957	0.15859	-0.0358	2.32673	0.19101	0.90891
Tunisia	-0.82398	-0.82133	-0.530938	-1.10519	0.157291	0.04909	2.90556	0.00773	0.99614
Uganda	-0.72205	-0.69681	-0.605026	-0.9379	0.110607	-0.7343	2.40289	1.04732	0.59235
South Africa	0.852639	0.866669	1.052064	0.676422	0.11253	0.11871	2.31237	0.2205	0.89561

Table A 3.1: Summary of signs of coefficients for the corruption control Index

	General public services	Defence	Education	Health	Social welfare services	Economic services	Other
Panel A: Full sample							
$\frac{g_i}{G}$	–	–	+/-	+	–	–	+/-
$\frac{g_i}{GDP}$	+	–	+	+	+	+/-	+
$\frac{G}{GDP}$	Indetermi-nate or insignificant	Significant	Indetermi-nate or insignificant	Significant	Indeterminate or insignificant	Indeterminate or insignificant	Indeterminate or insignificant
Panel B: Less corrupt sub-sample							
$\frac{g_i}{G}$	–	–	+	+	+	+	–
$\frac{g_i}{GDP}$	–	–	–	+	+	+	–
$\frac{G}{GDP}$	Significant	Significant	Indetermi-nate or insignificant	Significant	Significant	Significant	Significant
Panel C: 'Most corrupt' sub-sample							
$\frac{g_i}{G}$	–	+	–	–	+	–	+
$\frac{g_i}{GDP}$	+	–	+	+	+	+	+
$\frac{G}{GDP}$	Indetermi-nate or insignificant	Indetermi-nate or insignificant	Indetermi-nate or insignificant	Indeterminate or insignificant	Significant	Indetermi-nate or insignificant	Significant

Source: Author's compilation based on the signs of the estimated coefficients of corruption control index in the various estimations reported above.