

Construction, Corruption, and Developing Countries

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Abstract

The construction industry accounts for about one-third of gross capital formation. Governments have major roles as clients, regulators and owners of construction companies. The industry is consistently ranked as one of the most corrupt: large payments to gain or alter contracts and circumvent regulations are common. The impact of corruption goes beyond bribe payments to poor quality construction of infrastructure with low economic returns alongside low funding for maintenance –and this is where the major impact of corruption is felt. Regulation of the sector is necessary, but simplicity, transparency, enforcement and a focus on the outcomes of poor construction are likely to have a larger impact than voluminous but poorly enforced regulation of the construction process. Where government is the client, attempts to counter corruption need to begin at the level of planning and budgeting. Output based and community-driven approaches show some promise as tools to reduce corruption. At the same time they will need to be complimented by a range of other interventions including publication of procurement documents, independent and community oversight, physical audit and public-private anticorruption partnerships.

World Bank Policy Research Working Paper 4271, June 2007

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Introduction

Construction is a \$1.7 trillion industry worldwide, amounting to between 5 and 7 percent of GDP in most countries. It accounts for a significant part of global gross capital formation –a little under one-third.² The sector's role in economic development is undeniable –housing, roads, utility networks, schools and clinics are all built assets.

Because of construction's central role in development, corruption in the sector can be especially harmful. In particular, corruption that leads to poor quality construction or which supports an environment of poor project selection and insufficient maintenance can significantly reduce the economic return to investments, and carry high human costs in terms of injury and death. And while there is an undoubted role for the government in the sector both as customer and regulator, there is also a serious concern with the capacity of many governments to adequately fulfill these roles. This paper discusses what we know about the nature and extent of corruption in the construction industry and some approaches to governance and project design which may help to limit the development impact of that corruption.

The Global Construction Industry

Construction involves large, complex, non-standard activities in which quality can be very hard to assess. Projects can involve a multitude of players –the client, consultant engineers and architects, financiers, insurers, a main contractor and scores of subcontractors (see Figure 1). Large construction projects frequently attract international contractors, although much of the work is subcontracted to local firms.

The international construction industry is dominated by comparatively few very large firms, with Bechtel, Skanska AB and Taisei Corporation, all active in developing markets, having combined annual revenues of over \$50 billion, for example (Datamonitor, 2006). In turn, within most developing countries, the domestic construction industry is made up of a few larger firms, often state-owned, and a large number of small firms. In Vietnam, the 900 state-owned construction firms account for 60 percent of sector turnover, with nearly 7,000 private firms accounting for the rest of the market. About half of all construction enterprises employ fewer than fifty workers, with a considerable percentage of the labor force informal (Copplestone, 2006).

The sector is closely intertwined with government. A considerable portion of public investment goes to construction –not least, governments remain the dominant provider of infrastructure services worldwide, accounting for 78 percent of investment 1984-2003 (Estache, 2006). Government investment in road transport alone can account for between 2 to as high as 3.5 percent of GDP.³ Governments frequently own construction firms –as in Vietnam-- or have construction departments. Governments also have a significant role

² WDI report Gross Capital Formation globally at 21 percent of GDP. Construction share in GDP is from UNSTATS.

³ <http://www.worldbank.org/transport/whysimp.htm>.

in regulating the industry –overseeing the quality and safety of the construction process and outputs.

The Extent and Diverse Nature of Corruption in Construction

Because the industry involves complex, non-standard production processes that foster asymmetric information stocks between clients and providers, and because of its many close ties to government, it is perhaps unsurprising that construction is frequently held up as one of the most corrupt industries worldwide. Cases of corruption uncovered in construction are legion. The Deputy Mayor of Beijing in charge of urban development and Olympic projects was removed from his post in 2006 along with nine vice-mayors because of allegations of corruption related to construction. In the same year an audit of 21 Chinese highway construction projects with a combined value of over \$605 million found that as much as a third of that amount had been misappropriated by officials.⁴ Corruption has been uncovered in World Bank-supported projects in road construction in Vietnam and Indonesia, as well as a large dam project in Lesotho. On the regulatory side, in the Philippines, 57 percent of new construction is illegal and in Egypt the figure might reach 90 percent (World Bank, 2006).

Looking at business perceptions, Transparency International's 15 country poll ranked construction as the most corrupt industry (Figure 2).⁵ Similarly, a Control Risks survey of international companies which asked if they had lost a bid in the past year because a competitor paid a bribe found that public works/construction firms were most likely to suggest this had occurred (Figure 3).

Survey evidence of local and international firms at the country level suggest once more that construction is an industry particularly prone to corruption –both related to government contracting and to circumvent regulation. The Business Environment and Enterprise Performance Survey (BEEPS) covers over 4,000 firms in 22 transition countries and was conducted for the first time in 1999-2000.⁶ In 1999, the median firm in BEEPS reported spending one to two percent of its revenues on unofficial payments to public officials.⁷ At the aggregate level, across the region, the average firm suggested that it spent 28 percent of this sum to deal with licenses, health and fire inspections and 15 percent on securing government contracts.⁸ Figures were broadly similar for construction, but there were a number of notable differences (see Tables 1 and 2).

Construction firms represented in BEEPS have significantly larger 'bribe budgets' than the average firm, and they bribe more often. Of their total bribe budget a larger percentage goes to gain government contracts –an average of 23 percent for construction compared to 15 percent for all firms in the sample (see Figure 4 for data on percentage of

⁴ *International Construction* July-August 2006 p. 6.

⁵ http://www.transparency.org/policy_research/surveys_indices/global/bpi.

⁶ <http://info.worldbank.org/governance/beeps/>.

⁷ This amongst firms which reported a percentage and did not answer "don't know."

⁸ These are unweighted country average responses.

firm revenues which go to bribes for various activities). This reflects both that construction firms rely on governments for a considerable part of their business, but also that they tend to make larger payments (as a percentage of contract values) when they bribe. Construction firms in Eastern Europe believe that a typical payoff made for securing a government contract in their industry is around seven percent of the contract value.

Construction firms in BEEPS also report themselves more likely to make payments for licenses and permits (although this does not take up an abnormally large share of their bribe budgets). Similarly, Figure 5, based on data from global enterprise surveys, suggests that across a range of countries, construction permitting appears to be a regulatory area particularly prone to corruption –in most countries the process is notably more corrupt than the process to obtain an operating license or the process of labor inspections, for example.

A significant part of corruption in corruption was not captured by BEEPS, which did not report on government or SOE employee theft as a form of corruption. We have evidence from Indonesia that, where government officials are responsible for the construction of infrastructure, such theft can be significant. A physical audit of a community-driven development program that focused on road construction in Indonesia found that an estimated 24 percent of expenditures were ‘lost’ in materials theft, probably orchestrated by village heads who oversaw projects (Olken, 2004).

Survey evidence suggests the diversity of types of corruption present in the sector –from bribes designed to manipulate budgeting decisions, project selection, tender specifications, procurement outcomes or contract negotiations and renegotiations, through bribes designed to cover poor quality construction practices and outcomes, to the theft of materials. The evidence suggests that corruption may be a significant part of a system of decision-making that leads to poor construction, limited occupational safety and low returns to government infrastructure investment.

Variation in Measures of Corruption at the Country and Sector Level

It is worth noting three additional features about the survey data on the extent of corruption in construction. First, there is little significant correlation between cross-industry general estimates of corruption and estimates of corruption given by the subset of construction industries at the national level (Kenny, 2006). Second, it appears that there is considerable variation within countries as to the comparative level of corruption in different parts of construction-related regulation. Figure 5 suggests that businesses in India and Cameroon, for example, are prone to significant corruption in all three areas of obtaining licenses, construction permits and labor inspections. On the other hand, Benin and Lebanon both see significantly more corruption in construction permitting than in labor inspection.

A third feature of survey results worth noting is that there is a significant variation even within a sector in a given country in the level of corruption occurring in a particular process. Looking at the BEEPS question “when firms in your industry do business with the government, how much of the contract value would they typically offer in additional or unofficial payments to secure the contract?” only around fourteen percent of the variation in answers amongst construction firms can be explained by the country of respondent (Kenny, 2006).

This evidence suggests that general country-level corruption indicators may be poor tools to uncover particularly corrupt construction industries, but also that corruption within the industry may differ markedly by sub-sector or by location within a country. In turn this suggests some danger in assuming a single intervention or model will have a similar or significant impact on corruption in construction across different countries, and the need for a range of targeted and flexible responses at the country and sector level.

Differentiating the Extent and Impact of Corruption

Where we have good unit costs for the price of construction, it appears that they are sometimes correlated (if weakly) with available general corruption measures. Figure 6 shows CPI scores and GDP per capita for a number of countries ranked by their costs per square meter of classroom construction –there is no clear pattern of countries that are perceived to be more corrupt having higher unit costs of construction.⁹ A slightly more revealing picture is suggested by Figure 7, which displays average costs per meter squared for reconstruction of a two-lane road between 6-8 meters wide with a bituminous surface, for countries where we have four or more estimates based on individual project data.¹⁰ The average cost across the 28 countries for which we have data was around \$33.2 per square meter. For those countries with below average costs, PPP GDP per capita was \$6,282, compared to \$3,318 in those countries with above average cost. For those countries with below average costs, the CPI averaged 3.6, compared to 2.4 in countries with above average costs. A regression analysis suggests that lower corruption is significantly associated with lower costs in this sample, a result weakly robust to the inclusion of GDP.¹¹

⁹ Data on classroom construction costs from Theunynck, 2006.

¹⁰ Data from the ROCKs database http://www.worldbank.org/transport/roads/rd_tools/rocks_main.htm.

¹¹ The results suggest that an increase in the CPI (reflecting reduced corruption) from Pakistan’s score to Ghana’s would be associated with a drop in Pakistan’s road construction prices of around 20 percent. The equation is $\text{Cost} = 51.9 - 5.9 * (\text{CPI})$, with the constant and CPI entering at one percent, $R=0.23$, $N=28$. Including GDP per capita reduces the coefficient on CPI to 4.5 and the significance to ten percent (GDP per capita does not enter significantly). It should be noted that road construction costs vary considerably due to within-country factors including terrain and distance to suppliers. Within this sample, the average of standard deviations of costs within countries –at \$14.6—is only slightly smaller than the standard deviation of average costs across countries –at \$15.6—and for countries with more estimates, within-country cost variation rises. Given we cannot account for such within-country factors with this analysis, this result needs to be treated with some caution.

But the above survey evidence suggests that measures of the extent of payments or even measures of the cost inflation caused by corruption may be a poor proxy for the development impact of corruption in construction. For example, the Dabhol power project in India involved an "utter failure of governance" including bribery, according to a recent investigative committee report.¹² Enron, the key contractor, spent \$20 million in 'education and project development process' expenses for the project, widely assumed to have included significant side payments (Bosshard, 2005). But the economic cost of the governance failure (given that the plant has been mothballed because its output is uncompetitively expensive) is clearly considerably larger than the financial value of \$20 million –annual costs to the state were estimated at \$1.3 billion (Gulati and Rao, 2006). On the other hand, six million dollars in proven corrupt payments which have led to convictions in the case of the Lesotho Highlands dam project do not appear to have significantly reduced the economic impact of the project itself.¹³

Looking at regulation, we have seen that corruption for permitting is widespread. In 1999, more than half of all buildings in Turkey failed to comply with construction regulations, even though 98 percent of the country's population lives in earthquake-prone zones.¹⁴ One result of this evasion was a considerable number of avoidable fatalities in the 1999 earthquake –11,000 people died. Regarding bribes to circumvent health and safety standards, construction accounts for around 17 percent of fatal accidents at work worldwide –around 60,000 deaths a year.¹⁵ Once more, the size of bribe payments made to avoid compliance ill-captures this toll of corruption.

Corruption can have a particularly invasive effect if it skews incentives such that the impact of corrupt payments is felt far beyond the project itself. It appears likely that corruption is one factor behind the pressure to overspend on new construction rather than maintenance of existing infrastructure stocks for example (Kenny, 2006).¹⁶ This is despite the fact that maintenance is key to preserving the economic value of infrastructure. One year of driving a truck and trailer over potholed roads rather than well-maintained ones incurs an additional \$14,331 in operating costs. Despite these high

¹² <http://www.thecornerhouse.org.uk/item.shtml?x=51993>.

¹³ Total (Part 1a) project costs were estimated at launch to be in the region of \$2.5 billion, the bribes uncovered amounted to \$6 million. Despite the corruption, the project was competently constructed and was a significant economic boon to Lesotho. South Africa bears the full cost and associated debt of the water transfer (estimated to be \$1 billion less than any other method of supplying the water). At the same time, in 1998 the project accounted for 14 percent of GDP, 35 percent of value-added in construction, and 28 percent of government revenues in Lesotho. This is not to suggest it was an outright success – as of 2002 poor people in Lesotho had seen few benefits from the LHWP, and a number of environmental concerns related to the project had been raised. But it is worth noting that neither of these outcomes have been linked to corrupt payments (OED 2002).

¹⁴ This according to the Turkish Architects and Engineers Association, Celestine Bohlen Turkish Earthquake Survivors Blame Corruption *New York Times* - 8/20/99.

¹⁵ This compares to construction accounting for around four percent of the global workforce (ILO, 2005). If World-Bank financed projects accounted for a similar proportion of deaths in construction as they do for financing of global construction (around \$8 billion out of \$1.7 trillion), there would be 282 deaths on World Bank-financed construction projects a year.

¹⁶ It may also be that high corruption countries invest more in physical assets to the cost of human capital (de la Croix and Delavallade, 2006).

costs to low road quality, maintenance expenditures for roads are low across the developing world. A recent estimate for Latin America suggested maintenance expenditures were approximately half of the level that they should be, at one percent of GDP, and that raising them to an appropriate level would increase GDP itself by 1.87 percent (Rioja, 2003).¹⁷

Different forms of corruption carry significantly different ‘multiplier effects’ in terms of their development impact, then. For example, the impact of stealing one dollar’s worth of supplies from a road construction project is as much as four times higher than the impact of a dollar increase in contract costs due to collusion (Kenny, 2006).¹⁸ If the impact of corruption is to skew expenditures towards low-return projects or to reduce expenditures on maintenance, the multiplier effect may be many times higher again. Table 3 suggests estimates of the size of corrupt payments in various steps of the project cycle as well as the likely ‘multiplier impact’ of payments in terms of development outcomes. The table suggests that a focus on reducing the most damaging impacts of corruption will have to be broad, looking at overall budgeting issues --ensuring the resources dedicated to new construction are not diverted from required maintenance funding for example-- and ensuring that the outputs of construction projects are built to a high (safe, long-lived) standard.

An economic approach to corruption suggests an additional insight --there can be worse things than a bribe payment. One way to avoid corruption in competitive bid processes, for example, would be to sole source all contracts to a single firm --but this would be unlikely to improve overall development outcomes. Analysis of BEEPS data suggests that corruption is viewed by firms as a less effective substitute for lobbying (Campos and Giovannoni, 2006). This suggests that an effort to increase the power of firms to lobby (easing limits on campaign contributions, for example) may reduce corruption while worsening development outcomes. Again, anti-corruption measures, much like other regulation designed to minimize market or government failure, can carry higher costs than the economic benefit of the reduced corruption that they are associated with. Ben Olken’s examination of anti-corruption interventions in community-driven road projects in Indonesia suggested that sending out invitations to village meetings to discuss projects might fall into that category, for example (Olken, 2004). Such cost-benefit analysis of specific anti-corruption interventions has been sadly limited to date.

What Reduces Corruption in Construction

Construction firms bribe in order to obtain contracts, to increase profit margins on those contracts and to reduce the cost of construction. Given that, corruption is likely to be

¹⁷ Similarly, in Cameroon, between 1981 and 1997, the maintainable road network increased from 2,700km to 4,000km 1991-1997, but in 1997 only 31 percent of paved, and only 13 percent of unpaved roads were in good condition. Across Africa, estimates suggest that funding for maintenance is considerably below needed amounts (but also that what is spent is spent poorly) (Stein Hansen Consulting, 2000).

¹⁸ In Indonesia, Olken (2004) estimates that a marginal dollar of materials stolen from a road project reduces the discounted benefits from the project by \$3.41 because of the shorter life of the road when built with insufficient material.

reduced if there are fewer opportunities (less discretion for government officials to decide contract winners and contract terms, or interpret regulatory compliance) and less need (fewer contracts, fewer competitors, less fear of competitor bribery, less regulation). In addition the net benefits of corruption will change if costs are higher –bribes are larger or have to be paid to more people or the risk of being caught increases (because of audits or punishment regimes).

This theory can be very poorly illustrated by evidence from construction –indeed, our empirical knowledge about the causes of high corruption in the sector is extremely limited. Tables 4 and 5 point to some correlates discussed later in the text, but the summary message from these results is that, on the basis of limited data, a number of the relationships that one might expect from a theoretical perspective do not emerge from the analysis. All we can say with some certainty is that more wealthy countries appear to have less corrupt contracting, permitting and licensing procedures on average, but even here there is significant variation between countries at similar income levels (Table 4 and Figures 8 and 9).

Given our current state of limited knowledge about the extent and development impact of corruption in the sector and the cost and efficacy of proposed approaches to reduce that impact, evaluation of proposed approaches will largely have to fall back on theory as well as results from cross-sectoral analyses of what tends to reduce the extent of corruption. Results from this general empirical literature suggest a number of potential avenues to reduce the extent and impact of corruption in construction. These include efforts to improve planning and budgeting processes, increase competitive pressures, reduce unnecessary regulation and better monitor necessary regulation, improve the transparency of the project cycle, increase civil society participation, reduce the discretionary power of individual bureaucrats and improve financial and physical auditing (Kenny, 2006).¹⁹ These interventions share an additional attractive feature that they have considerable benefits beyond a potential role in reducing corruption –improving efficiency and outcomes due to lower transactions costs and more informed decision-making, for example.

Furthermore, given the impact of weak governance on sector performance begins at the level of budgeting and planning, and involves activities regulated and/or standardized at the central level, the macro-level, cross-sectoral environment will have a significant role in determining the level of corruption in construction.²⁰ Responses such as fiscal reform for transparency and development focus in budgets, civil service reforms including competitive selection and merit-based pay, reform of general procurement rules and auditing standards, legal reform and increased freedom of information should all have an impact on corruption in the construction sector as well as elsewhere. Indeed, much of the

¹⁹ See also Svensson, 2005 and Lederman, Loayza and Soares, 2005.

²⁰ Whilst we have seen that levels of corruption in the sector can be markedly different from average levels in the country, it is nonetheless the case that the broad macro governance environment does impact sector-level corruption. This is clear from the correlation between measures of construction sector corruption and GDP per capita –itself closely correlated with general indicators of governance.

sectoral agenda for improved governance builds upon the same principles and approaches as these macro interventions, but tailored to the particular features of construction.

Ownership, Competition and Regulation in the Sector

Again at the sector level, overall efforts to improve governance are likely to be an important tool in reducing the impact of corruption. As with other sectors, it will be important to separate the ownership and regulatory functions of government, and to ensure that the government as a client bids out work on a level playing field. Given the competitive nature of the sector, there appears little justification for state ownership of construction firms, and removing the government as an owner will also help to simplify the political economy of contract award and, in particular, monitoring for quality. What we know about corruption in the sector in Eastern Europe and Central Asia suggests that a private-sector dominated industry may be less prone to corruption. Evidence from the BEEPS surveys suggests that state-owned firms are at least as if not more likely to bribe for government contracts and licenses (Table 5).²¹ Regarding regulation, a study of labor practices on eleven large construction sites in Tanzania found that one of the most egregious violators of labor standards was the National Housing Corporation (National Construction Council, Dar es Salaam, 2005). Furthermore, the example of Indonesia's Kacamatan road projects suggests that corruption in construction by local government employees may frequently take the additional form of materials theft. This materials theft can be some of the most economically damaging form of corruption in construction, as we have seen.

Of course, the privatization process itself can be prone to considerable corruption. In a number of countries, privatization of construction firms has often been to the benefit of the few (Copplestone, 2006). Increasing the transparency and competitiveness of the privatization process itself should be an important precursor to this element of sector reform.

Regulation will remain a vital role for government in the sector, because monitoring technical standards in construction is both complex and central to ensuring quality. Attempts to deal with the information asymmetries inherent in construction have a long history. The Code of Hammurabi (1800BC) imposed the death penalty on builders whose houses collapsed and killed the owner (World Bank, 2006). Four thousand years later, there remains a need for greater regulatory oversight of construction in parts of the Middle East. Earthquake-prone Iran, for example, still lacks any building code for masonry structures.

At the same time, it is important that regulation is limited to cases where it is necessary, and that it is fairly but rigorously enforced. The record of developing countries in this regard is decidedly mixed. *Doing Business* surveys suggest that the number of procedures required in order to get permission to build a warehouse varies considerably

²¹ These results carry more than the usual caveats about regression results –there are no checks of robustness to the inclusion of other variables or country dummies, for example.

between countries. The average number of procedures was 16 in rich countries, and 20 in low income countries, with the time taken to comply 157 days in rich countries and 229 in poor countries. It is not clear that this extra regulatory burden is improving outcomes - there is no correlation between the number of procedures and the number of worker accidents across countries, for example.²² Alongside reducing the number of regulators, easing the process of regulatory compliance will also have a role in reducing corruption, through approaches such as consolidated clearances, time limits to license issuance (if a license is not issued or denied within a certain period, it is automatically granted), and risk-based inspections that occur at the completion of work but prior to the next stage (as opposed to time-based inspections).

Enforcement is a further considerable issue. Tanzania has strong laws regarding labor practices, yet the survey of large construction sites cited earlier suggested that despite the fact all of the projects were publicly-funded (three by donors) and all had been visited by regulatory officials, on only three of eleven sites were labor standards considered adequate (National Construction Council, Dar es Salaam, 2005). Working with industry, consumer and labor groups to craft codes and health and safety regulations that are (comparatively) easily and objectively verifiable, simple and enforceable will improve the likelihood of compliance. The capacity of regulatory bodies to enforce regulation also needs to be strengthened, and whilst this does not necessarily imply independence from concerned ministries, it may require comparative freedom regarding pay and conditions in order to ensure that agencies can attract and retain suitably qualified staff with the incentive remain uncorrupt, whilst removing corrupt enforcement agents. At the same time, the work of such bodies needs to be as open as possible to public scrutiny, with publication of licensing and regulatory principles and decisions.

These reforms will be difficult and, alone, are likely to be inadequate. For example, complex, context specific relationships between levels of corruption and bureaucratic requirements (as well as scarce, weak proxies) may help to account for the statistical insignificance of the relationship between measures of consistent enforcement of regulation and bribe payments amongst construction firms in BEEPS and between the number of procedures involved in getting permission to build a warehouse and the percentage of firms who pay bribes for construction permits in Doing Business and Enterprise Surveys (Tables 4 and 5).

In this regard, the Code of Hammurabi points to an important principle in the fight against corruption. It is often far easier to monitor and deter the *outcomes* of corruption (a collapsed building) than the act of corruption itself (the theft of resources or a payment to avoid correcting a regulatory infraction). This suggests the importance of mechanisms which hold firms and senior management accountable for poor construction and its results. Whilst Hammurabi's death penalty was extreme, ensuring that construction companies and their management teams as well as building owners are liable and held accountable for building code violations and resulting problems (from worker accidents

²² See Djankov, La Porta Lopez-de-Silanes and Shleifer (2000) for a broader discussion of the limited impact of regulation of entry on quality of service provision, but its stronger link with the extent of corruption, across a range of sectors.

to building collapse) should be part of any effort to ensure compliance and reduce the development impact of corruption.

For example, the UK already allows for conviction of senior company officials in cases where gross negligence leads to death. According to the Crown Prosecution Services, cases include work-related fatal accidents arising out of unsafe systems of work, and fatal accidents resulting from the provision of unsafe goods or services –events that are common in the construction industry.²³ A law to extend the culpability of senior company officers in cases where the way a company’s “activities are managed or organized” is causally related to a death and “amounts to a gross breach of duty of care” is working its way through the UK Parliament.²⁴

The Government as a Customer –Planning, Budgeting and Institutions

Looking at the government as a consumer of construction services, any approach to counter the negative effects of corruption again needs to look at outcomes rather than narrowly at procurement processes.²⁵ This suggests a focus that extends both upstream towards budgeting and project selection as well as downstream towards the final quality of deliverables.

If corruption is one factor that skews expenditure away from maintenance of existing infrastructure stocks and new construction with high economic returns, a key element of the anti-corruption agenda is to strengthen governance mechanisms linked with budgeting and project prioritization. The IMF’s Code of Good Practices on Fiscal Transparency – which promotes practices related to clarity of responsibilities, publication of information, open budget preparation and execution and assurances of integrity—provides guidance in the first area.²⁶ Evidence of the quality of budget management in 25 heavily indebted poor countries (HIPC)s suggests there is considerable need for progress, with the average country meeting just over five out of thirteen performance benchmarks in the areas of comprehensiveness, credibility, execution and external scrutiny.²⁷

A focus on the quality of existing infrastructure stocks will also involve institutions that help to ensure adequate funding and implementation of maintenance. One example might be hypothecated road funds with considerable board representation from user groups competitively contracting maintenance services through lump-sum contracts based on set performance standards. Such contracts would include performance bonds overseen through independent inspections as well as public involvement in monitoring

²³ http://cps.gov.uk/legal/section5/chapter_b.html.

²⁴ <http://www.publications.parliament.uk/pa/ld200607/ldbills/040/2007040.pdf>. There is a similar law on the books in Australia.

²⁵ A recent survey of Norwegian firms involved in overseas contracting found that only six percent felt procurement rules were an efficient obstacle to corruption (Soreide, 2006).

²⁶ And the result of an IMF Report on Observance of Standards and Codes provides an assessment of how well these good practices are implemented in a country:
<http://dsbb.imf.org/Applications/web/dqrs/dqrsroses/>.

²⁷ Calculated from p. 36 of Levy, 2007.

with payment deductions based on set criteria of deficiency. Tanzania's TANROADS agency has moved some distance towards this model –supported by a hypothecated roads fund, emphasizing maintenance over investment and utilizing performance agreements with private contractors.

Concentrating on quality project selection suggests a priority for transparent and (where appropriate) participatory selection of projects backed, in the case of larger proposals, by competent economic, technical, environmental and social analysis. This analysis will rely on cost and demand forecasts which can be manipulated (usually to increase predicted returns). As a result, predicted outcomes should be compared with predicted and actual outcomes of a relevant reference class of past projects to determine their likely accuracy, and forecasts should be published, publicly debated, and subject to independent review (Flyvbjerg, Holm and Buhl, 2005).

An additional tool to reduce the potential for selection of infrastructure projects with low returns is private sector risk-sharing in terms of outcomes. Private sector participation absent a sovereign guarantee will involve lenders and shareholders being satisfied of the financial viability of a project. It is also worth noting that private participation diversifies the risk of poor project choice, reducing the impact on returns to public investment. Such an approach is contingent on a broader infrastructure reform agenda covering pricing and regulation which allows for private providers to garner financial returns that approach the economic return of the project.

Chile's Ministry of Public Works is undergoing a reform effort that should help to improve the planning process, service standards, project management and oversight of public infrastructure construction:

- Chile already relies heavily on private provision, with 65 percent of investment resources for public works provided by the private sector.
- An integrated planning process will use a supply-chain approach to ensure investments are made based on multi-modal analysis using improved economic and engineering assessment.
- Planning, contracting and execution will be separated from regulation of infrastructure provision. An independent regulatory body, the superintendent of public works, will oversee transparent concession contracts oriented towards outputs and performance rather than inputs or investment mandates. A new set of benchmarked service standards will drive contract design and oversight, leading to 'conservation' concessions for road networks, for example. Model contracts will be designed to maximize competitiveness in the bidding process as well as focus on outcomes. The regulator will oversee both implementation and any contract renegotiation.
- Project management institutions will develop from a system of multiple project managers at different project stages (feasibility, design, construction, monitoring) to a single-manager structure, improving accountability and data collection.

Within the project design and maintenance process, output-based approaches of the type used in Chile provide a particularly attractive mechanism for reducing the potential

negative outcomes of corruption by emphasizing the quality of provision. Output-Based Aid (OBA) is a strategy for using explicit performance-based subsidies to support the delivery of basic services. It involves delegating service delivery to a contractor, under contracts that tie disbursements to the services or outputs actually delivered. OBA interventions ensure explicit recognition of *why* subsidies are being provided, *who* is receiving the subsidy and who is providing it, and *what* is being subsidized—both the activity and the financial sums involved (Kenny and Mumssen, 2007). Two of these features are attractive from the point of view of reducing corruption:

- The outputs defined are ‘technology neutral’ (delivery of electricity services of a given quality to a given community) rather than technology specified (suggesting use of particular equipment, for example). As such, the OBA process is less susceptible to corrupt agents designing project specifications in such a way as to favor a particular bidder.²⁸ The process is also likely to limit cases where unnecessary or unsustainable projects (uneconomic power plants such as Dabhol, for example) are undertaken because they provide greater opportunities for corruption.
- The outputs of OBA projects are easily monitored. Unlike the efficient operation of a power plant, for example, the presence or absence of a working electricity connection is directly experienced by householders and easily monitored by civil society, donors or other interested parties. As a result, even if corruption does occur in OBA projects, the risk that it significantly reduces the development impact of the financing is reduced. In the case of a water project, for example, the winning bidder, even if selected as part of a corrupt deal, nonetheless has to deliver quality infrastructure at a given cost that carries a considerable consumer surplus.

Community-driven approaches can also provide incentives that should act to reduce the development impact of corruption. CDD involves giving communities or locally elected bodies control over the decision making, management and use of development funds. As such, CDD approaches have a number of attractive features:

- Projects selected will tend to reflect local priorities rather than those with the maximum potential for generating rents. In Indonesia, for example, a 1997 survey of 48 villages found that less than 3 percent of village development requests proposed through the government’s development planning system received funding. The Kecamatan Development Program (KDP), begun in 1998, encompassed about 40 percent of the country’s villages and emphasized participatory appraisals for project selection with funding provided by a combination of village and local funding and direct central government support. These features help to ensure that local priorities were the key to setting project prioritization.
- Project implementation and oversight involves a strong role for beneficiary communities. In the KDP, project budgets, financing and procurement decisions are discussed publicly and displayed on village information boards, each village has an independent committee to oversee contracts and implementation, and

²⁸ A survey of Scandinavian firms found that 41 percent of firms had experienced bidding on tenders which had clearly been designed with one company in mind --Soreide (2006).

journalists and NGOs are invited in to act as watchdogs. In addition, there is an anonymous complaints mechanism which channels concerns to project authorities.

KDP projects that met high local demand with close local oversight and involvement produced savings of between 25 to 56 percent over conventional infrastructure projects and carried economic rates of return ranging from 33 to 83 percent (Wong and Guggenheim, 2005).²⁹

Features of community-driven and output-based approaches could be combined to maximize the efficiency of delivery and minimize the consequences of governance failure—for example, community-driven selection and monitoring could be combined with output-based delivery mechanisms. At the same time, it is worth noting that neither OBA nor CDD, combined or individually, is a panacea for corruption. Indeed, the study of road construction in Indonesia cited earlier, which found that an estimated 24 percent of expenditures were ‘lost’ in materials theft, focused on Kecamatan Development Program projects. Both approaches need to be combined with appropriate procurement, physical and financial auditing and transparency tools, and both are still likely to remain prone to corruption if the broader governance environment is weak.

Finally, it is important to design projects so that they do not put pressure on firms to contravene laws and regulations in order to increase the competitiveness of their bid. For example, bid documents and contracts can specify costs and obligations related to regulatory compliance in areas such as health and safety as well as building codes and standards. By inserting compliance obligations in bid documents and contracts, regulatory compliance moves from a burden on a competitive bid to a service to be paid for and monitored during implementation. Related to this, the World Bank, the Asian Development Bank and the International Finance Corporation all incorporate core labor standards in the design and formulation of their investments. If a country’s regulatory standards are considered inadequate for a particular construction project, specific standards can be elaborated for contracts.

The Government as Customer: Procurement

Within the procurement process itself, there is scope for a gamut of interventions covering e-procurement, financial management information systems, participatory approaches, transparency and third-party (NGO or external professional) oversight rules applicable across sectors.³⁰

²⁹ Similarly, community-based construction of schools in Zambia and Mauritania cut costs by one half to two thirds over national competitive bidding approaches—although some considerable part of this saving was due to lower architectural standards (Theunynck, 2006).

³⁰ At the project level, specifying who selects third party monitors (it should not be the implementing ministry) and where advertisements are placed (online as well as in a given set of major newspapers in a font of a minimum particular size) are both potential elements of an anti-corruption package. PEFA performance indicators include an indicator of procurement standards and the OECD’s Baseline Indicator of Procurement Systems provides a tool for improving the institutions of procurement <http://www.pefa.org/index2.htm>, <http://www.oecd.org/dataoecd/12/14/34336126.pdf>.

Ensuring a maximum of competition in bidding should reduce the scope for collusion and reduce prices as much in construction as elsewhere –this involves not only ensuring competition within the process but also rules banning direct negotiation with firms on the basis of unsolicited proposals and strict controls on renegotiation.³¹ Nonetheless, this does not in all circumstances indicate a preference for international competitive bidding over other techniques. Competitive bidding alone is clearly inadequate to ensure better outcomes. In the BEEPS data on construction firms, for example, there is also no relationship between town size (a proxy for the extent of competition) and the level of payments for construction contracts –this matches general corruption results suggesting that neither trade openness nor country size is robustly related to perceived corruption (Knack and Azfar, 2003), and there are numerous cases where international competitive bidding has proven inefficient.³²

To support the bid design process, whatever the level of competition, there is a significant role for benchmarking prices to provide guidelines for output-based pricing and also to provide a ‘red flag’ for overbidding. At the same time, it is important to note that efforts to compare construction pricing suggest considerable variation for the same output, only some unknown portion of which will be related to weak governance.³³

Procurement-related approaches might include contractual obligations and sanctions that prohibit and punish specific unethical practices and demand internal audits, matched by the right to carry out compliance audits and the creation of a project corruption hotline.³⁴ In this regard, there may be a role for rules based on Transparency International’s integrity pact model.³⁵ All bidders are required to disclose commissions and similar expenses paid relating to the contract, and they must agree not to bribe or collude. Sanctions are spelled out applying to violations of the agreement including blacklisting, contract revocation or forfeiture of bid bonds. Such a model has been utilized in Korea’s road sector and in a water project in Karachi, Pakistan (Lee and Larnemark, 2007). Companies that have previously broken laws, that do not have an internal system of

³¹ The survey of Norwegian firms cited earlier (Soreide, 2006) found that firms see efforts to obtain contracts through direct negotiation rather than competition as the most common form of contract bribery. It is worth noting that, with infrastructure concessions, there is evidence that contract renegotiation substitutes for direct negotiation, with 46 percent of competitively-awarded contracts renegotiated compared to 8 percent of contracts awarded through bilateral negotiations –this suggests the importance of contract clarity regarding triggers and implementation methods for renegotiation overseen by a neutral, transparent body (Guash, 2004).

³² In the case of school construction, for example bundling construction projects under one large ICB contract led to high prices, inadequate distribution of schools and construction delays --as a result, such approaches had been abandoned in favor of delegation to contract management agencies, NCB and community-based approaches by the 1990s (Theunynck, 2006).

³³ In the case of transport, ROCKS data suggest the complexity, as we have seen.

³⁴ Olken (2004) finds evidence that the threat of audits is a significant deterrent to corrupt activities in the case of an Indonesia road project reducing estimated levels of corruption by eight percent. A number of World Bank supported projects in Indonesia and elsewhere have supported the creation of project-specific hotlines that are well advertised and provide an independent and anonymous source for complaints.

³⁵ http://www.transparency.org/global_priorities/public_contracting/integrity_pacts. An expanded version of the integrity pact process which is designed specifically for construction is called PACS (Project Anti-Corruption System): http://www.transparency.org/tools/contracting/construction_projects.

controls in place, or that have been selected in non-competitive bids might be subject to additional oversight by an independent inspector acting as an integrity monitor, with access to internal documents and deliberations on a confidential basis.

In public works procurement in particular, there appears to be little reason to avoid free (preferably web-based) publication of procurement documents from initial design studies through bid documents to final contracts. It is becoming increasingly common within World Bank projects that e-procurement involving no charge for electronic documents is required, along with the use of bid tracking and collusion detection software and automated payment systems.³⁶ Already, Argentina publishes detailed information about contract awards and implementation, Turkey publishes winning bids for government contracts, the Philippines allows civil society representatives to observe the tendering process and Uganda publishes procurement audits and contract awards on the web (Kenny, 2007).³⁷

Regarding contracts, these specify what is to be delivered when, how, by whom and at what unit prices. As such, they contain a wealth of information about who will benefit from the contract, potential waste or padded prices, and what the project outputs should be. Whilst routine publication of contracts is far from the norm, it is quite possible. Many countries provide access if a specific case is made under a Freedom of Information law, and the government of the Australian State of Victoria publishes all contracts (including contract revisions) for contracts worth in excess of AUS\$10m (around USD \$7.7m) as a matter of course.³⁸

Oversight of contract implementation also needs to be clear. It should be spelled out and publicized which government official is responsible for ensuring delivery of a good quality outcome, and that official should be empowered with the necessary (technical and financial analysis) resources to monitor implementation. The official should be able to act under the guidance of comprehensive and transparent rules governing both oversight and payment procedures, and face consequences for failure to act according to this guidance.

In the case of construction, there is also a strong justification for physical audits of project outcomes. Ben Olken used such an approach to measure the extent of corruption in the Indonesia KDP project (Olken, 2004). Although it should be noted that there are other potential causes for ‘missing materials’ than corruption per. se., physical audits will

³⁶ Collusion detection software evaluates if bids are price-correlated after allowing for all publicly observable information (such as distance of firms to project) and if firm bids change similarly because of different circumstances (equally distant firms see bids that are equally higher, all else equal, than closer firms). However, this software only functions well if there are sufficient bids and comparatively few, well-known, publicly available influences on costs. How often these conditions will be met in developing country construction contracting is a matter for speculation.

³⁷ It should be noted that publication requirements should be spelled out and monitored –for example, the World Bank-supported Indonesia Urban Sector Development Reform Project specifies the form and content of disclosure required in Bank projects as well as ensuring information is easily available and written in a comprehensible style.

³⁸ See <http://www.tenders.vic.gov.au/CA256AEA00206A7D/webpages/PublicContractsFrameset?Open>.

provide significant circumstantial evidence of corruption as well as (perhaps more importantly) providing timely evidence of poor-quality construction that can be corrected at the cost of contractors.³⁹ Once initial physical audits are complete, asset registries allow governments to track how constructed assets are used and maintained.

Comprehensive physical audits will be particularly powerful if combined with financial audits undertaken by professionals with a background in the construction industry. Strengthening the capacity of government audit bodies to carry out such audits, and/or outsource this work where appropriate, will play an important deterrent role.

There is also a role for community participation alongside professional auditing –the World Bank-supported Indonesia Urban Sector Development Reform Project uses NGO oversight including routine checks on specifications in each construction project location, as well as citizen score cards and satisfaction surveys, for example. Similarly, the World Bank’s Water and Sanitation Program has supported efforts in a number of Indian states to introduce online complaints managements systems and citizens’ report cards, and the Indian government is considering mandatory community participation and monitoring more broadly in the process of urban management.⁴⁰ The Indian experience suggests the importance of combining approaches involving complaints management with clear standards, staff incentives to respond and citizen engagement.

The Paraguay Road Maintenance Project, launched with the support of the World Bank in 2006 suggests that it is possible to combine a number of governance and anticorruption approaches in one intervention without overwhelming institutional capacity. The project combines a sectoral approach to governance and corruption issues with output-based and community-driven approaches in execution. As the project was being designed, two workshops were held by the Ministry of Public Works to discuss sector governance weaknesses which provided input into sector reform proposals and project design. This centered around the pillars of monitored results, accountability, transparency and participation:

- Results elements included a framework of monitorable output indicators to be tracked, but also baseline and follow-up surveys to provide evidence of socio-economic project impact.
- Accountability measures included the development of a five year itemized sector budget, a road sector strategy and a road social contract in consultation with stakeholders that will guide expenditures and provide an agreed framework for measuring successful delivery. The project will also utilize performance-based contracting based on objective output measures for maintenance components.
- Transparency measures included an active program of dissemination prior to and during the project, as well as electronic publication of procurements, contract

³⁹ The World Bank Rampur Hydropower project includes processes to ensure implementing agency and independent laboratory testing of contractor materials, as well as daily measurement, testing and photography on-site to record conditions. In the Philippines, physical audits combined with a GIS system are being used to determine if roads and bridges actually exist and what state they are in as part of a drive towards improved transport governance.

⁴⁰ Under the National Urban Renewal Mission.

award and implementation progress, complaints procedures and other project and sector-related documents and policies.

- Participatory processes were used in the design of the local (unpaved) roads component of the project, which also involved local cost-sharing. Local universities will also be involved in monitoring physical quality of outputs.

Combined with World Bank led fiduciary assessments, the consultation process also prompted the development of a number of mitigation measures regarding project fiduciary arrangements, including new financial management systems and improved audits, and an enhanced supervision process involving the monitoring of 'red flags' such as price variance in bids and procurement delays, laid out in an annex to the project documents.⁴¹

Partnerships to Reduce Corruption

The BEEPS data on construction firms suggests that there is little evidence that foreign-owned and domestic construction firms bribe differently in Eastern Europe and Central Asia (Tables 4 and 5). This will be in some significant part because firm decisions on corruption are largely driven by host-country (rather than home-country) conditions. In particular, perceptions of corruption in a country are likely to become a self-fulfilling prophesy. A recent survey of international firms based in Norway suggested that the most important underlying motivation for bribery was "the fear of losing contracts because someone else had bribed the decision-makers," for example (Soreide, 2007). Multi-stakeholder partnerships can reduce the perception of the likelihood of corruption through participation in anti-corruption governance mechanisms. As such, they should play a double role in increasing the risk involved in corrupt acts and reducing the underlying incentive to commit such acts.

A 2004 initiative led by Transparency International, the World Economic Forum and nineteen engineering and construction firms created a set of business principles for countering bribery. This commits signatories to a 'zero tolerance' policy on bribery and implementing a program of internal practices to counter corruption. This program would prohibit all forms of bribery, control and monitor facilitation and charitable payments along with gifts and hospitality to ensure that they are not used for bribery, ensure those who refuse to pay bribes are protected from retaliation and set penalties for violating program rules, provide training and confidential channels of communication, and ensure for adequate internal auditing.⁴² An approach based on Transparency International business principles was greed amongst piping companies in Colombia's water sector, which resulted in significantly lower bid award prices for projects with the participating companies (Lee and. Larnemark, 2007).

⁴¹ Available here:

<http://web.worldbank.org/external/projects/main?pagePK=64283627&piPK=73230&theSitePK=40941&menuPK=228424&Projectid=P082026>.

⁴² http://www.weforum.org/pdf/paci/principles_short.pdf.

Similarly, the International Federation of Consulting Engineers has developed a set of guidelines on implementing a business integrity management system in consultant engineering firms including formulation of a code of conduct and business integrity policy, business integrity procedures for the main steps of the consulting process and practices regarding documentation.⁴³ Unions and Firms have also come together to sign agreements on compliance with labor standards including health and safety.⁴⁴

A new initiative under development is DfID's Construction Sector Transparency Initiative, loosely modeled on the Extractive Industries Transparency Initiative and designed to bring a greater level of openness to government contracting in construction. CoST is designed as a multi-stakeholder process that will foster publication and review of key project details including budgeted and actual payments, a project description and any project evaluation. Given the importance of quality outcomes to the development impact of construction projects, this focus on outcome measurement is very welcome.

Conclusion

Governments are and will remain major regulators of infrastructure services and consumers of construction services. Reducing unnecessary activities of the government in the sector may play a role in controlling corruption, but improving governance will remain central to any effort to reduce the development impact of corruption in construction. Our knowledge-base regarding effective interventions to reduce corruption is limited, in considerable part because the act of corruption is usually well hidden.

At the same time, despite the industry's status as one where corruption is both widespread and potentially very economically damaging, international construction companies surveyed by Control Risks were some of the least active in revising procedures in response to new antibribery legislation stemming from OECD and UN conventions, and some of the least likely to have strong existing procedures in place governing conditions such as antibribery clauses in agent contracts (Figure 10). Whatever our uncertainties regarding the most effective tools to reduce the development impact of corruption in the sector, it is clear there is a considerable unfinished agenda, then. And activities that work to limit the harmful outcomes of corruption—in terms of shoddy construction or the commissioning of low-return investments—may go a long way towards reducing the harm done by failures in governance.

⁴³ See <http://www1.fidic.org/resources/integrity/>.

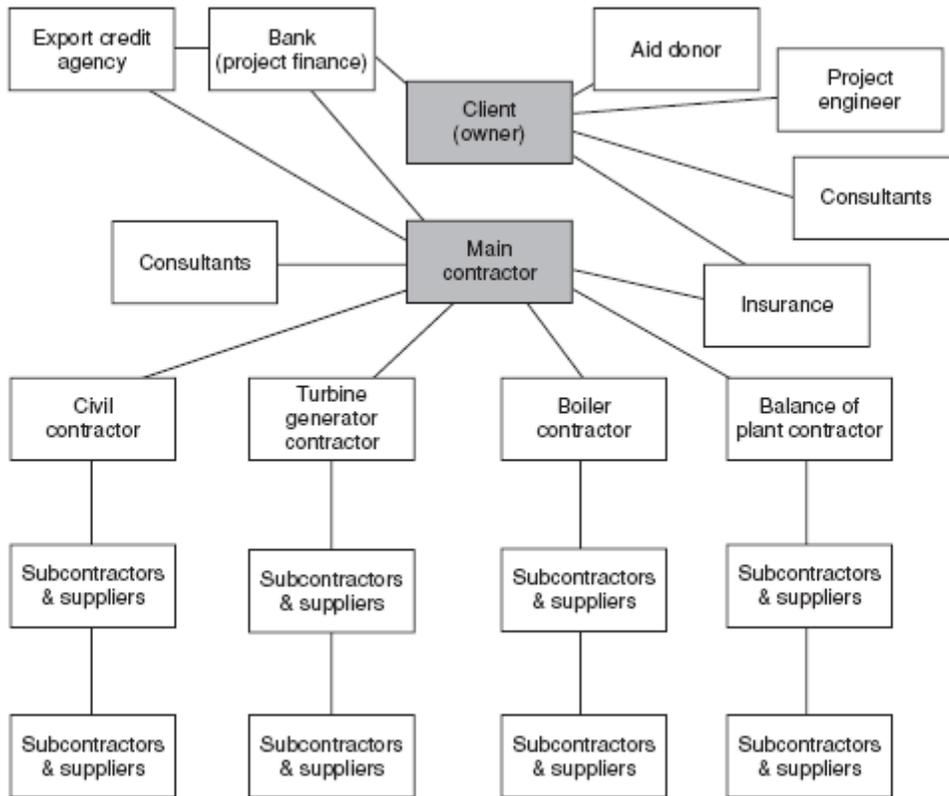
⁴⁴ For examples of framework agreements between a number of construction firms and the Building and Woodworkers' International, see <http://www.bwint.org/default.asp?Issue=Multinationals&Language=EN>.

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Figure 1: A Simplified Diagram of Contracting Arrangements in the Construction of a Power Station⁴⁵



⁴⁵ Source: Standsbury (2005)

Figure 2: Transparency International's Perceptions of Corruption by Industry, From 0 (corrupt) to 10 (uncorrupt)

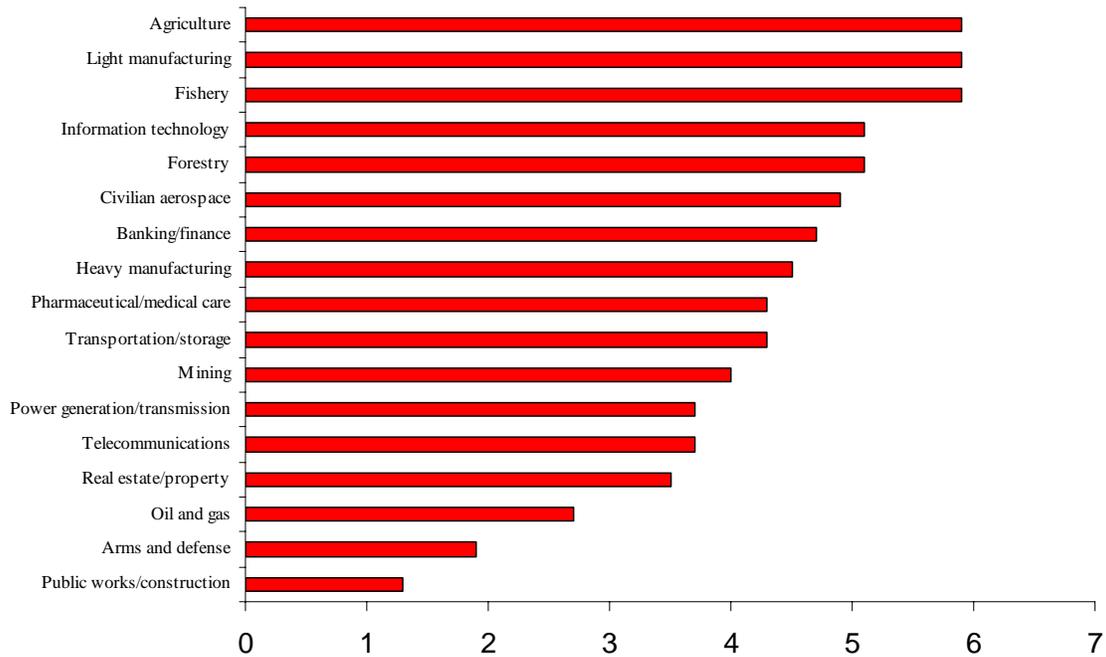
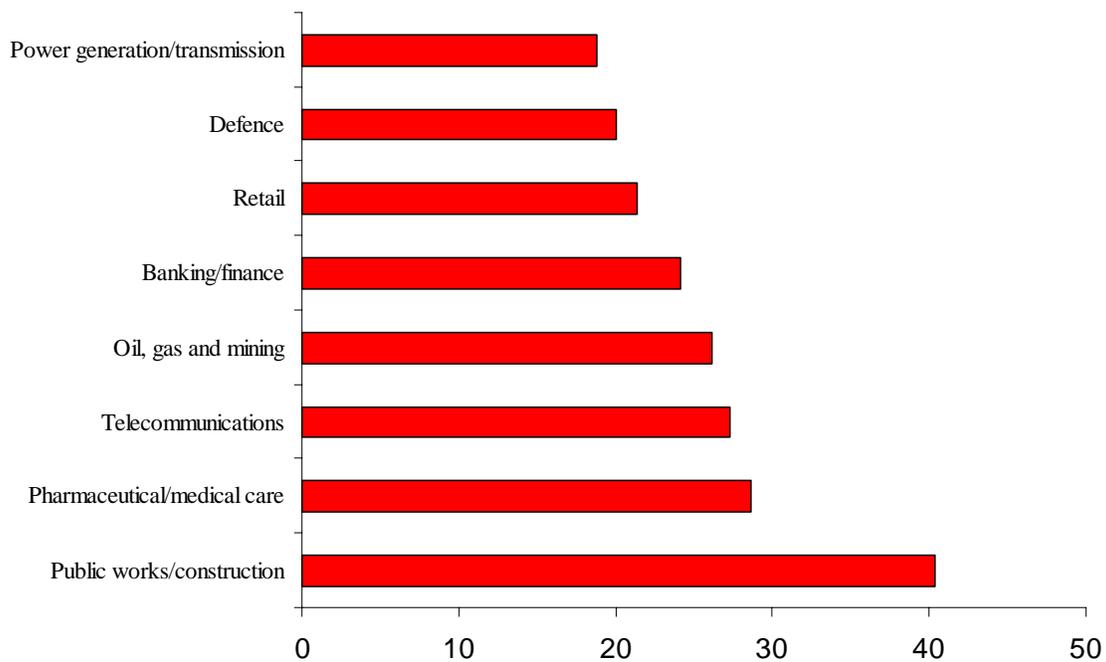


Figure 3: Control Risks Survey of International Companies that Lost Business in the Last Year Because a Competitor Paid a Bribe, by Sector⁴⁶



⁴⁶ Source: Bray, J (2005).

Figure 4: All Firms and Construction Firms in BEEPS –Bribes as a Percentage of Revenues

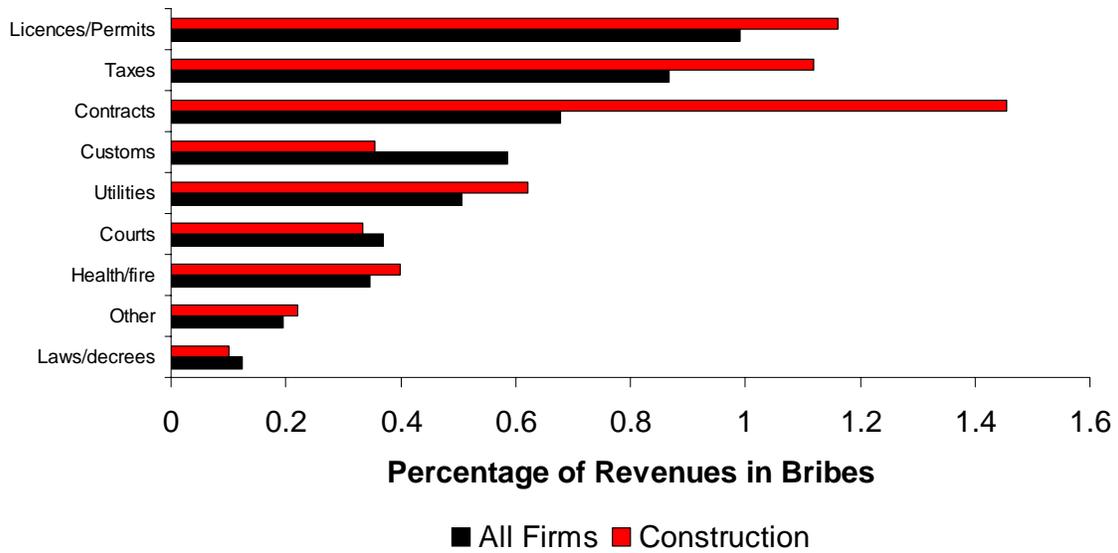


Figure 5: Construction-Related Corruption Across Countries

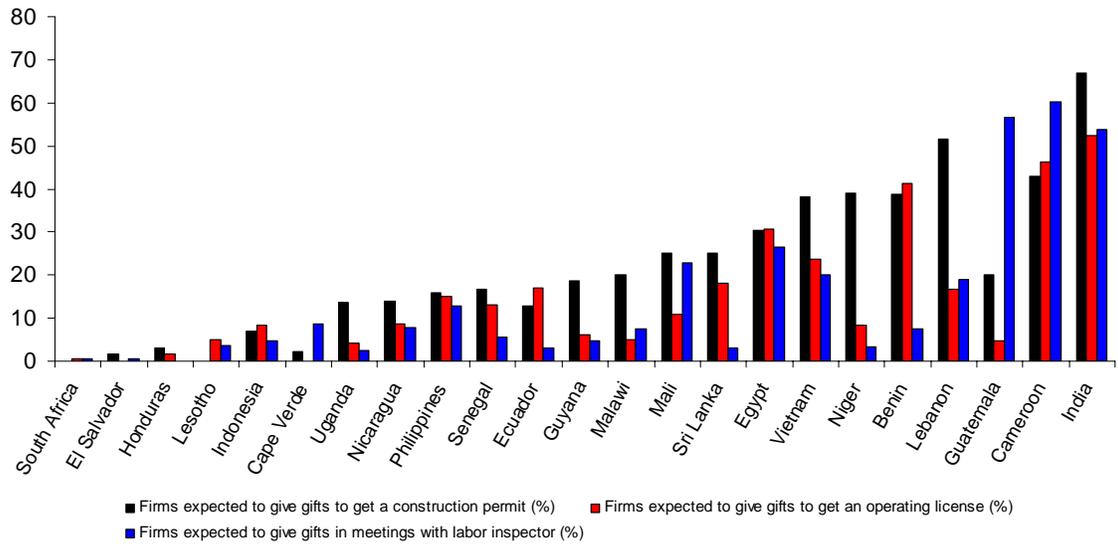


Figure 6: Countries Ranked by Cost of Classroom Construction (/m2): Income and CPI

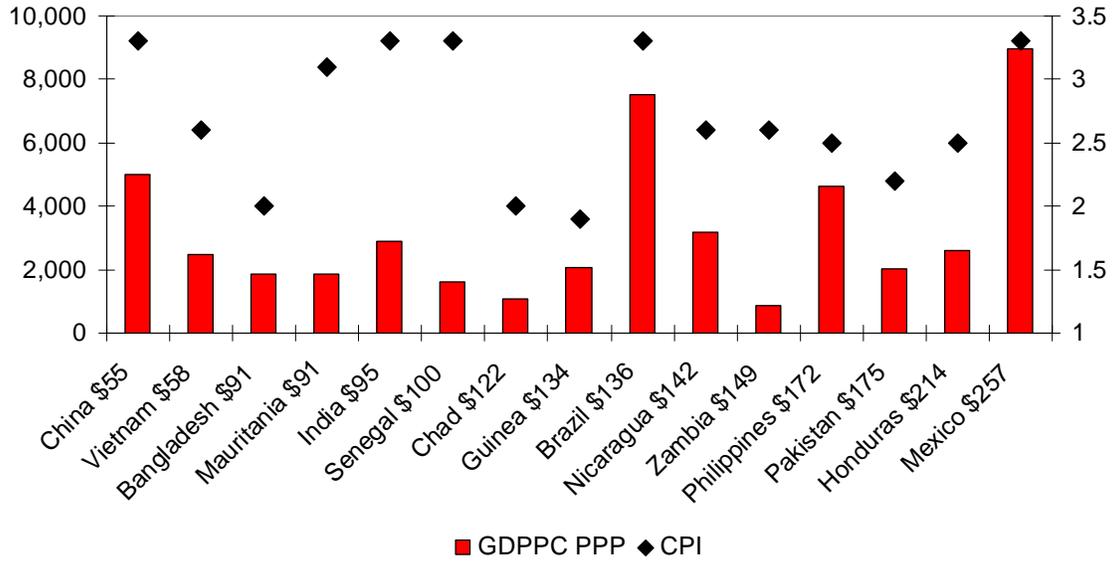


Figure 7: Countries Ranked by Cost of Rehabilitating a Road (/m2): Income and CPI

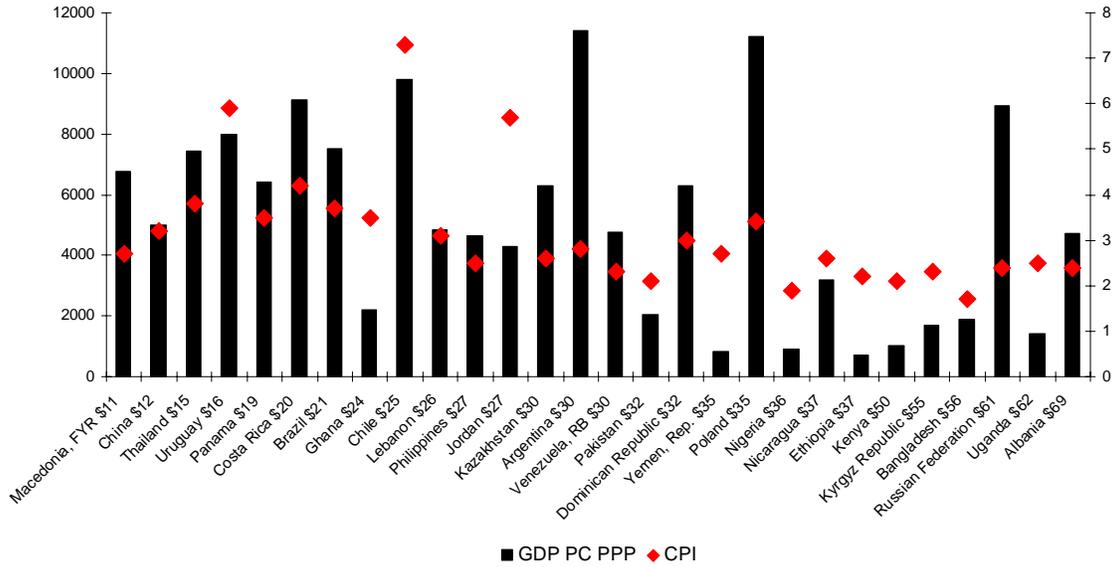


Figure 8: Contracting Corruption and GDP per Capita⁴⁷

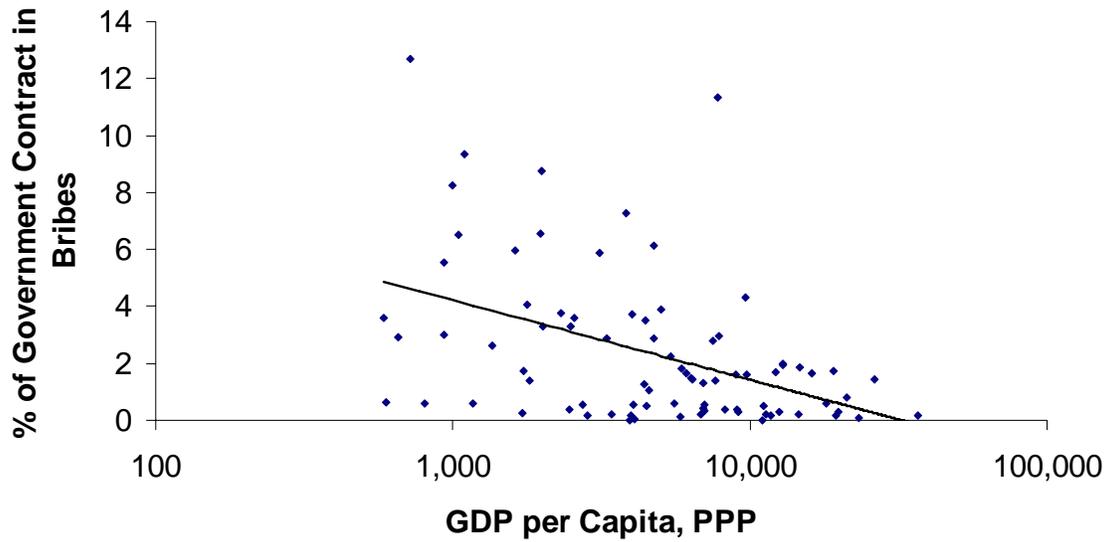
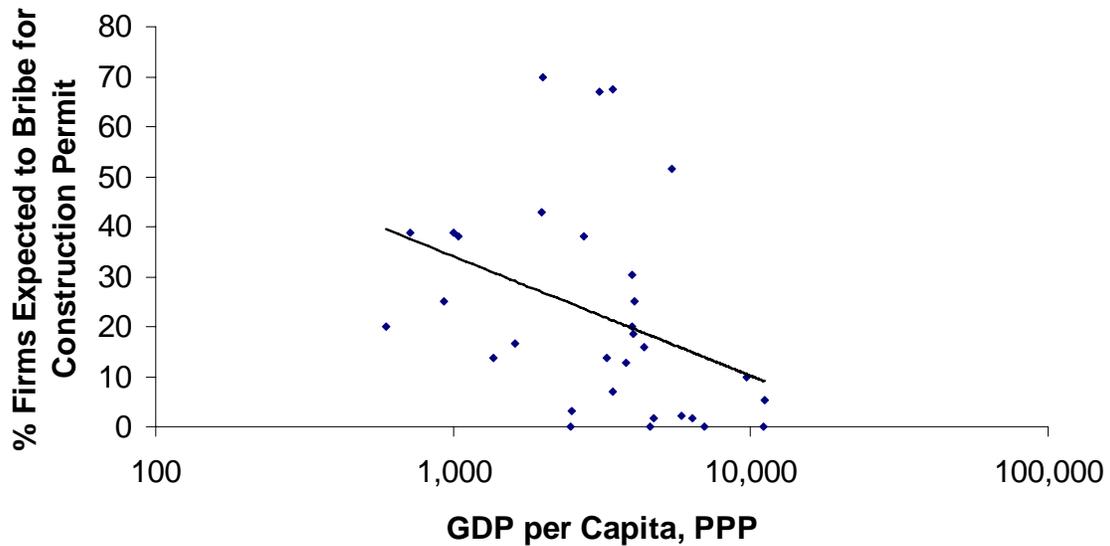


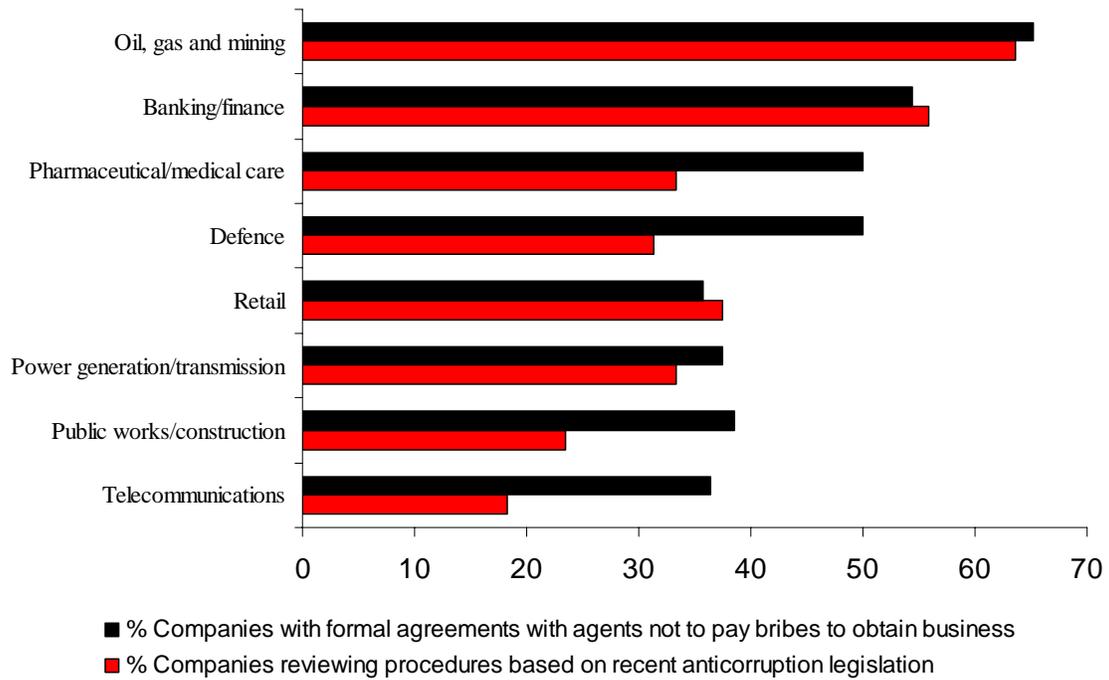
Figure 9: Permitting Corruption and GDP per Capita⁴⁸



⁴⁷ Source: GDP per capita from World Development Indicators, bribe data from Business Environment Surveys.

⁴⁸ Source: GDP per capita from World Development Indicators, corruption data from Business Environment Surveys

Figure 10: Control Risks survey of International Companies' Antibribery Efforts⁴⁹



⁴⁹ Source: Bray (2005).

Table 1: Corruption in BEEPS: How are Construction Firms Different?

	Average Construction	Average All	Construction < All%	Construction Coeff	Construction Prob
It is common in my line of business to have to pay some irregular 'additional payments' to get things done (1=always 6=never)	3.9	4.2	0.69	-0.39	0.00
On average, what percentage of revenues do firms like yours pay in unofficial payments? (1=0, 7=over 25%)	3.5	3.2	0.38	0.29	0.00
How often do firms like yours need to make extra, unofficial payments to get connected to public services? (1=always 6=never)	5.2	5.2	0.42	-0.09	0.24
How often do firms like yours need to make extra, unofficial payments to get licences and permits? (1=always 6=never)	4.8	5.0	0.46	-0.19	0.02
How often do firms like yours need to make extra, unofficial payments to deal with taxes and tax collection? (1=always 6=never)	5.1	5.1	0.50	-0.13	0.09
How often do firms like yours need to make extra, unofficial payments to gain government contracts? (1=always 6=never)	4.7	5.1	0.77	-0.56	0.00
How often do firms like yours need to make extra, unofficial payments when dealing with customs/imports? (1=always 6=never)	5.2	5.1	0.38	0.01	0.91
How often do firms like yours need to make extra, unofficial payments when dealing with courts? (1=always 6=never)	5.2	5.2	0.58	-0.07	0.34
How often do firms like yours need to make extra, unofficial payments to influence the content of new laws, decrees or regulations? (1=always 6=never)	5.7	5.6	0.46	-0.04	0.46
Of total unofficial payments that a firm like yours would make in any given year, what percentage to gain government contracts? (%)	23.0	15.4	0.20	11.92	0.00
When firms in your industry do business with the government, how much of the contract value would they typically offer in additional or unofficial payments to secure the contract? (1=0%, 6>25%)	2.8	2.6	0.63	0.31	0.00

Notes: BEEPS data. 'average construction' and 'average all' are unweighted averages of country average scores for construction and all firms. 'Construction<all' is the percentage of countries where the average score for a given question is lower for construction than for all firms. 'Construction coeff' and 'construction prob.' refer to coefficients and probabilities on a dummy variable for a firm being in construction from a regression of the question as the d.v., a constant and the construction dummy for all firms in BEEPS (no country dummies).

Table 2: All firms in BEEPS: What Determines Corrupt Payments?

	Intercept	Public? (1=state 2=private)	Construction firm (1=yes 0=no)	Foreign ownership? (1 =yes 0=no)	trade with state? (1=yes 0=no)	proportion of sales to state (%)	
On average, what percentage of revenues do firms like yours pay in unofficial payments? (1=0, 7=over 25%)	<i>Coefficients</i>	2.06	0.40	0.30	0.04	0.15	0.00
	<i>P-value</i>	0.00	0.00	0.00	0.65	0.06	0.03
How often do firms like yours need to make extra, unofficial payments to gain government contracts (1=always 6=never)	<i>Coefficients</i>	5.44	-0.52	-0.58	0.11	0.36	0.00
	<i>P-value</i>	0.00	0.00	0.00	0.17	0.00	0.45
Of total unofficial payments made by a firm like yours, what percentage paid to gain government contracts? (%)	<i>Coefficients</i>	30.12	3.16	11.05	-3.56	-10.68	0.05
	<i>P-value</i>	0.00	0.09	0.00	0.02	0.00	0.07
On government contracts, what percentage of contract value would a firm in your industry offer in unofficial payments to secure the contract?(1=0 6=>20%)	<i>Coefficients</i>	2.14	0.13	0.32	0.03	-0.02	0.00
	<i>P-value</i>	0.00	0.22	0.00	0.76	0.81	0.18

Note data from BEEPS, no country dummies, number of observations varies between 1,253 and 3,207.

Table 3: Corruption in Construction and the Multiplier Effect

<i>STAGE</i>	<i>NATURE OF CORRUPTION</i>	<i>AGGREGATE SIZE OF PAYMENTS/THEFT</i>	<i>MULTIPLIER IMPACT OF CORRUPT PAYMENT</i>
Budget process	Decisions on total budget, maintenance versus new construction –in return for direct payments or downstream payoff	Small –survey evidence of limited percentage of firm bribe budget to upstream, however reward may be downstream (received during construction procurements)	Very high –diversion of resources from maintenance to construction can reduce economic returns to the entire infrastructure stock.
Project selection/prioritization	Selection of projects that will favor particular contractors/ be easier to corrupt.	Small --survey evidence of limited percentage of firm bribe budget to upstream, (revenues for corrupt payments will come from downstream contract)	Very high –involves diversion from high to low return projects and (indirectly) from non-corrupt to corrupt contractors.
Project design	Design of projects that will favor particular contractors/ be easier to corrupt.	Medium? (revenues for corrupt payments will come from downstream contract, may be part of firm bribe budget for contracts)	Medium –involves diversion (indirect) from non-corrupt to corrupt contractors, may also involve lower-quality design.
Bid process design	Design of process that will favor particular contractors/ be easier to corrupt	Medium? (revenues for corrupt payments will come from downstream contract, may be part of firm bribe budget for contracts)	Medium –involves diversion (indirect) from non-corrupt to corrupt contractors
Firm selection	Bidder collusion on price with connivance of government officials	Very large –evidence of 10-30 percent mark-ups	Low –potential selection of wrong firm may lower quality, raises price by size of mark-up.
	Officials alter procurement outcome	Large –survey evidence of 5-10% of contract value payments	Medium –likely selection of wrong firm may lower quality of construction, may also raise price
Contract (re)negotiation	Contract (re)designed to lower quality, increase price or opportunity for materials theft	Medium? (part of firm bribe budget for contracts?)	Medium –often involves reduced quality of construction
Construction	Officials steal materials	Very large –survey evidence of 30+% theft in government-implemented construction projects	Very high –necessitates reduced quality of construction
	Regulators ignore code violation	Large –survey evidence of ~1% of construction firm revenues in bribes for licenses and permits	Very high –payments made to cover low quality construction.
	Officials ignore low quality/contract deviation	Medium? (part of firm bribe budget for contracts?)	Very high –payments made to cover low quality construction

Table 4: Business Enterprise Surveys, Doing Business and CPI on Corruption in Contracting and Construction⁵⁰

Dependent Variable	Constant	Lm GDP PC	CPI	Business Disclosure	Procedures to Build Warehouse
Value of gift for contract (% contract) N=78, R=0.21	13.3*	-1.3*	0.1		
Value of gift for contract (% contract) N=76, R=0.21	13.1*	-1.3*		-0.03	
% Firms expected to pay bribe for construction permit N=27 R=0.14	107.6*	-11.8***	3.9		
% Firms expected to pay bribe for construction permit N=28 R=0.14	88.0*	-9.0***		1.2	
% Firms expected to pay bribe for construction permit N=29 R=0.12	97.4*	-9.6***			0.2

Notes: *, **, *** -significant at 1, 5 and 10 percent.

⁵⁰ Sources: Corruption data from business environment surveys, income data from World Development Indicators, CPI from Transparency International, Business Disclosure and Procedures to Build Warehouse from Doing Business.

Table 5: What Determines Construction Bribe Payments?

	<i>Frequency of bribes for licenses and permits (1= always, 7=never)</i>	<i>Value of government contract in bribe (1=0%, 6=>20%)</i>
Intercept	5.05 *	2.95 *
Sector (State=1, Private = 2)	-0.33 **	-0.17
Full time employees (1=none 7=500+)	0.19 *	-0.17 *
Casual employees (1=none 7=500+)		0.13 **
Foreign ownership (1=yes 2=no)	0.05	0.19
Information on regulations easy to obtain (1=easy 7=not easy)	-0.09 ***	
Interpretations of regulations are consistent (1=agree 7= don't agree)	0.04	
Management time with gov't officials (1=1%, 6=>50%)	-0.11 *	
R Square	0.09	0.06
Observations	556	219

Notes: *,**,*** -significant at 1, 5 and 10 percent.