

# Public Investment with Widespread Corruption: Some Preliminary Results

David de la Croix<sup>1</sup>      Clara Delavallade<sup>2</sup>

October 28, 2006

## Abstract

We analyze one channel through which corruption hampers growth: public investment can be distorted in favor of specific types of spending for which rent-seeking is easier and better concealed. To study this distortion, we propose an optimal growth model where a planner chooses the composition of public spending subject to an incentive constraint reflecting households' choice between productive activity and rent-seeking. We test the implications of the model on a panel of countries estimating a system of equations with instrumental variables.

Keywords: Public investment, optimal growth, corruption, political power.

JEL Classification numbers: O41, H50, D73.

## Introduction

Wide-spread corruption seems to be one of the main phenomena preventing poor countries from catching up. Improved institution efficiency and corruption deterrence stand now very high on the agenda of organizations dealing with economic development. The World Bank and the OECD are currently supporting anti-corruption programs to improve governance capacity, promote economic development and fight poverty.

The detrimental effect of corruption to the structure of public expenditure is of particular relevance. Indeed, it has been shown by Mauro (1997), Tanzi and Davoodi (1997) and Delavallade (2006) that education expenditure are scaled down in countries with widespread corruption. Lowering the provision of education reduces future income, and reinforces economic inequality. On the contrary, corruption enhances the portion not only of military spending (Gupta, Sharan, and de Mello 2000), but also of public services and order, fuel and energy, and culture expenditure relative to education and

---

<sup>1</sup>Department of economics and CORE, Université catholique de Louvain.

<sup>2</sup>Centre d'Economie de la Sorbonne, Université Paris 1 - Panthéon Sorbonne.

health spending (Delavallade 2006). The distortion in public spending implied by corruption has been the subject of several empirical researches but has not yet received any attention on the theory side.

In this paper, we propose a model which has three distinctive features. First, corruption technology allows rent-seekers to capture part of specific types of public spending for which rent seeking is easier and better concealed. Second, rent-seekers may have more political influence than others on the decision of the government. Third, the problem of the government is to maximize utility subject to an incentive constraint, representing the choice made by individuals between productive activity and rent-seeking.

Then, we analyze how the distinctive features of our model translate into econometric estimates. We estimate a system of equations with instrumental variables on 63 countries. Growth, corruption and the composition of public investment depend on the concentration of political power and the technology of corruption. We find that countries with a high predatory technology invest more in housing and physical capital in comparison with health and education. For equal initial conditions, such countries grow slower and have higher corruption, in particular when political power is concentrated.

## 1 A Dynamic Model of Corruption

Time is discrete and goes from 0 to infinity. At each date, the economy is populated by a mass of identical households of measure 1. Households choose between working either in the productive sector or in the rent-seeking one.  $1 - x_t$  is the share of the population in the productive sector, and  $x_t$  the share in the rent-seeking sector.

### 1.1 Technology

There are two types of productive public capital: education and health,  $h_t$ , and physical capital,  $k_t$ . Investment spending in these two types are  $g_t$  and  $i_t$ . Investment in the first type is free from corruption, while investment in the second type is subject to corruption. This extreme assumption is meant to capture the idea that the degree of exposition to corruption is not identical across categories of public investment. Corruption acts as a tax on investment  $i_t$ . Rent-seekers can extract part of public investment  $i_t$ , proportional to their share in population. Only a share  $1 - \nu x_t$  of investment spending is effectively invested while  $\nu x_t i_t$  accrues as income for rent-seekers. The parameter  $\nu \geq 0$  reflects the corruption technology of the economy. The value  $1/\nu$  is the share of rent-seekers for which 100% of investment is diverted. The laws of motion of the two types of capital are:

$$h_{t+1} = (1 - \delta_H)h_t + g_t \tag{1}$$

$$k_{t+1} = (1 - \delta_K)k_t + (1 - \nu x_t)i_t \tag{2}$$

with  $\delta_H$  and  $\delta_K$  the depreciation rates ( $\delta_H, \delta_K \in (0, 1)$ ). There is one physical good which is used for consumption and investment in any of the two capital goods. Total

production  $q_t$  depends positively on labor input  $(1 - x_t)$  and on services from the two types of capital. The production function is written as the product of two terms:

$$q_t = b[1 - x_t]f[h_t, k_t].$$

The function  $b[\cdot]$  is increasing and concave, and satisfies the Inada conditions. The production function  $f[\cdot]$  is increasing and concave. As in Arrow and Kurz (1970) and Barro (1990), public capital directly enters the production function. One difference is that we have two types of public capital having different exposition to corruption. Public spending are financed by a lump sum tax  $T_t$  paid by every citizen:  $T_t = g_t + i_t$ .

## 1.2 Household Behavior

At each date, households consume their income. Income includes either the product of corruption or the return from the productive activity. Their preferences are represented by a utility function  $u[\cdot]$  having standard properties. Since households choose between production and rent-seeking, the return from these two activities must be equal at an interior equilibrium. The utility of working in the productive sector  $U_t$  is equal to the utility of the income in this sector. We assume that firms operating in this sector are owned by the workers, who are thus paid the average product

$$\frac{b[1 - x_t]}{1 - x_t}f[h_t, k_t] = \Gamma[1 - x_t]f[h_t, k_t]$$

with  $\Gamma[1 - x_t] = b[1 - x_t]/(1 - x_t)$ . They also pay taxes  $T_t$ . Net income per person is thus

$$y_t = \Gamma[1 - x_t]f[h_t, k_t] - T_t = \Gamma[1 - x_t]f[h_t, k_t] - g_t - i_t.$$

Hence,

$$U_t = u[y_t]. \tag{3}$$

The utility in the rent-seeking sector  $V_t$  is the utility associated to the income from corruption net of taxes. Since total income from corruption is  $\nu x_t i_t$ , the income per person is  $\nu i_t$ , as long as  $x_t \leq 1/\nu$ . If  $x_t = 1/\nu$ , all spending  $i_t$  are diverted by rent-seekers, there is no gain for the marginal person to move into rent-seeking.

$$V_t = u[\nu i_t - g_t - i_t] \text{ if } x_t \leq 1/\nu,$$

$V_t = 0$  otherwise. The individual utility from corruption  $V_t$  does not depend on the share of population which is corrupt for  $x_t \leq 1/\nu$  but decreases to 0 as soon as  $x_t$  is larger than  $1/\nu$ . The utility from the productive sector  $U_t$  is a positive function of  $x_t$ . Indeed, because of marginal decreasing returns to labor, the function  $\Gamma[1 - x_t]$  is decreasing in  $1 - x_t$ . Three cases may arise.

In the first case, the return in the rent-seeking sector is always dominated by the one in the productive sector even when the whole workforce is in the productive sector. In this case, we have  $x_t^* = 0$  and

$$\nu i_t < \Gamma[1]f[h_t, k_t]. \tag{4}$$

In such a situation, corruption does not exist at all. Condition (4) can be understood as a condition on the parameter  $\nu$  relative to the function  $b[\cdot]$ . If  $\nu$  is large enough, i.e. if the technology of corruption is efficient enough, this corner situation will never prevail.

In the second case, there is a value of  $x_t^* \in (0, 1)$  for which households are indifferent between the two activities. Equalizing the two utilities, we obtain that if corruption at equilibrium satisfies  $x_t \in (0, 1/\nu)$ , then the following constraint holds:

$$U_t = V_t \quad \Rightarrow \quad \Gamma[1 - x_t]f[h_t, k_t] = \nu i_t. \quad (5)$$

Condition (5) states that, at equilibrium, there is a relation between the share of the population in the rent-seeking sector, public capital ( $h_t$  and  $k_t$ ), the effectiveness of corruption technology ( $\nu$ ), and the amount of public spending subject to corruption ( $i_t$ ). This relation, which describes the choice of activity by households, will act as a constraint for the central planner. We label it *incentive constraint*.

In the third case, the income possibilities from rent-seeking are exhausted:  $x_t^* = 1/\nu$ . Investment  $i$  is entirely diverted implying that the stock of capital  $k$  shrinks. If the situation persists, income in the productive sector tends to zero, which cannot be an optimal solution in the long-run. In the following sections we assume that  $x_t < 1/\nu$  in equilibrium, i.e. we will rule out this possibility of maximum corruption because it is unrealistic and cannot be a long-run equilibrium anyway.

### 1.3 Government Behavior

The government chooses the level of taxes  $T_t$  and public spending per person  $g_t$  and  $i_t$ . It maximizes a weighted utilitarian social welfare function. The instantaneous social utility is

$$W_t = (1 - x_t)U_t + (1 + \theta)x_tV_t. \quad (6)$$

The parameter  $\theta$  is the additional weight attached to the persons in the rent-seeking sector, possibly positive, if one assumes that those persons have a higher political power, whether because they have a higher lobbying activity than those in the productive sector or because they purchase votes (see for example Docquier and Tarbalouti (2001)). The government maximizes the sum of all future utilities discounted with a factor  $\rho$ :

$$\max \sum_{t=0}^{\infty} \rho^t W_t \text{ subject to (1), (2), (5), and } H_0, K_0 \text{ given.}$$

To solve the planning problem we write the an infinite Lagrangian with Kuhn-Tucker multipliers to take care of the inequality constraints:

$$\begin{aligned} \nu i_t &\leq \Gamma[1 - x_t]f[h_t, k_t] \\ 0 &\leq x_t. \end{aligned}$$

At each date, three cases are logically possible:

Table 1: Steady state comparisons

	$\nu$	$\theta$	$x$	$g$	$i$	$g/i$	$h/k$	$y$
A	4	1/4	0	0.37	0.37	1	1	2.31
B	9	1/4	0	0.36	0.33	1.12	1.12	2.24
C	4	3/4	0.17	0.28	0.68	0.42	1.37	1.74

1. The **interior regime** with  $0 < x_t < 1/\nu$ ;
2. The **benchmark regime** where Equation (4) holds, so that the incentive constraint is not binding. There is no corruption and public investment is not distorted;
3. In the case of **distortion without corruption**, there is no corruption but Equation (4) does not hold. The incentive constraint holds with equality at  $x_t = 0$ : the planner has to lower investment  $i_t$  in order to deter households from rent-seeking.

## 1.4 Numerical illustration

In de la Croix and Delavallade (2006) we provide a complete analysis of the different cases. Here we simply illustrate the properties of the model with a numerical example. We first give the following specific functional forms to our functions:  $b[1 - x] = (1 - x)^\alpha$  and  $f[k, h] = k^\beta h^\epsilon$ . We assume a discount factor of 0.96 for the planner, and depreciation rates  $\delta_H = \delta_K = 0.04$ . The technology parameters are set at  $\alpha = 1/2$ ,  $\beta = 1/4$  and  $\epsilon = 1/4$ . The intertemporal elasticity of substitution is set at  $\sigma = 2$ . The three possible long-run regimes arise depending on the values of  $\{\theta, \nu\}$ . Three cases are illustrated in Table 1. The **benchmark regime** arises when  $\nu$  and  $\theta$  are small enough. Since, in the numerical example (point A), the two types of capital have the same depreciation and productivity parameters ( $\delta_H = \delta_K$  and  $\beta = \epsilon$ ), the optimal capital ratio  $h/k$  is equal to one in this regime, as well as the optimal investment ratio  $g/i$ . Assuming the same low political weight for rent-seekers ( $\theta = 1/4$ ) but increasing the efficiency of the corruption technology  $\nu$ , the economy switches to a **regime where corruption is still absent but public investment is distorted** (point B). The government reduces the investment subject to corruption in order to lower the income from rent-seeking and deter corruption at equilibrium. The ratio of public spending  $g/i$  is now equal to 1.12, since corruption distorts the composition of public spending in favor of investment for which rent-seeking is not possible. This distortion entails a loss of productive efficiency, as reflected in the lower value of income per capita  $y$ . The **interior regime** arises for high values of  $\theta$ . In this case, for example at point C, rent-seekers have such a high political weight that public spending subject to corruption are encouraged. The ratio  $g/i$  is equal to 0.42. This does not imply that capital  $h$  is low compared to  $k$ : the major part of investment in  $k$  does not reach its aim. In fact, both capital stocks are lower than in the economy without corruption, but the ratio  $h/k$  is higher. As a consequence of low investment levels and distorted allocation, output per person  $y$  is lower than in the two previous cases.

## 2 Empirical Analysis

In the model above, corruption level, income per capita and composition of public investment are endogenous and depend on a set of parameters. In this section, we first present observed variables which correspond to these parameters and investigate their effect on the three endogenous variables listed above. In particular, we look if a higher corruption technology entails lower investment ratio  $g/i$  and GDP per capita, and a higher level of corruption  $\nu x$ . We also look if in countries with a more concentrated political power,  $\theta$ , GDP per capita is lower and the share of rent-seekers higher.

The four parameters  $\nu$ ,  $\theta$ ,  $\rho$ , and productivity  $\Gamma[\cdot]$  are measured with the following variables. Since the variables are imperfect measures of the parameters, we may face some endogeneity biases. We present further the instruments used to control for endogeneity.

**Techcor:** The effect of  $\nu$  is estimated by using the *Rule of Law* index provided by the *World Bank*. This index is an aggregate of perceptions on the incidence of crime, the effectiveness and predictability of the judiciary, and the enforceability of contracts. We transform it as follows:  $Techcor = 2.5 - Rule\ of\ Law$ , so that  $Techcor = 0$  corresponds to the lowest technology of corruption.

**Polbias:** As a proxy for  $\theta$ , the weight given to rent-seekers by the government, we use an indicator of the lack of political rights taken from *Freedom House*. Indeed few political rights indicate a strong concentration of power in the hands of rent-seekers (because of lobbying activity or purchasing votes), thus  $\theta$  is high. We use a variable ranging from 0 (the citizens have very extended political rights) to 7 (no rights).

**Patience:** This variable indicates the number of years the party of the chief executive has been in office, taken from the *Database of Political Institutions* (Beck et al. 2001). It is used as a proxy for the discount factor  $\rho$ .

$\Gamma[\cdot]$ : We use a first dummy variable (**Tropic**) equal to 1 if the country is located between the tropics, 0 otherwise; and a second one (**Ldlock**) equal to 1 for landlocked countries, 0 for others. This enables to control for geographic conditions affecting productivity  $\Gamma[\cdot]$ . These two variables are taken from the *Global Development Network Growth Database* (*New York University*).

To control for initial conditions, we introduce the logarithm of 10 year-lagged constant PPP GDP per capita,  $\ln \mathbf{Y}_0$ . It is provided by the *WDI* database.

The endogenous variables are measured as follows:

**Ratio:** We define the ratio  $g/i$  which relates public investment spending free from corruption to investment spending subject to corruption.  $g$  is built as the portion of health and education spending in total public expenditure.  $i$  gathers expense on housing, fuel and energy, agriculture, mining and manufacture, transport (and other economic activities) as a percentage of total government spending. These data are taken from *GFSY* provided by the *International Monetary Fund*.

**Corrup:** The extent of corruption is represented in the model by  $\nu x$ , the share of spending which is diverted from its aim. As a proxy for  $\nu x$ , we use the index of *Control of Corruption* ( $Corrup_{WB}$ ) provided by the *World Bank* (see Kaufmann, Kraay, and Mastruzzi (2003)). The variable we use results from the following transformation:  $Corrup = 2.5 - Corrup_{WB}$ .

**Growth:** This index measures the logarithm of constant PPP GDP per capita growth on 10 years, provided by the *WDI* database. Using *Growth* as a dependent variable and regressing it on a set of explanatory variables among which  $\ln Y_0$  is equivalent to regressing  $\ln Y$  on the same set of variables.

## 2.1 Estimation results

We estimate a reduced form system of three equations where each endogenous variable is a function of the measured parameters and initial conditions. Theory shows that in the benchmark regime, the endogenous variables are not affected by small variations in  $\nu$  and  $\theta$ . Countries in such a situation also have higher income per capita. To control for this eventuality, we add interaction terms in the list of regressors:  $\frac{Techcor}{\ln Y_0}$  and  $\frac{Polbias}{\ln Y_0}$ .

Estimates are run on even-year data for the period 1996-2004 on 63 countries using a three-stage least squares (3sls) procedure. We first estimate an unrestricted model. At each step, we perform a Wald test that the least significant parameter of each equation is null. If the p-value of a coefficient is superior to 0.15, we reject the coefficient at the following step. Hence, at the end of the procedure, we retain a restricted model for which all coefficients have a low p-value (inferior to 0.15). For reinforcing the treatment of endogeneity, we introduce external instruments which are used in the first stage of the procedure to provide predicted values of endogenous variables. These excluded instruments are defined as follows:

**antiq** is an index of the depth of experience of state-level institutions, or state antiquity, developed by Bockstette, Chanda, and Putterman (2002). We use it here as an instrument for political and legal infrastructure.

**yrind** stands for the logarithm of the number of years of state independence. It measures the autonomy of the political and legal system and its capacity to influence or resist to foreign influence.

**latit** is the absolute value of the latitude of the country, introduced as an instrument for the quality of institutions by Hall and Jones (1999). Latitude is a proxy for geographical endowments. Hospitable environments favored the settlement by colonists which suited investment rather than extraction, predominant in poorly endowed environments.

**legsoc**, **legfr** and **legbr** are dummies equal to 1 respectively if the country's legal system has a socialist origin, a French origin or a British origin.

**polbiaslag** is the ten-year lagged index of political rights.

Table 2: Estimation of the reduced model of three simultaneous equations

Explanatory Variables	Dependent Variables		
	<i>Ratio</i> .10 <sup>-1</sup>	<i>Corruption</i>	<i>Growth</i>
<i>Techcor</i>	0.88 <sup>a</sup> (0.22)	0.98 <sup>a</sup> (0.09)	1.08 <sup>b</sup> (0.42)
$\frac{Techcor}{\ln Y_0} \cdot 10$	-0.75 <sup>a</sup> (0.19)		-1.39 <sup>a</sup> (0.47)
<i>Polbias</i>	-0.51 <sup>a</sup> (0.16)	0.37 <sup>c</sup> (0.23)	
$\frac{Polbias}{\ln Y_0} \cdot 10$	0.47 <sup>a</sup> (0.15)	-0.31 <sup>c</sup> (0.19)	-0.07 <sup>b</sup> (0.04)
<i>Patience</i> .10 <sup>-1</sup>	-0.10 <sup>a</sup> (0.04)		0.19 <sup>a</sup> (0.06)
<i>Tropic</i>	0.13 <sup>a</sup> (0.04)	-0.07 (0.05)	-0.15 <sup>b</sup> (0.07)
<i>Ldlock</i>	0.09 <sup>b</sup> (0.04)		-0.12 <sup>c</sup> (0.06)
$\ln Y_0$		-0.20 <sup>c</sup> (0.11)	-0.99 <sup>a</sup> (0.23)
Observations	304		
Instruments	<i>antiq yrind legsoc legfr legbr polbiaslag Tropic Ldlock</i> $\ln Y_0$		
Hausman Test	12.12 <sup>c</sup> (0.09)		
<i>p</i> - value			
Sargan Test	5.14 <sup>c</sup> (0.08)	5.37 (0.15)	1.75 (0.42)
<i>p</i> - value			
Cragg-Donald <i>F</i> stat.	1.30	2.31	1.51

Notes: Standard errors in parentheses: <sup>a</sup>, <sup>b</sup> and <sup>c</sup> denote significance respectively at the 1%, 5% and 10% level.

## 2.2 Interpretation of the results

The three tests run on instruments let think that these are both valid and relevant. Detailed tests and robustness checks are provided in de la Croix and Delavallade (2006). Let us now comment on the estimated coefficients in Table 2. As interaction terms are included in the regressions, the partial effect of *Techcor* and *Polbias* on the ratio  $g/i$ , the level of corruption and GDP growth, when both single and interaction terms are significant, depend on the initial GDP level  $Y_{0i}$ .

The results presented in Table 2 reveal first that the **ratio of spending**  $g/i$  is negatively affected by the *technology of corruption* in the poorest countries, positively in the richest ones. Its coefficient is significant at the 1% level and it ranges between -3.43 and 1.63 according to the initial level of GDP: the negative effect of  $\nu$  on  $g/i$  gets stronger when initial GDP decreases. The variable of *lack of political rights* (standing for  $\theta$ ) has a coefficient between 2.38 and -0.75. In the richest countries (GDP per capita superior to 20 000 \$),  $g/i$  increases with the extent of political rights. This corresponds to the

regime without corruption. In middle-income countries (between 4 000 and 20 000 \$) the impact of  $\theta$  on the ratio of spending is not significant. Strikingly in the poorest countries (inferior to 4 000 \$), which experience the equilibrium with corruption,  $\theta$  has a significantly positive effect on the ratio  $g/i$ .

As expected, the *technology of corruption* ( $\nu$ ) has a positive impact on the **level of corruption** and its coefficient is significant at the 1% level. The *lack of political rights* ( $\theta$ ) has a significant effect on the level of corruption as well, which gets stronger when GDP per capita increases.

*Techcor* and *Polbias*, respectively standing for  $\nu$  and  $\theta$ , have no significant effect on **GDP per capita growth**. But negative significant coefficients for interaction terms suggest that whatever the initial level of development of a country be, the *technology of corruption* and the *lack of political rights* slow growth down. And the lower the initial level of GDP, the more easy access to corruption (absence of rule of law) stems growth. Similarly in poorer countries, the lack of political rights damages growth more than in initially richer countries.

Finally, in the regression of growth, the coefficient of the *initial level of GDP per capita* is significant at the 1% level.

### 3 Conclusion

Our main message is that corruption distorts the structure of public spending, thus takes the economy away from the optimal ratio of public spending and stems growth. To study this distortion we provide an optimal growth model with endogenous corruption. Households choose between being producers or rent-seekers. The planner chooses the composition of public spending taking into account the behavior of households (incentive constraint). At equilibrium, the level of corruption, the ratio of spending and GDP per capita depend on the predatory technology and the concentration of power in rent-seekers' hands. We make explicit several regimes, with and without corruption.

Through econometric estimations, we give empirical evidence of the main implications of the model. Indeed, in the richest and most democratic countries, when corruption is made plausible by a failing legal system, public spending are distorted in favor of human capital spending, in order to discourage rent-seekers from corruption. This distortion hampers growth. We also show that a failing legal system (which provides a well developed predatory technology) in a country where the power is strongly concentrated entails a fall in the ratio of human capital spending on physical capital spending. Higher technology of corruption and political weight of rent-seekers also enhance the level of corruption, reduce GDP per capita and hamper growth even more than the previous distortion. The estimated effects are large. If Brazil had Chile's rule of law and democracy levels, annual income growth would more than double (going from 1.1% to 2.8%), its level of corruption would reach the Spanish one (going from 2.7 to 1). Its ratio of investment in education and health relative to investment in physical

capital would decrease from 2 to 1.6. Indeed, in Brazil where political power is not much concentrated, public investment is distorted in favor of expense in capital free from corruption. To sum up, among other factors, the limitations of the legal system and the concentration of political power may explain why poor countries have higher corruption than developed ones and why they have difficulties catching them up.

## References

- Arrow, Kenneth, and Mordecai Kurz. 1970. *Public Investment, the Rate of Return and Optimal Fiscal Policy*. Baltimore: The Johns Hopkins University Press.
- Barro, Robert. 1990. "Government spending in a simple model of endogenous growth." *Journal of Political Economy* 98 (5): S103–S125.
- Beck, Thorsten, George Clarke, Alberto Groff, Philip Keefer, and Patrick Walsh. 2001. "New tools in comparative political economy: The Database of Political Institutions." *World Bank Economic Review* 15 (1):165–176.
- Bockstette, Valerie, Areendam Chanda, and Louis Putterman. 2002. "States and Markets: The Advantage of an Early Start." *Journal of Economic Growth* 7 (4): 347–69.
- de la Croix, David, and Clara Delavallade. 2006. "Growth, Public Investment and Corruption with Failing Institutions." CORE Discussion Paper.
- Delavallade, Clara. 2006. "Corruption and Distribution of Public Spending in Developing Countries." *Journal of Economics and Finance* 30 (2):222–239.
- Docquier, Frederic, and Essaid Tarbalouti. 2001. "Bribing Votes: A New Explanation to the "Inequality-Redistribution" Puzzle in LDCs." *Public Choice* 108 (3-4): 259–72 (September).
- Gupta, Sanjeev, Raju Sharan, and Luiz de Mello. 2000, February. "Corruption and Military Spending." Imf working papers 00/23, International Monetary Fund.
- Hall, Robert E., and Charles I. Jones. 1999. "Why Do Some Countries Produce So Much More Output Per Worker Than Others?" *The Quarterly Journal of Economics* 114 (1): 83–116.
- Kaufmann, Daniel, Aart Kraay, and Massimo Mastruzzi. 2003, August. "Governance Matters III: Governance Indicators for 1996-2002." Macroeconomics 0308006, Economics Working Paper Archive EconWPA.
- Mauro, Paolo. 1997. Chapter The Effects of Corruption on Growth, Investment and Government Expenditure of *Corruption and the Global Economy*, edited by K. Elliot, 83–108.
- Tanzi, Vito, and Hamid Davoodi. 1997. "Corruption, Public Investment, and Growth." Imf working papers 97/139, International Monetary Fund.