CORRUPTION AND ITS IMPLICATIONS FOR INVESTMENT
J. Edgardo Campos, Donald Lien, and Sanjay Pradhan

In the last few years, corruption in developing countries has come to the forefront of development thinking. Tight fiscal situations at home have made donor countries focus more on the impact of their aid to developing countries, raising concerns among bilateral and multilateral aid agencies over the effect of corruption on economic performance. At the same time, the trend towards democratization has made developing country governments subject to greater scrutiny and accountability from a broader segment of the general public. The fall of the Buchar administration in Ecuador, the convictions of two former presidents in South Korea, the collapse of the Mobutu regime in Zaire, the surprising resignation of Suharto in Indonesia, and the peaceful midterm ouster of a democratically elected president in the Philippines, Joseph Estrada, are all testimony to the salience of corruption as a key issue upon which governments are increasingly being judged.

Despite this, there remains a significant degree of ambivalence among many policy makers about the real impact of corruption on the economy. This less-than-enthusiastic response is due in part to the so-called East Asian puzzle. In a number of East Asian countries, high rates of growth had been sustained over a long period despite high levels of corruption. A number of independent organizations that have conducted extensive surveys of businessmen throughout the world, e.g., Transparency International (TI), have ranked China, Vietnam, Indonesia, and Thailand among the most corrupt countries. Yet, as table 1 shows, up till the recent economic crisis, these countries have grown at phenomenal rates and, more important, attracted a considerable flow of private
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capital. This observation has posed a real challenge to the received wisdom that corruption impedes economic performance: it is inconsistent with the theory that weak institutions of governance, of which corruption is a concrete manifestation, discourage investments and thus constrict growth.

<table>
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<tbody>
<tr>
<td>China</td>
<td>2.43</td>
<td>11.05 %</td>
<td>n.a.</td>
</tr>
<tr>
<td>Vietnam</td>
<td>n.a.</td>
<td>8.30%</td>
<td>n.a.</td>
</tr>
<tr>
<td>Thailand</td>
<td>3.33</td>
<td>7.65</td>
<td>24.85 %</td>
</tr>
<tr>
<td>Indonesia</td>
<td>2.65</td>
<td>6.60</td>
<td>16.35</td>
</tr>
<tr>
<td>India</td>
<td>2.83</td>
<td>5.41</td>
<td>11.11</td>
</tr>
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<td>Egypt</td>
<td>2.84</td>
<td>3.78</td>
<td>8.03</td>
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<td>Kenya</td>
<td>2.21</td>
<td>3.27</td>
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<td>Brazil</td>
<td>2.96</td>
<td>2.70</td>
<td>15.74</td>
</tr>
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<td>Mexico</td>
<td>3.30</td>
<td>1.07</td>
<td>13.68</td>
</tr>
<tr>
<td>New Zealand</td>
<td>9.43</td>
<td>2.40</td>
<td>n.a.</td>
</tr>
</tbody>
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* From World Development Indicators 1997.
1 1990-1995 only

Scholarly concern over corruption predates the emergence of corruption as a highly controversial issue among practitioners. Many scholars, including Rose-Ackerman (1978), Klitgaard (1988), and Wade (1982), have sought to understand better the complexities that underpin the existence and persistence of corruption. In fact, much of the intellectual discussion on the implications of rent-seeking activities (Kreuger 1974; Bhagwati 1982; Tullock et al. 1988; Murphy, Shleifer, and Vishny 1993) and the role of institutions (North 1981 and 1990) for economic performance touched implicitly on the potential impact of corruption. However, because this intellectual strand has, up till recently, not led to large cross-country empirical testing, it has not been able to contribute effectively and convincingly to clarifying the consequences of corruption.

With the development of better databases, a number of scholars have managed to undertake much-needed cross-country empirical research. In what is probably a seminal piece of work in this area, Mauro (1995) has provided econometric analysis and evidence of the negative impact of corruption on investment and growth. More broadly, Keefer and Knack (1995) show empirically that weak institutions, as manifested in part by the extent of corruption, impede economic growth. In a different vein, Stone et al. (1996) and Paul (1995) use surveys to extract evidence of high transactions costs that accompany activities commonly believed to be associated with corruption, e.g., customs. Nevertheless, this research still fails to explain why a number of East Asian countries persist as outliers.

Wei (1997) has attempted the first empirical analysis that more poignantly addresses the East Asia puzzle. He shows that, controlling for other factors such as GDP (gross domestic product)/capita, the impact of corruption on the flow of foreign direct investment (FDI) is no different in East Asia relative to other countries. The implication is that in East Asia other factors swamp the negative effect that corruption has on FDI. This offers a possible explanation for why East Asian countries have grown more rapidly despite significantly high levels of corruption. There is, however, one problem with his analysis: the inflows and outflows of FDI are dominated by countries belonging to the Organization for Economic Cooperation and Development (OECD). It is quite possible that the results would be different if the OECD countries were excluded from the sample as "hosts" of FDI or, alternatively, if the dependent variable used was private investment (both domestic and foreign).

In fact, other empirical findings of Wei suggest that there is more to the corruption story than meets the eye. He finds that ethnic ties lead to higher flows of FDI and, in particular, that much of the FDI that flows into China comes from overseas Chinese. What this suggests is that informal institutions may be an important omitted variable that affects the nature of corruption and thus its impact on investment. It supports the thesis that in East Asia, informal norms bound inseparably with illicit exchanges help enforce intertemporal transactions that facilitate relatively larger inflows of FDI.

This thesis is consistent with the work of Shleifer and Vishny (1993). Shleifer and Vishny analyze different types of corruption regimes—monopolistic versus independent "suppliers" of bribe-generating products—an approach that is also evident in Kaufmann's recent work (1996). This chapter follows their line of reasoning. That is, different corruption regimes have different effects on investment. In particular, we argue and provide empirical evidence that regimes in which corruption is more
"predictable" (in the sense that the favor, service, or product being sought is more likely to be granted), ceteris paribus, have a smaller negative impact on investment than those in which it is less predictable. However, we also show that the level of corruption matters as well. Given the same degree of predictability, lower levels of corruption result in higher levels of investment. In sum, we are able to categorize countries into three broad types: (1) those with high levels of corruption and low predictability are the worst off in terms of attracting private investment; (2) those with high levels but greater predictability are better off than those in (1) in terms of attracting relatively higher levels of private investment; and (3) those with low levels of corruption and high predictability are the most well-off. East Asia's "puzzling economies" are likely to fall in the second category.

This chapter is divided into three parts. In the first, we present and discuss a more generalized version of the Shleifer/Vishny approach. We then describe our data (including their limitations), the econometric model we used for our analysis, and present our empirical findings. Finally, we draw some conclusions and make some suggestions for future empirical research on corruption.

Why Predictability Matters

The underlying logic of our approach can be illustrated with a simple example. Consider a situation in which several firms are confronted with the need to bribe several government officials in order to obtain a monopoly franchise to provide some public service. Each of the officials has veto power over a firm's application but none have absolute power to grant the franchise. Suppose further that each of the officials comes from a different region in the country and each is biased toward helping individuals who come from his or her region. Now contrast this with a situation in which there is a single public official who can decide on awarding the franchise and that official has no regional sympathies. These two situations differ in terms of the degree of uncertainty that firms face about the possibility of actually obtaining the franchise should it pay bribes. In the second, there is a much higher degree of certainty—barring any unforeseen interventions, the firm with the highest willingness to pay will get the franchise. In the first, there is no such guarantee. In all likelihood, therefore, firms will invest less if confronted with the first situation than when faced with the second, e.g., the winning firm ends up supplying completely depreciated general-purpose dump trucks (which would make them mechanically more troublesome than average) for collecting the garbage as opposed to trucks specifically designed for garbage collection—perhaps even new ones.

The first situation is what Shleifer and Vishny refer to as a regime with independent "suppliers," the second as one with a monopoly supplier. The key here, however, is not so much the distinction between independent versus monopoly suppliers; it is one of predictability. Consider again the second case of a single public official having monopoly power over the granting of the franchise. That official obtains his power from the office he or she holds. Suppose that the politics in the country is such that ruling cliques change ever so often and with each change comes a reshuffling or replacement of government officials. In this case the single public official may be in office for a very limited time. When his replacement takes over, this individual could decide to terminate the franchise (or make it extremely difficult for the existing franchisee to operate). Hence the firm that originally obtained the franchise can never be certain that it will indeed maintain the rights accorded to it. It could possibly pay additional bribes to the new official but this only shifts the uncertainty to the cost side of the equation. In either case the firm will be less willing to invest adequately to deliver the service, e.g., they will provide fully depreciated general-purpose dump trucks instead of real and newer garbage trucks.

Does Theory Meet Reality?

In this section, we explore the implications of a unique database for the particular thesis that we have proposed above. Specifically, we hypothesize that the predictability embodied in a corruption regime is as important as the extent of corruption. We test this using data from a large-scale survey of firms conducted for the World Development Report 1997 of the World Bank. Below, we describe the data, discuss the variables we used, and present our test results.

The Data

Though there has been considerable scholarly research on the issue of corruption, only in recent years have large-scale cross-country empirical studies emerged. The main problem with undertaking such a task was the absence of data on corruption. Because of the nature of the beast, getting direct information on the extent of corruption in any country and especially in developing countries has been elusive. With the advent of greater political and economic openness worldwide, some independent organizations have managed to conduct worldwide surveys of business-
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men on a variety of issues, some of which relate to corruption, and have been compiling and collating data from these surveys. Indeed, the empirical work that has emerged in the last few years has made extensive use of databases from one or more of these organizations.

To the best of our knowledge, however, none of these surveys has introduced questions that pertain specifically to the uncertainty surrounding corruption in respondents' countries. As part of its efforts to prepare and complete the World Development Report 1997—The State in a Changing World, the World Bank conducted a large cross-country survey of private businesses designed to obtain information on a number of institutional issues: (1) the predictability of laws and policies, (2) political instability and security of property, (3) government-business interface, (4) bureaucratic red tape, and (5) the efficiency with which government provides services. Questions pertaining to the extent and the uncertainty surrounding corruption were included in (4); in fact, of the eight questions, four dealt with corruption. The relevant questions for this chapter are presented in Table 2.

Table 2 Survey Questions on Corruption

<table>
<thead>
<tr>
<th>Question</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>It is common for firms in my line of business to have to pay some irregular ‘additional payments’ to get things done.” This is true</td>
<td>(1) always</td>
</tr>
<tr>
<td>(2) mostly (3) frequently (4) sometimes (5) seldom (6) never</td>
<td></td>
</tr>
<tr>
<td>Firms in my line of business usually know in advance about how much ‘additional payment’ is.” This is true</td>
<td>(1) always</td>
</tr>
<tr>
<td>(2) mostly (3) frequently (4) sometimes (5) seldom (6) never</td>
<td></td>
</tr>
<tr>
<td>Even if a firm has to make an ‘additional payment’ it always has to fear that it will be asked for more, e.g., by another official.” This is true</td>
<td>(1) always</td>
</tr>
<tr>
<td>(2) mostly (3) frequently (4) sometimes (5) seldom (6) never</td>
<td></td>
</tr>
<tr>
<td>If a firm pays the required ‘additional payment’ the service is usually also delivered as agreed.”</td>
<td>(1) always</td>
</tr>
<tr>
<td>(2) mostly (3) frequently (4) sometimes (5) seldom (6) never</td>
<td></td>
</tr>
</tbody>
</table>

The survey originated and was managed from the World Bank's headquarters in Washington, D.C., but its implementation was facilitated through its field offices worldwide. The survey covered sixty-nine countries (including nine from the OECD) and drew responses from approximately 3,700 companies. The same questionnaire was used in all the countries, and the target respondents in each country were local businessmen.

The Variables

Our basic objective was to determine whether or not the “predictability” of corruption has a significant impact on economic performance. By predictability, we mean the degree to which firms are confident that they will in fact be able to obtain the “product” they are seeking, e.g., a license or a franchise, if they pay bribes. To quantify and encapsulate “predictability” in variable form, we used the responses to questions 2 and 4 in Table 2. Specifically, we calculated a country average (across all the responses from individual firms in the country that completed the questionnaire) for each question. Then we constructed the variable CORPRD as follows:

\[ \text{CORPRD} = 7 - 0.5 \times (\text{country average for q.2} + \text{country average for q.4}) \]

We also wanted to test whether the extent of corruption mattered. Previous empirical work indicated that higher levels of corruption impede economic performance. Moreover it is possible that the degree of predictability may be of more concern to firms than the extent of corruption. By including a variable that represents the extent of corruption, we could test this hypothesis. We used the responses to question 1 to construct the variable COREXT. Specifically,

\[ \text{COREXT} = 7 \times \text{country average for q.1} \]

In order to control for other factors that might affect investment, we used the 1990 values of GDP per capita (at purchasing power parity) and as an alternative, secondary school enrollment.

For the dependent variables we used the ratio of gross investment to GDP and the ratio of private investment to GDP. For the gross investment variable we used the average over 1990 to 1994 and had fifty-nine observations. For the private-investment variable, we used both the average from 1982 to 1993 and from 1990 to 1993. Ideally, the latter would have been the independent variable of choice. Unfortunately, the developing countries for which we could obtain annual data on private investment flows did not map well onto the countries that were included.
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in the World Bank survey. Hence, we had fewer observations—between twenty-one and twenty-three.

The Empirical Results

In table 3 below, we present results of OLS regressions using GDP per capita and secondary enrollment alternatively as control variables. In equations (1) and (4), we test only for the impact and significance of the extent of corruption and in equations (2) and (5) only for the predictability of corruption. In equations (3) and (6), we include both the extent and the predictability. In all cases, the extent and the predictability variables have the correct sign. The predictability variable is significant in all cases at least at the 5 percent level. The extent variable is at best significant at the 5 percent level.

Table 3 OLS Regression Results

<table>
<thead>
<tr>
<th>Variables</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ln(Enrol)</td>
<td>2.443*</td>
<td>2.353*</td>
<td>1.286</td>
<td>(2.112)</td>
<td>(2.201)</td>
<td>(1.9997)</td>
</tr>
<tr>
<td>Ln(GDP)</td>
<td>2.213*</td>
<td>2.264*</td>
<td>1.313</td>
<td>(2.092)</td>
<td>(2.477)</td>
<td>(1.257)</td>
</tr>
<tr>
<td>COREXT</td>
<td>1.169</td>
<td>-4.766*</td>
<td>1.813</td>
<td>-4.377*</td>
<td>(-1.803)</td>
<td>(1.453)</td>
</tr>
<tr>
<td>CORPRD</td>
<td>2.987*</td>
<td>3.877*</td>
<td>8.532*</td>
<td>(2.167)</td>
<td>(2.779)</td>
<td>(2.889)</td>
</tr>
<tr>
<td>R²</td>
<td>.719</td>
<td>.0759</td>
<td>.1306</td>
<td>.0747</td>
<td>.1486</td>
<td>.1951</td>
</tr>
<tr>
<td>adj. R²</td>
<td>.1423</td>
<td>.0429</td>
<td>.0996</td>
<td>.0416</td>
<td>.1182</td>
<td>.1512</td>
</tr>
<tr>
<td>No. of Obs.</td>
<td>59</td>
<td>59</td>
<td>59</td>
<td>59</td>
<td>59</td>
<td>59</td>
</tr>
</tbody>
</table>

Table 4 Regression Results

Private Investment/GDP as Dependent Variable

<table>
<thead>
<tr>
<th>Variables</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>11.141</td>
<td>5.719</td>
<td>-12.061</td>
<td>10.575</td>
<td>5.101</td>
<td>-12.558</td>
</tr>
<tr>
<td>Ln(Enrol)</td>
<td>1.907</td>
<td>1.645</td>
<td>(1.087)</td>
<td>(1.006)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ln(GDP)</td>
<td>2.341*</td>
<td>2.291*</td>
<td>(1.910)</td>
<td>(1.722)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COREXT</td>
<td>-3.844*</td>
<td>-2.750</td>
<td>-5.792*</td>
<td>-4.151*</td>
<td>-3.042</td>
<td>-6.837*</td>
</tr>
<tr>
<td>CORPRD</td>
<td>3.580</td>
<td>2.446</td>
<td>6.984*</td>
<td>4.085</td>
<td>2.925</td>
<td>8.302*</td>
</tr>
<tr>
<td>R²</td>
<td>.1546</td>
<td>.2041</td>
<td>.499</td>
<td>.1497</td>
<td>.4992</td>
<td>.5014</td>
</tr>
<tr>
<td>adj. R²</td>
<td>.07</td>
<td>.0784</td>
<td>.4105</td>
<td>.0647</td>
<td>.3741</td>
<td>.4134</td>
</tr>
<tr>
<td>No. of Obs.</td>
<td>23</td>
<td>22</td>
<td>21</td>
<td>23</td>
<td>22</td>
<td>21</td>
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</table>

Note: Significant at the 1 percent level (*), at the 5 percent level (†), at the 10 percent level (‡).
In the above analysis, we used gross investment to GDP as the dependent variable. We investigated whether or not we could use the available data on private investment to GDP to derive information that would be consistent with our findings (though not necessarily of any statistical significance). In table 4 below, we present OLS results using the average of private investment to GDP from 1982–1993 (columns 1–3) and the average from 1990 to 1993 (columns 4–6). These results are based on a small subset of countries included in the World Bank survey and for which we could retrieve private investment data. In both sets of regressions, we used either GDP per capita or secondary enrollment as the control variable.

When GDP per capita is used as the control variable, both the extent and predictability variables have the right sign and are significant at 5 percent. The control variable is also of the correct sign and significant at the 10 percent level.

Because the sample size is small—twenty-one to twenty-three observations in all—these results must be interpreted with caution. Nevertheless, they provide further evidence supporting our hypotheses.

Conclusion

Empirical evidence indicating that corruption impedes growth and investment has begun to emerge, with academics and scholars increasingly devoting more time to study the surrounding issues. These findings parallel the emerging concern of politicians and policy makers around the world about the deleterious effects of corruption on economic performance and increasing efforts to try to address its underlying causes. Despite these, there remains a lot to learn about corruption: its consequences, its causes, and effective strategies for controlling it.

This chapter has been motivated by a seeming paradox in East Asia: the positive correlation between high rates of investment and growth with relatively high levels of corruption. Conventional wisdom in economic theory suggests that weak property rights, often manifested by high levels of corruption, retard investment and thus economic growth. East Asia’s experience has posed a serious challenge to this hypothesis. The chapter attempts to unravel this paradox. Specifically, it argues that it is not only the level of corruption that affects investment but also the nature of corruption. Corruption regimes that are more predictable—in the sense that those seeking favors from government do obtain those favors—have less negative impact on investment than those that are less predictable. In many of East Asia’s miracle economies, corruption is said to be well organized and systematic so that the degree of predictability is relatively high. This chapter thus suggests that, despite high levels of corruption, these miracle economies still managed to attract significantly higher levels of investment than other developing countries. The result: compared to many developing countries, these countries have grown faster despite corruption.

However, the chapter also points out that whatever the degree of predictability, more corruption necessarily means less investment. Hence, to justify corruption on the basis of the East Asian paradox is misleading.

There still is much to learn about corruption and economic development. Research on this matter is very much in a nascent stage. One issue that definitely needs studying is the implication of highly organized (and thus more predictable) forms of corruption for sustaining high rates of growth. The chapter suggests that countries can be classified into three categories: those with high levels and a low degree of predictability in corruption; those with high levels and a high degree of predictability; and those with low levels and a high degree of predictability. East Asia’s miracle economies fall into the second category, the developed countries into the third. The implication here is that for East Asia’s miracle economies to move on to their next stage of economic development, they would have to reduce the level of corruption. The explosion of the Asian economic crisis suggests that this may in fact be the case.

The rest of the volume presents country case studies that elaborate on this Asian paradox and suggest why it is intimately linked to the crisis.

APPENDIX

MODELS OF PREDICTABILITY

We present two simple models that encapsulate our notion of predictability. In the first, we present a two-period monopolistic regime which captures the effect of uncertainty over time. In the second, we consider an “O-ring” type corruption regime. This setup is akin to Shleifer and Vishny’s (1993) independent corruption regime.

“Monopolistic” Corruption and Uncertainty

Consider a firm that plans to make an investment over two periods. A bribe is needed for a single firm to operate successfully. Let us con-
Consider two scenarios. In the first, both the period 1 and period 2 bribes, \( b_1 \) and \( b_2 \), are made known beforehand. By contrast, in the second, \( b_1 \) is known but \( b_2 \) is unknown. We assume that the firm will operate in the second period only if the bribe is affordable; the investment is simply abandoned if the bribe is too high. We can show that less investment will occur in the second scenario. The outcome predictability is lower as the success or failure of a given bribe in the second period is not known until the second period.

Let \( I \) be the investment level of a specific firm. The cost of capital is \( c(I) \). The investment lasts for two periods. It generates an income stream of \( f(I) \) if it is in operation. To be in operation in period \( i \), a bribe payment of \( b_i \) is required, \( i = 1, 2 \). We begin with scenario 1 in which \( b_1 \) and \( b_2 \) are both known beforehand. Here the firm's profit is

\[
\pi_1(I) = (f(I) - b_1) + \delta(f(I) - b_2) - c(I),
\]

where \( \delta \) is the discount rate. The resulting first order condition for profit maximization is

\[
\pi_1'(I) = (1+\delta)f'(I) - c'(I) \leq 0.
\]

An interior solution \( I \) satisfying \( \pi_1'(I) = 0 \) exists if \( \pi_1'(I) \geq 0 \). Otherwise, the firm will not invest at all.

For scenario 2, we assume \( b_1 \) is known but \( b_2 \) is a random variable. In this case, the firm will simply quit if \( b_2 \) is not affordable. The firm's expected profit function is then

\[
\pi_2(I) = (f(I) - b_1) + \delta E[max(f(I) - b_2, 0)] - c(I),
\]

where \( E[.] \) is the expectation operator. Let \( H(.) \) denote the probability distribution function of \( b_2 \). The first order condition for expected profit maximization is

\[
\pi_2'(I) = f'(I) + \delta \int_0^{f(I)} f'(I)dH(b_2) - c'(I) \leq 0.
\]

An interior solution \( I^* \) satisfying \( \pi_2'(I^*) = 0 \) exists if \( \pi_2'(I^*) \geq 0 \). Otherwise, the firm will not invest.

Throughout the analysis, we assume \( f(.) \) is a concave function and \( c(.) \) is a convex function to ensure the second order conditions are satisfied. Because \( \pi_2'(I) \leq 0 \), it follows that \( I^* \leq I' \). That is, the firm will invest less (if it ever does) when the second period bribe payment is uncertain.\(^{10}\)

O-Ring Corruption

Now assume once again there is a single firm but this time it needs separate approvals from two officials.\(^{11}\) Unless it obtains both approvals, its investment will not be productive. We posit two scenarios. In the first, the bribes offered to each official are made known beforehand; in the other, only one of the bribes is known beforehand. Moreover, in either scenario, if the second required bribe payment is too high, the firm simply quits and takes the loss equivalent to the first bribe and whatever capital costs it has incurred. We show that less investment occurs under the second scenario.

Herein, \( b_1 \) and \( b_2 \) are bribe payments to the two corrupt officials. The investment will not be in operation unless both payments are made. Again, we consider two scenarios. In scenario 1, both \( b_1 \) and \( b_2 \) are known. The firm's profit function is given by

\[
\pi_1(I) = f(I) - c(I) - b_1 - b_2
\]

The corresponding first order condition for profit maximization is

\[
\pi_1'(I) = f'(I) - c'(I) \leq 0.
\]

An interior solution \( I_1 \) satisfying \( \pi_1'(I_1) = 0 \) exists if \( \pi_1'(I_1) \geq 0 \). Otherwise, no investment will be undertaken.

Under scenario 2, the firm pays \( b_1 \) first without knowing the exact amount of \( b_2 \). If \( b_2 \) is affordable, it will be paid and the project will be undertaken. If it turns out that \( b_2 \) is large, the firm may then choose to quit and take a loss. In this instance, we assume the firm loses a portion of the capital cost \( ac(I) \) as well as the first bribe payment \( b_1 \). The firm's expected profit function is given by

\[
\pi_2(I) = E[max(f(I) - c(I) - b_1 - b_2, -ac(I) - b_1)],
\]

or, more precisely,

\[
\int_0^B (f(I) - c(I) - b_1 - b_2)dH(b_2) + \int_B^\infty (-ac(I) - b_1)dH(b_2)
\]

where \( B = f(I) - (1-\alpha)c(I) \).
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The resulting first order condition is $\pi'_2(I) \leq 0$, that is,

$$(f'(I) - c'(I)) H(f(I) - (1 - \alpha)c(I)) - \alpha c'(I)[1 - H(f(I) - (1 - \alpha)c(I))] \leq 0.$$ 

An interior solution satisfying $\pi'_2(I) = 0$ exists if $\pi_2(I_2) \geq 0$. Otherwise, no investment will be undertaken. Again, it is easily seen that $I_1 \geq I_2$. That is, the uncertainty with the second bribe payment reduces the investment amount.