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.

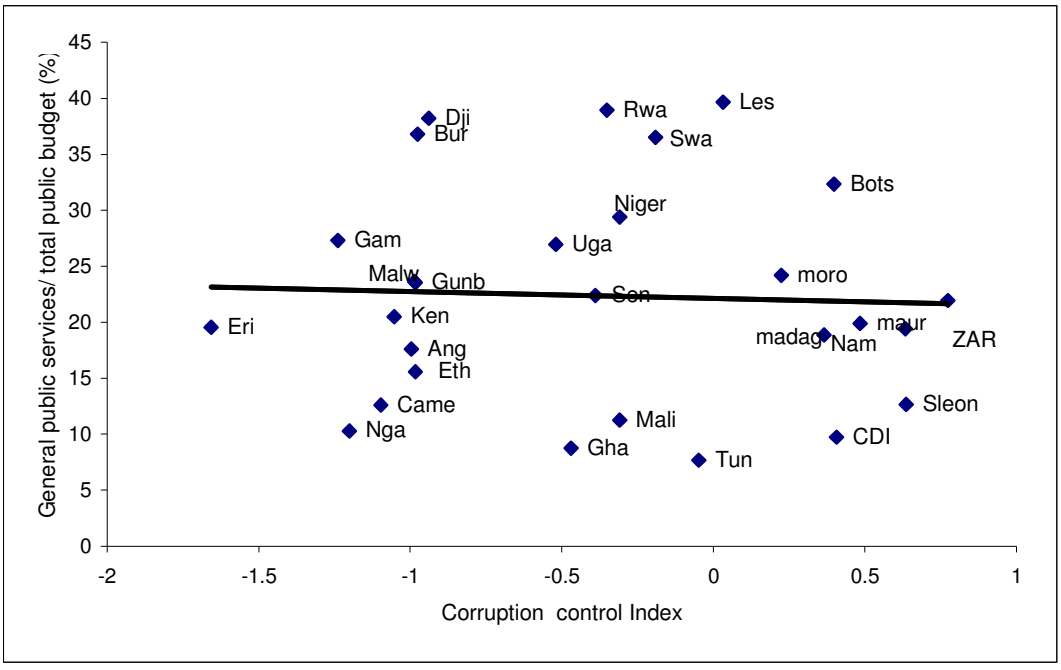

Figure 8: Corruption control index and general public services spending

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.

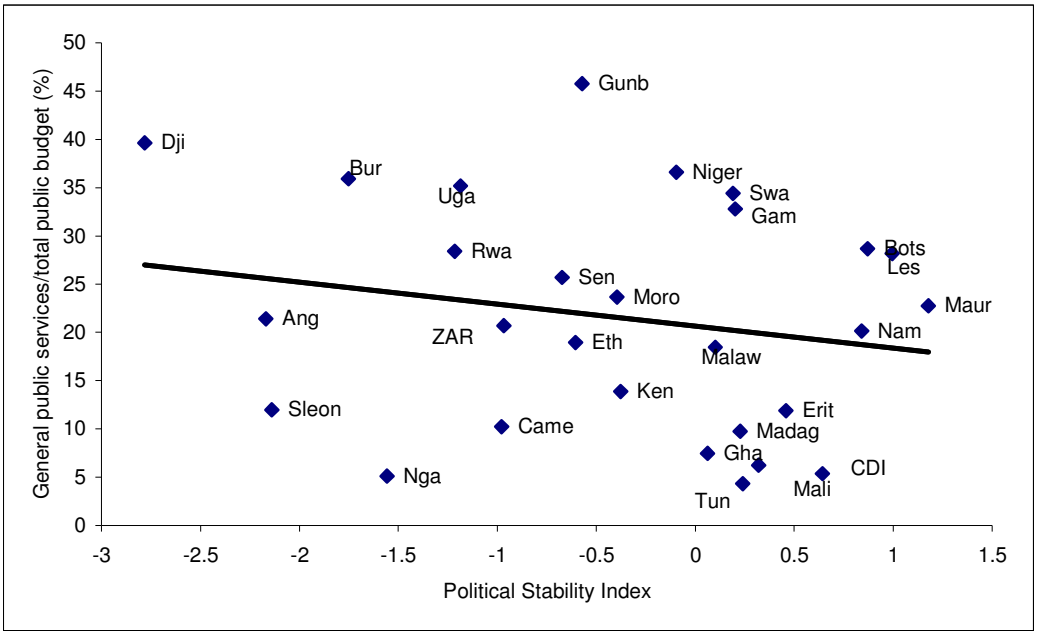

Figure 9: Political stability index and general public services spending

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.

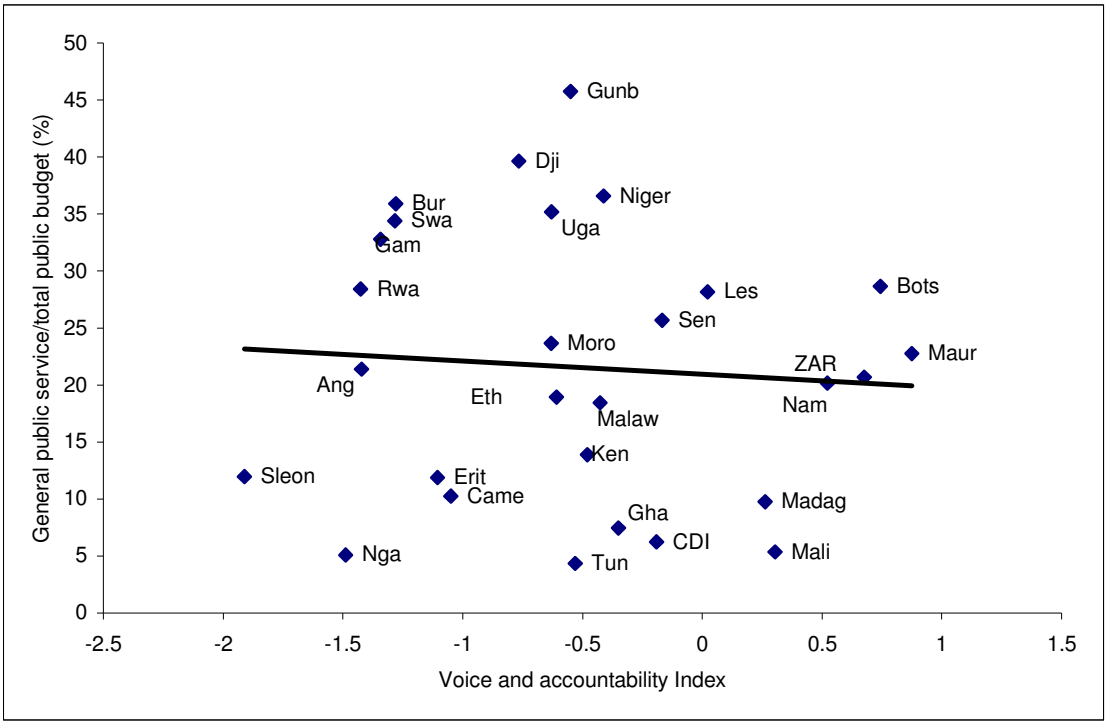

Figure 10: Voice and accountability index and general public services spending

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.

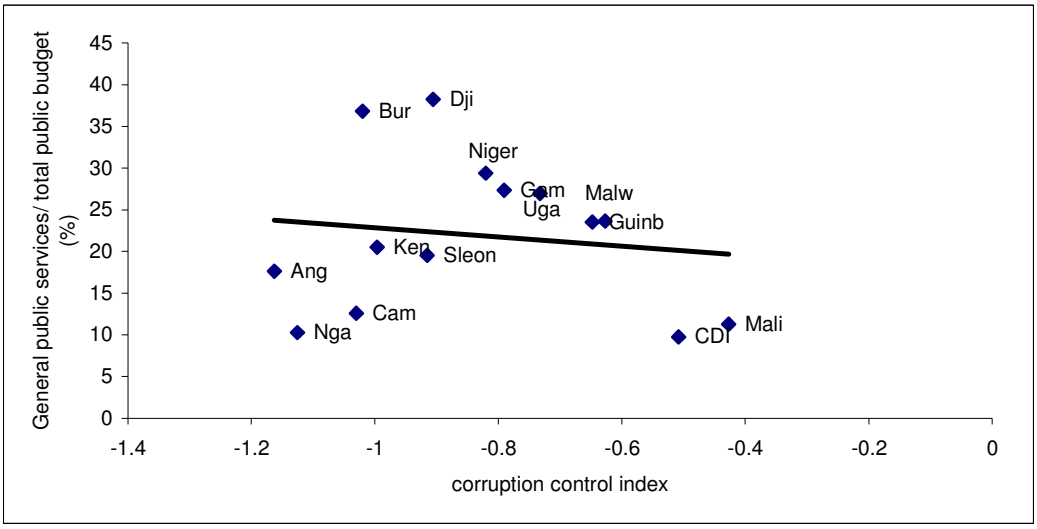

Figure 11: Corruption control index and general public services spending as a ratio of the total budget: 'most corrupt' sub-sample

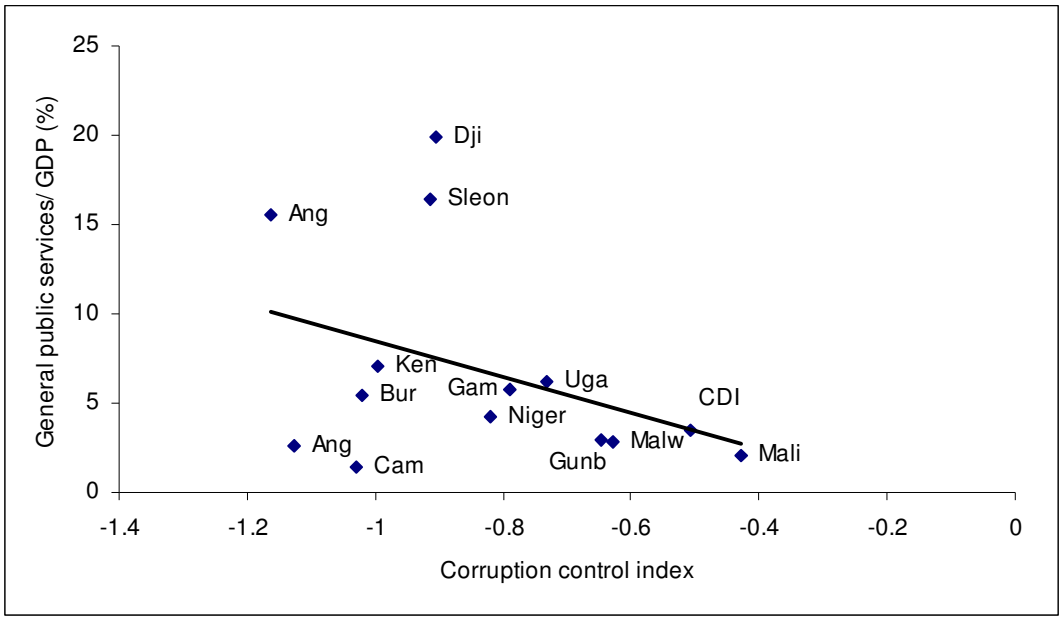

Figure 12: Corruption and general public services spending as a ratio of GDP: 'most corrupt' sub-sample

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.

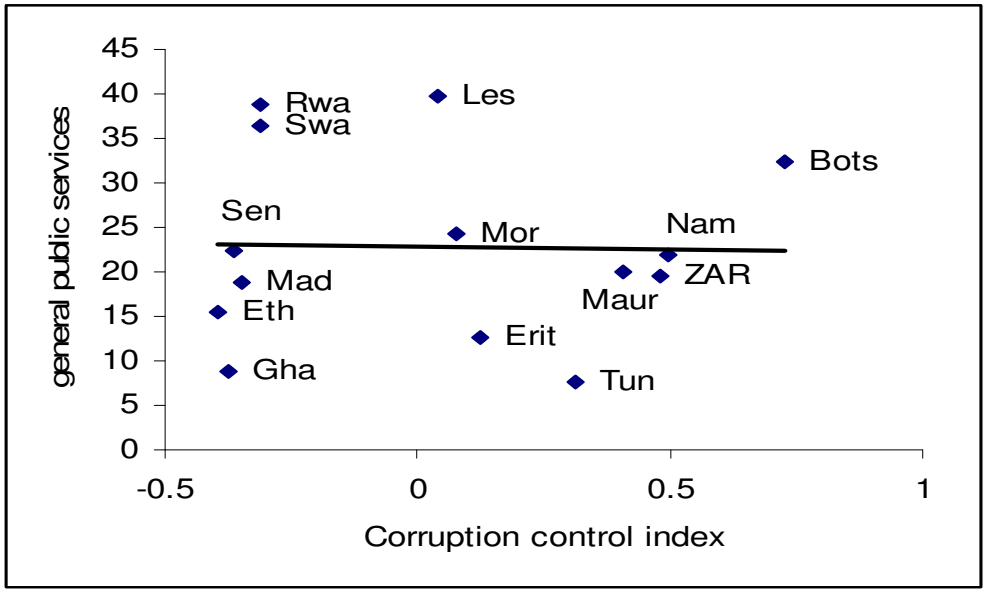

Figure 13: Corruption control index and general public services spending as a ratio of the total budget: 'less corrupt' sub-sample

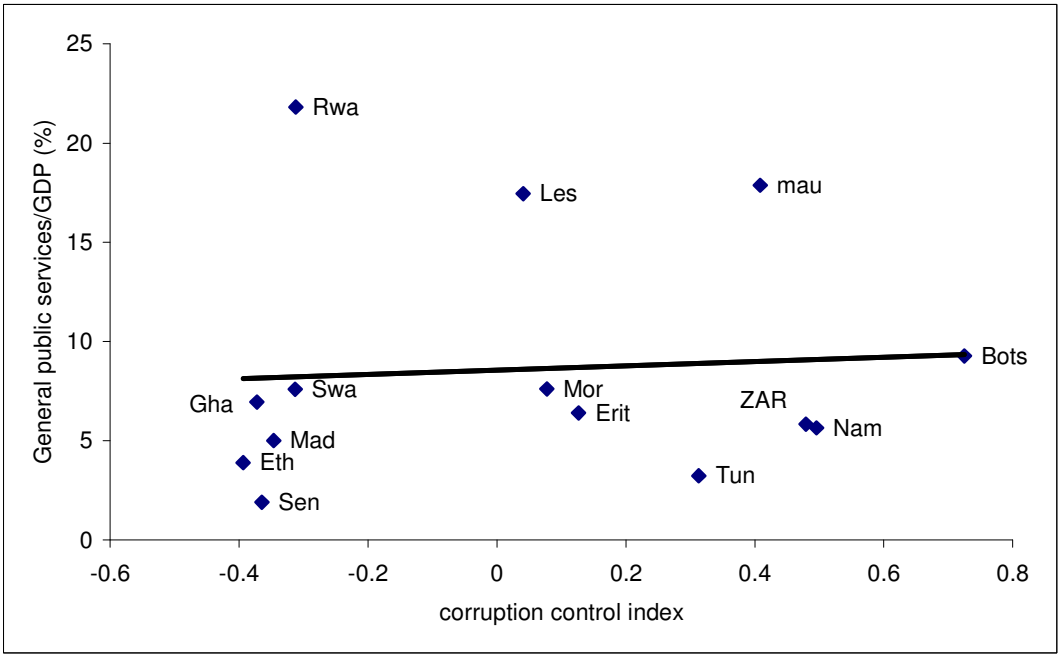

Figure 14: Corruption control index and general public services spending as a ratio of the GDP: ' less corrupt' sub-sample

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.

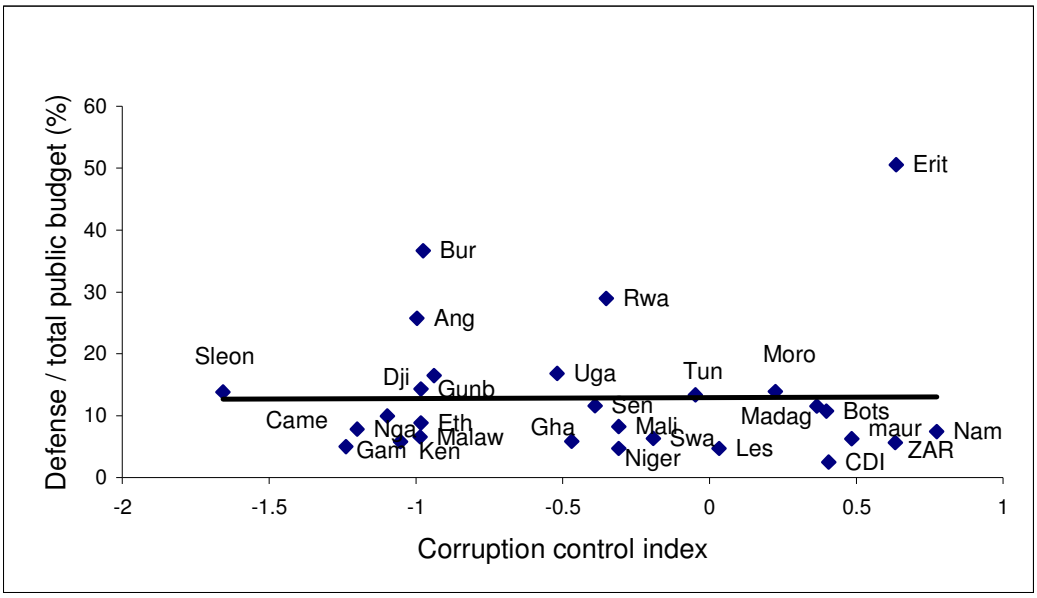

Figure 15: Corruption control index and defence spending

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.

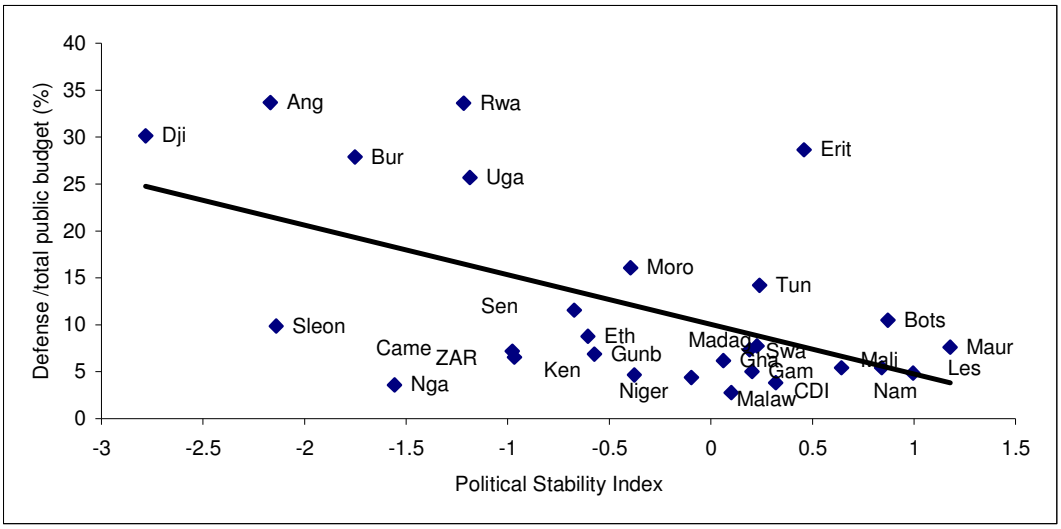

Figure 16: Political stability index and defence spending

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.

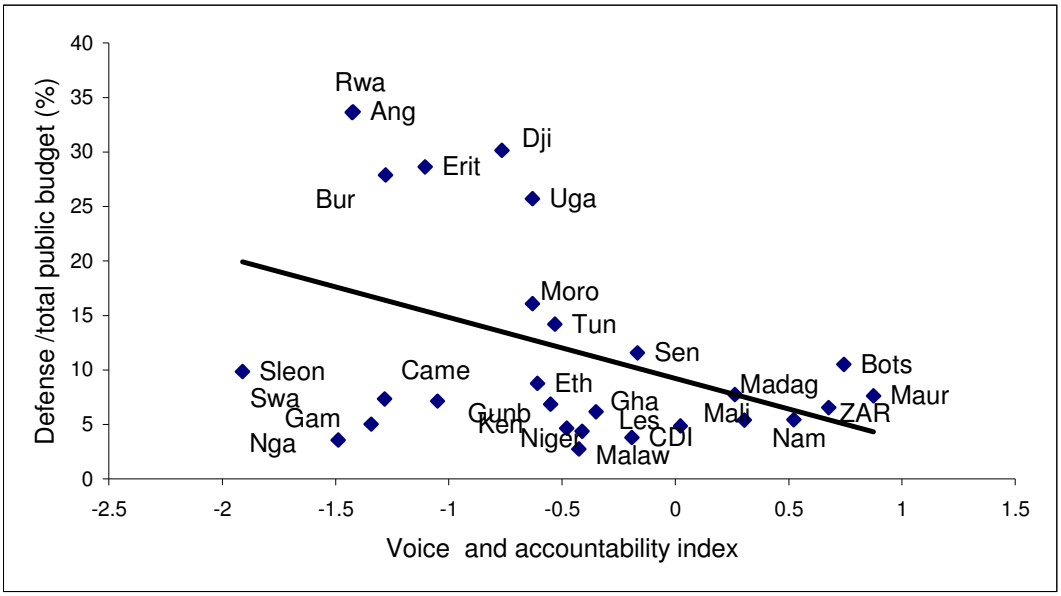

Figure 17: Voice and accountability index and defence spending

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.

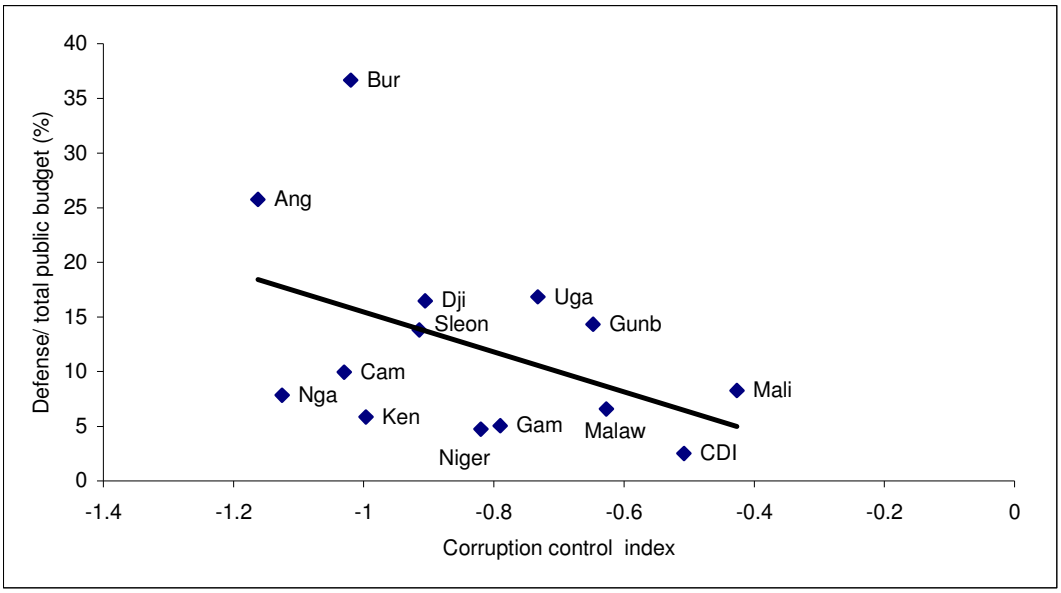

Figure 18: Corrution control index and defence spending as a ratio of the total budget: ' most corrupt' sub-sample

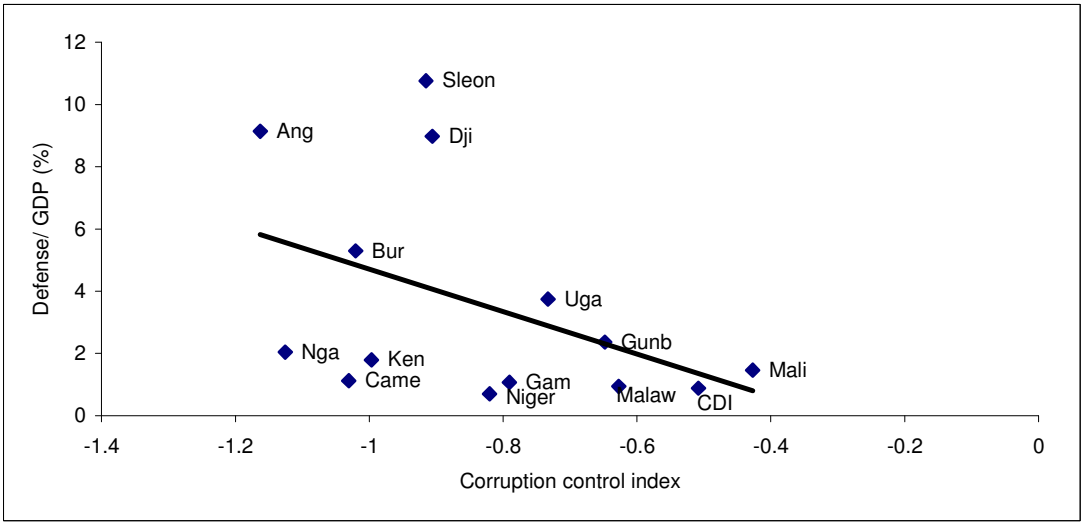

Figure 19: Corruption control index and defence spending as a ratio of the GDP: 'most corrupt' sub-sample

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.

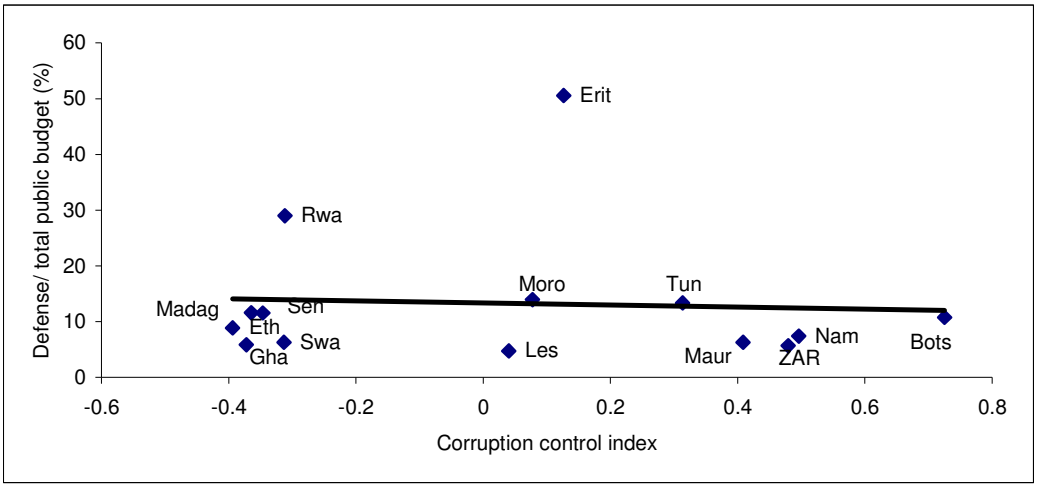

Figure 20: Corruption control index and defence spending as a ratio of the total budget: ' less corrupt' sub-sample

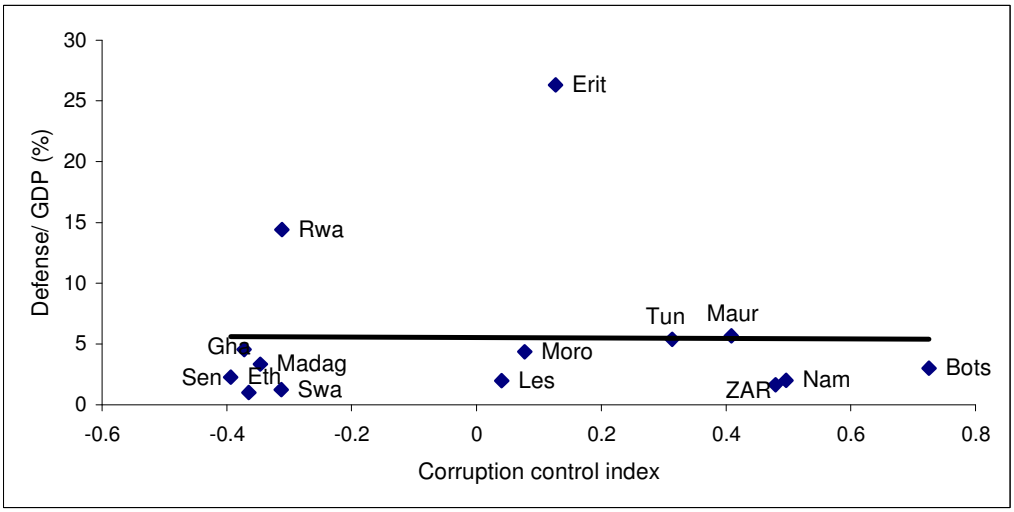

Figure 21: Corruption control index and defence spending as a ratio of the GDP: 'less corrupt' sub-sample

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.