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.

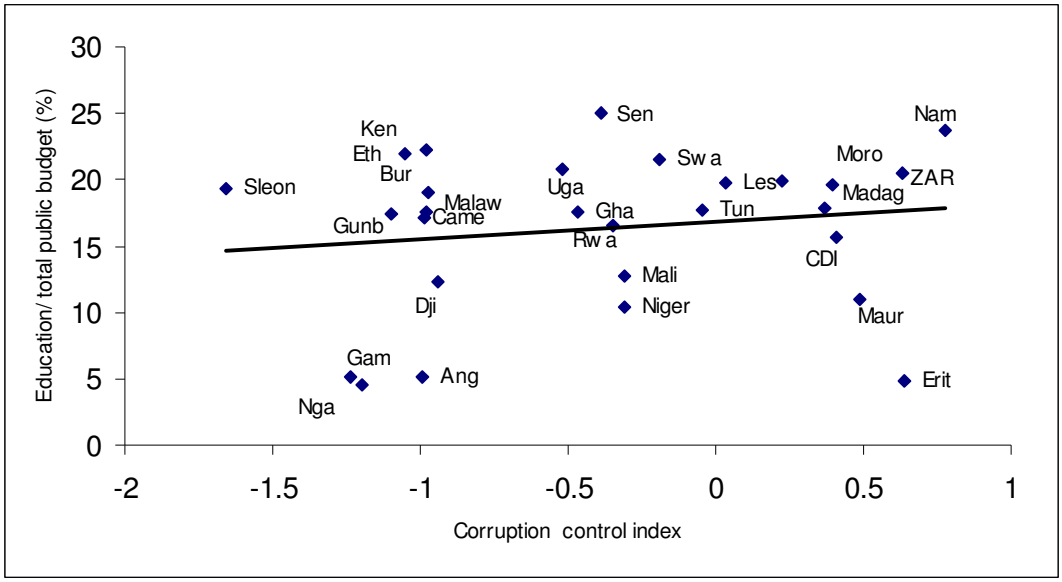

Figure 22: Corruption control index and education spending as a ratio of the total budget

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.

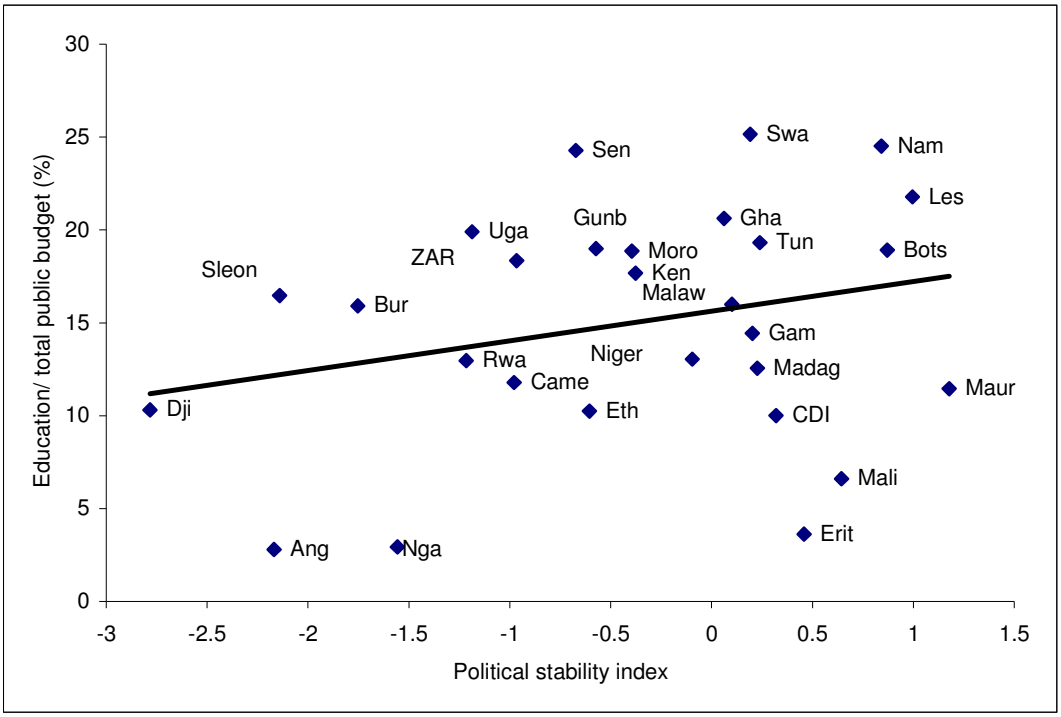

Figure 23: Political stability index and education spending as a ratio of the total budget

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.

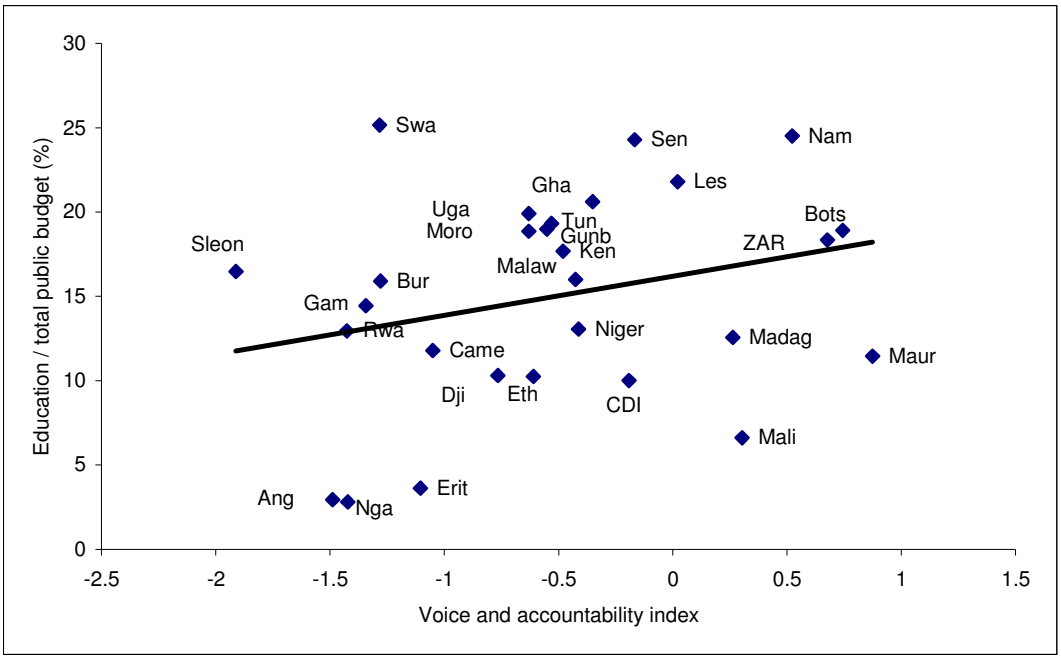

Figure 24: Voice and accountability index and education spending as a ratio of the total budget

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.

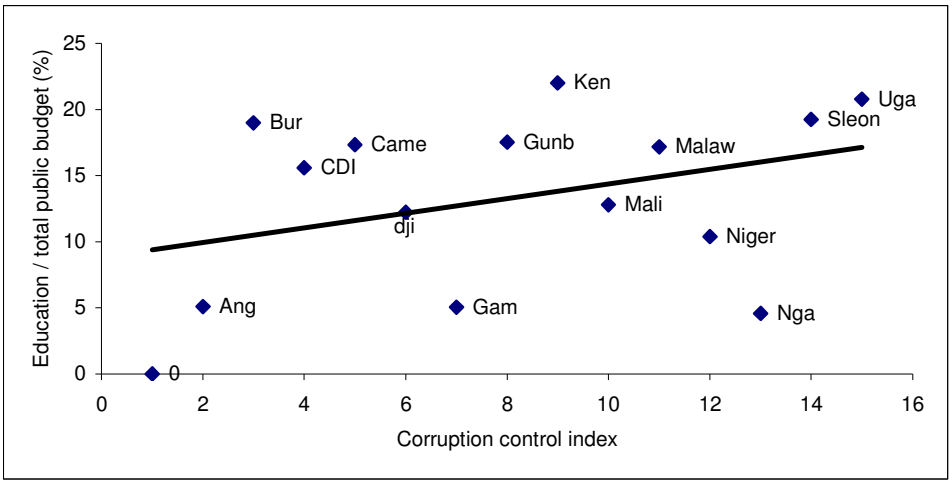

Figure 25: Corruption control index and education spending as a ratio of the total budget: 'most corrupt' sub-sample

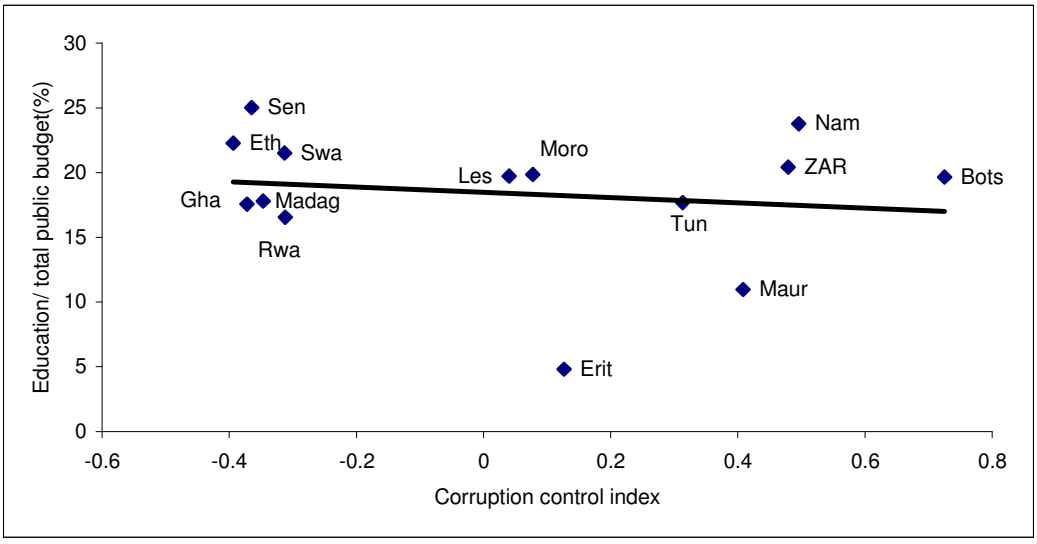

Figure 26: Corruption control index and education spending as a ratio of the total budget: ' most corrupt' sub-sample

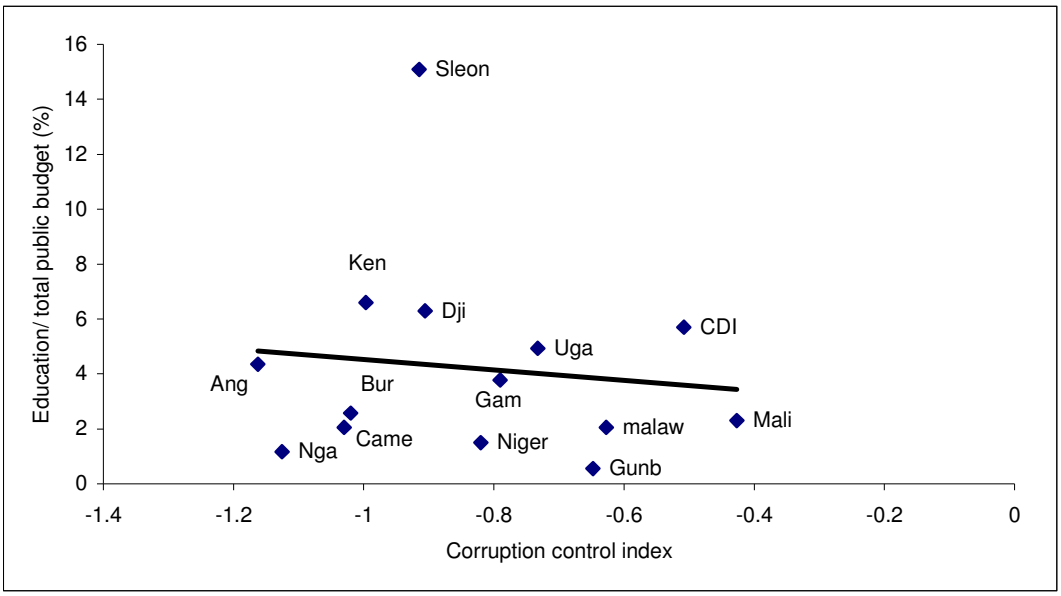

Figure 27: Corruption control index and education spending as a ratio of the total budget: 'less corrupt' sub-sample

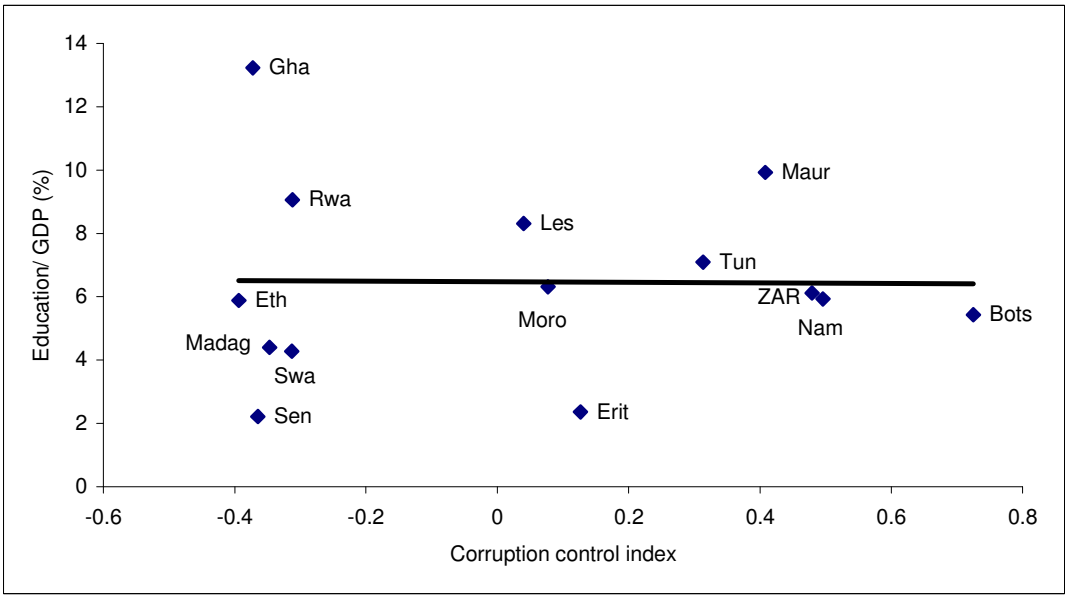

Figure 28: Corruption control index and education spending as a ratio of the GDP: 'less corrupt' sub-sample

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.

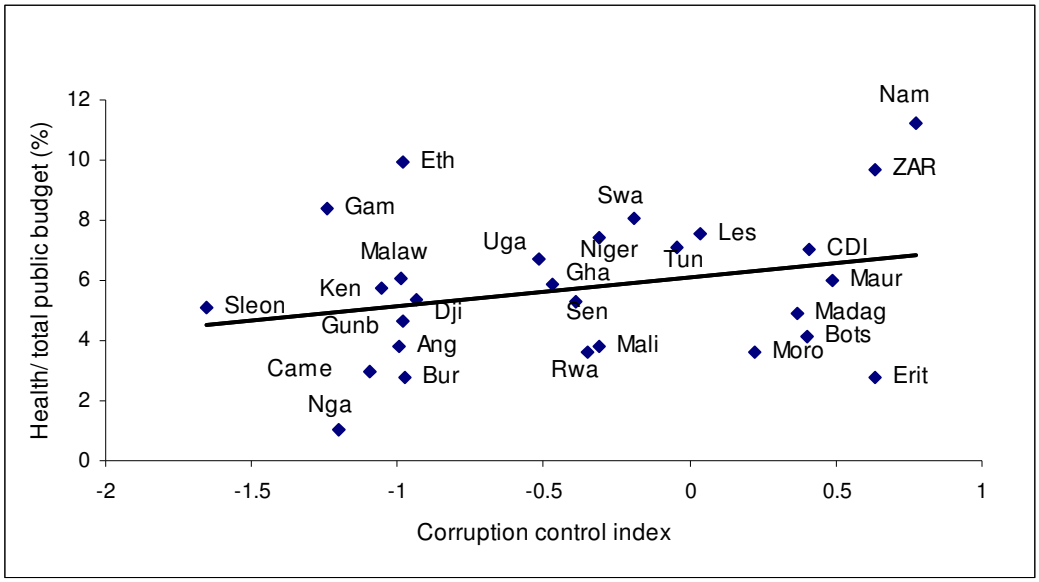

Figure 29: Corruption control index and health spending as a ratio of the total budget

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.

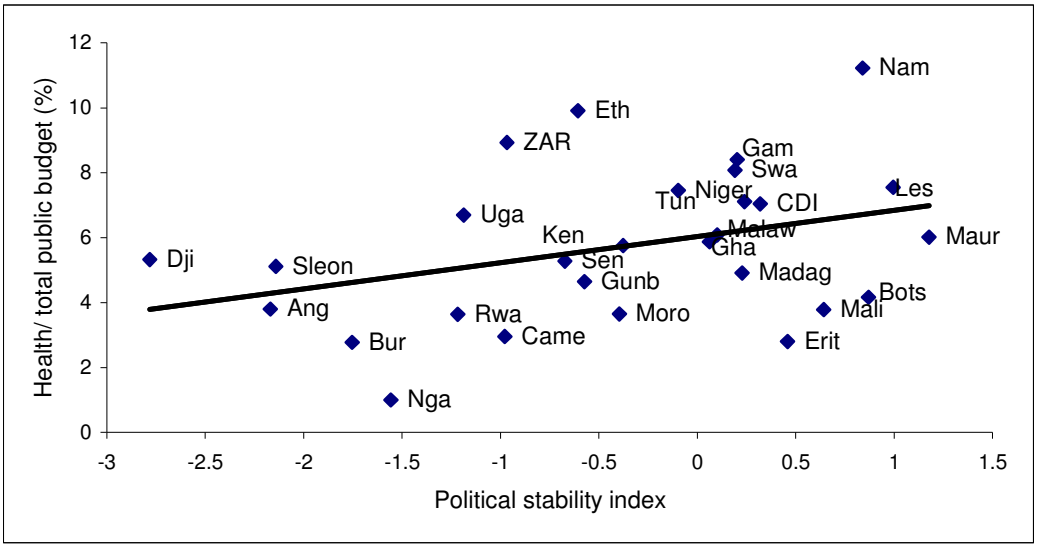

Figure 30: Political stability index and health spending as a ratio of the total budget

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.

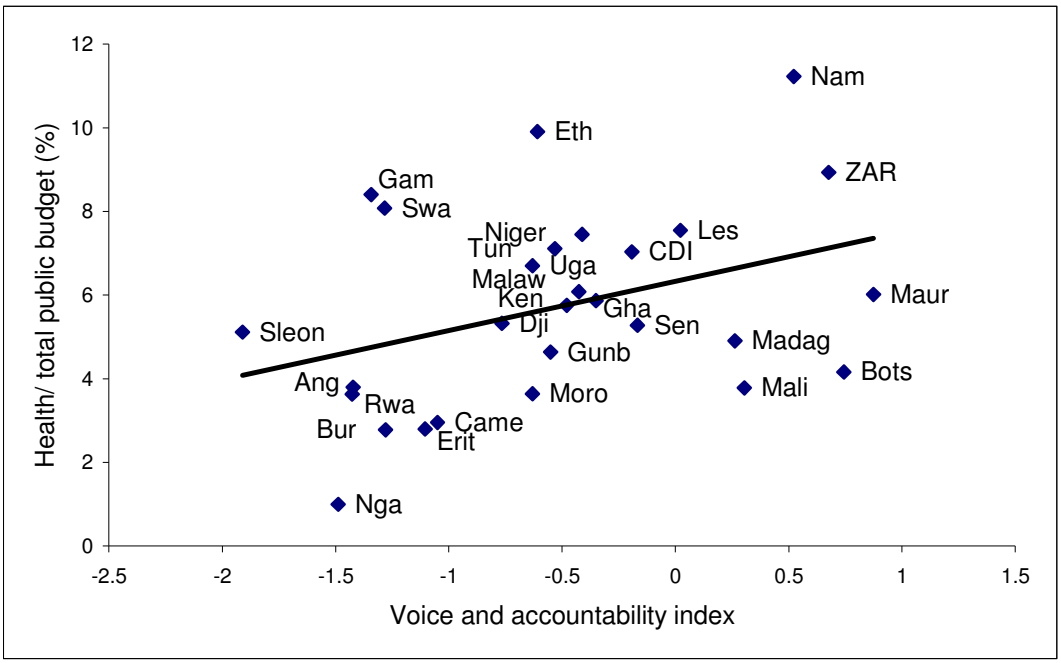

Figure 31: Voice and accountability index and health spending as a ratio of the total budget

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.

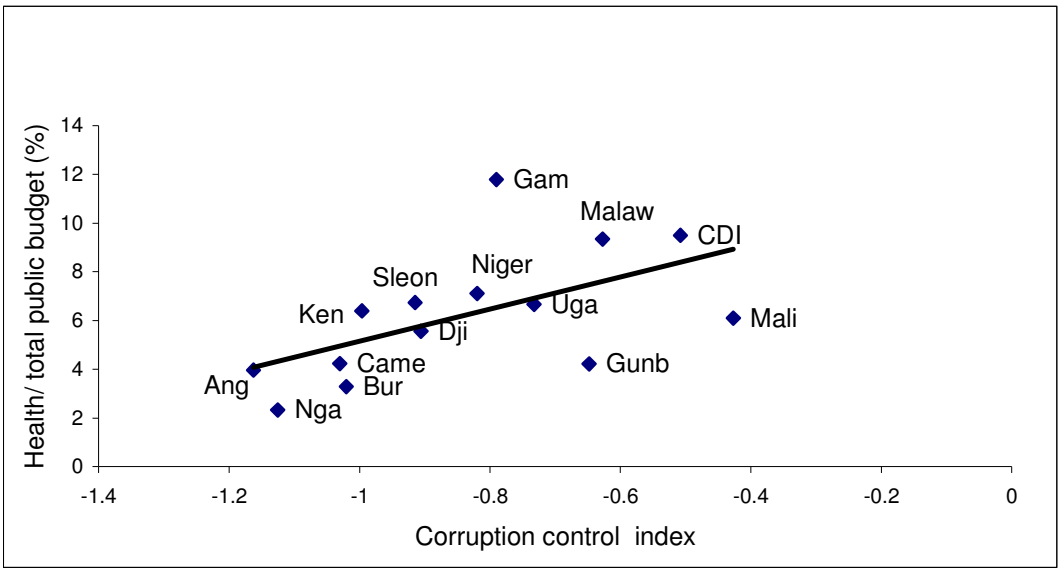

Figure 32: Corruption control index and health spending as a ratio of the total budget: 'most corrupt' sub-sample

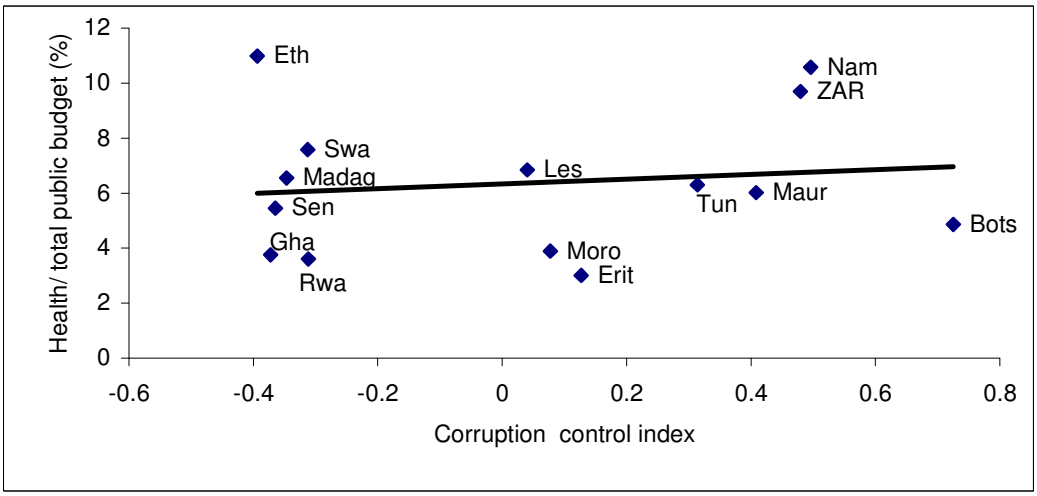

Figure 33: Corruption control index and health spending as a ratio of the GDP: 'most corrupt' sub-sample

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.

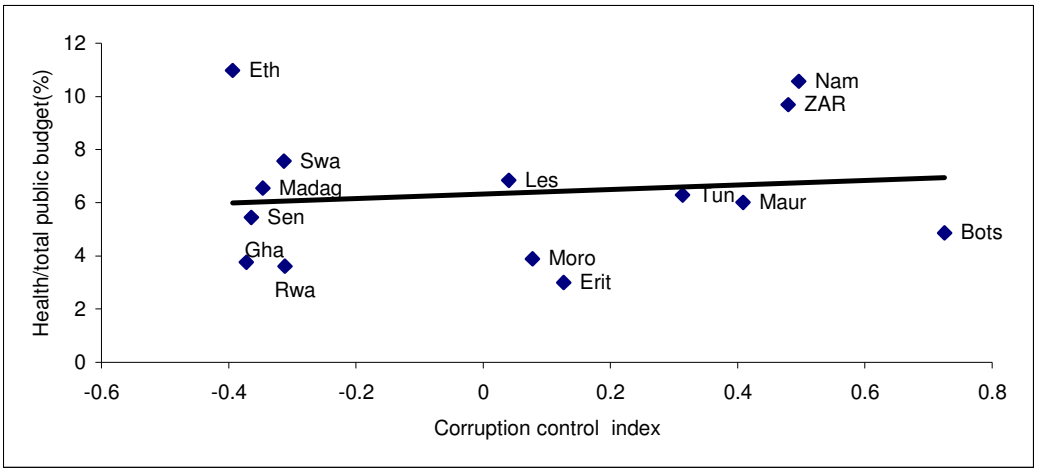

Figure 34: Corruption control index and health spending as a ratio of the total budget: 'less corrupt' sub-sample

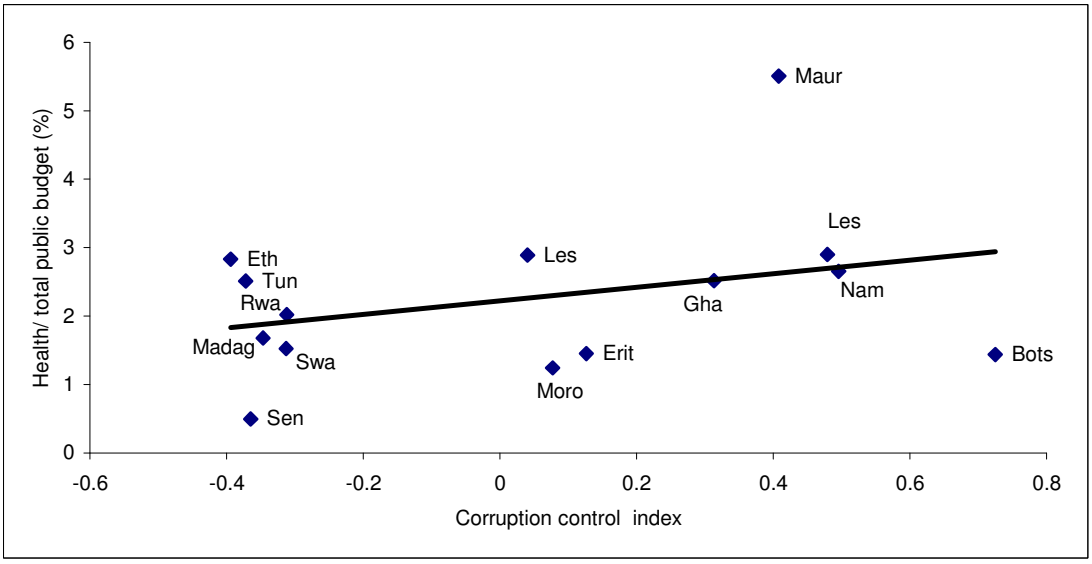

Figure 35: Corruption control index and health spending as a ratio of the GDP: 'less corrupt' sub-sample

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.