

Determinants of Bribery in Asian Firms: Evidence from the World Business Environment Survey

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ABSTRACT. While it is widely believed that bribery is ubiquitous among Asian firms, few studies have offered systematic evidence of such activities, and the dynamics of bribery in Asian firms have not been well understood. The research reported here used World Business Environment Survey data to examine some distinct characteristics of bribery in Asian firms and to empirically test 10 hypotheses on determinants of bribery. We find that firm characteristics such as firm size, growth rate, and corporate governance are important determinants of bribery activities at the firm level, and that Asian firms are more likely to bribe when faced with fierce market competition, corrupted court systems, convoluted licensing requirements, nontransparent interpretation of laws and regulations, inefficient government service delivery, and high taxes.

KEY WORDS: bribery, corruption, Asia

Introduction

Many Asian countries have experienced phenomenal economic growth in recent years. In East Asia, the nine developing economies as a group – China, Hong Kong, Indonesia, South Korea, Malaysia, Philippines, Singapore, Taiwan, and Thailand – have grown on average about 8% annually since the 1960s (Lau and Park, 2003). South Asia's growth has also been impressive in recent years: almost all South Asian countries except Nepal and Sri Lanka experienced an annual economic growth rate of >5% during the 5 years from 2001 to 2005 (Devarajan and Nabi, 2006). The rapid economic growth in Asia has enabled many countries to drastically reduce poverty and to substantially improve the quality of life for their people (Bourguignon, 2003; Chen and Wang, 2001; Ravallion, 2004).

Although growth prospects remain strong in the near future, there is little disagreement among experts and policymakers that many Asian countries face mounting difficulties in sustaining such growth in the long run. Among the most pressing challenges are weaknesses in governance. According to the corruption perception index by Transparency International (Table I), many Asian countries have been consistently rated as having high levels of corruption for the most current decade and some of them (Myanmar and Bangladesh, for example) are perceived as among the most corrupt countries in the world. The persistence and prevalence of corruption pose serious threats to Asia's growth potential, as corruption reduces investment flows and retards the development of financial, economic, and political institutions (Habib and Zurawicki, 2002; Mauro, 1995; Wei, 2000).

Corruption increases the costs of doing businesses in two ways. First, payment of bribes increases the costs of providing goods and services. Second, corruption increases financial costs because it increases the risk premium. It is estimated that corruption adds 5% to the costs of doing business in Asia (Kraar, 1995). However, it is grossly inaccurate to regard firms merely as passive onlookers or victims of corruptive practices. In environments with high levels of corruption, firms may indeed have no choice but to pay "facilitation fees" for government services they are in fact entitled to, but many corrupt exchanges are initiated by firms themselves, to avoid or reduce taxes, to secure public procurement contracts, to bypass laws and regulations, or to block the entry of potential competitors into desirable markets or consortia (Powpaka, 2002; Rose-Ackerman, 2002). Firms are the perpetrators in these latter cases,

TABLE I
Corruption in Asia: corruption perception index 1995–2005

	1995		2000		2005	
	Raw score	Rank	Raw score	Rank	Raw score	Rank
Singapore	9.3 ^a	3	9.1	6	9.4	5
Hong Kong	7.1	11	7.7	15	8.3	12
Japan	6.7	20	6.4	23	7.3	21
Malaysia	5.3	23	4.8	36	5.1	39
South Korea	4.3		4.0	48	5.0	40
Thailand	2.8	34	3.2	60	3.8	59
China	2.2	40	3.1	63	3.2	78
Sri Lanka	– ^b	–	–	–	3.2	78
Mongolia	–	–	–	–	3.0	85
India	2.8	35	2.8	69	2.9	88
Kazakhstan	–	–	–	–	2.6	107
Vietnam	–	–	2.5	76	2.6	107
Nepal	–	–	–	–	2.5	117
Philippines	2.8	36	2.8	69	2.5	117
Azerbaijan	–		1.5	87	2.2	137
Indonesia	1.9	41	1.7	85	2.2	137
Pakistan	2.3	39	–	–	2.1	144
Myanmar	–	–	–	–	1.8	155
Bangladesh	–	–	–	–	1.7	158

Data Source: Transparency International.

^aThe raw scores are measured in a scale of 1–10 scale (10 being very “clean” and 1 being very corrupted).

^bThe date is not available as the country was not ranked in that particular year.

and their willingness to engage in bribery activities directly contributes to prevalent corruption problems in Asia.

Although, it is widely believed that bribery is ubiquitous among Asian firms (Lee and Oh, 2007), few studies have offered systematic evidence of bribery activities in firms both within and across different Asian countries. Most existing studies focus on the demand side of the corruption, that is, on the corrupt government officials who receive bribes, while the role of the corporate sector in providing the payoffs is largely ignored. As a result, many critical questions regarding the extent and nature of bribery activities among Asian firms remain unanswered. For instance, to what extent do these firms engage in bribery? What amount of bribes do they pay? Why there are considerable differences in bribery as practiced in different Asian countries? Why are some firms more prone to bribery than others within individual countries? What are the key factors shaping firms’ decision to bribe?

The answers to these questions are not only of paramount importance to sustaining growth in Asian countries. They are also essential to the global campaign against corruption. The phenomenal growth in Asian economies has enabled some Asian countries to become leading exporting nations worldwide, but this economic success might pose potential dangers to the global economy if bribery practices localized to Asian countries become exported to other countries along with goods and services. Transparency International’s Bribe Payers Index shows that Asian firms are among the most likely to bribe in emerging markets, and that this is true even for countries or economies with relatively low levels of corruption, such as Hong Kong and South Korea.

The main objective of the present study was to investigate the dynamics of bribery in Asian firms by using a unique cross-country firm-level data set from the World Business Environment Survey to examine some distinct characteristics of bribery in those firms,

and to empirically test hypotheses on determinants of bribery. The presentation below proceeds with a review of literature on the determinants of bribery, then proposes a set of testable hypotheses that are approached by multivariate analysis of the data set. The results of that analysis include policy implications that are addressed in the concluding discussion.

Determinants of bribery: theories and hypotheses

Scholarly attention to the determinants of corruption has surged during the last decade owing to widespread corruption across the globe and also to the increasing availability of information on cross-country measures of corruption. Studies have shown that gross domestic product (GDP), openness of economy, and quality of political institutions, as well as legal and cultural roots, are among the main determinants of corruption (Sanyal, 2005; Treisman, 2000). This literature on the determinants of corruption has greatly enhanced our understanding of the causes of corruption, but analyses based on country-level data can provide only limited insights on the dynamics of bribery at the firm level. For example, firms operating in the same country may vary greatly in their propensity to pay bribes not only because of different factors specific to individual firms, but also because of different perceptions of the external environment. One of the main challenges to study bribery at the firm level is the difficulty to measure bribery activities systematically.

In recent years, rigorous analyses on bribery at the firm level have become viable with the development of appropriate survey techniques. Using a private sector survey conducted by the World Bank and Inter-American Development Bank, Gaviria (2002) finds that bureaucratic interference is higher in firms that are more likely to pay bribes, defying a conventional wisdom that bribes can increase efficiency by allowing firms to circumvent bureaucratic harassment. Clarke and Xu (2004) show that firms are more likely to pay bribes when they are more profitable based on their analysis of firm-level data on bribes paid to utilities in 21 transition economies in eastern Europe and central Asia, a finding consistent with Svensson's (2003) study based on a survey of Uganda firms. Herrera and Rodriguez

(2003) provide empirical evidences to the claim that firms are more likely to pay bribes in environments where firms know in advance the size of bribes and believe that service for which the bribe is offered will be delivered once bribe payment is made.

The present study seeks to contribute to the empirical literature on bribery by proposing a comprehensive framework in which various hypotheses with regard to determinants of bribery can be jointly tested. We group main potential determinants of bribery into three broad categories; they are, namely, firm characteristics, firm's operating environment, and governance influence, and Table II lists 10 hypotheses on the determinants of bribery under these categories.

Firm size and growth rate

Two easily measured characteristics that might affect firms' involvement in bribery are size and growth. There are strong reasons to believe that small firms may have a higher propensity to bribe than large firms. First, small firms may be easy targets because they lack power to resist predatory officials' demands for bribe payments and they do not ordinarily attract much attention from government disciplinary agencies and law enforcement authorities (Herrera and Rodriguez, 2003; Svensson, 2003). Second, unlike large firms, which often have robust internal procedures for dealing with various business frauds, including bribery, small firms are less likely to have such internal protocols in place (Arvis and Berenbeim, 2003). Third, small firms may pay a higher proportion of their revenues in bribe payments than large firms do. The equilibrium bribe rate is often uniform across all firms regardless of size. The result is that small firms may appear to have a higher propensity to bribe than large firms, not because they are more corrupt but simply in order to keep up with basic requirements in their business environment.

Firms that are growing rapidly may be more vulnerable to extortion by corrupt officials because of their increasing "ability to pay." According to the "endogenous harassment" theory (Myrdal, 1968), predatory officials can sort targeted firms according to their "ability to pay" and demand corresponding levels of bribe payments. This possibility has been confirmed by several recent studies. For example,

TABLE II
A summary of hypotheses on the determinants of bribery

Hypothesis	
<i>Firm characteristics</i>	
Firm size and growth rate	<i>H1</i> : Small firms are more likely to pay bribe than large firms <i>H2</i> : Firms with higher growth rate are more likely to pay bribes
Corporate governance	<i>H3</i> : Family-run firms will be more likely to pay bribes than firms under other forms of governance structure <i>H4</i> : Firms with poor accounting practices are more likely to be engaged in bribery activities than firms with good accounting practices
<i>Operating environment</i>	
Market environment	<i>H5</i> : The more competitive the firms' market environment, the less likely the firms will pay bribes
Legal environment	<i>H6</i> : Firms are more likely to pay bribes if the legal system is corrupted
Regulatory environment	<i>H7</i> : Firms will be more likely to pay bribe if they perceive the regulation on licensing is problematic <i>H8</i> : Firms will be more likely to pay bribe if they perceive the interpretation of laws of regulations are not transparent
<i>Government influence</i>	
Quality of government service	<i>H9</i> : Firms are more likely to pay bribe in an environment where the quality of government services is low
Taxation	<i>H10</i> : Firms are more likely to pay bribes if they face high taxes

Svensson's (2003) research on firms in Uganda shows that the higher a firm's current and future profits, the more it must pay; Clarke and Xu (2004) report similar findings on the relationship between firm performance and bribery from transition economies in Eastern Europe and Central Asia.

Corporate governance

Although on the surface bribery may appear to be a low-cost, high-return activity, it carries significant risks for firms that practice it, and it is counterproductive in the long run (Wu, 2005a). Modern corporations are often subject to principle-agent problems and information asymmetry that make it difficult to detect bribery. Principles of good corporate governance, such as responsibility, accountability, and transparency, not only can improve firms' operating performance but can also reduce the level of bribery by solving principle-agent problems and information asymmetry. Good corporate governance also imposes more constraints on corrupt

officials by increasing the risks of being caught in illicit activities.

That the majority of businesses in Asia are family-run may contribute to the complexity of dealing with bribery practices. Family-run firms are often more vulnerable to bribery pressures because they may be perceived by corrupt officials as ideal "trading" partners. Family firms are more likely to return past favors because of a longer continuity of management (Wu, 2005b). Being involved with a few families instead of a large number of firms also could reduce the chances of being exposed, as corrupt officials would only need to deal with a few individuals.

Poor accounting practices in many Asian firms pose another significant barrier to efforts to reduce bribery. Meticulous accounting practices are essential to detecting and preventing bribery, because bribery often involves financial payment in one form or another, and it almost inevitably leaves a paper trail (Kimbro, 2002). Accounting is an information system that reports financial transactions and auditing serves as a monitoring and internal control mechanism: together they form a critical line of defense against corrupt practices.

Market environment

The market environment for Asian firms has changed dramatically in recent decades. Many developing countries have introduced market-oriented reforms to open up more sectors for competition, and globalization entails competition not only among local firms but also with multinational companies that may have better technology and products. These changes could have profound impacts on firms' decisions to participate in bribery and other corruption schemes. Market competition created by dismantling state monopolies may reduce bribery activities by decreasing firms' incentive to bribe. Increased market competition may also offer firms the chance to sell to new markets and thus decreases their reliance on government procurement contracts to meet sales targets. These insights are confirmed by some recent studies that show that competition reduces the level of corruption (Ades and Di Tella, 1999; Clarke and Xu, 2004).

Legal environment

The legal system provides a potential safety valve for controlling the spread of bribery practices: it imposes risks on both sides, to corrupt officials and to firms that pay bribes (Treisman, 2000). However, the legal system itself is a part of government structure and thus subject to the same afflictions. For example, in many Asian countries the legal system is as corrupt as other government agencies, if not more so. Firms operating within a corrupt legal environment may be more prone to bribery, for two reasons. Predatory officials have less to fear when backed by a corrupt legal system. And firms can bribe their way out of trouble when dealing with law enforcement agencies, even if their bribery activities become exposed.

Regulatory environment

Regulation is an important policy instrument that governments can wield to combat various market failures that are pervasive in modern society, and it has assumed a heightened role in many developing countries after market-oriented reforms. However, regulation can provide a fertile breeding ground for

bribery in countries with weak governance, where officials charged with regulatory responsibility are often given discretionary power (Wei, 2000). Governments not only impose regulations but also levy taxes and enforce criminal laws. As they carry out these functions, officials can delay and harass firms that they deal with, and they can impose costs selectively in a way that affects firms' competitive position (Rose-Ackerman, 1996). The greater an official's discretionary power becomes, the more opportunities arise for extracting bribery payments. Moreover, according to the endogenous harassment theory, predatory officials may create unnecessary regulations and rules expressly in order to maximize opportunities for reaping payments. Such opaque and complex regulatory environments create various incentives for firms to pay bribes, including quick approval of registration permits or licenses, or favorable interpretations of laws and regulations.

Quality of government services

Commonly referred to as facilitating payment, or speed money (Argandona, 2005), bribes may be paid to avoid delays induced by a government's failure to deliver their services efficiently. In many developing countries, governments are unable to deliver standardized quality services because of no competition in the provision of these services, or no incentive for government employees to improve services, or both; but firms can obtain packaged services in exchange for bribes paid (Gaviria, 2002; Rose-Ackerman, 2002). One would expect firms to have a higher propensity to pay bribes in an environment where the quality of government services is low.

Taxation

Tax evasion is a common form of financial fraud among firms that are confronted with high taxes (Palda, 2001). Opportunities for tax evasion provide firms with an incentive to bribe tax collectors to overlook the fraud. And taxation subjects firms to extortion from corrupt officials who have discretionary powers to interpret and enforce laws and regulations on taxation, and this is especially true in instances where arbitrary and irregular tax-like levies

are imposed by authorities (Asher, 2001). One would expect that firms facing high taxes would have greater propensity to bribe.

Empirical analysis

Data

In contrast to the wealth of literature on corruption, few empirical studies on bribery have been conducted on the firm level. The secretive and illicit nature of bribery poses serious challenges for data collection. In recent years, however, international financial institutions have launched several large-scale cross-country surveys targeted at the firm level, such as the World Business Environment Survey (WBES) and the Business Enterprise Environment Performance Survey (BEEPS). Because these surveys address many issues related to bribery activities, they provide unique new data on firm-level bribery that can be used for empirical research (Kaufmann, 1997; Svensson, 2003).

The present study relies on data from the World Business Environment Survey (WBES), conducted by the World Bank, to determine the constraints that businesses confront worldwide. The surveys were carried out over a period of roughly 18 months between the end of 1998 and the middle of 2000. Data were collected mostly through personal interviews conducted at the managerial level, and 10,032 enterprises from 83 countries participated in the survey. WBES appears to be the only survey to record information on corruption and bribery from individual firms across Asian countries (BEEPS contains similar information but for 26 transition countries in Central and East Europe).

WBES data are particularly suitable for comparative analysis of bribery activities in Asia because 1,867 firms from 12 Asian countries participated in the survey (for details, see Table III). The survey contains several important questions directly related to corruption and bribery in firms' business environment. For example, it asks the respondent/manager how often the individual firm must make "additional payment" to public officials to get things done,¹ and it elicits the amount of bribes paid as a percentage of the firm's revenues.²

TABLE III
Coverage of WBES in Asia

Country	Number of firms
Azerbaijan	128
Bangladesh	50
Cambodia	326
China	101
India	210
Indonesia	100
Kazakhstan	127
Malaysia	100
Pakistan	103
Philippines	100
Singapore	100
Thailand	422
Total	1867

Bribery practices in Asian firms

Table IV presents an overall assessment of bribery practices among Asian firms. When similar ratings such as "frequently," "usually," and "always" are combined, for analytical purposes, under a single heading such as "regularly," the survey reveals that 54% of Asian firms regularly pay bribes to public officials. Only 17% of firms have never paid any bribe. The results also indicate the highly institutionalized nature of bribery in many Asian countries: firms generally learn in advance the amount(s) of payment that will be required, and bribe takers do deliver promised services once payments are received.

Equally informative is the evidence that many firms have the option of not paying bribes. More than half of the Asian firms surveyed reported that they could seek out other officials to get correct treatment without recourse to bribe payments. Thus it becomes clear that the corporate sector is not just a "victim" of corruption, and many firms are in fact active and willing parties to corrupt transactions.

There is considerable variation in the degree, or incidence, of bribery experienced in different Asian countries. Table V indicates that 98% of firms in Bangladesh reported regularly paying bribes to public officials, whereas 90% of firms in Singapore never paid any. It is also interesting to note that a country's rank in the corruption perception index roughly corresponds to its incidence of bribery

TABLE IV
Nature of bribery in Asian firms

	Never (%)	Seldom (%)	Sometimes (%)	Regularly ^a (%)
Do firms have to pay some irregular “additional payments” to government officials to get things done?	17	10	19	54
Do firms know in advance about how much this “additional payment” is?	9	12	22	57
Is the service delivered as agreed if the firm pays the required “additional payment”?	5	5	13	77
Would another government official subsequently require an additional payment for the same service if firm pays the required additional payment to a particular government official?	20	11	21	47
Can the firms go to another official to get the correct treatment without recourse to unofficial payments if a government agent acts against the rules?	25	22	24	29

Data source: WBES and author’s calculation.

^aSimilar ratings such as “frequently,” “usually,” and “always” are grouped into one category (“regularly”).

payments, a confirmation that the corporate sector is indeed a major contributor to the rampant corruption problems in Asia.

Among firms reporting graft activities, the amount of bribes paid also differs considerably from country to country (Table VI). In Azerbaijan, Indonesia, Pakistan, and Malaysia, more than a quarter of these firms paid out at least 10% of their sales as bribes. And, from country to country, the amount of bribe payment may not be correlated closely with the incidence of bribery. For example, the incidence of bribery reported by Malaysian firms is quite low, but a significant portion of the Malaysian firms that were involved in bribery made sizeable payouts. In Bangladesh, by contrast, although 98% of firms reported some degree of bribery activity, the majority of these firms made only small payouts. From this perspective, anti-corruption programs may actually result in increased amounts per bribe payoff, as a higher reward is needed to justify the increased risk of being caught in illicit activity (Rose-Ackerman, 2002).

In summary, the corporate sector is an important source of prevalent corruption problems in Asia. WBES survey results demonstrate that the majority of Asian firms have been involved in bribery activities, although the nature of these activities varies distinctively across countries. Firms may pay a sizable

portion of their sales as bribes, and bribe payments often lead to further extortions from predatory officials.

Econometric models

Three econometric models – probit, ordered, and interval regression – were adopted to test the hypotheses on the determinants of bribery in Asian firms. The probit model focuses on firms’ decisions to engage in or refrain from bribery in their business operations. The ordered probit model investigates how frequently firms are engaged in bribery. The interval regression model analyzes size of payments among firms that do pay bribes. Together, these econometric models offer a multidimensional view of the dynamics of bribery activities among Asian firms.

The probit model assumes that the firm’s bribe payment (y_i^*) is a function of a set of variables. That is,

$$y_i^* = \beta' x_i + u_i, \quad (1)$$

where y_i^* is assumed to be a “latent” variable that cannot be observed directly. What is observed is a dummy variable y_i defined by

TABLE V
Incidence of bribery versus perception of corruption among firms across Asian countries

	Incidence of bribery				Perception of corruption			
	Never (%)	Seldom (%)	Sometimes (%)	Frequently (%)	No obstacle (%)	Minor obstacle (%)	Moderate obstacle (%)	Major obstacle (%)
Azerbaijan	17	14	9	59	21	22	17	40
Bangladesh	0	2	4	94	4	4	29	63
Cambodia	15	14	27	44	N/A	N/A	N/A	N/A
India	11	6	28	55	6	33	35	26
Indonesia	6	3	23	68	15	36	20	29
Kazakhstan	28	13	35	24	34	14	20	32
Malaysia	45	7	27	20	47	31	14	9
Pakistan	4	9	17	70	5	12	32	51
Philippines	13	17	27	43	10	17	25	48
Singapore	90	7	1	2	85	7	6	2
Thailand	4	8	10	79	1	12	26	61
Total	17	10	19	54	24	21	22	32

Data source: WBES and author's calculation.

N/A: information not available.

TABLE VI

Amount of bribery among firms across Asian countries

	Amount of bribery payments as % of sales			
	Up to 2%	2–10%	10–25%	Above 25%
Azerbaijan	56	10	26	7
Bangladesh	65	16	19	0
Cambodia	39	39	18	5
Indonesia	49	24	23	4
Kazakhstan	62	18	17	3
Malaysia	42	32	26	0
Pakistan	41	27	29	3
Philippines	73	15	13	0
Thailand	49	28	21	2

$$y_i^* = \begin{cases} 1 & \text{if } \gamma_i^* > 0 \\ 0 & \text{otherwise.} \end{cases} \quad (2)$$

The dependent variable for the probit model is I_{ij} , a dummy variable indicating whether or not firm i in country j is involved in bribery activities. I_{ij} takes 1 if the firm has engaged in bribery, and I_{ij} equals 0 if the firm has never been involved in bribery. The likelihood function for the probit model can be expressed as follows:

$$L = \prod_{\gamma_i=1} F(\beta'x_i) \prod_{\gamma_i=0} [1 - F(\beta'x_i)], \quad (3)$$

where F is the cumulative distribution function of u .

From the hypotheses on the determinants of bribery described in the previous section, a set of independent variables can be defined to measure firm characteristics: corporate governance; market, legal, and regulatory environments; quality of government services; and taxation. These, summarized in Table VII, are defined as follows.

SMALL (H1) and SALES (H2) test the importance of firm characteristics in determining the firms' propensity to engage in bribery. SMALL is a dummy variable taking 1 if firm has less than 500 employees and 0 for firm with 500 employees and above, and SALES represents the growth rate of firm's sales over the last three years (can be positive, negative, or zero).

Three variables, INDIVFAM (H3), IAS (H4), and AUDIT (H4), measure the importance of corporate governance in determining the propensity for bribery. All three are dummy variables. INDIVFAM indicates whether a firm is controlled by individual owners or family (as distinct from, e.g., a governing board or managers). IAS indicates whether a firm has adopted international accounting standards while

TABLE VII
Descriptive statistics of variables

Variable	Description	Mean	SD
SMALL	Dummy variable. 1 = Small size firm; 0 = all others	0.82	0.38
INDIVFAM	Dummy variable. 1 = firm is controlled either by individual owner(s) or a family; 0 = all others	0.49	0.50
IAS	Dummy variable. 1 = firm adopts international accounting standards; 0 = all others	0.48	0.50
AUDIT	Dummy variable. 1 = Annual financial statements reviewed by external auditor; 0 = all others	0.58	0.49
COMPETITION	Number of competitors	2.50	0.83
SALES	Percentage of change (increase or decrease) of the firm's sales over the last three years	0.03	0.36
COURT	The extent to which the court system is honest/uncorrupt (1 = never; 2 = seldom; 3 = sometimes; 4 = frequent; 5 = usually; 6 = always)	3.56	1.56
GOVEFFIC	Efficiency of government in delivering services (1 = very efficient; 2 = inefficient; 3 = mostly inefficient; 4 = mostly efficient; 5 = efficient; 6 = very efficient)	3.60	1.27
LICENSING	The extent to which business licensing is problematic. Scale from 1 to 4 (1 = no obstacle; 2 = minor obstacle; 3 = moderate obstacle; 4 = major obstacle)	1.98	0.99
TAXATION	The extent to which tax regulations/administration are problematic. Scale from 1 to 4 (1 = no obstacle; 2 = minor obstacle; 3 = moderate obstacle; 4 = major obstacle)	2.97	1.06
INTERPRETATION	The extent to which interpretations of regulations affecting the firm are consistent and predictable (1 = never; 2 = seldom; 3 = sometimes; 4 = frequently; 5 = mostly; 6 = always)	3.86	1.19

AUDIT indicates whether a firm's annual financial report receives an external audit.

Operating environment is represented by three variables: market, legal, and regulatory. Number of competitors (COMPETITION) tests the hypotheses on the importance of market environment in determining propensity to bribe (H5). Firms' legal environment is measured by COURT (H6), a nominal variable scaling from 1 to 6, indicating the extent to which the court system is honest and uncorrupted. Quality of the regulatory environment is measured by LICENSING (licensing requirements) and INTERPRETATION (level of transparency in interpretation of laws and regulations), corresponding to H7 and H8, respectively.

Two independent variables on governmental influences round out the probit model. GOVEFFIC (H9) measures the impacts of quality of government services on bribery in terms of firm's responses to a

question on the efficiency of government in delivering services (ranging from "very inefficient" to "very efficient"). TAXATION (H10) measures firms' perceptions on the extent to which high taxes are an obstacle to business activity (ranging from "no obstacle" to "major obstacle").

The second econometric model, the ordered probit model, focuses on the determinants of frequency of bribery activities. The dependent variable, BRIBE, indicates how frequently firms engage in bribery (ranging from "never" to "always"). This model assumes that frequency of bribery practices (y_i^*) is a function of a set of variables, including the test variables and control variable. That is,

$$y_i^* = \beta' x_i + u_i \quad (4)$$

where y_i^* is a "latent" variable that cannot be observed directly. What is observed is

$$\begin{aligned}
y_i &= \text{“never”} \text{ if } \gamma_i^* \leq 0 \\
&= \text{“seldom”} \text{ if } 0 \leq \gamma_i^* < \mu_1 \\
&= \text{“sometimes”} \text{ if } \mu_1 \leq \gamma_i^* < \mu_2 \\
&= \text{“frequently”} \text{ if } \mu_2 \leq \gamma_i^* < \mu_3 \\
&= \text{“mostly”} \text{ if } \mu_3 \leq \gamma_i^* < \mu_4 \\
&= \text{“always”} \text{ if } \mu_4 \leq \gamma_i^* < \mu_5
\end{aligned} \tag{5}$$

The corresponding probabilities for each ordinal interval can be stated as:

$$\begin{aligned}
\text{prob}(y_i = \text{“never”}) &= \phi(-\beta'x_i) \\
\text{prob}(y_i = \text{“seldom”}) &= \phi(\mu_1 - \beta'x_i) - \phi(-\beta'x_i) \\
\text{prob}(y_i = \text{“sometimes”}) &= \phi(\mu_2 - \beta'x_i) - \phi(\mu_1 - \beta'x_i) \\
\text{prob}(y_i = \text{“frequently”}) &= \phi(\mu_3 - \beta'x_i) - \phi(\mu_2 - \beta'x_i) \\
\text{prob}(y_i = \text{“mostly”}) &= \phi(\mu_4 - \beta'x_i) - \phi(\mu_3 - \beta'x_i) \\
\text{prob}(y_i = \text{“always”}) &= \phi(\mu_5 - \beta'x_i) - \phi(\mu_4 - \beta'x_i)
\end{aligned} \tag{6}$$

And log-likelihood of the model can be specified as

$$\ln L = \sum_{i=1}^N \sum_{j=0.4}^1 Z_{ij} \ln [\phi_{ij} - \phi_{i,j-1}] \tag{7}$$

where $\phi_{i,j} = \phi(\mu_j - \beta'x_i)$, $\phi_{i,j-1} = \phi(\mu_{j-1} - \beta'x_i)$, and Z_{ij} is an indicator variable which equals 1 if $y_i = j$ and 0 otherwise.

The interval regression model assumes that a firm's bribe payment (γ_i^*) is a function of a set of variables. That is,

$$\gamma_i^* = \beta'x_i + u_i \tag{8}$$

Although γ_i^* cannot be directly observed, information is in hand regarding the upper and lower bound of payments made by bribe-paying firms; it is thus possible to use the interval regression model to estimate the determinants of the amount of bribe payment. The dependent variable for the model is taken from responses to a question on amount of bribes as a percentage of the firms' revenues. Only firms responding with non-zero percentages are included in the estimation, and six brackets are constructed, corresponding to firms reporting <1% (0, 0.01), 1–2% (0.01, 0.02), 2–10% (0.02, 0.10), 10–12% (0.10, 0.20), 12–25% (0.12, 0.25), and more than 25% (0.25, 1.00). The two numbers in the each bracket indicate the lower (b_i^{lower}) and upper (b_i^{upper}) bounds of the bribery payment made by the firm.

The likelihood function for the interval regression model can thus be expressed as

$$L = \sum_i \log \left[\phi \left(\frac{b_i^{\text{upper}} - \beta_1 x_i}{\sigma} \right) - \phi \left(\frac{b_i^{\text{lower}} - \beta_1 x_i}{\sigma} \right) \right] \tag{9}$$

The same independent variables are used for all three models. A set of dummy variables for country was also included, to control for country and international differences such as global corruption and income level. A set of industry-level dummy variables was added to control for the influence of sectors (manufactory, services, agriculture) on bribery.

Regression results

The results of the three models are presented in Table VIII. Column (1) reports the coefficients and standard errors of the estimation based on the probit model, which aims at explaining firms' decisions on whether or not to bribe.

The results show that firm characteristics matter. Consistent with other empirical studies (Clarke and Xu, 2004; Svensson, 2003), the propensity to bribe is significantly correlated with firm size. Small Asian firms are more likely to bribe than their larger counterparts (H1). However, the hypothesis on relationship between firm growth and propensity to bribe (H2) is unsupported. Firms experiencing slower growth are just as likely to engage in bribery as the fast-growing firms.

Corporate governance also may play an important role in propensity to bribe. Consistent with the hypothetical prediction, firms controlled by individual owners and family are more likely to pay bribes than are firms governed by boards or other advisors (H3). However, firms' accounting practices, as measured by adoption of international standards and practices (H4), do not show a statistically significant effect on propensity to bribe. These results suggest that while actual improvement in accounting practices can potentially reduce the incidence of bribery, mere lip service to accounting rules and regulations will do little to reverse the trend.

The effect of market competition on bribery (H5) is both statistically and economically significant in the probit and ordered probit models, but the sign

TABLE VIII
Regression results

	(1)	(2)	(3)
SMALL	0.380** (0.168)	0.150* (0.092)	0.005 (0.008)
INDIVFAM	0.307** (0.143)	0.160** (0.079)	0.006 (0.005)
IAS	0.169 (0.146)	0.018 (0.087)	0.001 (0.006)
AUDIT	-0.023 (0.206)	0.014 (0.112)	-0.009 (0.007)
COMPETITION	0.727*** (0.101)	0.173** (0.074)	0.002 (0.006)
SALES	-0.042 (0.131)	-0.049 (0.074)	-0.013** (0.005)
COURT	-0.123** (0.050)	-0.078*** (0.029)	-0.006*** (0.002)
LICENSING	0.207** (0.083)	0.107*** (0.041)	0.004 (0.003)
INTERPRETATION	-0.193*** (0.067)	-0.045 (0.036)	-0.007*** (0.002)
GOVEFFIC	-0.246*** (0.063)	-0.248*** (0.037)	-0.005** (0.002)
TAXATION	0.249*** (0.064)	0.200*** (0.043)	0.002 (0.003)
Number of observations	899	901	454
Pseudo R^2	0.381	0.100	

Note: The table reports unstandardized coefficients, with standard errors in parentheses.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

on the coefficients on COMPETITION shows that the level of competition has positive effects on bribery activities, in contrary to the theoretical prediction made earlier. One plausible explanation is that firms may acquiesce to increased bribe payments if a bidding war for desired services intensifies. Another explanation is that, in a fiercely competitive environment, firms may resort to bribery to sidestep bureaucratic red tape when delays could directly translate to loss of market share. The findings of a positive correlation between competition and bribery activities suggest that reform initiatives to increase market competition, such as privatization and deregulation, might actually create some obstacles for anti-corruption campaign from the supply side of corruption.

Legal and regulatory environments play a significant role in determining firms' propensity to bribe. Propensity to bribe is found negatively correlated with quality of legal environment as measured by the extent to which the court system is viewed as honest and uncorrupted (H6). Characteristics of the regulatory environment are also among key determinants of propensity to bribe: firms that report resentment over licensing requirements (LICENSING) are more likely to bribe government officials (H7), and the opposite is true for firms that are satisfied with persistence and predictability of interpretation of laws and regulations (H8).

Both the quality of government service (GOVEFFIC) and level of taxes (TAXATION) are shown to be important determinants of firms' decision to bribe. The more efficient the governance service, the less likely firms will engage in bribery (H9). Firms are more likely to bribe if they perceive high taxes are barriers to their businesses (H10).

Column (2) reports the results of the ordered probit model that focus on the determinants of frequency of bribery. These results are quite similar to the estimations based on the probit model, an indication that the findings are robust. Small firms have higher incidence of bribery than large ones, and firms controlled by individual owners and family bribe more often than firms controlled by corporate boards, managers, or financial institutions. Here too, operating environments play key roles: level of competition drives firms to bribe more frequently, honest and uncorrupt court systems reduce firms' incentives to bribe, and firms bribe more often if facing tortuous licensing requirements. And quality of government service and level of taxes also feature among determinants of the incidence of bribery.

The dynamics determining the amount paid by firms that decide to bribe (Column 3, the interval regression model) do not follow the pattern visible in Columns (1) and (2). Firm size (SMALL) and the identity of controlling stakeholders (INDIVFAM) both have the expected effects on amount of bribe

payment, but the coefficients are not statistically significant. However, the growth rate of bribe-paying firms has statistically significant effects on the amount of bribes paid: the higher the growth rate, the less is required for bribes. This result suggests that high-growth firms may have more leverage in dealing with requests from corrupt officials. Other statistically significant variables in this column, INTERPRETATION and GOVEFFIC, indicate that the more transparent the interpretation of laws and regulation is perceived to be, and the more efficient government services are perceived to be, the less amount firms will pay in bribes.

Discussion

In summary, the multivariate analysis suggests that bribery activities at the firm level are determined by a set of determinants both internal and external to the firms. Firm size, identity of controlling stakeholders, integrity of court systems, licensing requirements, transparency of interpretation of laws and regulations, efficiency of government services, and level of taxes are all shown to be important factors in firms' propensity to bribe and in incidence of bribery. But quite a different picture emerges regarding the dynamics driving the *amount* of bribes paid: only a small set of variables prove to be significantly correlated here.

While most of these findings are consistent with theoretical predictions and other empirical work, a few "surprises" have emerged. Market competition may drive up the level bribery activities, and contrary to the "ability to pay" hypothesis, high-growth firms would pay a relatively lower proportion of revenue in bribes than would firms with slower growth. In addition, intriguingly, the results consistently show that conformity with international accounting standards and practices may not directly contribute to the reduction of bribery at the firm level.

Concluding remarks

Although most Asian firms consider corruption among the major obstacles for business development, a substantial percentage of these firms are engaged in bribery activities on a regular basis. The empirical analysis presented here clearly shows that the corpo-

rate sector, often portrayed as the victim of corruption, is an important source of rampant corruption problems in Asia. In most countries a majority of firms have engaged in bribery activities, and in some countries almost all firms are involved in one way or another. These bribery practices are highly institutionalized, as there appears to be little uncertainty regarding the amount of bribes expected to be paid as well as the delivery of services in exchange for bribe payments. It is also clear that corporate bribe-payers are not always the innocent prey that they are made out to be, for many firms are active and willing parties in corrupt transactions.

Perhaps because the corporate role in bribery activities in Asia has not been well understood, the potential for containing corruption through the reduction of such practices in the corporate sector has not been fully explored. One major shortcoming of many anti-corruption programs is that the supply side of corruption problems has not been given due attention. Corruption has aspects of both demand and supply, and the actions of bribe-payers (supply side) are as important as those of bribe-takers (demand side) in determining the nature and level of corruption.

The empirical analysis detailed above points to several potential areas where anti-corruption programs can work more effectively by targeting the supply side of corruption problems. Corporate decisions to engage in bribery are determined by factors both internal and external to firms. Characteristics such as firm size and growth rate are important determinants of bribery activities at the firm level, and corporate governance can also play an important role in determining the propensity and incidence of bribery. External influences that firms must confront may render them more vulnerable to bribery practices. Asian firms are more likely to bribe when faced with fierce market competition, corrupted court systems, convoluted licensing requirements, nontransparent interpretation of laws and regulations, inefficient government service delivery, and high taxes.

The findings shown here suggest that government, the business community, and individual firms all have respective roles to play in combating bribery in Asian firms. Government can significantly reduce bribery by targeting areas where firms are most prone to bribery practices, such as integrity of court systems, business licensing requirements, quality of government service delivery, and taxation. The business community can

reduce incidence of bribery by setting up rules of market competition so that bribery will not automatically increase as the level of competition rises. Individual firms can shoulder their share of responsibility through improvements in corporate governance, such as broadening the basis of ownership.

Success in combating bribery in Asian firms will have significant impacts in several arenas. It is not only of paramount importance to sustaining growth in Asian countries but also essential to the global anti-corruption campaign, because many Asian countries are among the leading exporting nations in the world. If Asian firms cannot develop effective measures against bribery activities within and among themselves, such practices may spread and contribute to the increase of corruption in other countries.

Notes

¹ Firms were asked: “How often do firms in my line of business have to pay some irregular ‘additional payments’ for government officials to get things done?” The responses were tabulated across a range: always, usually, frequently, sometimes, seldom, and never.

² Firms were asked: “What percentage of revenues do firms like yours pay per annum in unofficial payments to public officials?” The responses ranged across percentages: 0%, <1%, 1–2%, 2–10%, 10–12%, 12–25%, and >25%.

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