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The Effects of Corruption on Growth, Investment, and Government Expenditure: A Cross-Country Analysis

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The study of the causes and consequences of corruption has a long history in economics, dating back at least to the seminal contributions to the rent-seeking literature by Bhagwati (1982), Krueger (1974), Rose-Ackerman (1978), Tullock (1967), and others. However, empirical work in this area has been limited, partly because the efficiency of government institutions cannot easily be quantified. Corruption in particular is by its very nature difficult to measure.

Renewed interest in the topic has led a number of researchers to attempt to quantify, using regression analysis and indices developed by private rating agencies, the extent to which corruption permeates economic interactions. These indices are typically based on replies to standardized questionnaires by consultants in a variety of countries and therefore have the obvious drawback of being subjective. Nevertheless, the correlation between indices produced by different rating agencies is very high, suggesting a certain consensus on the ranking of countries according to their degree of corruption. In addition, the high prices that the rating agencies charge their customers (usually multinational companies and international banks) for access to these indices are indirect evidence that the information is useful.

At the same time, however, the consultants' judgments that form the basis of these indices may be influenced by the economic performance of the countries they monitor. Thus, researchers who use such indices must be extremely cautious in asserting a causal relationship between

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corruption and any economic variables found correlated with it. One way of addressing this possible endogeneity problem is through the use of instrumental variables, as discussed later in this chapter.

An additional drawback of currently available indicators of corruption is their generality: they do not distinguish, for example, between high-level corruption (such as kickbacks to a defense minister for the purchase of expensive jet fighter aircraft) and low-level corruption (such as that of a minor official accepting a bribe to expedite issuance of a driver's license). Nor do they distinguish between well-organized and poorly organized corruption. In the latter, the required amount and appropriate recipient of a bribe are left unclear, and payment does not guarantee that the desired favor will be obtained. The uncertainty of poorly organized systems of corruption may make them the more harmful of the two (Shleifer and Vishny 1993). Yet, even with these limitations, the indices provide a wealth of information from which researchers have obtained a number of interesting results.

This chapter identifies a number of possible causes and consequences of corruption, with emphasis on those links that have been or that could, at least in principle, be investigated through the use of cross-country regression analysis. The chapter reviews and synthesizes the results of recent studies that have made use of such regressions. Although data limitations subject the empirical work to a number of difficulties, these studies provide tentative evidence that corruption may have considerable adverse effects on economic performance that merit the attention of policymakers. More interestingly, the identification of possible causes of corruption may suggest a number of ways to curb it. Although in some cases the distinction between causes and consequences is blurred, there are cases where such ambiguities about the direction of causality should not be overstated in drawing policy conclusions, as argued below.

This chapter also presents new results on the effects of corruption on investment and economic growth. These results were obtained by using a larger data set to expand the analysis of Mauro (1995). New evidence is also presented on the relationship between corruption and the composition of government expenditure. These results need to be interpreted with caution, but they do indicate that corruption lowers overall investment and economic growth and alters the composition of government expenditure, specifically by reducing the share of spending on education.

Causes and Consequences of Corruption

Causes of Corruption

Building upon theoretical contributions from the literature on rent-seeking behavior, recent empirical studies analyze the possible causes of

corruption by regressing indices of corruption on a number of potential explanatory variables. Several of these causal variables are related to the extent of government intervention in the economy and, more generally, to variables (such as the level of import tariffs or civil service wages) that are determined by *government policy*. Where regulations are pervasive and government officials have wide discretion in applying them, private parties may be willing to pay bribes to government officials to obtain any rents that the regulations may generate. Identifying such policy-induced sources of corruption is obviously helpful in bringing it under control. The following paragraphs list some of the sources of corruption identified in the literature.

The original literature on rent seeking emphasizes trade restrictions as the prime example of government-induced sources of rents (Krueger 1974). For example, quantitative restrictions on imports make the necessary import licenses very valuable; importers may then be willing to bribe the relevant officials in order to obtain them. More generally, protection of domestic industries from international competition generates rents that local entrepreneurs may be willing to pay for, in the form of bribes. Ades and Di Tella (1994) find that greater openness in an economy, as measured by the sum of imports and exports as a share of GDP, is significantly associated with lower corruption.

Government subsidies can be a source of rents, as Clements, Hugounenq, and Schwartz (1995) have argued. Ades and Di Tella (1995) explain corruption as a function of *industrial policy*, showing that subsidies to manufacturing (measured as a proportion of GDP) are correlated with corruption indices.[1]

Price controls (which can be quantified on the basis of indicators such as those in World Bank 1983) are also a potential source of rents and therefore of rent-seeking behavior. For example, entrepreneurs may be willing to bribe government officials to maintain the provision of inputs at below-market prices.

Similarly, multiple exchange rate systems and foreign exchange allocation schemes (whose importance may be proxied by parallel exchange market premiums, such as those used by Levine and Renelt [1992]) lead to rents. For example, suppose that, in a given country, managers of state-owned commercial banks ration foreign exchange according to priorities they themselves establish; then the country's entrepreneurs may be willing to bribe the managers to obtain the foreign exchange necessary to purchase imported inputs.

Low wages in the civil service relative to private-sector wages or GDP per capita are also a potential source of (low-level) corruption, following

1. Ades and Di Tella (1995) also argue that, in evaluating the costs and benefits of industrial policies, it is necessary to take into account the fact that they may generate corruption as an unintended byproduct.

efficiency-wage mechanisms (Kraay and Van Rijckeghem 1995; Haque and Sahay 1996). That is, when civil servants are not paid enough to make ends meet, they may be obliged to use their positions to collect bribes, especially when the expected cost of being caught and fired is low. Countries should take such considerations into account when faced with the difficult choice of lowering an excessive civil service wage bill by cutting salaries or by reducing the number of staff. The International Monetary Fund's Fiscal Affairs Department (1995, 15) warns of the dangers of across-the-board civil service wage cuts, which could lead to a rise in corrupt behavior.

Other sources of rents or factors that make it more likely that rents will be exploited are due not to government policy but to certain underlying characteristics of an economy or a society. Policymakers need to be alert to the possibility of rent-seeking behavior arising from these factors, and attempts to evaluate the effects of government policy on corruption need to take them into account as well. The following are some of these nongovernmental causes of corruption.

Natural-resource endowments are a textbook example of a source of rents, since these resources can typically be sold at a price far exceeding their cost of extraction. Sachs and Warner (1995) argue that resource-rich economies may be more prone than resource-poor economies to extreme rent-seeking behavior. They find (although not at conventional levels of statistical significance) that a country's share of primary-product exports in total exports is associated with indices of bureaucratic efficiency.

Sociological factors may contribute to creating an environment in which the availability of rents is more likely to result in rent-seeking behavior. Shleifer and Vishny (1993) suggest that in countries populated by several ethnic groups one is more likely to find a less organized—and therefore potentially more harmful—type of corruption. This hypothesis is used in Mauro (1995), where an index of ethnolinguistic fractionalization is found to be correlated with corruption. Tanzi (1994) argues that public officials are more likely to do favors for friends and relatives in societies in which relationships are more personalized.

Consequences of Corruption

Corruption has a number of adverse consequences. In particular, recent empirical evidence suggests that corruption lowers economic growth. This may happen through any of a wide range of channels.

Where corruption exists, entrepreneurs are aware that some of the proceeds from their future investments may be claimed by corrupt officials. Payment of bribes is often required before necessary permits will be issued. Therefore, investors may perceive corruption as a tax—and one of a particularly pernicious nature, given the need for secrecy and the uncertainty that come with it—which reduces incentives to invest.

Mauro (1995) provides tentative empirical evidence that corruption lowers investment and economic growth. The observed effects are considerable in magnitude: in an analysis using the Business International (BI) indices of corruption, a one-standard-deviation improvement in the corruption index causes investment to rise by 5 percent of GDP and the annual rate of growth of GDP per capita to rise by half a percentage point. The evidence indicates that much of the effects on economic growth take place through the effects on investment. Using indices of institutional efficiency from the *International Country Risk Guide* (*ICRG*), Keefer and Knack (1995) obtain broadly similar results, and in their estimates institutional variables have a significant direct effect on growth in addition to the indirect effect through investment.[2] Further evidence on these relationships is presented below.

Murphy, Shleifer, and Vishny (1991) argue that in situations where rent seeking provides more lucrative opportunities than productive work does, the allocation of talent will be worse: talented and highly educated individuals will be more likely to engage in rent seeking than in productive work, with adverse consequences for their country's growth rate.

Of particular relevance to developing countries is the possibility that corruption might reduce the effectiveness of aid flows, through the diversion of funds from their intended projects. The vast literature on aid flows has explored whether the fungibility of aid resources ultimately results in aid flows financing unproductive public expenditures. Perhaps as a result of this ongoing debate, many donor countries have focused increasingly on issues of good governance, and in some cases in which governance is judged to be very poor, some donors have scaled back their assistance (IMF 1995, 32-34).

Corruption may also bring about loss of tax revenue when it takes the form of tax evasion or the improper use of discretionary tax exemptions. Strictly speaking, these phenomena fall under the definition of corruption only when there is a counterpart payment to the tax official responsible.

By affecting tax collection or the level of public expenditure, corruption may have adverse budgetary consequences. Alternatively, where corruption takes the form of the improper use of directed lending at below-market interest rates by public-sector financial institutions, corruption may result in an undesirably lax monetary stance.

The allocation of public procurement contracts through a corrupt system may lead to inferior public infrastructure and services. For example, corrupt bureaucrats might allow the use of cheap, substandard materials in the construction of buildings or bridges.

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2. One way in which the growth rate may be affected even for a given investment rate is through changes in the allocation of resources among sectors (Easterly 1990), perhaps including that between the formal and the informal sectors (Loayza 1996).

Finally, corruption may affect the composition of government expenditure. It is this possibility on which the empirical section of this chapter focuses. Corrupt government officials may come to prefer those types of expenditure that allow them to collect bribes and to keep them secret. Shleifer and Vishny (1993) suggest that large expenditures on specialized items such as missiles and bridges, whose exact market value is difficult to determine—lead to more lucrative opportunities for corruption. Opportunities for levying bribes may also be more abundant in connection with items produced by firms operating in oligopolistic markets, where rents are available. One might expect a priori that substantial bribes are easier to collect on large infrastructure projects or high-technology defense equipment than on textbooks and teachers' salaries. For example, Hines (1995) argues that international trade in aircraft is particularly susceptible to corruption. In other areas, such as health, the picture is less clear-cut: opportunities to collect bribes may be abundant in the procurement of hospital buildings and state-of-the-art medical equipment but more limited in the payment of doctors' and nurses' salaries.

Empirical work on the potential links between corruption and the composition of government expenditure is extremely limited. Among the few contributions, Rauch (1995) analyzes both the determinants and the effects of government expenditure composition in a sample of US cities. He finds that the wave of municipal reform during the Progressive Era increased the share of total municipal expenditure allocated to road and sewer investment, which in turn increased growth in manufacturing employment in those cities. To probe further into this relatively unexplored issue, this chapter analyzes data from a cross-section of countries and finds tentative evidence that corruption may lower government spending on education as a proportion of GDP.

Empirical Analyses

Description of the Data

This chapter uses indices of corruption drawn from two private firms: Political Risk Services, Inc., which publishes the *International Country Risk Guide* (*ICRG*), and Business International (BI; now incorporated into the *Economist Intelligence Unit*).

The *ICRG* indices are described in detail by Keefer and Knack (1995). The index used here, which was compiled by the IRIS Center at the University of Maryland, is the 1982-95 average from the *ICRG* and is available for more than a hundred countries. This index purports to measure for each country the likelihood that "high government officials [will] demand special payments" and that "illegal payments are gener-

ally expected throughout lower levels of government" in the allocation of import and export licenses, foreign exchange, tax assessments, credit, and the like (Keefer and Knack 1995, 23).

The full BI data set used in this chapter is provided, together with a more complete description, in Mauro (1995). The index used is the 1980-83 average and is available for 67 countries. This index attempts to measure "the degree to which business transactions involve corruption or questionable payments" (Mauro 1995, 684). Both the *ICRG* and the BI indices are scaled from 0 (most corrupt) to 10 (least corrupt), with similar distributions.

The corruption index used in this chapter is the simple average of the *ICRG* and BI indices, when both are available, and the *ICRG* index otherwise. The two indices are strongly correlated ($r = 0.81$) and, arguably, averaging them may reduce the errors in each. There are thus 106 observations in the Barro (1991) sample for which the corruption index is available. The sample statistics are as follows: mean = 5.85, standard deviation = 2.38, minimum = 0.59, maximum = 10.

On the argument that economic growth might contribute to improved institutional efficiency, I use instrumental variables in some estimates in this chapter to address potential endogeneity bias. The first of these, an index of ethnolinguistic fractionalization,[3] is a useful instrument because, as Shleifer and Vishny (1993) argue, more fractionalized countries tend to have more dishonest bureaucracies. The index correlates well ($r = 0.39$, significant at conventional levels) with the corruption index. The other instruments are two dummy variables specified to represent whether (following Taylor and Hudson 1972) the country has been a colony (since 1776) and whether the country achieved independence after 1945. These colonial dummies (data for which come from the *Encyclopedia Britannica*) are good instruments because they, too, are highly correlated with a country's corruption index ($r = 0.46$ and 0.38, respectively; both values are significant). In addition, these three variables may be valid instruments to the extent that ethnolinguistic fractionalization and colonial history are unrelated to economic growth, investment, or

3. The raw data from which this index is constructed refer to 1960 and come from the *Atlas Narodov Mira* (Department of Geodesy and Cartography of the State Geological Committee of the USSR, Moscow, 1964). This publication was the result of a vast project to provide an extremely accurate depiction of the ethnolinguistic composition of world population. The index is computed by Taylor and Hudson (1972) as

$$ELF = 1 - \sum_{i=1}^{I} \left(\frac{n_i}{N}\right)^2, \; i = 1, \ldots I$$

where n_i is the number of people in the ith group, N is the total population, and I is the number of ethnolinguistic groups in the country. The index measures the probability that two randomly selected persons from a given country will not belong to the same ethnolinguistic group.

the composition of government expenditure, other than through their effects on corruption.

This chapter uses three standard sources of data on the composition of government expenditure: Barro (1991), Devarajan, Swaroop, and Zou (1993), and Easterly and Rebelo (1993).

The Barro (1991) data set contains 1970-85 averages of government spending on defense, education, social security and welfare, public investment, and total government expenditure for over 100 countries. The primary sources are the International Monetary Fund's *Government Finance Statistics* (*GFS*) and UNESCO. All macroeconomic variables are also drawn from Barro (1991), since his data set provided the basis for much recent empirical work on the determinants of economic growth.

Data for the industrial countries were added to the Devarajan, Swaroop, and Zou (1993) data set of developing countries to obtain a larger sample of around 95 countries. The data ultimately come from the *GFS* and refer to 1985. The components of expenditure on education (primary and secondary, university, and other education) and health (hospitals, clinics, and other) are available for about 60 countries.

The Easterly and Rebelo (1993) data set consolidates the public investment expenditures of the general government with those undertaken by public enterprises for 96 countries. It provides data on the composition of public investment by sector (agriculture, education, health, housing and urban infrastructure, transport and communication, and industry and mining) for a sample of about 40 developing countries. Public investment data are also available by level of government (general government versus public enterprises) for about 50 countries. The primary sources are the World Bank's country reports, United Nations national accounts data, and the World Bank's annual *World Development Report*.

The Effects of Corruption on Investment and Economic Growth

Using cross-country regressions similar to those in Mauro (1995), this section examines a larger data set to provide further evidence that corruption may affect investment and economic growth.[4] Regression of the 1960-85 average investment rate alone on the corruption index shows an association between these variables that is significant at conventional levels (table 1, column 1). A univariate regression of the 1960-85 average

4. The analysis in this chapter relies only on cross-sectional regressions using averages of the data over the sample period, as a country's degree of institutional efficiency typically evolves only rather slowly. Mauro (1993) shows that the relationship between investment and corruption is significant in a fixed-effects panel.

Table 1 Results of regressions estimating the effects of corruption on investment-GDP ratios[a]

Independent variable	Univariate, OLS (1)	Univariate, 2SLS (2)	Multivariate, OLS (3)	Multivariate, 2SLS (4)
Constant	0.0780 (4.19)	–0.0025 (–0.05)	0.1226 (3.66)	0.0543 (0.47)
Corruption index	0.0187 (7.03)	0.0320 (3.93)	0.0095 (2.09)	0.0281 (0.99)
GDP per capita in 1960			–0.0062 (–0.91)	–0.0213 (–0.96)
Secondary education in 1960			0.1749 (2.95)	0.1241 (1.21)
Population growth			–0.8226 (–0.82)	–1.0160 (–1.05)
R^2	0.32	n.a.[b]	0.44	n.a.[b]

OLS = ordinary least-squares; 2SLS = two-stage least-squares; n.a. = not applicable.
a. There are 94 observations. The dependent variable is the average investment-GDP ratio for 1960-85. The corruption index is the simple average of indices produced by Political Risk Services, Inc. (compiled by the IRIS Center at the University of Maryland, for 1982-95) and Business International (for 1980-83). One standard deviation of the corruption index equals 2.38. A high value of the corruption index means that the country has good institutions in that respect. White-corrected *t*-statistics are reported in parentheses. In the 2SLS regressions the index of ethnolinguistic fractionalization from Taylor and Hudson (1972) was used as an instrumental variable.
b. R^2 is not an appropriate measure of goodness of fit with 2SLS.

Sources: Barro (1991); Business International; Political Risk Services, Inc.; IRIS Center, University of Maryland.

annual growth in GDP per capita on the corruption index (table 2, column 1) also produced a significant association. The magnitude of the effects is considerable: a one-standard-deviation (2.38-point) improvement in the corruption index is associated with over a 4-percentage-point increase in a country's investment rate and over a ½-percentage-point increase in the per capita growth rate. This means that if a given country were to improve its corruption "grade" from 6 out of 10 to 8 out of 10, its investment-GDP ratio would rise by almost 4 percentage points and its annual growth of GDP per capita would rise by almost half a percentage point.

The estimated coefficients become even larger when two-stage least-squares techniques, with the index of ethnolinguistic fractionalization as an instrument, are used to address possible endogeneity bias (tables 1 and 2, column 2). The relationships remain significant even in multivariate regressions that take into account the effects of other standard

Table 2 Results of regressions estimating the effects of corruption on growth of GDP per capita[a]

Independent variable	Univariate, OLS (1)	Univariate, 2SLS (2)	Multivariate, OLS (3)	Multivariate, 2SLS (4)	Multivariate including investment, OLS (5)
Constant	0.0035 (0.85)	–0.0284 (–2.12)	0.0012 (1.50)	–0.0404 (–0.81)	–0.0012 (–0.16)
Corruption index	0.0029 (4.74)	0.0081 (3.61)	0.0038 (2.95)	0.0175 (1.40)	0.0028 (2.01)
GDP per capita in 1960			–0.0075 (–4.49)	–0.01821 (–1.79)	–0.0069 (–4.78)
Secondary education in 1960			0.0401 (3.09)	0.0034 (0.09)	0.0217 (1.82)
Population growth			–0.4124 (–1.83)	–0.5192 (–1.29)	–0.3255 (–1.81)
Investment					0.1056 (3.09)
R^2	0.14	n.a.[b]	0.31	n.a.[b]	0.42

OLS = ordinary least-squares; 2SLS = two-stage least-squares; n.a. = not applicable.
a. There are 94 observations. The dependent variable is average annual growth of GDP per capita for 1960-85. The corruption index is the simple average of indices produced by Political Risk Services, Inc. (compiled by the IRIS Center at the University of Maryland, for 1982-95), and Business International (for 1980-83). One standard deviation of the corruption index equals 2.38. A high value of the corruption index means that the country has good institutions in that respect. White-corrected *t*-statistics are reported in parentheses. In the 2SLS regressions the index of ethnolinguistic fractionalization from Taylor and Hudson (1972) was used as an instrumental variable.
b. R^2 is not an appropriate measure of goodness of fit with 2SLS.

Sources: Barro (1991); Business International; Political Risk Services, Inc.; IRIS Center, University of Maryland.

determinants of investment and growth (tables 1 and 2, column 3).[5] The magnitude of the coefficients also rises when instrumental variables are used for the corruption index in the multivariate regressions (tables 1 and 2, column 4). Finally, when the investment rate is added to the list of independent variables in the growth regression, the coefficient on the corruption index falls by two-thirds (compare table 2, column 5, with table 1, column 3), although it remains just significant at the 5 percent

5. The specification chosen here is the base regression in Levine and Renelt (1992) and includes initial GDP per capita, the initial secondary education enrollment rate, and the population growth rate.

level. This result implies that much of the effect of corruption on economic growth takes place through investment, although it leaves open the possibility that some of the effect occurs directly.

The general result of these analyses—namely, that corruption may have large, adverse effects on economic growth and that investment may have important implications—has already received considerable attention elsewhere.[6] The following section focuses on a channel other than investment through which corruption may affect economic performance, namely the possible link between corruption and the composition of government expenditure.

The Effects of Corruption on the Composition of Government Expenditure

The potential effects of corruption on the composition of government expenditure remain largely unexplored, at least in the context of cross-country work. This section asks whether corrupt politicians choose to spend more on those components of public expenditure on which it may be easier or more lucrative to levy bribes. The appendix derives a generalization of the Barro (1990) model that shows that if corruption acted simply as though it were a tax on income, then the amount and composition of government expenditure would be independent of corruption. As a consequence, it seems reasonable to interpret any empirical relationships between corruption indices and particular components of government spending as tentative evidence that corrupt bureaucrats obtain more revenue for themselves not simply by increasing government expenditure and their share of it, but also by shifting the composition of government expenditure to those areas in which bribes can be more efficiently collected.

The question is interesting because, even though the empirical literature has so far yielded mixed results on the effects of government expenditure, and in particular of its composition, on economic growth,[7]

6. A number of additional robustness tests for similar regressions using the BI data set are reported in Mauro (1993, 1995).

7. Levine and Renelt (1992) show that the overall level of government expenditure does not seem to bear any robust relationship with economic growth. Previous work on the composition of government expenditure has been limited. Devarajan, Swaroop, and Zou (1993) find no clear relationship between any component of government expenditure and economic growth. Easterly and Rebelo (1993) do find some significant relationships: public investment on transport and communications is positively associated with economic growth, although not with private investment; public investment in agriculture is negatively associated with private investment; general government investment is positively correlated with both growth and private investment; and public enterprise investment is negatively correlated with private investment.

most economists seem to think that the level and type of spending undertaken by governments do matter for economic performance. For example, even though cross-country regression work has not conclusively shown a relationship between government spending on education and economic growth, it has gathered fairly robust evidence that school enrollment rates (Levine and Renelt 1992) and educational attainment (Barro 1992) play a considerable role in determining economic growth.

Perhaps part of the reason significant and robust effects of the composition of government expenditure on economic growth have proved difficult to find is that the quality of the available data may be relatively low, both because it is difficult to ensure that all countries apply the same criteria in allocating projects among the various categories of government expenditure and because each public expenditure component presumably contains both productive and unproductive projects. The relative noisiness of the expenditure data implies that this study must necessarily be exploratory and that one should not expect a priori to find significant relationships. Nevertheless, this section presents new, tentative evidence that corrupt governments may display predatory behavior in choosing the composition of government expenditure. In particular, government spending on education seems to be reduced by corruption.

Table 3 analyzes the relationship between each component of public expenditure (as a ratio to GDP) reported in the Barro (1991) data set and the corruption index.[8] Government spending on education as a ratio to GDP is positively and significantly correlated with lower levels of corruption (i.e., a higher ranking on the index). The magnitude of the coefficient is considerable: a one-standard-deviation improvement in the corruption index is associated with an increase in government spending on education by around half a percent of GDP. Taken at face value, this result implies that if a given country were to improve its "grade" on corruption from, say, 6 out of 10 to 8 out of 10, on average its government would increase its spending on education by about half a percent of GDP. Figure 1 shows that this result is not just driven by a small group of countries.

Other components of government expenditure (but, interestingly, not total government consumption expenditure) are also significantly associated with the corruption index at the conventional levels, most notably in the case of transfer payments, and social insurance and

8. The various components of government spending are analyzed as a share of GDP because the generalization of the Barro (1990) model that is derived in the appendix, which provides a useful theoretical benchmark, implies that if bribes could be levied just as easily on all income (rather than more easily on some government expenditure components than others), then the various components of government *as a ratio to GDP* should be unrelated to corruption.

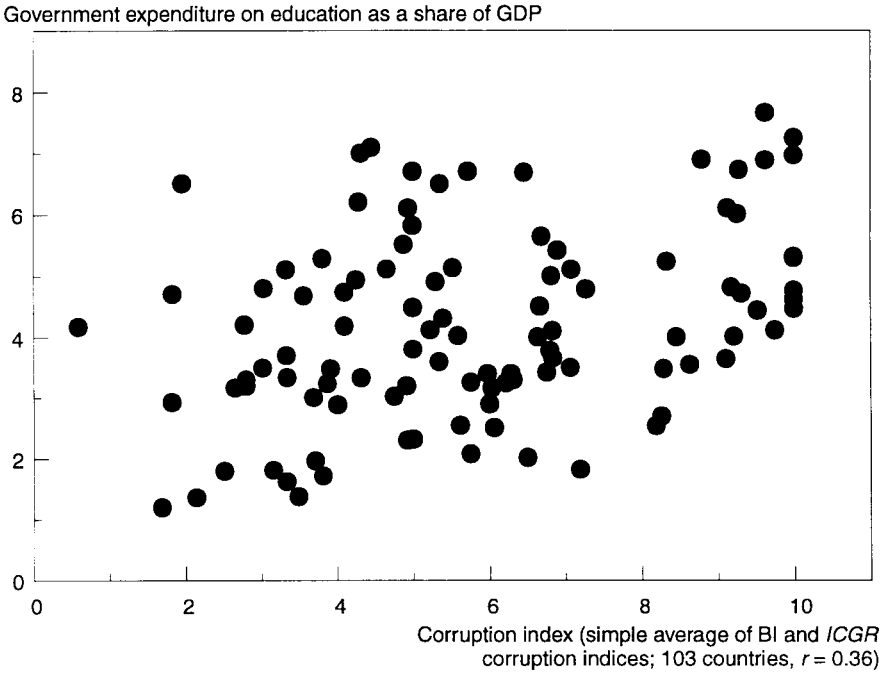
Table 3 Results of regressions estimating the relationship between corruption and the composition of government expenditure, using the Barro data set[a]

Dependent variable (averages for 1970-85, as percentages of GDP)	Constant	Corruption index	GDP per capita (1980)	R^2	*N*
Regressions omitting GDP per capita as a variable					
Government expenditure on education	0.028 (7.48)	0.0023 (3.97)		0.13	103
Government consumption expenditure	0.213 (11.85)	–0.0047 (–1.70)		0.03	106
Government consumption expenditure, excluding education and defense	0.146 (10.69)	–0.0070 (–3.35)		0.10	93
Government expenditure on defense	0.032 (3.64)	0.0004 (0.28)		0.00	93
Government transfer payments	–0.039 (–2.22)	0.0208 (7.22)		0.45	73
Social insurance and welfare payments	–0.044 (–4.41)	0.0156 (7.94)		0.48	75
Regressions including GDP per capita as a variable					
Government expenditure on education	0.029 (6.85)	0.0020 (2.20)	0.0003 (0.43)	0.13	103
Government consumption expenditure	0.189 (10.20)	0.0052 (1.46)	–0.0094 (–4.88)	0.16	106
Government consumption expenditure, excluding education and defense	0.116 (7.79)	0.0049 (1.41)	–0.011 (–4.54)	0..25	93
Government expenditure on defense	0.030 (2.25)	0.0009 (0.25)	–0.0004 (–0.17)	0.00	93
Government transfer payments	0.013 (0.78)	0.0001 (0.03)	0.018 (5.60)	0.64	73
Social insurance and welfare payments	–0.015 (–1.70)	0.0041 (1.64)	0.010 (4.47)	0.59	75

a. The corruption index is the simple average of the indices produced by Political Risk Services, Inc. (compiled by the IRIS Center, University of Maryland, for 1982-95) and Business International (for 1980-83). One standard deviation of the corruption index equals 2.38. A high value of the corruption index means that the country has good institutions in that respect. White-corrected *t*-statistics are reported in parentheses. *N* is the number of observations.

Sources: Barro (1991); Business International; Political Risk Services, Inc.; IRIS Center, University of Maryland.

Figure 1 Correlation between corruption and government expenditure on education for 103 countries



Sources: Barro (1991), BI, and *ICRG*.

welfare payments. However, it is important to take into account the well-known empirical observation—known as Wagner's law[9]—that the share of government expenditure in GDP tends to rise as a country becomes richer. When the level of income per capita in 1980 is used as an additional explanatory variable, education turns out to be the only component of public spending whose association with the corruption index remains significant at the 95 percent level.[10] The magnitude of the coefficient remains broadly the same as in the univariate regression.

Table 4 reports results obtained using *GFS* data, which are more finely disaggregated, although possibly at the cost of lower cross-country

9. Easterly and Rebelo (1993) review the literature on Wagner's law and show that, in a panel of countries, several components of public spending rise (as a ratio to GDP) as per capita income rises.

10. This analysis is a first pass at the data. Future research could introduce additional control variables, such as the demographic structure of the population (a higher share of the school-age population in the total population would usually imply a higher expenditure on education) and indicators of relations with neighboring countries (an increased possibility of war is expected to raise defense spending).

Table 4 Results of regressions estimating the relationship between corruption and the composition of government expenditure, using *GFS* data[a]

Dependent variable (1985 observation, as ratio to GDP)	Constant	Corruption index	GDP per capita, 1980	R^2	*N*
Total government expenditure	0.233 (4.16)	0.0043 (0.36)	0.0112 (1.59)	0.122 2	88
Government current expenditure	0.141 (3.33)	0.0124 (1.34)	0.0094 (1.64)	0.238 8	85
Government capital expenditure	0.081 (4.54)	–0.0064 (–1.61)	0.0011 (0.43)	0.118 8	86
Government expenditure on education	0.021 (3.95)	0.0030 (2.29)	–0.0020 (–1.93)	0.070 0	85
Government expenditure on schools	0.012 (2.01)	0.0028 (1.60)	–0.0022 (–1.69)	0.077 7	57
Government expenditure on universities	0.004 (2.71)	0.0008 (2.45)	–0.0006 (2.79)	0.074 4	56
Other government expenditure on education	0.007 (1.93)	0.0001 (0.01)	–0.0002 (–0.29)	0.003 3	54
Government expenditure on health	0.001 (0.13)	0.0027 (2.34)	0.0012 (1.27)	0.301 1	86
Government expenditure on hospitals	0.006 (1.62)	0.0006 (0.64)	0.0005 (0.69)	0.063 3	54
Government expenditure on clinics	–0.002 (–0.41)	0.0012 (1.02)	0.0003 (0.31)	0.093 3	28
Other government expenditure on health	0.001 (0.32)	0.0011 (0.83)	–0.0009 (–1.18)	0.042 2	44
Government expenditure on defense	0.034 (2.42)	–0.0009 (–0.24)	0.0010 (0.41)	0.003 3	82
Government expenditure on transportation	0.013 (4.13)	0.0009 (1.02)	–0.0003 (–0.39)	0.023 3	85

a. The corruption index is the simple average of the indices produced by Political Risk Services, Inc. (compiled by the IRIS Center, University of Maryland, for 1982-95) and Business International (for 1980-83). One standard deviation of the corruption index equals 2.38. A high value of the corruption index means that the country has good institutions in that respect. White-corrected *t*-statistics are reported in parentheses. *N* is the number of observations.

Sources: *Government Finance Statistics* (International Monetary Fund); Business International; Political Risk Services, Inc.; IRIS Center, University of Maryland.

comparability at the level of the more detailed items. Total government expenditure is again unrelated to corruption, and the results obtained when public expenditure is split by function are in line with those obtained using the Barro data set. In particular, when GDP per capita is controlled for, government expenditure on education is negatively and significantly associated with higher levels of corruption (a lower ranking on the index). Government expenditure on health is also found to be negatively and significantly associated with corruption. Finally, neither defense nor transportation displays any significant relationship with corruption. Of course, this does not mean that there is no corruption associated with spending on these items but only that this simple analysis does not find any significant evidence of it.

The link between corruption and the subcomponents of education and of health expenditure is more blurred. The association is significant only for spending on primary and secondary education and on universities, and then only at the 90 percent level.

Finally, table 4 shows the results of the test of a hypothesis often heard in popular debate—namely, that corruption is likely to lead to high capital expenditures by the government, perhaps on useless white-elephant projects. The data are consistent with this hypothesis but do not provide significant evidence in favor of it. In fact, an improvement in the corruption index does coincide with a decline in capital expenditure by the government as a ratio to GDP, but this relationship is barely significant at the 90 percent level. Similarly, an improvement in the corruption index is associated with an increase in current expenditure by the government as a ratio to GDP, but not significantly so. Therefore, these results are interesting, but only suggestive at this stage.

The impact of corruption on the level and composition of public investment were analyzed using the data from Easterly and Rebelo (1993), which unfortunately reduces the sample size sharply. Interestingly, most of the relationships are not statistically significant (table 5). In particular, although there is fairly robust evidence that corruption lowers total investment (and private investment—see Mauro 1995), no clear relationship emerges between corruption and public investment. A possible interpretation is that predatory behavior by corrupt governments may help sustain the level (although not the quality) of public investment as a ratio to GDP, even as private investment declines. In addition, none of the components of public investment (including the education component) is significantly associated with the corruption indices. In part, these findings may be due to the fact that the sample is relatively small and consists only of developing countries, yielding relatively little variation in the independent variables. However, it is also possible to speculate that bribes are difficult to levy on teachers' salaries but easier to levy on the construction of school buildings.

Finally, table 6 reports results from a number of simple tests of the

Table 5 Results of regressions estimating the relationship between corruption and the composition of public investment[a]

Dependent variable (1985 observation, as ratio to GDP)	Constant	Corruption index	GDP per capita, 1980	R^2	*N*
Public investment	0.110 (8.45)	–0.0041 (–1.95)		0.051	84
Public investment	0.098 (6.67)	0.0009 (0.29)	–0.0060 (–2.75)	0.121	84
General government	0.051 (4.76)	–0.0014 (–0.92)		0.021	51
General government	0.038 (2.34)	–0.0030 (0.85)	–0.0040 (–1.98)	0.126	51
Public enterprises	0.060 (4.93)	–0.0022 (–1.21)		0.028	42
Public enterprises	0.042 (3.83)	0.0052 (2.15)	–0.0079 (–4.21)	0.224	42
Agriculture	0.021 (2.15)	–0.0010 (–0.55)		0.013	44
Agriculture	0.023 (2.42)	–0.0007 (–0.37)	–0.0021 (–1.34)	0.033	44
Education	0.006 (2.58)	0.0001 (0.11)		0.001	42
Education	0.0058 (2.68)	0.0003 (0.49)	–0.0008 (–1.69)	0.035	42
Health	0.004 (2.59)	–0.0001 (–0.14)		0.001	37
Health	0.0046 (2.92)	0.0001 (0.19)	–0.0007 (–1.88)	0.038	37
Housing	0.004 (1.41)	0.0003 (0.57)		0.006	31
Housing	0.0049 (1.60)	0.0008 (1.16)	–0.0016 (–1.82)	0.056	31
Industry	0.011 (1.79)	–0.0001 (–0.10)		0.001	32
Industry	0.011 (1.88)	–0.0001 (–0.05)	–0.0003 (–0.28)	0.002	32
Transportation	0.018 (3.94)	0.0004 (0.45)		0.004	36
Transportation	0.019 (3.93)	0.0005 (0.55)	–0.0005 (–0.43)	0.007	36

a. The corruption index is the simple average of the indices produced by Political Risk Services, Inc. (compiled by the IRIS Center, University of Maryland, for 1982–95) and Business International (for 1980–83). One standard deviation of the corruption index equals 2.38. A high value of the corruption index means that the country has good institutions in that respect. White–corrected *t*–statistics are reported in parentheses. *N* is the number of observations.

Sources: Barro (1991); Business International; Political Risk Services, Inc.; IRIS Center, University of Maryland.

Table 6 Results of regressions estimating the relationship between corruption and government expenditure on education[a]

Dependent variable (average 1970-85)	Constant	Corruption index	GDP per capita, 1980	Government consumption expenditure as ratio to GDP	R^2	N
Ratio of government expenditure on education to GDP	0.010 (2.25)	0.0027 (5.48)		0.0863 (4.74)	0.278	103
Ratio of government expenditure on education to GDP	0.009 (2.15)	0.0014 (1.62)	0.0013 (1.75)	0.1042 (4.74)	0.318	103
Ratio of government expenditure on education to government consumption expenditure	0.103 (4.11)	0.0256 (5.40)			0.262	103
Ratio of government expenditure on education to government consumption expenditure	0.149 (6.49)	0.0056 (1.09)	0.0187 (5.00)		0.424	103
Ratio of government expenditure on education to GDP; instrument: fractionalization	0.036 (4.08)	0.0011 (0.74)			n.a.[b]	100

Ratio of government expenditure on education to GDP; instruments: fractionalization, colonial history, and postwar independence	0.033 (5.08)	0.0015 (1.36)		n.a.[b]	100
Ratio of government expenditure on education to government consumption expenditure; instrument: fractionalization	0.068 (1.11)	0.0318 (3.04)		n.a.[b]	100
Ratio of government expenditure on education to government consumption expenditure; instruments: fractionalization, colonial history, and postwar independence	0.059 (1.23)	0.0331 (3.95)		n.a.[b]	100

n.a. = not applicable

a. The corruption index is the simple average of the indices produced by Political Risk Services, Inc. (compiled by the IRIS Center, University of Maryland, for 1982-95) and Business International (for 1980-83). One standard deviation of the corruption index equals 2.38. A high value of the corruption index means that the country has good institutions in that respect. White-corrected *t*-statistics are reported in parentheses. *N* is the number of observations. "Fractionalization" is the index of ethnolinguistic fractionalization in 1960, from Taylor and Hudson (1972). "Colonial history" is a dummy for whether the country was ever a colony (since 1776). "Postwar independence" is a dummy for whether the country was still a colony in 1945.

b. R^2 is not an appropriate measure of goodness of fit with instrumental variables (two-stage least-squares).

Sources: Barro (1991); Business International; Political Risk Services, Inc.; IRIS Center, University of Maryland.

robustness of the relationship between corruption and government expenditure on education. This robustness is tested, first, by relaxing some of the previous estimates' assumptions on functional form and, second, by controlling for possible endogeneity problems by using instrumental variables. When the ratio of government expenditure on education is regressed on the corruption index and total government expenditure as a ratio to GDP, the relationship remains significant, but only barely so when GDP per capita is included in the specification. Government expenditure on education as a share of total government consumption expenditure is significantly correlated with the corruption index, but only when GDP per capita is *not* included in the regression. Thus, the relationship between corruption and government expenditure on education seems to be somewhat sensitive to changes in the specification, but not overly so.

To the extent that the direction of causality to be captured is that from corruption to government spending on education, it is interesting to estimate this relationship using instrumental variables (the index of ethnolinguistic fractionalization and the colonial dummies). The coefficient on corruption falls by about half in the regression of government expenditure on education as a ratio to GDP when instrumental variables are used (compare table 6, rows 5 and 6, with table 3, row 1). However, the use of instrumental variables raises the coefficient on corruption in the regression of government expenditure as a share of total government consumption expenditure (in table 6, compare rows 7 and 8, with table 3, row 3). Thus, there is some tentative support for the hypothesis that corruption *causes* a decline in government expenditure on education, but the results are somewhat mixed.

Overall, the evidence is suggestive, but by no means conclusive, that corruption is negatively associated with government expenditure on education and possibly on health. Despite some indications that the direction of the causal link may be at least in part from corruption to the composition of spending, the issue of the direction of causality remains unresolved. At the same time, the extent to which potential policy conclusions depend on the direction of causality should not be overstated—an issue that the next section explores.

The Direction of Causality—Is It Relevant for Policy?

For the sake of clarity, the above list of variables that might be related to corruption has been presented as though these variables could unambiguously be categorized as either causes or consequences of corruption. But in fact the direction of causality is blurred in some cases. For example, it is not clear whether the existence of regulations leads

bureaucrats to ask for bribes to help entrepreneurs circumvent them, or instead whether corrupt bureaucrats are more likely to multiply regulations as a way of creating opportunities for bribes. The same is true for the empirical relationship on which this chapter focuses: just as the existence of corruption may cause a less-than-optimal composition of government expenditure, so it may be that high government spending on items where monitoring is difficult creates opportunities for corruption. The empirical section of this chapter has made some attempts to identify the correct direction of the causal links. But the issue of causality has not been—and may never be—fully resolved, since causality may well operate in both directions.

In general, the direction of causality has important implications for policy prescriptions, but in some cases policy conclusions are not entirely dependent on it. In the specific case of the composition of government spending, its observed correlation with corruption may constitute grounds for considering whether governments should be encouraged to allocate a larger proportion of their spending to those items that are less susceptible to corruption, subject to the following qualifications.

If a less-than-optimal composition of government spending causes corruption in the sense of creating opportunities for it, then encouraging governments to improve the composition of their spending might be an effective way of reducing corruption. If, on the other hand, it is corruption that causes a less-than-optimal composition of government expenditure,[11] then corrupt governments will attempt to circumvent any effort to encourage them to spend proportionately more on activities that are less susceptible to corruption. In fact, corrupt governments could thwart such pressure by substituting publicly unproductive but privately lucrative projects for publicly productive but privately unlucrative ones *within* a given expenditure category and still be able to show, for example, that their share of spending on education has risen. In such a case, would encouraging governments to improve the composition of their spending be an effective way of curbing corruption? The answer hinges on whether, as a practical matter, it is possible to specify the composition of government expenditure in a way that makes it difficult for corrupt officials to find scope for raising bribes while still appearing to adopt a more desirable composition of government spending.

Therefore, even if a priori considerations and the tentative evidence presented above suggest that any correlation between corruption and the composition of government spending reflects at least in part causality running from the former to the latter, encouraging governments to improve the composition of their spending may still be an effective way

11. The estimates in table 6 provide tentative evidence that the observed correlation between corruption and government expenditure composition may be due at least in part to this mechanism.

of curbing corruption. However, it is so only to the extent that the composition of spending may be specified so as to make substitution *within* its categories difficult.

Concluding Remarks

This chapter has analyzed a number of the causes and consequences of corruption. It has reviewed and synthesized recent studies that have estimated some of these links empirically, but others remain on the agenda for future research. In addition, the chapter has presented further evidence (which must, however, be interpreted with caution, given the data limitations mentioned) that corruption may have considerable adverse effects on economic growth, largely by reducing private investment, but perhaps also through a variety of other channels, which may include a worsening in the composition of public expenditure. Specifically, this chapter has presented new, tentative evidence of a negative and significant relationship between corruption and government expenditure on education. This evidence is reason for concern, since previous literature has shown that educational attainment is an important determinant of economic growth. A possible interpretation of the observed correlation between corruption and the composition of government expenditure is that corrupt governments find it easier to collect bribes on some expenditure items than on others. Although one policy implication might be that governments should be encouraged to shift the composition of their expenditure, an important issue is whether, as a practical matter, the desired composition can be specified in a way that corrupt officials could not circumvent by substituting publicly unproductive but privately lucrative projects *within* the various expenditure categories.

Appendix: A Generalization of the Barro Model as a Benchmark

This appendix develops a simple generalization of the Barro (1990) model, which may constitute a useful benchmark to analyze the relationship between corruption and the composition of government expenditure. It shows that if corruption acted simply as a proportional tax on income, the ratio of each component of government expenditure to GDP would be the same, no matter how corrupt or unstable the government.

Following Barro (1990), taxes are assumed to be levied as a proportion of income. The production function is assumed to be of the form:

$$y = A\, k^{(1-\alpha)} \prod_{i=1}^{N} g_i^{\alpha_i}, \quad \sum_{i=1}^{N} \alpha_i = \alpha, \quad 0 < \alpha < 1 \tag{1}$$

where y is income per worker, A is a technological parameter, k is private capital per worker, and g_i is the flow of public services from government expenditure of type i, per worker. This is the simple extension to N types of government expenditure of the production function in Devarajan, Swaroop, and Zou (1993).

Defining ϕ_i so that:

$$g_i = \phi_i g, \quad \sum_{i=1}^{N} \phi_i = 1 \tag{2}$$

where g is the total flow of public services from productive government expenditure per worker, the production function in equation (1) reduces to the Barro (1990) production function if $N = 1$.

Barro (1990) examines two extreme cases. In the first, a benevolent government maximizes the lifetime utility of the representative consumer, subject to the constraint that $\tau = g/y$; solving for the optimal τ yields $\tau^* = (g/y)^* = \alpha$. In the second, a self-interested government (of infinite duration in office) obtains consumption equal to $C_g = [\tau - (g/y)]y$; that is, corrupt bureaucrats get to consume the "budget surplus" (τ represents the sum of a proportional tax rate and a proportional bribe rate). The self-interested government maximizes the present value of the future flow of utility derived from C_g, subject to $\tau \geq g/y$.

To analyze the role of institutions in determining the composition of public expenditure, it is interesting to analyze the problem of a government that maximizes a weighted average of the lifetime utility of the representative consumer and of the lifetime utility derived from consumption by its self-interested members. The maximization program may be expressed as, choose τ and (g/y), subject to $\tau \geq g/y$, so as to maximize, $(1-\gamma)\,U + \gamma\, U_g$, with $0 \leq \gamma \leq 1$, and where U is the lifetime utility of the representative consumer and U_g is the lifetime utility of the self-interested government official.

Following Barro (1990), the lifetime utility of the citizen can be assumed to be:

$$U = \int_0^{\infty} e^{-\rho t} \left(\frac{c^{1-\sigma} - 1}{1 - \sigma} \right) dt \tag{3}$$

where ρ is the rate of time preference and σ is the inverse of the intertemporal elasticity of substitution. Similarly, the lifetime utility of the self-interested government official can be assumed to be:

$$U_g = \int_0^{\infty} e^{-\theta t} \left(\frac{c_g^{1-\sigma} - 1}{1 - \sigma} \right) dt \tag{4}$$

where θ is the sum of the government official's rate of time preference and of his probability of death (a metaphor for government collapse, for analytical simplicity).

Barro (1990) analyzes special cases (i and ii) of the above maximization program, where $\gamma = 0$ and $\gamma = 1$, respectively. The weight given to the lifetime utility of the self-interested government officials, γ, may be taken to represent the degree to which the country is corrupt.

It can be shown that the more corrupt (higher γ) and the more unstable (higher θ) the government, the higher is τ, and therefore the lower are private investment and economic growth. This result is consistent with the observation in this chapter that corruption reduces private investment and growth.

On the other hand, in this model it can also be shown that the optimal share of government infrastructure services is independent of corruption and political stability; that is, $(g/y)^* = \alpha$, regardless of the weights assigned to the two classes of people and regardless of the discount rate. A proof of this proposition can be obtained by simply taking derivatives of $(1 - \gamma)\, U + \gamma\, U_g$ with respect to τ and g/y. A few pages of algebra (not reproduced here) yield the result.

The following condition relating to the composition of productive government expenditure maximizes the lifetime utility of both the representative consumer and the self-interested bureaucrat:

$$\frac{\phi_j}{\phi_k} = \frac{\alpha_i}{\alpha_k}, \quad \forall j, k \tag{5}$$

As a consequence, any government would choose the composition of expenditure implied by equation (5), regardless of the degree of corruption and political instability. Therefore, under the assumptions of the Barro (1990) model, and most notably the assumption that corruption acts as a proportional tax on income, the ratio of each component of government expenditure to GDP would be the same, no matter how corrupt or unstable the government.

References

Ades, Alberto, and Rafael Di Tella. 1994. *Competition and Corruption*. Institute of Economics and Statistics Discussion Papers 169. Oxford, UK: University of Oxford.

Ades, Alberto, and Rafael Di Tella. 1995. "National Champions and Corruption: Some Unpleasant Competitiveness Arithmetic." University of Oxford. Photocopy.

Barro, Robert. 1990. "Government Spending in a Simple Model of Endogenous Growth." *Journal of Political Economy* 98, no. 5, part 2 (October): S103-25.

Barro, Robert. 1991. "Economic Growth in a Cross-Section of Countries." *Quarterly Journal of Economics* 106, no. 2: 407-43.

Barro, Robert. 1992. "Human Capital and Economic Growth." In *Policies for Long-Run Economic Growth*. Federal Reserve Bank of Kansas City.

Bhagwati, Jagdish. 1982. "Directly Unproductive, Profit-Seeking (DUP) Activities." *Journal of Political Economy* 90, no. 5 (October): 988-1002.

Clements, Benedict, Réjane Hugounenq, and Gerd Schwartz. 1995. *Government Subsidies:*

Concepts, International Trends and Reform Options. IMF Working Papers 95/91. Washington: International Monetary Fund.
Devarajan, Shantayanan, Vinaya Swaroop, and Heng-fu Zou. 1993. *What Do Governments Buy? The Composition of Public Spending and Economic Performance*. PRE Working Papers 1082. Washington: World Bank.
Easterly, William. 1990. "Endogenous Growth in Developing Countries with Government-Induced Distortions." In Vittorio Corbo, Stanley Fischer, and Steve Webb, *Policies to Restore Growth*. Washington: World Bank.
Easterly, William, and Sergio Rebelo. 1993. "Fiscal Policy and Economic Growth: An Empirical Investigation." *Journal of Monetary Economics* 32, no. 2 (November): 417-58.
Haque, Nadeem Ul, and Ratna Sahay. 1996. *Do Government Wage Cuts Close Budget Deficits?* IMF Working Papers 96/19. Washington: International Monetary Fund.
Hines, James. 1995. *Forbidden Payment: Foreign Bribery and American Business*. NBER Working Papers 5266. Cambridge, MA: National Bureau of Economic Research.
International Monetary Fund (IMF). 1995. "Official Financing for Developing Countries." *World Economic and Financial Surveys*. Washington, December.
International Monetary Fund (IMF), Fiscal Affairs Department. 1995. *Unproductive Public Expenditures: A Pragmatic Approach to Policy Analysis*. Pamphlet Series 48. Washington: International Monetary Fund.
Keefer, Philip, and Stephen Knack. 1995. "Institutions and Economic Performance: Cross-Country Tests Using Alternative Institutional Measures." *Economics and Politics* 7, no. 3 (November): 207-27.
Kraay, Aart, and Caroline Van Rijckeghem. 1995. *Employment and Wages in the Public Sector—A Cross-Country Study*. IMF Working Papers 95/70. Washington: International Monetary Fund.
Krueger, Anne. 1974. "The Political Economy of the Rent-Seeking Society." *American Economic Review* 64, no. 3 (June): 291-303.
Levine, Ross, and David Renelt. 1992. "A Sensitivity Analysis of Cross-Country Growth Regressions." *American Economic Review* 82, no. 4 (September): 942-63.
Loayza, Norman. 1996. "The Economics of the Informal Sector: A Simple Model and Some Empirical Evidence from Latin America." World Bank. Photocopy.
Mauro, Paolo. 1993. Essays on Country Risk, Asset Markets and Growth. Ph.D. dissertation, Harvard University.
Mauro, Paolo. 1995. "Corruption and Growth." *Quarterly Journal of Economics* 110, no. 3 (August): 681-712.
Murphy, Kevin, Andrei Shleifer, and Robert Vishny. 1991. "Allocation of Talent: Implications for Growth." *Quarterly Journal of Economics* 106, no. 2 (May): 503-30.
Rauch, James. 1995. "Bureaucracy, Infrastructure and Economic Growth: Evidence from U.S. Cities during the Progressive Era." *American Economic Review* 85, no. 4 (September): 968-79.
Rose-Ackerman, Susan. 1978. *Corruption: A Study in Political Economy*. New York: Academic Press.
Sachs, Jeffrey, and Andrew Warner. 1995. *Natural Resource Abundance and Economic Growth*. NBER Working Papers 5398. Cambridge, MA: National Bureau of Economic Research.
Shleifer, Andrei, and Robert Vishny. 1993. "Corruption." *Quarterly Journal of Economics* 109, no. 3 (August): 599-617.
Tanzi, Vito. 1994. *Corruption, Governmental Activities and Markets*. IMF Working Papers 94/99. Washington: International Monetary Fund.
Taylor, Charles L., and Michael C. Hudson. 1972. *World Handbook of Political and Social Indicators*. New Haven, CT: Yale University Press.
Tullock, Gordon. 1967. "The Welfare Costs of Tariffs, Monopolies and Theft." *Western Economic Journal* 5 (June): 224-32.
World Bank. 1983. *World Development Report 1983*. New York: Oxford University Press.