Corruption, Transport Infrastructure Stock and Economic Development

by

Cesar Queiroz and Alex Visser

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Cesar Queiroz Lead Highway Engineer Infrastructure Sector Unit Europe and Central Asia Region World Bank 1818 H Street, NW Washington, DC 20433 USA Tel: (202) 473-8053 Fax: (202) 477-3378 E-mail: cqueiroz@worldbank.org

Alex Visser SA Roads Board Professor of Transportation Engineering Department of Civil Engineering University of Pretoria Pretoria, 0002, South Africa Tel: +27-12-420 3168 Fax: +27-12-362 5218 E-mail: avisser@postino.up.ac.za

Abstract

Notwithstanding the difficulty in defining, identifying, and measuring corruption, a corruption perception index (CPI), or corruption score, is now available from Transparency International (TI) for 85 countries. The CPI relates to perceptions of the degree of corruption as seen by businesspeople, risk analysts and the general public; it ranges between 10 (highly clean) and 0 (highly corrupt). Data on paved road infrastructure are also available for a number of countries, as published by organizations such as the International Road Federation. Using the density of paved roads (km per population) as a proxy for a country's availability of transport infrastructure, comparison of the data across countries indicates that, in general, countries perceived to be less corrupt have higher amount of transport infrastructure. The data also show that corruption varies with income groups: the average corruption score is 2.1 in low-income economies, 4.1 in middle-income economies, and 7.7 in high-income economies. The empirical information presented can be used as one of the means to encourage governments and funding agencies to fight corruption.

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Introduction

This paper discusses the availability of data on corruption and infrastructure stock for a number of countries, and explores the association between these two variables, as measured by the "corruption perception index" and paved roads density (km per population). The latter is used in the paper as a *proxy* for the availability of transport infrastructure facilities in a country. The aim of the paper is to present the empirical evidence as a means to encourage governments and funding agencies to fight corruption. Although corruption permeates throughout a society and affects all types of infrastructure, the focus of this paper is on transport infrastructure.

Two distinct concepts are often used to describe infrastructure. The first is infrastructure as a stock of capital, for example, a physical facility such as a road or a power plant; and the second is infrastructure as a flow of services, for example, electric power, water supply, or port services (1). Infrastructure, as measured in this paper, is based on the first concept. As defined by Herman and Ausubel (2), infrastructure is the built environment in which we live.

While corruption is not easy to define, it can be generally viewed as the use of public office for illicit gain. The World Bank, in its 1997 World Development Report, defines corruption as "the abuse of public power for private gain."

Corruption and Governmental Activities

Corruption distorts the legitimate role of government and is costly to society. It may take in many shapes and forms. Corruption can be defined as the intentional noncompliance with the principle of "arm's-length relationship," which implies that personal or family relationships ought not to play a role in economic decisions by private economic agents or government officials (3). More simply, corruption can be viewed as the use of public office for illicit gain. Klitgaard (4) states that illicit behavior flourishes when agents have monopoly power over clients, when agents have great discretion, and when accountability of agents to the principal is weak. Accordingly, he proposes the following stylized equation:

Corruption = Monopoly + Discretion - Accountability

The term corruption comes from the Latin verb *rumpere*, to break. That which is broken might be a moral or social code of conduct or, more often, an administrative rule. This is usually the case of a government official who uses his or her position to give special privileges to private businesses in which he or she has a personal stake. Privatization programs in some countries have led to public perception of widespread corruption mostly in the form of misappropriation of public property, thus undermining support for governments and for reform (5). Such is the case where economic reforms, including privatization programs, are perceived to benefit a select group of well-connected entrepreneurs (6).

Delayed economic recovery in some of the transition economies, including Russia and Ukraine, has been attributed, *inter alia*, to excessive taxation, suffocating regulations, and omnipresent bribery, which are paralyzing business activity (7).

Table 1 provides helpful indicators for ascertaining whether collusion or kickbacks are taking place which have been successfully applied in the United States (4). Kickbacks refer to

payments by contractors or suppliers to agents of the purchaser of the goods. Collusion refers to agreement among possible suppliers or contractors before submitting their bids.

Incentives for corrupt behavior arise whenever public officials have wide discretion and little accountability. Tanzi (3) has provided examples of conditions or instruments that make corruption possible: (a) administration of government regulations (such as the issuance of licenses and permits, and zoning and other sorts of regulations that may have great economic value); (b) fines for alleged or actual violations of legal norms; (c) control over government procurement contracts; (d) control over public investment contractors that can favor some areas or contractors over others; (e) tax incentives, subsidized credits, and multiple foreign exchange rates; (f) controls over hiring and promotions; (g) controls over the assignment of entitlements and other benefits (disability pensions, scholarships, subsidies); (h) control over access to underpriced public services (such as electricity, telephone, and water); and (i) tax administration decisions (auditing, determination of presumptive income, customs exemptions, etc.).

The conditions or instruments mentioned above are present, to some extent, in all governments. However, the greater the use of these instruments by a country, the greater the potential for corruption. Control over these instruments enables government employees to exercise great power, which--given a tolerant social environment, personal incentive systems (e.g., family and clan responsibilities), and weak and uncertain penalties--may allow them to extract illicit financial advantages (rents) for themselves or for their families and friends.

Corruption diverts resources from the poor to the rich, increases the cost of running businesses, distorts public expenditures, deters foreign investors. Corruption is a major barrier to sound and equitable development. For this reason, international development organizations have been concerned with corruption in their client countries. As an example, the World Bank has vowed that it will not tolerate corruption in programs that it supports: "If we find evidence of corruption in projects in which we are involved, we will cancel the projects" (8).

International Corruption Ranking

Notwithstanding the difficulties in defining, identifying and measuring corruption, a corruption score, called the Corruption Perception Index (CPI), is now available for each of 85 countries. This scoring or ranking system, known as the International Corruption Ranking (ICR), is a joint initiative of Transparency International (a corruption-fighting nongovernmental organization) and Goettingen University (9). The observations are posted to the internet address of Transparency International, www.gwdg.de/~uwvw/CPI1998.html. The corruption ranking tries to asses the perceived degree to which public officials, businesses and politicians in particular countries are involved in corrupt practices:

- misusing public power for private benefit
- bribing public officials
- taking kickbacks in public procurement

As a result of the corruption ranking exercise, a corruption score is obtained for each country evaluated. A score of 10 signifies a country that is seen as highly clean; at the other

extreme, a score of zero would mean that in this country business transactions are highly dominated by kickbacks, extortion, bribery, and the like (9).

The corruption perception index for a country should be interpreted with care. In particular, the developers of the ranking state that the following caveats are appropriate in its interpretation:

• The index is an attempt to assess the degree to which corruption affects commercial and social life, as perceived by businesspeople, risk analysts and the general public. The perception of corruption does not necessarily reflect the real level of corruption.

• The ranking system only scores the observed behavior of public officials and politicians; however, exporting industries of certain countries may contribute to the development of corruption abroad. Industrial countries that succeed in keeping a clean profile at home may be bribing officials abroad, and thus bear a much higher burden of responsibility for corruption than the ranking indicates.

• The ranking includes only those countries that have been included in a minimum of three surveys; a total of up to 12 surveys were used. Sources used include World Competitiveness Report, Institute for Management Development, Lausanne; Political & Economic Risk Consultancy, Hong Kong; McGraw-Hill Global Risk Service, NY; Gottingen University Surveys, www.uni-gottingen.de/~uwvw/icr.htm. The 1998 ranking is the most comprehensive to date and assesses 85 countries.

• An objective approach to assessing corruption is almost impossible because corruption involves concealed actions and data that are not revealed publicly. Although objective data are created by justice systems, these facts reveal more about the quality and independence of the reporting media and the prosecuting judiciary. For example, an efficient and incorruptible justice system may produce high numbers of convictions. Rather than acknowledging this in the positive light it deserves, however, "objective" data "punish" such a country with a bad score.

A Proxy for the Availability of Transport Infrastructure

According to the World Development Report 1994 (10), developing countries invest about \$200 billion a year in new infrastructure--representing 4 percent of their national output and a fifth of their total investment. Some 38 percent of the infrastructure investments is on transportation projects.

The adequacy of infrastructure helps determine one country's success and another's failure--in diversifying production, expanding trade, coping with population growth, reducing poverty, or improving environmental conditions. Good infrastructure raises productivity and lowers production costs. Although the precise linkages between infrastructure and development are still open to debate, there is little doubt that growth of the economy is dependent on infrastructure capacity. It has been shown that a 1 percent increase in the stock of infrastructure is associated with a 1 percent increase in gross domestic product (GDP) across all countries (10).

Several indices can be used to measure the availability of general infrastructure, such as: telephone main lines per thousand persons, percentage of population with access to safe water, and kilometers of paved roads per million persons. Ingram and Fay (1) present measures of infrastructure stock that are available for several sectors. The World Development Report 1994 presents data on paved road density, electricity generating capacity, telephone main lines, railroad tracks and irrigated land area for up to 132 countries. These measures of infrastructure are presented in per capita terms to standardize them across countries. Using the available data, an investigation of the relationships among these variables was carried out. Several statistical models relating paved road and other measures of infrastructure were developed. The most significant equation obtained was:

$$\log PRD = 0.75 + 0.76 \log ELE + 0.22 \log RWY$$
(4.36) (8.94) (2.16)

where PRD is the per capita length of paved roads--or density (km/million population); ELE is electricity generating capacity per capita (thousands of kilowatts/million population); and RWY is railroad tracks per capita (km/million population). The adjusted R square value is 0.86, the number of degrees of freedom is 38, and the t-statistics are given in the parentheses. Here we will use kilometers of paved roads per population as a *proxy* for the availability of transport infrastructure, or more broadly, infrastructure in general in a country, an index that has been shown to be closely associated with economic development (11, 12).

Cross-Country Comparison

Governments typically invest a substantial part of their resources in the development of transport infrastructure. Thus, these investments represent relatively large opportunities for illicit diversion of public funds. It seems likely therefore that the more corruption there is in a country, the less effective would be the investments made on its infrastructure and, consequently, the lower would be the country's available stock of productive infrastructure.

To explore a possible association between corruption and infrastructure, we plotted in Figure 1 the scatter diagram for the 54 countries where data is available, showing the association between PRD, paved road density, expressed in km per million population, and the corruption perception index (CPI), or corruption score. The diagram indicates a positive association between PRD and CS. This trend is also apparent when paved road density and corruption score are plotted for individual countries. However, it is important to note that there are many other factors that bear on the provision of transport infrastructure, such as a country's degree of economic development and its size and geographic and topographic conditions.

The data examined also show that corruption varies with income groups: the average corruption score is 2.1 in low-income economies, 3.4 in lower-middle-income economies, 4.8 in upper-middle-income economies, and 7.7 in high-income economies. This is illustrated in Figure 2. Economies are divided according to 1994 GNP per capita, calculated using the World Bank Atlas method (5). The groups are: low income, GNP per capita of \$725 or less; lower-middle income, \$726 to \$2,895; upper-middle income, \$2,896 to \$8,955; and high income, \$8,956 or more.

Non-Infrastructure Issues

The previous section explored the association between corruption, transport infrastructure, and economic development. There are, however, many non infrastructure related problems associated with a country's high degree of corruption, including:

a. <u>Social</u>: corruption can divert public resources away from not only infrastructure but also other vital areas, such as social programs and education, where the potential for bribes is smaller. By illicitly benefiting the richer, corruption also contributes to increased inequality in income distribution;

b. <u>Political</u>: corruption weakens public confidence in government and therefore may tend to support extremist politicians who promise not only reduced corruption but substantially increased political control over society.

c. <u>Fiscal</u>: corruption can undercut governments' ability to collect public revenues, as business activities shift into the shadow economy to avoid government altogether. In the worst case, citizens and business people simply opt out of the legal, above-ground economy and rely on organized crime to provide protection from both a suspect state and others who seek to interfere with their operations (*13*);

d. <u>Economic</u>: corruption can undermine the optimum allocation of resources within an economy. One common pattern is that a country's rulers or top officials contract with multinationals for excessively expensive and inappropriate investment projects ("white elephants") as a way of creating bribe opportunities (14, 15). Furthermore, bribes paid to top officials are frequently deposited outside the country, rather than reinvested within the country (16).

e. <u>Rapid Growth in Development Funds</u>: often the administrative infrastructure does not keep pace with the growth in development funds, with the result that the fiscal and other controls no longer operate effectively, which creates unwanted opportunities for corruption.

Next we will review several measures that can be used to reduce corruption.

Reducing Corruption

Evidence from a number of countries shows that corruption thrives when both public officials and private agents have much to gain and little to lose. Moreover, uncertain rules, heavy regulation, and pervasive controls give officials exceptional power, opportunities to seek bribes, and wide scope for appropriating public wealth. The low official pay of public servants which prevails in many countries provides a strong incentive to supplement salaries through corrupt practices. In some countries, opportunities for gain through corruption represents the main incentive to remain in public service (9). It has been estimated that in some countries corruption leads to a 20 percent loss of funds for infrastructure development. If an average 3 percent loss is accepted as an indicative value for developing countries, this translates into a 6 billion annual loss for infrastructure in general, or some 2.2 billion annually for transport-associated infrastructure.

Several measures are available to governments which seek to reduce corruption, such as:

a. <u>Reduce the Opportunities</u>. Governments can minimize the opportunities for individuals to engage in corruption by reducing the role of the state in the economy (3). Rapid and transparent privatization, liberalization, and demonopolization of the economy can do much to reduce the scope for corruption and restructure incentives (9). Often programs that generate payoffs can be eliminated or reduced: some trade restrictions, regulatory constraints, string of permissions required of businesses, purchase specifications. For example, the opportunities for corruption are reduced when the government purchases standardized products at market prices instead of writing its own specifications (16);

b. <u>Establish a Dependable Legal System</u>. The stability of a system operating under a wellestablished legal system can reduce corruption by reducing the discretion of officials. The possibility of detection and prescription of punishment limit the willingness of the unscrupulous to accept and pay bribes. An honest judiciary that is independent of the executive and political branches can reduce corruption through credible legal sanctions. A key factor is outside checks on the actions of public officials, such as an independent judiciary, a free press, and a dense network of nongovernmental organizations (*16*);

c. <u>Increase Salaries</u>. Higher salaries for public officials reduce the attraction of bribes. While it may not be feasible for a country to increase salaries of an overstaffed public service, arguably it would make sense to increase the salaries following reform of the public service;

d. <u>Punish Corruption</u>. Public education campaigns and serious attempts to publicize and punish high-level corruption can send a message that the rules of the game are changing (9);

e. <u>Use Standard Bidding Documents</u>. Multilateral development institutions such as the Asian Development Bank, the Inter-American Development Bank, and the World Bank have issued sample or standard bidding documents for the procurement of goods and works. Countries have been urged to use these forms and procedures when buying things with money loaned by these banks. One purpose was to reduce the possibilities for kickbacks, collusion, and other corrupt schemes. The use of sealed competitive bids elicit competition among the suppliers and, along with other rules, delimit the discretion of the purchaser's agents, thereby reducing the opportunities for kickbacks (4).

f. <u>No Bribery Pledges</u>. The objective of a "no bribery pledge" is to discourage bribes, by committing firms to bid on a bribe-free basis. A "no bribery pledge" may reduce the cost of bidding, increase competition and lower prices (17). The most basic form of the no bribery pledge is a letter from the chief executive of each bidding company promising that the firm will not bribe to obtain the contract or during contract implementation.

g. <u>Watchdog Institutions</u>. Anticorruption watchdog bodies, such as the Independent Commission Against Corruption in Hong Kong (China) and smaller corruption-fighting institutions in Botswana, Chile, Malaysia and Singapore, are often credited with progress in fighting corruption in these countries. However, it is believed that the broader economic and institutional reforms that have taken place simultaneously have been essential for these countries' success in fighting corruption.

The newest frontier in the fight against corruption is to survey the parties to corruption directly and simultaneously--including household members, enterprise managers and public officials--and ask them about the costs and private returns of paying bribes to obtain public services, special privileges and government jobs (18). Recent surveys carried out in several countries in collaboration with the World Bank show that respondents are willing to discuss agency-specific corruption with remarkable candor. These surveys have indicated that there are different institutional causes of corruption, thus suggesting specific priorities for reform.

What about the "grease" and "speed money" arguments? Empirical evidence refutes these arguments. Responses from more than 3,000 firms in 58 countries surveyed in the World Economic Forum's Global Competitiveness Survey for 1997 indicate that enterprises reporting a greater incidence of bribery also tend to spend a greater share of management time with bureaucrats and public officials negotiating licenses, permits, signatures and taxes (19). Bribery gives officials an incentive to create red tape. Bribes are also pernicious when they override regulations needed by society, such as building codes, environmental controls and prudential banking regulations.

Is Fighting Corruption Worth the Bother?

Skeptics point out the dearth of successes in anticorruption drives and the fact that it took England more than a century to bring corruption under control (19). But Hong Kong (China) and Singapore, for example, have shifted reasonably quickly from being very corrupt to being relatively clean. The Economist (20) gives three reasons for being hopeful in the fight against corruption:

- a. To the extent that corruption is the abuse of public office for private gain, its perpetrators have one foot in the legitimate world; they are thus within reach of incentives or threats--such as removal from office--that may persuade them to change their ways.
- b. There is a dawning realization that, since corruption usually creates inefficiency, corrupt countries tend to lose out in the global competition for capital and aid; bankers and businessmen bruised by collapsing economies now demand more than a minister's blessing before they risk their money.

c. Corruption is now an issue that brings the crowds out on to the streets. In the 1990s, governments in Italy, Brazil, Pakistan, Indonesia and Zaire have fallen partly because the people they governed would no longer tolerate the corruption of politicians.

Conclusion

A cross-country comparison of data on corruption and transport infrastructure stock suggests that a country's per capita availability of infrastructure is positively associated with decreased corruption. The measures used in the comparison are the density of paved roads, measured in km per population, and the "corruption perception index" of a country, measured on a scale of 0 (highly corrupt) to 10 (highly clean).

The data examined also show that corruption varies with income groups: the average corruption score is 2.1 in low-income economies, 3.4 in lower-middle-income economies, 4.8 in upper-middle-income economies, and 7.7 in high-income economies. The empirical information presented can be used as one of the means to encourage governments to fight corruption using the guidelines presented. Substantially reducing corruption could make an additional estimated \$2.2 billion annually for investing in transport infrastructure in developing countries.

References

1. Ingram, Gregory K., and Marianne Fay. 1994. "Valuing Infrastructure Stocks and Gains from Improved Performance." Background Paper for 1994 World Development Report, World Bank, Washington, D.C.

2. Herman, Robert and Jesse H. Ausubel. 1988. "Cities and Infrastructure: Synthesis and Perspectives." In Jesse Ausubel and Robert Herman, ed., Cities and Their Vital Systems. Infrastructure: Past, Present and Future. Washington, D.C.: National Academy Press.

3. Tanzi,Vito. 1995. "Corruption, Governmental Activities, and Markets". Finance & Development. International Monetary Fund and The World Bank, Washington, D.C. Volume 32, Number 4 (December).

4. Klitgaard, Robert E. 1988. "Controlling Corruption." Berkeley: University of California Press.

5. World Bank. 1996. "World Development Report 1996: From Plan to Market." New York: Oxford University Press.

6. Escobar, Gabriel. 1997. "Argentina Examines Seamy Side of Progress." The Washington Post, 120th Year, No. 129, April 13. Washington, D.C.

7. Kaufmann, Daniel 1997. "Why is Ukraine's Economy-and Russia's-Not Growing?" Transition, The Newsletter About Reforming Economies. Macroeconomics and Growth Division, Policy Research Department, World Bank, Washington D.C. Volume 8, Number 2 (April).

8. Wolfensohn, James D. 1996. "The Cancer of Corruption." Transition, The Newsletter About Reforming Economies. Macroeconomics and Growth Division, Policy Research Department, World Bank, Washington D.C. Volume 7, Number 9-10 (September-October).

9. World Bank. 1996. "Corruption-An International Comparison." Transition, The Newsletter About Reforming Economies. Macroeconomics and Growth Division, Policy Research Department, World Bank, Washington D.C. Volume 7, Number 7-8 (July-August).

10. World Bank. 1994. "World Development Report 1994: Infrastructure For Development." New York: Oxford University Press.

11. Queiroz, Cesar and Surhid Gautam. 1992. "Road Infrastructure and Economic Development: Some Diagnostic Indicators." Policy Research Working Paper WPS 921, World Bank, Washington, D.C.

12. Queiroz, Cesar, Ralph Haas and Yinyin Cai. 1994. "National Economic Development and Prosperity Related to Paved Road Infrastructure." Transportation Research Record No. 1455, Pavement Management Systems, Transportation Research Board, Washington, D.C.: 147-152.

13. Rose-Ackerman, Susan. 1994. "Reducing Bribery in the Public Sector." In Duc V. Trang, ed., Corruption and Democracy: Political Institutions, Processes, and Corruption in Transition States in East-Central Europe and in the Former Soviet Union. Budapest: Institute for Constitutional and Legislative Policy.

14. Diamond, Larry. 1993. "Nigeria's Perennial Struggle Against Corruption: Prospects for the Third Republic." *Corruption and Reform* 7: 215-25.

15. Good, Kenneth. 1994. "Corruption and Mismanagement in Botswana: A Best-Case Example?" *Journal of Modern African Studies* 32: 499-521.

16. Rose-Ackerman, Susan. 1995. "Corruption." In Michael Bruno and Boris Pleskovic, ed., Annual Bank Conference on Development Economics, Roundtable Discussion on Second-Generation Issues in Transition. World Bank, Washington, D.C.

17. World Bank. 1997. "Helping Countries Combat Corruption: The Role of the World Bank." Poverty Reduction and Economic Management. The World Bank, Washington, D.C.

18. World Bank. 1998. "New Frontiers in Diagnosing and Combating Corruption." Poverty Reduction and Economic Management, Note Number 7, October. The World Bank, Washington, D.C.

19. World Bank. 1998. "Corruption and Development." Poverty Reduction and Economic Management, Note Number 4, May. The World Bank, Washington, D.C.

20. The Economist. 1999. "Honest Trade: A Global War Against Bribery." January 16, pp 22-24.

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- A. Indicators of Possible Collusion
 - 1. Identical bid prices for contract
 - 2. Evidence same person prepared all bids (e.g., same handwriting or typeface)
 - 3. Patterns in bids over many contracts
 - a. Same vendor gets a particular kind of contract
 - b. Regional or agency pattern to bids
 - c. Pattern of rotation among winning vendors
 - 4. Information that prices charged are greater than competitive prices
 - a. Prices for same or similar contracts elsewhere
 - b. Market information
 - c. Informers among contractors
 - d. Internal or third-party estimates of costs
- B. Indicators of Opportunities for Kickbacks
 - 1. Large contract
 - 2. Few bidders on contract
 - 3. Discretion in awarding a contract
 - a. Agency may award contract to other than low bidder
 - b. Agent has discretion to avoid competitive bidding in a contract
 - c. Agent can negotiate with bidders
 - 4. Discretion after contract awarded
 - a. Agent can issue "change orders"
 - b. Agent can award additional work to contractor without bids

- C. Indicators of Possible Occurrences of Kickbacks
 - 1. Large contract
 - 2. Few bidders
 - 3. Specifications of contract
 - a. None or vague when bidding opened
 - b. Bidder helped set specifications
 - c. Particular brand of equipment mandated
 - d. "Emergency" contract
 - 4. Awarding of contract
 - a. Not to low bidder
 - b. Contract awarded without bidding
 - c. Modification of bid after submission
 - d. Contract put to bid for second time
 - 5. After contract awarded
 - a. Cancellation of award
 - b. Unexplained delay in executing contract
 - c. Many change orders
 - d. Further work on contract without bids
 - e. Lots of overtime on project
 - 6. Character of agent and contractor
 - a. Presence of small-scale corruption in area
 - b. Presence of "suspicious individuals" in system
 - c. Vendor has made questionable payment in the past

Source: Klitgaard (1988).





