The quality of governance and education spending in Africa

M.E. Nyamongo & N.J. Schoeman

A B S T R A C T

This study investigates the effects of the quality of governance, namely corruption, political instability and democracy, on the public budget allocation to education by using data for a panel of 28 African countries over the period 1995–2004. The estimation results show that education expenditure is affected by the level of corruption, with highly corrupt countries devoting a smaller share of their budgets to this vote. Political instability impacts negatively on education, but the level of democracy does not seem to have a prominent effect in this regard. However, International Monetary Fund programmes favour expenditure on education as part of its intended capacity-building effort.

Key words: quality of governance, education spending, panel, Africa

Background

A voluminous literature exists regarding budget priorities, especially allocations to education (Aschauer 1989; Barro 1990; Levine & Renelt 1992; Easterly & Rebelo 1993; Devarajan, Swaroop & Zou 1996; Gupta, Clements & Tiongson 1998; Nyamongo 2007). Most of these studies find that the composition of government in terms of representation and quality of service delivery is critical with respect to its influence on economic growth performance. In studies such as Hanushek (1995), Mingat and Tan (1998), Rajkumar and Swaroop (2002) and Carmignani (2008), the impact of educational expenditure on growth is further explored, and typical drivers that affect the level of prioritisation with regard to educational expenditures are identified.

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These drivers include conventional factors such as the level of income per capita and demographic characteristics (see Mauro 1998; Stasavage 2005; Shelton 2007). In these and other studies, the important role of the quality of governance is prominently highlighted. For example, the level of corruption in a country is analysed by Mauro (1998), Tanzi (1998), Tanzi and Davoodi (2000) and Delavallade (2006), while Habibi (1992) and Stasavage (2005) find democracy to be instrumental in the public budget allocation to education.

The purpose and objectives of the study

The purpose of this study was to investigate the factors that determine education spending in Africa. The study was motivated by various other studies in the recent past that highlight the importance of educational spending as a priority, especially the driving forces behind spending on education compared to military expenditure. In this regard, see Habibi (1992), Stasavage (2005) and Delavallade (2006). This study contributes to the literature by adding a new dimension which, apart from the conventional factors, indicates how, in an African context, institutional governance factors play a role in the allocation of government spending in education. The specific objectives of the study include:

- Identifying the factors that determine education spending in Africa
- Establishing whether the nature of governance affects government spending on education
- Identifying some clear guidelines based on the findings on spending patterns in the 28 African countries included in the study, which should be useful to policy-makers when deciding their expenditure priorities.

The rest of the paper is structured as follows: the second section discusses the trend in public expenditures in Africa; the third section outlines the framework used in the model; while the fourth section analyses the empirical results. The last section contains some concluding remarks.

Review of government spending on education

Figure 1 shows the average distribution of government expenditure in Africa during the period 1995–2004. The figure suggests that education spending tends to account for a relatively larger average share of the budget (16.3%), and in many cases it tops the list of expenditures, with health and social welfare expenditures accounting for

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an average of 12.8%. Expenditures on public administration account for 22.3%, while the share of economic services is only 15.0%.
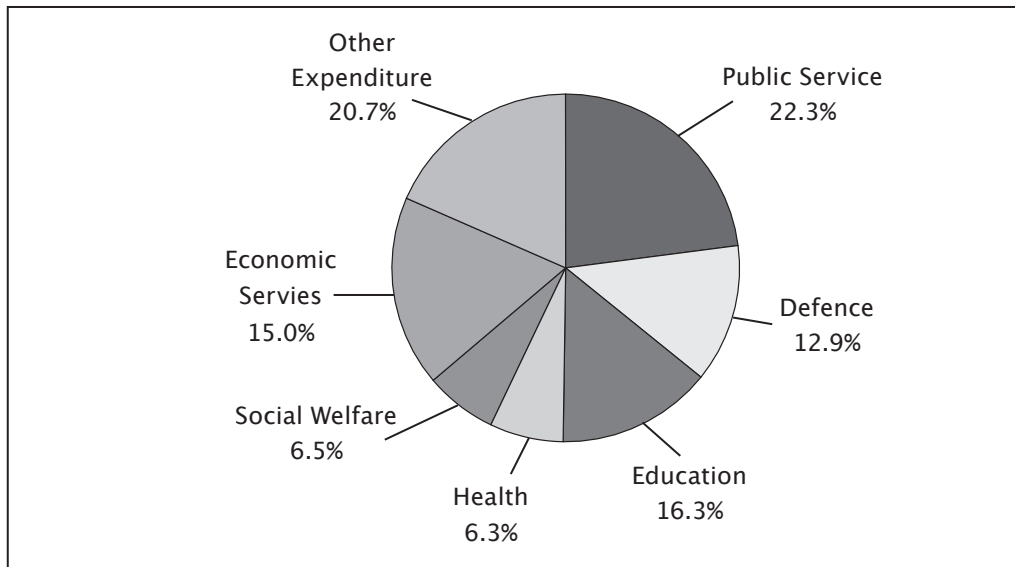
Source: IMF, *Government Financial Statistics* (various issues)
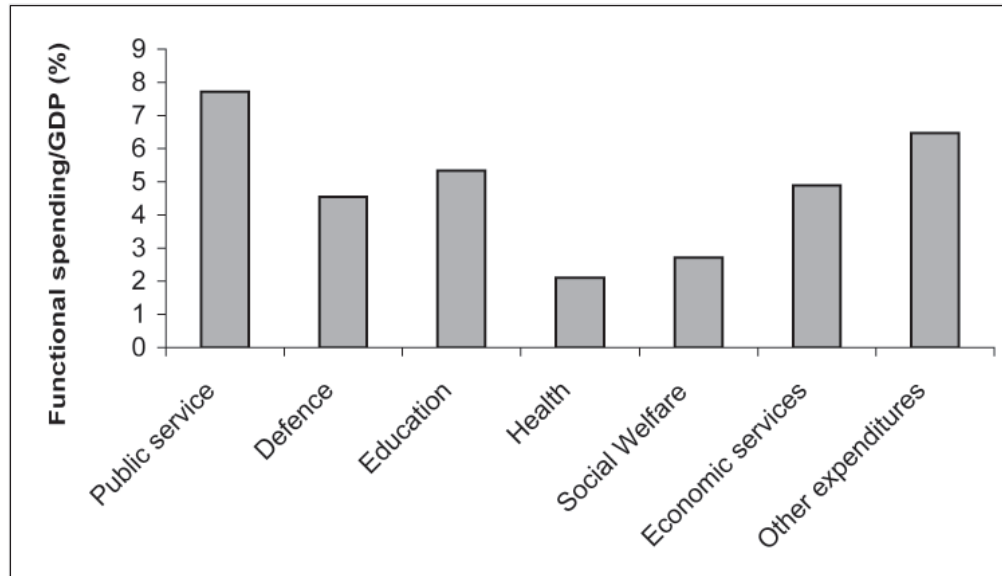
Figure 1: Average distribution of government expenditure in Africa (1995–2004)

Figure 2 shows the distribution of government expenditure as a share of gross domestic product (GDP) to various functional spending categories in Africa during the period 1995–2004. The public service spending category accounts for the highest share of GDP (7.7%), followed by the spending category 'other' (6.5%). Among the social sector spending categories, education accounts for the highest share of GDP (5.3%), which is almost double the share of the health and social welfare spending categories. The economic services spending category amounts to 4.9% of GDP, and defence spending is at 4.5%. It can be seen that the public budget allocation in Africa during this period was tilted towards public services, defence and education.

Methodology

Analytical framework

This study uses a modified and extended version of the model developed by Hewitt (1992, 1993), which is used to analyse the determinants of military expenditure. In this analysis, we partition government spending into education and 'other' spending

Source: IMF, *Government Financial Statistics* (various issues)

Figure 2: Average distribution of public budget/GDP ratios in Africa (1995–2004)

categories. Government spending, G, is a composite of education spending, E, and other expenditures, O, such that:

$$G = E + O \qquad\qquad 1$$

As proposed by Hewitt (1992, 1993) and Gupta, De Mello & Sharan (2001), government spending is financed through taxation, borrowing and seigniorage. Therefore, the government budget constraint in period t (t = 1) can be approximated as in Beetsma & Bovenberg 1999, 2002 as:

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

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

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

It is also assumed that in period t $= 1$, government revenue (tax) is a function of income Y_1. That is:

$$T_1 = \tau Y_1 \qquad 0 \le \tau \le 1 \tag{3}$$

In order to simplify the analysis, the we use a Cobb-Douglas utility function of the form:

$$U(C,E,O) = C^\beta E^\gamma O^\delta \tag{4}$$

The function is assumed to be twice-continuously differentiable on private consumption (C) and government spending (G), with $U_f > 0$ and $U_{ff} < 0$ for $f = C, G$, where $\delta = 1 - \beta - \gamma$. Finally, for tractability, no private investment is assumed, and time indices are omitted for notational simplicity. Therefore, the utility maximiser's problem (in this case the ruling authority) is stated as:

$$\text{Max } U(C,E,O) = C^\beta E^\gamma O^\delta \tag{5}$$

Subject to:

$$Y = C + G, \text{ and } G = E + O \tag{6}$$

Which yields optimal education and 'other' spending as:

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

and

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

In equation 7a, for a given tax rate τ, the share of spending category E in income and total government spending depends on the parameters of the utility functions γ and β. In the same vein, in equation 7b, for a given level of tax rate τ, the share of the 'other' spending category, O, in income and total government spending depends on the parameters of the utility functions δ and β. This, therefore, suggests that a higher γ relative to β, leads to an increase in the education spending category relative to private consumption. The same is true for a higher value of δ relative to β, which also leads to an increase in spending in 'other' spending relative to private consumption. This approach is in line with the thinking of Gupta et al. (2001), who argue that the effect of the quality of governance may be established by its effect on the parameters

in equations 7a and 7b. In this regard, the association between quality of governance and education spending and 'other' spending categories is described as follows: Let the parameters of the utility function γ, β and δ be affected by the quality of governance, Q, such that equations 7a and 7b are redefined as:

$$\frac{E}{Y} = \frac{\gamma(Q)}{\beta(Q)}(1-\tau) - \frac{\gamma(Q)}{\beta(Q)}[\frac{d_1}{Y} + \frac{(1+r)d_0}{Y}]$$

8a

and

$$\frac{E}{G} = \frac{\gamma(Q)}{\beta(Q)}(1-\gamma)\frac{Y}{G} - \frac{\gamma(Q)}{\beta(Q)}[\frac{d_1}{G} + (1+r)\frac{d_0}{G}]$$

8b

Differentiating equations 8a and 8b with respect to the quality of governance, Q, yields:

$$\frac{\partial(E/Y)}{\partial Q} = (1-\tau)\left[\frac{\gamma_q\beta - \beta_q\gamma}{\beta^2}\right] - [\frac{d_1}{Y} + \frac{(1+r)d_0}{Y}]\left[\frac{\gamma_q\beta - \beta_q\gamma}{\beta^2}\right]$$

9a

and

9b

$$\frac{\partial(E/G)}{\partial Q} = (1-\tau)\frac{Y}{G}\left[\frac{\gamma_q\beta - \beta_q\gamma}{\beta^2}\right] - [\frac{d_1}{G} + \frac{(1+r)d_0}{G}]\left[\frac{\gamma_q\beta - \beta_q\gamma}{\beta^2}\right]$$

where $\gamma_q = \frac{d\gamma}{dQ}$ and $\beta_q = \frac{d\beta}{dQ}$. In this case, $\frac{\partial(E/G)}{\partial Q} > 0$ and $\frac{\partial(E/Y)}{\partial Q} > 0$ if $\frac{\gamma_q}{\gamma} > \frac{\beta_q}{\beta}$.

In this study, the quality of governance is measured using three indicators, namely the level of corruption, political stability and the level of democracy and human rights. Against this background, the effect of the quality of governance could be interpreted in three ways. Firstly, in the case of corruption, an increase in E spending can be expected as long as the government perceives such an increase as an opportunity to misuse public money for private benefit. Secondly, the corrupt government will allocate a larger portion of the budget to education as long as such expenditures are regarded as important for staying in power. Lastly, government will allocate a larger share of the budget to education should it be viewed as appealing to the median voter, thereby increasing the chances of being re-elected. In view of the above, the general education spending model can be defined as:

$$\frac{E}{Y} = f_1(\beta, \gamma, \tau, Q, \frac{D}{Y}) \text{ and } \frac{E}{G} = f_2(\beta, \gamma, \tau, Q, \frac{Y}{G}, \frac{D}{G}) \tag{10}$$

Because β, γ, τ and Q are not directly observable, the impact of the quality of governance (Q) on E can therefore be estimated as:

$$\left(\frac{E}{Y}\right)_{jt} = \lambda_0 + \lambda_1 Q_{jt} + \lambda_2 \left(\frac{D}{Y}\right)_{jt} + \lambda_3 K_{jt} + \varepsilon_{jt} \tag{11a}$$

and

$$\left(\frac{E}{G}\right)_{jt} = \varpi_0 + \varpi_1 Q_{jt} + \varpi_2 \left(\frac{G}{Y}\right)_{jt} + \varpi_3 \left(\frac{D}{G}\right)_{jt} + \varpi_4 K_{jt} + \upsilon_{jt} \tag{11b}$$

where t is a time index and j indexes the countries in the panel, $(\frac{E}{Y})_{jt}$ is the ratio of education to GDP; $(\frac{E}{G})_{jt}$ is the ratio of education spending to total government spending; $(\frac{G}{Y})_{jt}$ is the ratio of total government spending to GDP; Q is a vector of the quality of governance indicators; $(\frac{D}{G})_{jt}$ and $(\frac{D}{Y})_{jt}$ are, respectively, the ratios of the public debt to the total public budget and the GDP; K_{jt} is a vector of the state variables; while ε_{jt} and υ_{jt} are the idiosyncratic error terms.

By estimating equations 11a and 11b, the ratio of total government spending (G) to income (Y) is estimated as follows:

$$\frac{G}{Y} = \frac{E/Y}{E/G} \tag{12}$$

Factors that affect budget allocations to education

In the literature, a number of factors are identified that explain the allocation of the public budget to education. Prominent among those is the level of corruption in a country. As argued by Mauro (1998), the educational sector offers fewer opportunities for corruption that might influence the flow of funding to this sector. Thus, a negative relationship can be expected between education spending and corruption. Education expenditures include recurrent expenditures that obviously

do not attract any substantial rent, but investment in educational structures such as schools and universities with value-intensive laboratories may create avenues for corruption that Mauro (1998) ignores. In this study, therefore, we do not state any *a priori* expectations with regard to the role of corruption on education spending.

The political environment in a country, as reflected in its human and political rights as well as transparency with regard to government expenditure, also impacts on budget allocations to education. As suggested by Habibi (1992), Stasavage (2005) and Delavallade (2006), in an environment that features improved levels of human rights and democracy, governments would spend more on electorate preferences such as education. Therefore, one can expect that higher levels of education will be associated with more liberal rights and democracy.

Political instability will obviously trigger budget allocation to those sectors that are critical to restoring stability. As suggested in the literature (see Kimenyi & Mbaku 1995), a country that is under constant threat of instability tends to structure its budget allocations in favour of those functional categories that seek to restore stability; obviously, education spending is not one of them. This, therefore, suggests that politically stable countries will devote more resources to education.

In the models developed by Tabellini and Alesina (1990) and Mahdavi (2004), debt accumulation is instrumental in the allocation of the public budget. For example, higher levels of public debt will tend to enhance the shares of expenditure on economic services, health and education, because funds generated through external and internal loans are usually channelled to these sectors.

The level of income per capita also affects the allocation of the public budget. This draws from Wagner's law, which hypothesised that government spending would increase in the course of development to a modern society, which, as argued by Mahdavi (2004), reflects a greater role for the government as the economy becomes more complex and the demand for public goods and social programmes rises. Consequently, changes in the structure of the public budget are likely to occur as a country advances from lower levels of development. As shown in the literature (see Sheldon 2007; Stasavage 2005; Delavallade 2006; Nyamongo 2007; and Mauro 1998), a positive relationship exists between education spending and the level of GDP per capita. Thus, in this analysis, we *a priori* expect to find a positive relationship between these variables.

Education spending is also affected by numerous demographic characteristics. For example, Sheldon (2007), Delavallade (2006) and Stasavage (2005) find especially that the proportion of the population under 15 years of age is positively correlated with education spending. The reason is obviously that the bulk of pupils fall within this age category, with educational expenditures largely flowing towards

primary education and the first two grades in secondary education. Furthermore, Stasavage (2005) identifies the rate of urbanisation as an important indicator; in particular, the ratio of the rural to urban population is a critical indicator of the level of expenditure on education. The more dense the population, the higher the proportion of expenditure on education compared with the rest of the budget.

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

In the African context, the role of the International Monetary Fund (IMF) in influencing total government expenditure allocation is well documented. As far as fiscal policy is concerned, the IMF's advice to its members has largely remained that of improving the public spending mix, which favours productive and social spending. Thus, in view of this emphasis on investment in human capital, the mere existence of IMF programmes in a country is expected to favour budget allocations to education.

Model specification

In view of the framework and discussion in the previous two sub-sections, the model to be estimated is structured as follows:

$$\left(\frac{E}{G}\right)_{jt} = \alpha + \beta(Lypc)_{jt} + \gamma(Lgov)_{jt} + \delta(DEM)_{jt} + \eta(POL)_{jt}$$
$$+ \lambda(Acc)_{jt} + \kappa(Cor) + \omega(IMF) + \hbar\left(\frac{D}{G}\right) + \varepsilon_{jt}$$

13a

and

$$\left(\frac{E}{Y}\right)_{jt} = \alpha + \beta(Lypc)_{jt} + \delta(DEM)_{jt} + \eta(POL)_{jt} + \lambda(Acc)_{jt} +$$
$$\kappa(Cor) + \omega(IMF) + \hbar\left(\frac{D}{Y}\right) + \mu_{jt}$$

13b

Lypc is the real per capita GDP, which serves as a proxy for the level of development; *Lgov* is the ratio of total government spending to the GDP, which measures the size of

the government relative to the size of the economy; *DEM* is a vector of demographic characteristics such as population, population structure, density and urbanisation; *POL* is the political stability index, which measures the level of political stability in a country; *Acc* is the voice and accountability index, which measures the level of democracy, political and civil rights in a country; and *Cor* is the corruption control index, which measures the state of corruption in a country. IMF is the IMF dummy, which reflects the degree of reform in a country in terms of openness and democracy.

Description of the data

Sources and type

Annual data for 28 African countries[1] are used over the period 1995–2004. The variables used in this study are as follows:

- Education spending expressed as a ratio of the total public budget and of the GDP. The data are obtained from IMF, *Government Financial Statistics* (various issues).
- The corruption control index, political stability index, and voice and accountability index are the quality of governance measures and are obtained from Kaufman, Kraay & Mastruzzi (2006).
- The variables, size of government, level of income (GDP), external debt, population aged 0–14, population density, and urbanisation rates are sourced from the World Bank, *African Development Indicators* (various issues).
- The IMF dummy is constructed on the basis of information available from the IMF. A country is assigned a value of 1 if IMF programmes have been implemented in a given year for at least six months, and a value of 0 if not.

The choice and measurement[2] of governance indicators

Data reflecting the level of governance can be obtained from a number of different institutions. In this study, the authors used the World Bank data set for several reasons. Firstly, it contains data collected by 31 firms that construct governance indicators, which makes it a hybrid index encompassing all the attributes of these individual indicators. Secondly, individual firms use different methodologies to construct their indices for various uses. The performance of the World Bank data set is superior in this regard, because it draws from a wide variety of sources, which makes it more reliable overall. Thirdly, the number of countries and territories used by individual firms is less than the number available from the World Bank database. For example, the Political and Economic Risk Consultancy data include only ten countries, the

Political Risk Services data reflect 140 countries, and the Afro-barometer data include only 18 countries. Using data from these individual sources would have reduced the number of countries in this study because, apart from being limited in terms of coverage, they are also limited in terms of the periods covered. Lastly, compared to the Corruption Perception Index (CPI) of Transparency International (TI), for example, the World Bank data set is superior because it does not use lagged data when current data are not available, which is the methodology used by TI when constructing the CPI (Kaufmann, Kraay & Mastruzzi. 2006).

The corruption control index is a proxy for the level of corruption. It captures the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as a 'capture' of the state of elites and their private interests. It is constructed in such a way that a country that demonstrates the least effort in combating corruption (therefore having a higher level of corruption) is assigned a value of -2.5, while one showing greater effort in combating corruption (resulting in a lower level of corruption) is assigned a value of +2.5. The political stability index is a proxy for the level of political stability in a country. It measures perceptions of the likelihood that the government will be destabilised or overthrown by unconstitutional or violent means, including political violence and terrorism. The political stability index is constructed in such a way that a country that is most politically unstable is assigned a value of -2.5, while one that is politically stable is assigned a value of +2.5. The voice and accountability index measures the extent to which a country's citizens are able to participate in selecting their government, as well as the level of freedom of expression, freedom of association and freedom of the media. The voice and accountability index is constructed in such way that a country ranking poorly in voice and accountability is assigned a value of -2.5, while one that is ranked highly is assigned a value of +2.5.

Empirical results

Preliminary findings

Figure 3 shows the relationship between a corruption control index and education spending as a ratio of total government expenditure. From the figure, it appears that, of the most corrupt countries, Kenya and Sierra Leone devote a larger share of their total government expenditure to education, while Nigeria, Gambia and Angola allocate the least.

Among the less corrupt countries, Namibia, South Africa, Madagascar and Morocco devote the largest shares of their public budgets to education, while
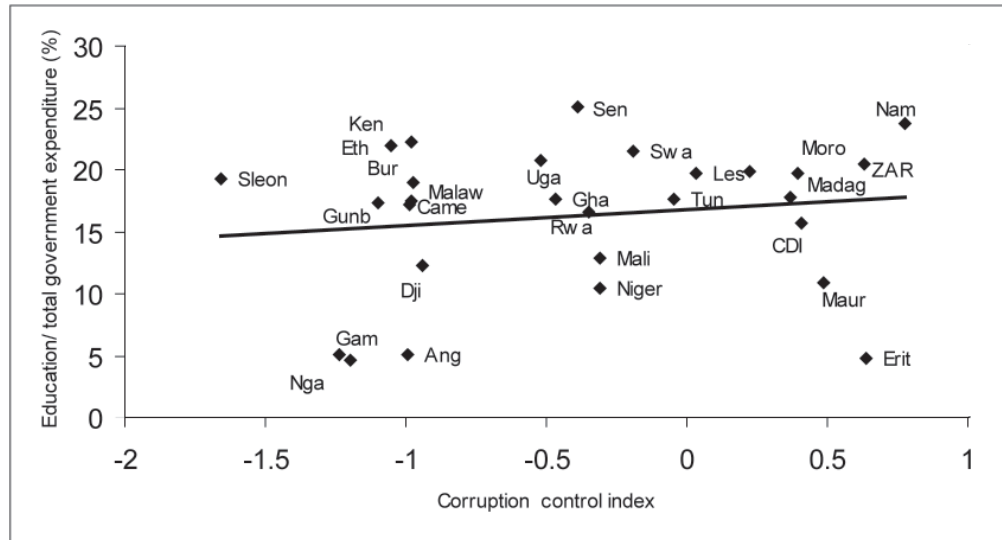
Note: See endnote no. 1 for country abbreviations.

Figure 3: Corruption control index and education spending as a ratio of the total budget

Mauritius and Eritrea allocate the least. Generally, there appears to be a weak positive relationship between the corruption control index and education spending, but the trend suggests that countries that are less corrupt tend to allocate a larger share of their budgets to education, which is consistent with Mauro (1998).
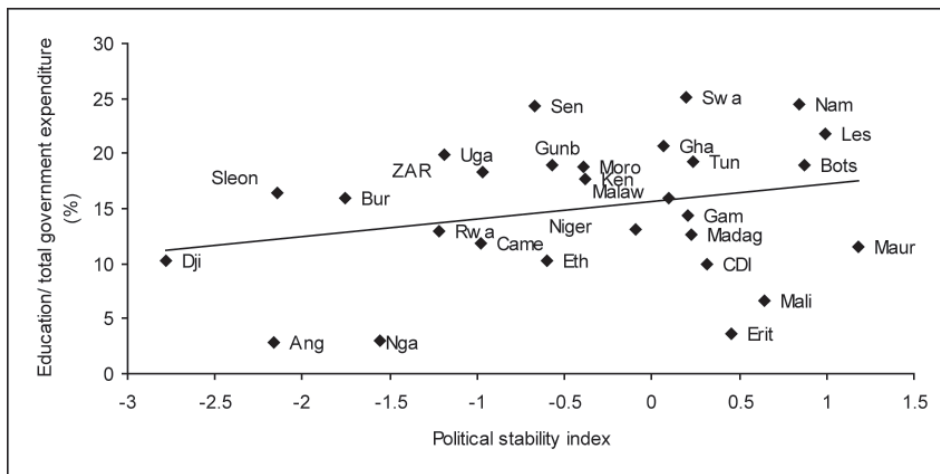
Note: See endnote no. 1 for country abbreviations.

Figure 4: Political stability index and education spending as a ratio of the total budget

Figure 4 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, while Sierra Leone and Burundi allocate larger shares of their budgets. 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.
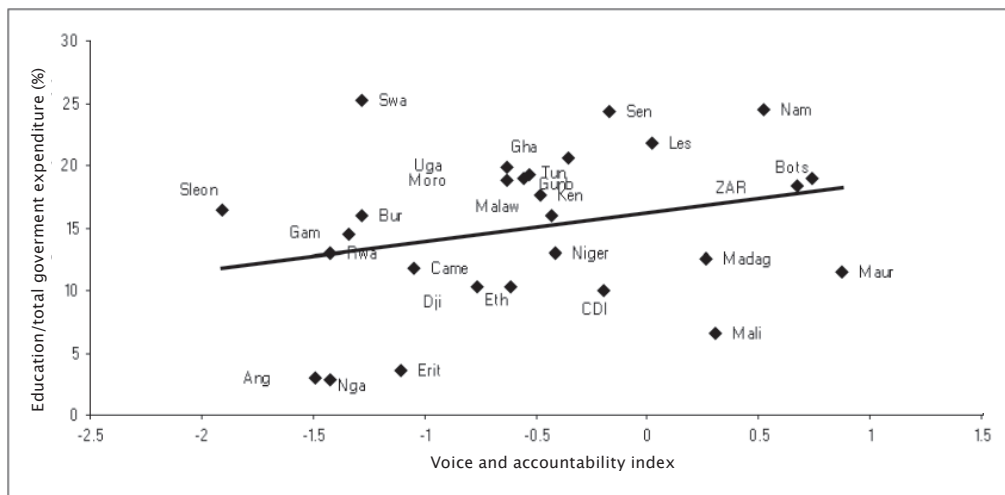
Note: See endnote no. 1 for country abbreviations.

Figure 5: Voice and accountability index and education spending as a ratio of the total budget

Figure 5 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 the education vote. Among the 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.

Estimation results

This section analyses estimation results on education spending as a share of the total public budget and as a share of the GDP. Bivariate[3] and multivariate analyses are performed. This enables controlling for the importance of each of the governance indicators.

Tables 1–3 show the estimation results of the share of education spending in the total public budget and the GDP. The results reveal that the estimated coefficients of the corruption control index are unambiguously positive and significant across all estimations in the full sample, which largely supports studies by Mauro (1998). 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 more corrupt countries, and positive and significant for the least corrupt countries. This result suggests that high levels of corruption are associated with low levels of education spending, which is consistent with Mauro (1998), as explained previously, given the high percentage of recurrent expenditure in the total education budget, which does not really allow for corruption.

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 (educational expenditures) is defined as a share of the total public budget, the coefficients are negative and significant in all sub-samples. However, when defined in terms of GDP, the results are mixed, with the 'more 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. 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 defined as its share of the total public budget, the voice and accountability index produces mixed signs and is not

Table 1: Estimation results of education spending: full sample

	Dependent variable expressed as a share of public budget				Dependent variable expressed as a share of 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	0.16	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 brackets. PM is the pooled model, and FEM is the fixed effects model.

Table 2: Estimation results of education spending as a ratio of the total public budget[4]

	'More 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 brackets. PM is the pooled model.

significant at the conventional levels of testing. Similarly, in the estimations where the dependent variable is defined as its share to GDP, the coefficients also have mixed signs and are insignificant in all estimations for the sub-sample. However, the positive and significant coefficient shows that a high level of voice and accountability is positively related to education spending, which means that a high regard for human rights is consistent with the findings of Habibi (1992) and Sheldon (2007). This is because as a country becomes more open and transparent particularly with regard to its fiscal policy, the budget allocation priorities more closely reflect socio-priorities such as education.

The estimated coefficients for the size of the government are found to be positive and significant at the 1% level of testing in all the estimations in both the full sample and the sub-samples. This seems to suggest that if a country maintains a large public sector relative to its GDP, it tends to allocate a larger portion of its budget to education. Greater demand for education prompts governments to employ more educational staff and increase investment in educational structures such as schools. However, it is significant to note that the estimated coefficients are higher among less corrupt countries than both the 'more corrupt' sub-sample and the full sample. Thus, the results indicate 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. This result supports the views of Devarajan, Rajkumar and Swaroop (1999), who found that higher levels of foreign aid will favour education spending on a one-to-one basis. 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 'more 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, which confirms the findings of Stasavage (2005). The results therefore suggest that in less corrupt countries, the size of the public debt does not really affect the level of funding towards education, while strong evidence exists 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 a share of the GDP, the estimated coefficients are found to be positive and significant

Table 3: Estimation results of education spending as a ratio of the GDP

	'More 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)
R²	0.71	0.88	0.66	0.89	0.94	0.89	0.89	0.87
Adj. R²	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 brackets. PM is the pooled model.

at the conventional levels of testing, and similar results are replicated in all the sub-samples.

As expected, the proportion of the population under the age of 14 years is positively related to education spending in all estimations for the full sample, which is consistent with Stasavage (2005) and Shelton (2007). 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. In those sub-samples where the dependent variable is a share of GDP, the estimated coefficients 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, which is in agreement with Stasavage (2005) in his model of government expenditure on primary education among African countries.

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 a share of the budget, the estimated coefficients have unexpected negative signs for the 'more 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 a share of GDP, all the coefficients of the GDP per capita have the expected positive sign. This phenomenon suggests that as a country develops, it tends to increase its spending on education, which is consistent with Stasavage (2005) and Shelton (2007).

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 a share of the GDP, the estimated coefficients are insignificant, while in those cases where the dependent variable is a share of the total budget, they are highly significant. Further analysis reveals that in all cases where the dependent variable is a share of total budget, the IMF dummy is positive and significant in the 'more corrupt' sub-sample, and where the dependent variable is a share of 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 show that IMF programmes play a prominent role in the allocation of public resources to the educational sector, particularly among less corrupt countries. This finding is largely in agreement with the findings of Gupta et al. (1998).

Estimated coefficients of the IMF interaction variable are negative and significant in the full sample, and the coefficients are 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.

Conclusions

This study shows mixed results concerning the impact of the quality of governance on expenditure priorities using the three indicators, namely the level of corruption, political stability and the level of democracy and human rights as criteria. 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. Conversely, the coefficients for the political stability index are 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 defined as a share of 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 allocations in favour of education. From the results, it could be deduced that also in Africa, countries characterised by 'better' levels of good governance tend to favour expenditures on education, while the less competent governments (in terms of the criteria for good governance) spend more on the military. The more corrupt the government is, the more is spent on the military, because this provides more opportunities for forceful political dominance and other corrupt practices such as bribery in the purchase of military equipment. This finding is further substantiated by the fact that in cases where countries are bound by conditions set by the IMF when implementing IMF support programmes, these countries (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. These results suggest that countries that have implemented IMF programmes tend to have resilient education spending compared to those without such programmes. IMF support programmes, by their very nature, normally set

conditions such as borrowing and spending constraints that limit malpractices such as corruption and political oppression.

Factors tested in this analysis but not directly related to the quality of governance that impacts on expenditure decisions include the demography of the population, the level of the public debt and the level of economic growth. As could be expected, demographic variables, including population density and the proportion of the population aged 0–14 years, play an important role in motivating budget allocations to education. In most African countries, education is a public good provided by government, and with more pupils in the relevant age group, more infrastructure is needed to provide educational services. Another variable that was tested, namely, the impact of public debt on expenditure priorities, surprisingly did not show meaningful results. The coefficients of public debt are not significant at the conventional levels of testing in approximately all the estimations, although the majority of the estimations show a slightly positive relationship between public debt and education spending. The coefficient of income per capita is positive and significant in all the estimations.

Endnotes

1. **Full sample:** Angola (Ang), Botswana (Bots), Burundi (Bur), Cameroon (Came), Côte d'Ivoire (CDI), Djibouti (Dji), Ethiopia (Eth), Eritrea (Eri), Ghana (Gha), Guinea-Bissau (Gunb), Kenya (Ken), Lesotho (Les), Madagascar (Madag), Malawi (Malaw), Mali (Mali), Mauritius (Maur), Morocco (Moro), Namibia (Nam), Niger (Niger), Nigeria (Nga), Rwanda (Rwa), Senegal (Sen), Sierra Leone (Sleon), South Africa (ZAR), Swaziland (Swa), Gambia (Gam), Uganda (Uga), Tunisia (Tun). **'More corrupt' countries:** Angola, Burundi, Cameroon, Côte d'Ivoire, Djibouti, Guinea-Bissau, Kenya, Malawi, Mali, Niger, Nigeria, Sierra Leone, Gambia, Uganda. **'Less corrupt' countries:** Botswana, Ethiopia, Eritrea, Ghana, Lesotho, Madagascar, Mauritius, Morocco, Namibia, Rwanda, Senegal, South Africa, Swaziland, Tunisia.
2. For information regarding construction of these indices, see Kaufman & Mastruzzi (2006).
3. The estimation results of the bivariate regressions are not reported, but are available from the authors on request.
4. The sample was divided into two, namely the 'less corrupt' and 'more corrupt'. The 'more corrupt' includes those countries in the sample that post a less than average full sample score using the corruption control index, while the 'less corrupt' score above the average score.

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