

## CORRUPTION AND DISTRIBUTION OF PUBLIC SPENDING IN DEVELOPING COUNTRIES

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### Abstract

*This paper empirically examines the impact of corruption on the structure of government spending by sector. Using the three-stage least squares method on 64 countries between 1996 and 2001, we show that public corruption distorts the structure of public spending by reducing the portion of social expenditure (education, health and social protection) and increasing the part dedicated to public services and order, fuel and energy, culture, and defense. However, civil and political rights seem to be a stronger determinant of expense on defense than corruption. Our results are robust to instrumentation by the latitude of the country. (JEL O57, H5, D73)*

### Introduction

In all countries, and more noticeably in developing countries, corruption is detrimental to state efficiency. It hampers budget equilibrium, diminishes expenditure efficiency and distorts its allocation between different budgetary functions.

First of all, the state budget equilibrium is undermined in a corrupt political context. Corruption reduces state revenue (Tanzi and Davoodi, 1997; Tanzi, 1998; and Johnson et al., 1999). The impact of corruption on the amount of public spending is controversial. On the one hand, corruption is thought to enlarge total public expenditure as a part of GDP (Tanzi, 1998). On the other hand, Mauro (1997) shows that corruption has no significant impact on the level of public spending. Even if corruption increases the overall level of public expenditure, it is likely to reduce the part of it which really reaches the community since most of the increased expenditure will most likely be captured by corrupt agents. As an illustration, a study carried out in Ugandan primary schools shows that only 30 % of the expenditure per pupil had actually reached schools between 1991 and 1995 (Ablo and Reinikka, 1998). Corruption raises the cost of expenditure and reduces the quantity of output provided by the state (Shleifer and Vishny, 1993).

Secondly, for the same level of spending and for a given budgetary function, public spending is less efficient in countries with high levels of corruption. Corrupt public agents tend to favor investment projects which generate the highest bribes and which are not necessarily the most efficient (Shleifer and Vishny, 1993). Corruption diminishes the impact of public spending on social outcomes and alters the quality of public services. Reducing corruption would enable to improve human development through the reduction of infant mortality and the improvement of primary school rates (Gupta et al., 2000).

Thirdly, corruption affects some given economic sectors' expenditure as a share of GDP: it has a negative impact on the part of human capital investment (Ehrlich and Lui, 1999) and more precisely on education (Mauro, 1997), and a positive one on military spending (Gupta et al., 2001). A high level of corruption distorts expenditure structure. Corrupt civil servants favor investments in building and creation of projects rather than operation and maintenance ones (Tanzi and Davoodi, 1997).

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Hence the impact of corruption on public spending allocation is important not only from an operational viewpoint - since more and more international loans are conditioned by states budgetary structure - but also from a scientific viewpoint. Previous studies on this topic have highlighted that corruption introduced distortions in expenditure level and efficiency. But none of them have highlighted its impact on the budget structure, only paying attention to one or another element of the budget. Yet, it is likely that corrupt public decision makers favor bribe-generating spending. In this paper we intend to answer two main questions. For the same level of government budget, does a high level of public corruption influence public spending structure? And, in that case, which budgetary sectors are favored by public corruption and which are infringed upon?

Using *Government Finance Statistics* data on national budgetary accounts of 64 countries between 1996 and 2001, our major contribution consists in analyzing the impact of corruption on the respective portion of each economic sector in the government budget. Corruption is shown to alter spending structure in favor of fuel and energy, public services and order, defense, and culture at the expense of education, health and social protection. One potential explanation for such an allocation effect could be that the benefits, in terms of corruption, that corrupt officials expect to obtain from project funding is highly correlated with the rent firms expect from such contracts. Firms' rents are likely to be higher for sizable investment projects such as those in public order defense, energy and culture.

This article is made up of five sections. In section 2, we investigate conceptually the relation between corruption and public spending allocation. Section 3 describes the data and section 4, the econometric method. In section 5, we present empirical results. Then, section 6 concludes.

## **Corruption and Public Expenditure**

### ***Corruption and Biased Public Decisions***

Different forms of corruption within the civil service prevent the state from fulfilling wholly its roles<sup>1</sup> as far as they give way to distortions in the public decision making. In developing countries, especially "failing" markets make the intervention of the state even more indispensable. But, at the same time, these countries have the highest levels of corruption<sup>2</sup>.

Precisely, corruption may occur in civil service in the form of bribes offered to a civil servant as a reward for a favor shown towards a private actor. This is an obstacle to competition since it reduces the cost of economic activity for the active corruptor or creates for him opportunities to get a contract he would not have been selected for normally. Corruption can also take the form of paying bribes to a civil servant for a service that would normally be provided by the administration without any additional tax. This can incite the civil servant to "invent" rules making it legal for him to ask for a commission. In both cases, the rules of public decision making are distorted.

In fact, the making as well as the execution of the state budget necessitates tremendously wide and complex decision making proceedings. Therefore, it is highly likely that choices related to the amount and the allocation of government expenditure are particularly propitious to these different forms of corruption. To better understand these mechanisms, we must disentangle the first phase of preparation of the budget from its execution<sup>3</sup>. While administrative corruption occurs more often during the execution of the budget, affecting mostly the accuracy of expenditure, political

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<sup>1</sup> The main roles of the state are: i) the allocation of funds which aims at correcting the weaknesses of the market; ii) the stabilization of economic activity; and iii) the redistribution of wealth.

<sup>2</sup> Chile, the less corrupt developing country, ranks only 20th out of 195 countries. In other words, the 19 least corrupt countries are developed ones. Those figures are taken from the World Bank classification according to the 2002 corruption control index.

<sup>3</sup> In a democratic state, the budgeting process usually takes in several steps: i) drawing up the forecasts, ii) defining the rough lines of the budget, iii) negotiating with the ministries, iv) arbitration and fixing a ceiling to the budget, v) setting the forecasts and elaborating the budget, vi) the ultimate agreements, vii) presenting the budget, viii) and finally having the budget examined by the parliament.

corruption (or state capture<sup>4</sup>) alters the decisions about the allocation of public spending by sector, taken during the preparation phase. Therefore we focus here mostly on political or grand corruption. Hence the data on public expenditure we use here tend to reveal the political decision making process rather than the execution one.

### ***Corruption, Rent-Seeking and Choices of Public Expenditure***

The decisions on the amount and allocation of public spending depend highly on the nature of the state and the organization of public authorities (Varoudakis, 1996). Therefore, it can be assumed that those choices can vary according not only to the nature of the political system itself but also to the level of public corruption in the country.

Previous studies put forward the hypothesis that bribes increase the total amount of public spending when the public decision-makers are corrupt, especially under a “bureaucratic” system (Varoudakis, 1996, and Tanzi, 1998). When corruption exists, under the form of diverting public funds, the state budget includes not only effective public expense but also the diverted amounts. Besides the spending amount, corruption can influence the spending allocation towards several items. Empirical works on the subject show that corruption: i) reduces the operation and maintenance expenditures (Tanzi and Davoodi, 1997); ii) increases the amount of military expenditure as a percentage of GDP (Gupta et al., 2001); and iii) reduces education and health expenditure as a percentage of GDP (Mauro, 1998, and Gupta et al., 2000).

The reaction of budget decisions to the level of corruption in a given country is notably related to the specificity of public procurement – which is prevalent in energy, defense, building, public works, transport equipment and telecommunications. Public procurement creates incentives for corrupt behavior for two major reasons:

1. In any public authority, there is a risk of separating the economic interest of the authorities from that of the people they represent. Public decisions are likely to lead to bribery when they involve the decision maker’s individual utility maximization rather than social welfare maximization.
2. A high percentage of state spending is predetermined: payment for public debt, pensions, wages, welfare payments, etc. Fraud and corruption are quite rare on those payments. On the contrary, investments in goods acquisition or renovation and investments in civil engineering and payments to private firms provide a freedom of action that favors corruption. Public procurement is prevalent in capital expenditure.

The impact of corruption on the allocation of government spending can occur through various channels. As for bribe demand – that is the supply side of public contracts – the government authorities find themselves in an oligopsony position, with little competition because of their small number compared to a large demand. Those officials decide on the allocation of expenditures and contracts, which increases their negotiating power and develops rent seeking behavior. Moreover, corrupt agents are motivated to favor some spending items in which they know or expect that decisions are made in relatively “secret” conditions, such as energy, defense, or public order. Indeed, for national security reasons, civil servants seldom have recourse to invitations to bid for granting public contracts<sup>5</sup>. Moreover, according to *Transparency International*, defense is the second largest scale corrupt sector: approximately 15% of defense expenditure is spent on commissions given to high-level public agents.

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<sup>4</sup> A useful distinction is made by Hellman et al. (2000) between administrative corruption and state capture, the latter brings into play the formulation of law whereas the former deals with its application.

<sup>5</sup> An Agreement on Government Procurement was elaborated under the aegis of WTO and took effect on 1 January 1996. It aims at opening up as much public procurement as possible to international competition, mainly through regulation of tendering procedures. But the agreement has only 28 members up to now, and mostly developing countries.

As for bribe supply - that is the demand side of public contracts -, firms may be incited to bribe foreign civil servants into exporting arms, military equipment, oil, gas and gold. Those incitements can go through noncommittal laws or even tax codes allowing bribes to get contracts abroad<sup>6</sup>. Moreover, the effects of the competition level between sellers upon the bribe offer are uncertain. Heavy competition between sellers could incite them to pay commissions in order to make up for their weak negotiating power and get market shares (Gupta et al., 2001). But, on the other hand, low competition incites them to anticipate significant rents and to pay bribes in order to capture these markets (Mauro, 1998). In fact, it is likely that the rent a firm expects is high, not because of low competition between sellers, but rather because the projects are vast and involve huge amounts of money. It is especially the case in sectors such as energy, defense or transport, more than in education or health. Expecting a high rent from a contract is for a firm an incentive to offer high bribes to civil servants. For Lambsdorff (2002), corruption “motivates politicians and public servants to impose [...] market restrictions so as to maximize the resulting rents and the bribes paid in connection with them.”

Hence, rent-seeking behavior can arise from both private and public agents. The latter will seek bribes whereas the former will seek preferential treatments to get monopoly rents. We assume here that this type of behavior, and in particular corruption, distorts public spending allocation.

### **Allocation of Public Spending**

Previous empirical analyses have shown that corruption lowered education and health expenditure as a percentage of GDP on the one hand and enhanced military spending on the other hand. We reveal that the *allocation effect* of corruption which appears when paying attention to its impact on global budget structure. Indeed, first, we analyze all economic functions. Second, we highlight a net effect of corruption on the distribution of public spending by examining expenditure as a percentage of the budget, not as a percentage of GDP. Taking into account expenditure as a percentage of GDP does not make it possible to analyze the “allocation” effect of corruption<sup>7</sup>. Formally, the part of each sector of spending in GDP can be split up into two expressions as follows:

$$\frac{EXP_{sect}}{GDP} = \frac{EXP_{tot}}{GDP} \times \frac{EXP_{sect}}{EXP_{tot}} \tag{1}$$

where  $\left[ \frac{EXP_{sect}}{GDP} \right]$  is the part of GDP allocated to each public economic function: education, health, social protection, defense, public services and order, housing, culture, fuel and energy, other economic activities (including agriculture, manufacture, fishing...),  $\left[ \frac{EXP_{tot}}{GDP} \right]$  is the part of public expenditure in GDP and  $\left[ \frac{EXP_{sect}}{EXP_{tot}} \right]$  is the part of spending of each item in the sum of expenditure.

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<sup>6</sup> On November 21, 1997, the OECD countries and five other countries, namely, Argentina, Brazil, Bulgaria, Chile and the Republic of Slovakia, adopted a convention about combating the corruption of foreign civil servants in international commercial transactions along with comments on that convention.

<sup>7</sup> Indeed, government spending on education as a share of GDP is on the average higher in the Middle East and North Africa (MENA) than in the Asian countries. But, for these two areas, the part of education spending in the overall government spending is equivalent to approximately 13% of the government budget. This can be explained by the fact that MENA countries dedicate a bigger part - around 33% - of their GDP than Asian countries to government expenditure - less than 21%

Reasoning for a given budget amount might enable us to reveal the impact of corruption on certain sectors, that a conceptualization as a part of GDP would not have brought out. Indeed, assuming that the effect of corruption on  $\left[ \frac{EXP_{tot}}{GDP} \right]$  is positive (Tanzi and Davoodi, 1997, Tanzi, 1998, and Johnson et al., 1999), if its effect on  $\left[ \frac{EXP_{sect}}{EXP_{tot}} \right]$  is negative then the global effect of corruption on  $\left[ \frac{EXP_{sect}}{GDP} \right]$  might be undetermined or not significant, whereas corruption has an allocation effect on the budget structure.

This paper brings an empirical contribution, showing that corruption distorts public spending allocation, that is to say the portion of each sector in the budget.

## Data and Descriptive Analysis

### The Indicators

Our empirical work draws on annual data of 51 developing and 13 developed countries<sup>8</sup> from 1996 to 2001. We use here the most common definition of corruption, which is the biased use of a public service for private benefits. Our study focuses on public corruption, not on the private forms of corruption.

We test a system of nine equations expressing the part of each sector<sup>9</sup> in total public spending in function of the corruption level and control variables, as follows:

$$\left. \begin{aligned} \frac{EXP_{educ}}{EXP_{tot \ it}} &= \alpha_1 + \alpha_2 Corrup_{it} + \alpha_3 Control_{it} + \varepsilon_{it} \\ \frac{EXP_{health}}{EXP_{tot \ it}} &= \beta_1 + \beta_2 Corrup_{it} + \beta_3 Control_{it} + \mu_{it} \\ &\dots \\ \frac{EXP_{defense}}{EXP_{tot \ it}} &= \gamma_1 + \gamma_2 Corrup_{it} + \gamma_3 Control_{it} + \eta_{it} \end{aligned} \right\} \quad (2)$$

where  $\left[ \frac{EXP_{sect}}{EXP_{tot}} \right]$  represents the part of each sector in global public expenditure. *Corrup* measures the corruption level of the country and *Control* is a vector of control variables.

The corruption indicator comes from the World Bank, and is one of the six governance indicators presented by Kaufmann et al. (2003). It is made up after answers of a large number of actors such as firms, private actors and experts, to inquiries led by different research institutes, nongovernmental and international organizations. Corruption is here defined as the exercise of public power for private gain. This indicator is only available in 1996, 1998, 2000 and 2002. For 1997, 1999 and 2001, we calculate the average value between those of the previous and the following years<sup>10</sup>. In fact, the original corruption variable is set between -2.5 and 2.5 and reflects

<sup>8</sup> See Table 3 in appendix.

<sup>9</sup> These sectors are education, health, social protection, housing and commodities, culture, defense, fuel and energy, public services and order, other economic activities.

<sup>10</sup> For example, for a given country, the corruption index in 1997 equals the average of the 1996 and 1998 corruption indices.

the corruption control since its maximum value corresponds to the lowest corruption level. We have transformed this variable so as to have an indicator showing the level of corruption with values from 0 to 5: the higher our indicator, the more corrupt the country<sup>11</sup>.

The data on public spending per item are drawn from *Government Finance Statistics Yearbook* (GFSY), from 1996 to 2001, published by the IMF. These data are collected from precise questionnaires distributed to financial statistic correspondents of the government in roughly a hundred countries. The GFSY defines a government as all the units implementing public policies in delivering non-merchant services and transfer revenues. More precisely, we measure spending per economic item as a percentage of the central government's total expenditure. The reported figures refer to inflows recorded in national accounts according to real disbursements. These data are consolidated. For each country, statistics are presented for a set of units - budgetary, extra-budgetary and social security funds - as if they constituted a single unit, that is the central government. The consolidation method prevents us from double counting transactions or stocks among government units. However, local government data on expenditure by economic function are not available. As a consequence, we can not broach the effects of "decentralized" corruption.

Besides, the control variables are chosen from the following set, with economic and statistical criteria according to the variable analyzed. Indeed, the public expenditure amount and allocation can be altered not only by the corruption level of a country but also by social, economic and demographic indicators. Control variables include:

1. the proportion of urban population in the whole population (*Urbpop*) (Gupta et al., 2001, and Gupta et al., 2000),
2. the dependency ratio of the population, corresponding to the ratio of people under 15 or over 64 to the working population (from 15 to 64) (*Depdcy*) (Gupta et al., 2001, and Gupta et al., 2000),
3. the percentage of population between 0 and 14 (*0-14Pop*) (Mauro, 1998),
4. the percentage of taxes in GDP (*Taxes*) (Abed and Davoodi, 2002),
5. constant per capita Gross Domestic Product (*GDP*) (Mauro, 1997, 1998, Tanzi and Davoodi, 1997, and Gupta et al., 2001),
6. military personnel as a percentage of total labor force (*Milit*) (Gupta et al., 2001),
7. the proportion of the central government's debt in GDP (*Debt*),
8. the proportion of social contribution in GDP (*Soctax*)
9. the lack of global freedom (*Freedomlack*) (Mauro, 1995, and Gupta et al. 2000).

These control variables also come from the *World Bank World Development Indicators* data bank, except for the freedom index. The latter comes from the *Freedom House* database. They are lagged one year<sup>12</sup> first because budgetary decisions for a given year depend on the value of control variables the previous year, second to reduce the simultaneity bias. For each country and for a given year, the indicator is the mean of the political rights index and the civil liberties one. It varies between 1 and 7, 1 representing the most free and 7 the least free<sup>13</sup>.

The urbanization rate is expected to have a positive impact on the spending for social protection and a negative one on the spending for other economic activities, which include rural activities. The dependency ratio can negatively affect the budget allocated to culture and religion, which first concerns the working-age population (between 25 and 64). The percentage of population between 0 and 14 is expected to have a positive impact on spending for education.

<sup>11</sup> The new variable is obtained from the following transformation:  $Corrup = 2.5 - Corrup_{WB}$ , where  $Corrup_{WB}$  stands for the World Bank corruption control indicator.

<sup>12</sup> For example, the portion of education expenditure in 2000 is explained by the level of corruption in 2000 and by control variables in 1999.

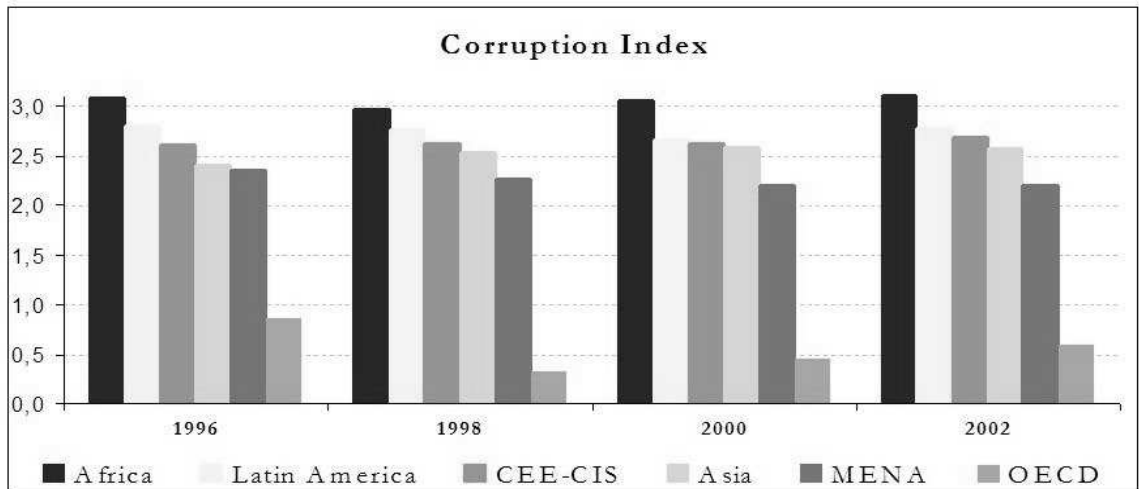
<sup>13</sup> Note that this index is not a measure of the government performance but rather of the state of individuals' freedom allowed by both state and nongovernmental actors.

Taxes as a part of GDP are expected to have a positive impact on spending for health and culture. Per capita GDP is supposed to have a positive effect on social protection and defense expenditure as part of total expenditure. Then the percentage of military personnel in total labor force is expected to have a positive impact on defense in the budget. The proportion of the central government's debt may affect on fuel in total spending. Social contribution as a part of GDP is expected to have a positive impact on social protection spending. Finally, political rights and civil liberties are expected to have a positive impact on social spending (health and social protection) and spending on culture but a negative one on defense or fuel and energy spending.

### *Descriptive Statistics*

We first examine geographic distinctions and specificities concerning the level of corruption and the allocation of public spending. The graph below represents the average levels of corruption by geographic zone in 1996, 1998, 2000 and 2002.

**Figure 1: Corruption Index by Geographic Zone**



Corruption tends to be much higher and relatively constant over the period (between 2.96 and 3.03 for a 0 to 5-scale index) in Sub-Saharan African countries. Across developing countries, MENA<sup>14</sup> ones have the lowest levels of corruption and the index linearly decreases between 1996 (2.27) and 2002 (2.29). For the three other regions, Asia, CEE-CIS<sup>15</sup> and Latin America, they encounter similar levels of corruption between themselves and over the period, except that corruption tends to diminish in Latin America since 2000. Not surprisingly, OECD<sup>16</sup> countries have by far the smallest corruption index all over the period.

<sup>14</sup> Middle-East and North Africa

<sup>15</sup> Central and Eastern Europe - Commonwealth of Independent States

<sup>16</sup> Organization for Economic Cooperation and Development

**Figure 2: Allocation of Public Expenditure by Economic Sector and Geographic Zone (As a Percent of Total Expenditure)**

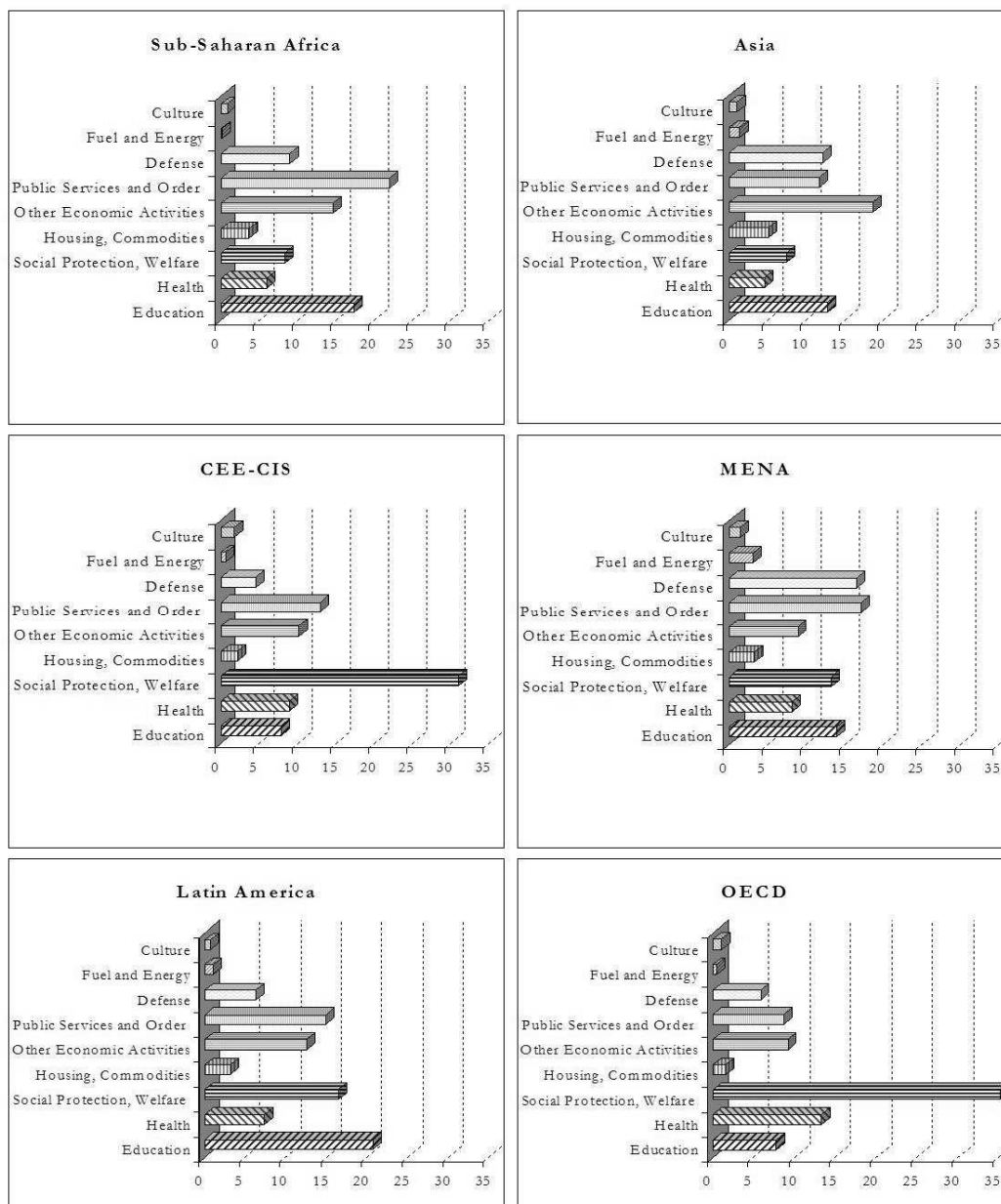


Figure 2 presents the respective portions of each item in total public expenditure. The portions are calculated from the mean over the period and across countries of each geographic zone. In the same way, we observe differences in the budget structure by geographic region. The budget structure leads to identify two regional patterns among developing countries. The first one gathers MENA, Sub-Saharan African and Asian countries which favor defense, public services, order and energy spending. The second one is composed of Latin America and CEE-CIS which dedicate very large parts of their government budget to social sectors such as education, health, social

protection - and culture for CEE and CIS: most countries in these regions have experienced communist regimes, which boosted sectors favoring human development. On the contrary, Latin American, CEE and CIS countries spend a very small part of their budget to defense, fuel and energy. Sub-Saharan Africa has the highest rate of public services and order expenditure: 20% of the budget. On the opposite, MENA, Asia and CEE-CIS have comparable proportions of public services spending (around 14%).

In sum, MENA countries combine very low levels of corruption with very high defense spending portions, whereas African countries combine high levels of corruption with low ratios of military spending and high ratios of public services and order spending. Are these first hypotheses confirmed by the analysis of the correlation between corruption and budget structure?

### **Estimation Method**

Our empirical demonstration consists in testing a system of nine equations [see system (2)], estimated through the three-stage least squares method, designed by Zellner and Theil (1962). The first stage regresses each endogenous variable - each sector's share of expenditure but also corruption - on all of the exogenous variables in the model. Hence, we obtain the predicted values of endogenous variables, which can be considered as their instrumented values. The second stage enables us to get a consistent estimation of the variance-covariance matrix of the residuals. Such estimators are based on the residuals obtained from a two-stage least squares regression of each equation of the system. The third stage consists of a generalized-least squares estimation using the variance-covariance matrix estimated on the second stage and with the instrumented values instead of the right-hand endogenous variables.

The three-stage least squares method provides several advantages. First, it reduces simultaneity bias, i.e. reverse causality. Indeed the level of public corruption in a country also depends on the budget structure: the higher the portion of expenditure allocated to a rent-generating sector, the higher the bribes (in money, employment or assets form) disbursed. Second, this econometric method enables us to take into account not only the residuals' heteroskedasticity (residuals' variance depends on the level of corruption because the latter partly reflects the quality of political and legal institutions) but also the correlation between residuals of two distinct equations in the system<sup>17</sup>. An estimator which takes into account such correlation between residuals of different equations is more efficient than an ordinary least squares one.

### **Results**

#### ***Allocation Effect***

We investigate in detail the composition of government spending, that is to say the budget structure and give an estimation of the impact of corruption on the proportion of each spending item in total public spending.

Table 1 presents the coefficients we have obtained through three-stage least squares estimation. Otherwise, we only present the specifications where the control variables are significant. The model first is estimated with corruption and different control variables as explanatory variables.

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<sup>17</sup> Indeed, the matrix of residuals correlation in Table 4 (see Appendices) confirms this hypothesis: except the level of corruption, the decisions concerning the budget allocation towards one or another type of spending depend on similar factors - mostly institutional factors - whatever the sector.

**Table 1: Corruption and Distribution of Public Spending by Budget Item**

Dependent Variable	Portions of all budget items in government expenditure								
	Education	Health	Social Protection	Housing	Other Economic Activities	Public Services and Order	Culture	Fuel and Energy	Defense
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Corrup	-1.20** (-2.16)	-2.43*** (-5.00)	-9.70*** (-4.18)	-0.43 (-1.25)	-0.38 (-0.65)	2.22*** (3.38)	0.24** (2.40)	1.02** (2.19)	4.54*** (3.64)
GDP*10 <sup>-3</sup>			-0.48** (-2.43)					0.06* (1.65)	0.33*** (2.98)
Urbpop			0.07* (1.64)		-0.15*** (-5.42)				
Taxes*10 <sup>-1</sup>		1.18** (2.10)		-0.55* (-1.65)		-1.45* (-1.93)	0.17** (1.56)		
Depdcy							-1.37** (-1.98)		
Pop 0–14	0.54*** (8.17)			0.08** (2.00)					
Milit									1.81*** (7.31)
Debt*10 <sup>-1</sup>								-0.09** (-2.08)	
Soctax			0.52*** (9.98)						
R <sup>2</sup>	0.36	0.33	0.61	0.13	0.21	0.19	0.14	0.15	0.28
N	142	142	142	142	142	142	142	142	142

Notes: t-statistics in parentheses: coefficients marked \*\*\* are significant at 1% level, \*\* at 5% level and \* at 10%. N stands for the number of observations.

Corruption influences government expenditure allocation: for seven items out of nine presented above, the coefficient associated with corruption is significant. It is negative for the three following items: education, health and social protection<sup>18</sup>; it is positive for the share of spending allocated to public services and order<sup>19</sup>, defense, fuel and energy, and culture. Therefore, a high level of corruption distorts the structure of public expenditure in favor of energy, defense, public order, and culture and at the expense of social sectors. The coefficient on the level of corruption is not significant in the regressions of housing and other economic activities (sector which gathers agriculture, fishing, manufacture, transport and communication).

The results we obtain are coherent with empirical studies on education and health (Mauro, 1997) as well as on defense spending (Gupta et al., 2001). But the negative impact of corruption on the portion of expenditure allocated to social protection and its positive impact on the portion

<sup>18</sup> This sector gathers provision, administration, operation and support of social protection: sickness and disability, old age, survivors, family and children, unemployment, housing, social exclusion, etc.

<sup>19</sup> The sector called “General Public Services, Public Order and Safety” mainly covers spending on administration, operation of or support of executive and legislative organs, government agencies, police and fire protection services.

of expenditure allocated to fuel and energy, public services and order, and culture are new findings.

As mentioned above, the reallocation of expenditure corruption comes from the type of markets where the expenditure is involved within the different economic sectors: energy and defense sectors generate more rents and more “generous” rents, projects in such sectors involve larger amounts of money, therefore attract larger bribes. Given that, a kilogram of arms is the most expensive product in the world, commissions are huge and can reach 5 to 15 percent of the contract.

Moreover, the rules guiding procurement allocation are more opaque in the energy and defense sectors than in the social sectors, which makes bribery easier since it reduces the probability of being caught, denounced and punished. Well-known illustrations of large-scale secret commission payments in the defense and energy sectors are, respectively, Thomson-CSF’s frigate affair in Taiwan and Elf affair in Africa, well-known for its commissions and retro-commissions system<sup>20</sup>.

Then, the type of spending involved in each sector also explains the alteration in the budget structure corruption. Capital expenditures are more prone to commissions than current spending - because corruption requires secrecy and discretion but also because embezzlement and bribery are more difficult on predetermined spending - such as wages, which are in higher proportions within educational expenditures. Among the high-level corruption and high-level defense spending countries, Algeria, where the Assembly has just passed a law dealing with laundering and fighting against corruption, is the most corrupt country in the MENA zone.

Finally, if we consider democratic countries, high-ranking civil servants’ accountability might explain why corrupt individuals do not favor social spending: in a democracy - which implies the maximization of the chances of re-election - social spending offers less embezzlement, bribery and corruption opportunities to civil servants since they are more accountable for their public actions, in which case social spending efficiency can be measured for instance through mortality, birth or illiteracy rates whereas defense spending can not as easily. But now, if we consider “predator” or “bureaucratic” governments, then those whose action is led by the will to maximize personal interests might favor rent-generating projects, which are supposed to be more bribe-generating, as in the case of defense, energy, and culture but not social items. However, social sectors are not free from corruption, but could be associated with petty corruption as it concerns teachers or doctors rather than political or top-ranking administration leaders.

As for the control variables, *constant per capita GDP*, which captures the wealth effect, has a significant and positive coefficient in the regressions of defense and fuel and energy spending but negative in social protection spending. Such a result leads us to suggest that economic development favors budgetary sectors like defense and energy. On the contrary, social protection and welfare expenditures have a lower share of public spending as GDP increases. Less developed countries, encouraged by institutional organizations, often rule more “social” policies than emerging ones. The *urbanization rate* has a significant and negative coefficient in the regression of other economic activities (transport, agriculture, manufacturing, etc.). Indeed, such types of projects are often less expensive in the rural zones of developing countries. On the contrary, the larger the proportion of the population is located in urban areas, the higher the proportion of social protection expenditure: urban people are often better covered by social protection systems. *Tax revenue as a percentage of GDP* has a significant and positive impact on culture, leisure and health expenditures, but it has a negative and significant impact on housing and public services and order expenditures. Indeed, it is quite easy to understand that the increase in budget due to the increase in taxes is more beneficial to culture and health than to housing or public services and order since these two sectors are less sensitive to variations in resources. Moreover, one can

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<sup>20</sup> Retro-commissions stand for hidden commissions which come back in the country where the company head office is located. It is a percentage of the commissions that are paid to the producer country or to middlemen. Elf was deducting 5 to 10 percent from such commissions to finance French political parties or politicians.

consider public services and order as a proxy for state legitimacy: a state with weak legitimacy is tempted to resort to repression or violence to maintain its place, and this can explain why such states devote a larger part of their budget to public order. The *dependency ratio* has a significant and negative impact on spending for culture: the more numerous the working-age population relatively to children under 15 and elderly, the larger the share of the budget allocated to culture. Education and housing spending depends on the *under-15 population*: the public effort towards education and housing is harder when the proportion of children in the population is higher. Notice that, as far as education is concerned, the use of a control variable composed of the 5-20 age group would have been more appropriate, but unfortunately, the data is not available. Then, the higher the *percentage of military personnel in labor force population*, the higher the share of defense expenditure. First, the military represents a large part of defense spending through wages, pensions, equipment, etc. Second, such a variable proxies for a country's militarization. Furthermore, when a country's *debt* (as a percentage of GDP) is high, its budget is biased at the expense of energy, which can be due to an eviction effect. Finally, it appears that *social security taxes* have a positive and significant impact on social protection spending.

In Table 2, we include a lack of freedom index as a regressor when it appears to be significant. This controls for each country's institutional counterbalances to corruption. The results reinforce our intuition that corrupt top-ranking civil servants favor spending sectors that generate high rents and engage in secret or easily embezzled expenditure at the expense of the social sectors. The portions of education, health, and social protection expenditure in the budget decrease when corruption raises, whereas those of public services and order, culture and energy increase. However, it is interesting to note that corruption does not seem to raise the part of defense spending in the budget. It is as if the lack of freedom was much more distorting than corruption, and one can suppose that the freedom index captures the effect of corruption. Indeed, the correlation between these two variables is 0.57 (significant at the 1% level).

The *lack of freedom* index appears to have a significant impact in only three equations out of nine. Increasing freedom has a positive effect on health and culture spending and a negative one on defense spending. To a certain extent, lack of freedom and widespread corruption seem to have similar effects on the structure of the budget: it distorts public spending allocation away from social expenditure towards sectors like defense. Indeed, social spending efficiency is much more easily measurable than defense spending. Hence, in a more democratic regime, accountability makes it more difficult to extort funds from social items like health and social protection. But, if corruption fosters spending on culture, freedom does so as well.

Indeed, lack of freedom reveals a lack of political leaders' accountability, hence the opportunity for public agents to maximize their own utility and to favor rent generating sectors such as defense at the expense of the social sectors. Besides, in countries with weak political and civil rights, governments have a weak legitimacy and tend to use internal forces to consolidate their power rather than external forces.

The results concerning the impact of the other control variables are almost unchanged in relation to those obtained from the first model, which excludes freedom (Table 1), except that the coefficients associated with urban population and taxes are not significant in the regressions with social protection, and health, housing, and culture expenditure.

### ***Instrumenting Corruption***

In this section, we implement a robustness test by instrumenting corruption. Indeed, as mentioned above, in dealing with corruption and budget structure, we are faced with the problem of corruption endogeneity, which has three main origins. First, it can arise from measurement error which is likely to happen since the observed phenomenon is based on perceptions. Second, endogeneity occurs when some variables are omitted in the model. For instance, budgetary choices are probably influenced by political cycles as well, which are not taken into account in our model. Third, we are likely to encounter simultaneity bias, that is to say reverse causality. Such

mechanisms imply that corruption is correlated with the disturbance in each equation of the model. Hence, the ordinary least squares estimator is not only inefficient as mentioned above, but also inconsistent.

**Table 2: Distribution of Public Spending by Budget Item: Impact of Corruption and Freedom**

Dependent Variable	Portions of all budget items in government expenditure								
	Education	Health	Social Protection	Housing	Other Economic Activities	Public Services and Order	Culture	Fuel and Energy	Defense
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Corrup	-1.43*** (-2.61)	-1.48*** (-2.77)	-10.84*** (-5.00)	-0.42 (-1.24)	-0.37 (-0.64)	2.28*** (3.52)	0.37*** (3.37)	1.11** (2.55)	1.04 (0.83)
Freedomlack		-1.19*** (-3.85)					-1.72*** (-2.79)		1.75*** (5.74)
GDP*10 <sup>-3</sup>			-0.59*** (-3.14)					0.07* (1.69)	0.19** (2.02)
Urbpop			0.06 (1.47)		-0.15*** (-5.46)				
Taxes*10 <sup>-1</sup>		0.39 (0.67)		-0.55 (-1.53)		-1.59** (-2.13)	0.05 (0.44)		
Depdcy							-1.13* (-1.65)		
Pop0–14	0.55*** (8.38)			0.08** (2.09)					
Milit									1.64*** (7.47)
Debt*10 <sup>-1</sup>								-0.09** (-1.93)	
Soctax			0.56*** (10.35)						
R <sup>2</sup>	0.36	0.38	0.60	0.13	0.21	0.19	0.15	0.14	0.52
N	142	142	142	142	142	142	142	142	142

Notes: t-statistic in parentheses; coefficients\*\*\* are significant at the 1% level, \*\* at the 5% level and \* at 10%. N stands for the number of observations.

Then, in order to have a consistent and efficient estimator of the impact of corruption, we use instrumentation. According to the exclusion restriction, a “good instrument” needs to have an effect on X (endogenous) and Y but all its effect on Y must pass through its effect on X. We finally use the absolute value of the latitude of the country as an external instrument as well as exogenous variables of the model as internal instruments<sup>21</sup>. Latitude stands for a proxy for geographical endowments. It has already been used to instrument the quality of institutions by Hall and Jones (1999) and the level of corruption by Gupta et al. (2002). The economic motivation for using it relies upon the influence of geographical endowments and the formation of long

<sup>21</sup> The results of the overidentification test are presented in appendices (see Table 5).

lasting institutions which shape present corruption (Acemoglu et al., 2001): in hospitable environments which favored settlements, European colonists tended to form settler colonies, then settled institutions to protect private property, and check the power of the state (e.g. India). On the contrary, in poorly endowed environments, the colonization strategy consisted in extracting from the colony as much as possible (e.g. Brazil, Congo, and Ivory Coast). Hence, they settled institutions that empowered and protected the elite (Engerman and Sokoloff, 1997). Besides, the institutions created by European colonists endured after independence.

The results obtained from a three-stage least squares regression including the freedom index and latitude as an external instrument for corruption are presented in Table 6 (see Appendices). For coherence's sake, the specifications are identical to those above. Econometric results are not much altered by the introduction of latitude<sup>22</sup>, which make our empirical demonstration more robust.

## Conclusion

This paper contributes to the existing literature by providing evidence that corruption plays a significant role in determining the structure of government expenditure by sector. It addresses the issue of which spending sectors favors corruption. Previous studies have shown that corruption reduced public spending efficiency and lowered education and health expenditure as a percentage of GDP and enhanced military spending (Tanzi, 1998; Tanzi and Davoodi, 1997; Shleifer and Vishny, 1993; Gupta et al., 2000; Mauro, 1998; and Gupta et al., 2001).

Using a dataset of 64 countries over the period 1996-2001, we contribute to the existing literature by showing that corruption alters public spending distribution among sectors. We use three-stage least squares to estimate a system of simultaneous equations. Corruption appears to have an impact on the structure of public expenditure in favor of defense, fuel and energy, culture, and public services and order, at the expense of the social sectors like education, health, and social protection. But, when introducing a freedom index, the latter seems to capture the effect of corruption on defense spending. Our results are robust to instrumentation in the use of the latitude of the country.

Therefore, new evidence is presented on the effect of corruption on public services and order, and fuel and energy as well as on culture, and social protection spending. On the demand side of bribes, corrupt agents are incited to favor spending sectors where decisions are taken in a "secret" environment such as defense and energy. On the supply side, firms can be prompted to bribe foreign officials in order to export arms, military equipments, fuel, gas or gold. Moreover, in sectors like public order, defense, energy, and, to a lesser extent, culture, each project involves greater public investments. It is likely that these projects potentially generate more rents for the producers. Therefore, they are ready to pay more bribes to capture the market. Finally, expenditure on fuel and energy, culture and public services and order involve a higher of public procurement. This type of spending gives more freedom of action, hence more opportunities for corruption, than social spending which involves more predetermined spending. The parts of public expenditure allocated to transport and communication, agriculture and manufacture are not affected by corruption.

Public expenditure is a key instrument of development, and in particular of human development through social spending. Therefore, our evidence suggests that combating corruption shall be one of the main objectives of developing countries, and more so in less developed countries. Indeed, widespread corruption in these countries prevents them from laying the foundations for development through education and health, since corruption is detrimental to spending in these sectors. The results suggest that corrupt countries should be incited to allocate

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<sup>22</sup> Indeed, using three-stage least squares estimation was supposed to account for the endogeneity issue already.

their expenditures from public services and order, defense, culture and energy towards education, health and social protection to counterbalance the distorting effects of corruption.

### References

- Abed, G.T. and H.R. Davoodi. 2002. "Corruption, Structural Reforms, and Economic Performance in the Transition Economies." in *Governance, Corruption and Economic Performance*. Washington, DC: IMF.
- Ablo, E. and R. Reinika. 1998. "Do Budgets Really Matter? Evidence from Public Spending on Education and Health in Uganda." *World Bank Policy Research Working Paper No. 1926*
- Acemoglu, D., S. Johnson, and J.A. Robinson. 2001. "The Colonial Origins of Comparative Development: An Empirical Investigation." *American Economic Review* 91: 1369-1401.
- Ehrlich, I. and F.T. Lui. 1999. "Bureaucratic Corruption and Endogenous Economic Growth." *Journal of Political Economy* 107: 270-293.
- Engerman, S.L. and K.L. Sokoloff. 1997. "Factor Endowments, Institutions, and Differential Paths of Growth among New World Economies: A View from Economic Historians of the United States." in *How Latin America Fell Behind*, edited by Stephen Haber. Stanford: Stanford University Press.
- Gupta, S., M. Verhoeven, and E. Tiongson. 2003. "Public Spending on Health Care and the Poor." *Health Economics*, 12: 685-696
- Gupta, S., H.R. Davoodi, and R. Alonso-Terme. 2002. "Does Corruption Affect Income Inequality and the Poor?" *Economics of Governance* 3: 23-45.
- Gupta, S., L. de Mello, and R. Sharan. 2001. "Corruption and Military Spending." *European Journal of Political Economy* 17: 749-777.
- Gupta, S., H. Davoodi, and E. Tiongson. 2000. "Corruption and the Provision of Health Care and Education Services." *IMF Working Paper* 00/116.
- Hall, R.E. and C.I. Jones. 1999. "Why Do Some Countries Produce So Much More Output Per Worker than Others?" *Quarterly Journal of Economics* 114: 83-116.
- Hellman, J.S., G. Jones, and D. Kaufmann. 2000. "Seize the State, Seize the Day: State Capture, Corruption and Influence in Transition." *World Bank Policy Research Working Paper* 2444.
- International Federation for Human Rights. 2005. "Serbia: Discrimination and Corruption, the Flaws in the Health System." *Mission Internationale d'Enquête*.
- Johnson, S., D. Kaufmann, and P. Zoido-Lobaton. 1999. "Corruption, Public Finances and the Unofficial Economy." *World Bank Policy Research Paper* 2169.
- Kaufmann, D., A. Kraay, and M. Mastruzzi. 2003. "Governance Matters III: Governance Indicators for 1996-2002." *World Bank Policy Research Working Paper* 3106.
- Lambdsorff, J.G. 2002. "Corruption and Rent-seeking." *Public Choice* 113: 97-125.
- Lopes, P.S. 2002. "A Comparative Analysis of Government Social Spending Indicators and Their Correlation with Social Outcomes in Sub-Saharan Africa." *IMF Working Paper* 02/176.
- Mauro, P. 1995. "Corruption and Growth." *Quarterly Journal of Economics* 110: 681-713.
- Mauro, P. 1997. "The Effects of Corruption on Growth, Investment and Government Expenditure: A Cross-Country Analysis." in *Corruption and the World Economy*, edited by K.A. Elliot. Washington, DC: Institute for International Economics.
- Mauro, P. 1998. "Corruption and the Composition of Government Expenditure." *Journal of Public Economics* 69: 263-279.
- Rajkumar, A.S. and V. Swaroop. 2002. "Public Spending and Outcomes: Does Governance Matter?," *Development Research Group – The World Bank*.
- Reinika, R. and J. Svensson. 2004. "The Power of Information: Evidence from Public Expenditure Tracking Surveys" *Global Corruption Report 2004, Transparency International*
- Shleifer, A. and R.W. Vishny. 1993. "Corruption." *Quarterly Journal of Economics* 108: 599-618.
- Tanzi, V. 1998. "Corruption Around the World: Causes, Consequences, Scope and Cures." *IMF Staff Papers* 45: 559-594.

- Tanzi, V. and H. Davoodi. 1997. "Corruption, Public Investment and Growth." *IMF Working Paper* 97/139.
- Varoudakis, A. 1996. "Régimes non Démocratiques et Croissance, Théorie et Estimation." *Revue Economique* 3: 831-840.
- Zellner, A. and H. Theil. 1962. "Three Stage Least Squares: Simultaneous Estimation of Simultaneous Equations." *Econometrica* 30: 63-68.

## Appendices

**Table 3: List of the Countries in the Database, by Geographic Zone**

<b>Sub-Saharan Africa</b>	<b>Asia</b>	<b>CEE-CIS</b>	<b>MENA</b>	<b>Latin America</b>	<b>OECD</b>
Botswana	China	Albania	Algeria	Bolivia	United States
Burundi	Indonesia	Belarus	Bahrain	Colombia	Canada
Cameroon	Mongolia	Bulgaria	Israel	Costa Rica	Australia
Congo D.R.	Nepal	Cyprus	Jordan	Dominican Rep.	New Zealand
Kenya	Philippines	Czech Rep.	Lebanon	El Salvador	Austria
Lesotho	Singapore	Estonia	Morocco	Jamaica	Finland
Mauritius	Sri Lanka	Georgia	Oman	Mexico	Greece
Sudan	Thailand	Hungary	Tunisia		Iceland
Swaziland		Kazakhstan			Netherlands
Zimbabwe		Kyrgyz Rep.			Norway
		Latvia			Spain
		Lithuania			Switzerland
		Malta			United Kingdom
		Moldavia			
		Poland			
		Russia			
		Slovak Rep.			
		Turkey			
		Ukraine			

**Table 4: Correlation Matrix of the Residuals of the Regressions by Sector Relative to Table 1**

	Education	Health	Social Protection	Housing	Other Eco	Defense	Pub.S. Order	Fuel	Culture
Education	1.00								
Health	0.24***	1.00							
Social Protection	-0.20***	-0.20***	1.00						
Housing	0.26***	0.01	-0.20***	1.00					
Other Eco	0.08	0.00	-0.22***	0.17***	1.00				
Defense	-0.06	-0.11	-0.38***	0.05	-0.06	1.00			
Pub.S. Order	0.12**	0.07	-0.34***	-0.06	-0.05	0.20***	1.00		
Fuel	-0.07	-0.03	-0.22***	0.05	-0.02	0.21**	0.10	1.00	
Culture	-0.06	0.09	-0.11*	0.06	0.07	0.01	0.10	0.08	1.00

Notes: \* indicates significance at the 10 % level, \*\* at 5% level, and \*\*\* at 1% level. *Pub.S. Order* stands for *Public Services and Order* and *Other Eco* for *Agriculture, Manufacture, Transport and Communication*.

**Table 5: Sargan Test**

Equation	Model relative to Table 6
Education	40.789***
Health	15.210***
Social Protection	3.958
Housing	21.031***
Other Eco	6.943
Defense	17.853***
Pub.S. Order	4.104
Fuel	21.062***
Culture	22.038***

Notes: \*\*\* means significance at the 1 % level. An *overidentification test* for a three-stage least squares (3sls) regression is a joint test of all the orthogonality conditions. Given that the software we use cannot perform an overidentification test after a 3sls regression, we estimate each of the equations separately by two-stage least squares regressions and do an overidentification test for each. Hence we test each of the sets of orthogonality conditions separately.

The following table presents the results of the Sargan test for each equation of the system.

The *Sargan test* consists in testing the hypothesis that the instrumental variables are uncorrelated to a set of residuals. Then, if the null hypothesis is not rejected statistically, the instruments are valid.

**Table 6: Distribution of Public Spending by Budget Item: Impact of Corruption and Freedom - Instrumented**

Shares of all budget items in government expenditure									
Dependent Variable	Education	Health	Social Protection	Housing	Other Economic Activities	Public Services and Order	Culture	Fuel and Energy	Defense
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Corrup	-3.49*** (-4.23)	-1.84** (-2.03)	-9.14** (-2.27)	-0.32 (-0.62)	0.77 (0.94)	3.83*** (4.12)	0.43** (2.08)	3.50** (2.94)	-1.38 (0.77)
Freedom		-0.98*** (-2.58)					-0.18** (-2.35)		1.69*** (4.35)
GDP*10 <sup>-3</sup>			0.05 (0.08)					0.36** (2.54)	-0.14** (-0.72)
Urbpop			-0.01 (-0.26)		-0.12*** (-3.69)				
Taxes*10 <sup>-1</sup>		0.46 (0.74)		-0.37 (-0.95)		-0.62 (-0.70)	0.05 (0.41)		
Depdcy							-1.51* (-1.77)		
Pop0-14	0.73*** (9.07)			0.08* (1.90)					
Milit									1.57*** (6.81)
Debt*10 <sup>-1</sup>								0.28* (1.73)	
Soctax			0.42*** (3.82)						
R <sup>2</sup>	0.28	0.38	0.50	0.14	0.19	0.12	0.14	0.18	0.47
N	142	142	142	142	142	142	142	142	142

Notes: t-statistics in parentheses: coefficients marked \*\*\* are significant at 1% level, \*\* at 5% level and \* at 10%. N stands for the number of observations.