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HOW TAXING IS CORRUPTION ON INTERNATIONAL INVESTORS?

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Abstract—This paper studies the effect of corruption on foreign direct investment. The sample covers bilateral investment from twelve source countries to 45 host countries. There are two central findings. First, a rise in either the tax rate on multinational firms or the corruption level in a host country reduces inward foreign direct investment (FDI). In a benchmark estimation, an increase in the corruption level from that of Singapore to that of Mexico would have the same negative effect on inward FDI as raising the tax rate by fifty percentage points. Second, American investors are averse to corruption in host countries, but not necessarily more so than average OECD investors, in spite of the U.S. Foreign Corrupt Practices Act of 1977.

> "We need to deal with the cancer of corruption. . . . We can give advice, encouragement, and support to governments that wish to fight corruption—and *it is these governments that, over time, will attract the larger volume of investment.*" (Emphasis added).
>
> James D. Wolfensohn[1]
> President, The World Bank

I. Introduction

This paper studies two sets of questions regarding the effect of corruption on international direct investment. First, does corruption in host countries negatively affect their ability to attract foreign direct investment (FDI)? How big is the effect relative to the host governments' tax on foreign corporations? Second, is the United States a special source country? I will test the hypothesis that the American investors are especially sensitive to host country corruption, possibly due to the deterrent effect of the U.S. Foreign Corrupt Practices Act.

This first question is partly motivated by the observation on China. China has rampant corruption according to various newspaper accounts as well as surveys of business executives.[2] Yet, for every year in the last four, China has been the largest developing host of international investment. Even its FDI flow-to-GDP ratio has been among the highest among developing countries. Indonesia is another apparent paradox. President Suharto is known as "Mr. Ten Percent," as foreign corporations doing business there are naturally expected to pay a relatively well-defined bribe to the president or members of his family. Yet, Indonesia is a popular destination of FDI, particularly those from Japan.

Empirical evidence on a negative correlation between corruption and inward FDI has so far been elusive. In a study of foreign investment of U.S. firms, Wheeler and Mody (1992) failed to find a significant correlation between the size of FDI and the host country's risk factor, a composite measure that includes perception of corruption as one of the components. The authors concluded that the importance of the risk factor should "be discounted, although it would not be impossible to assign it some small weight as a decision factor" (p. 70).

Similarly, more recently, using total inward FDI (as opposed to bilateral FDI used in this paper), Hines (1995) failed to find a negative correlation between total inward FDI and the corruption level in host countries. Commenting on his table A6, Hines remarked (footnote 24, p. 20), "while the equations fit poorly, it is noteworthy that local corruption has an insignificant effect on post-1977 growth of FDI."[3]

On the other hand, popular press and policy circles seem to believe that corruption does reduce inward FDI, as suggested by the opening quote from James Wolfensohn,

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[1] "Transition," 7(9–10), p. 9, Sept/Oct., 1996.

[2] According to *The Wall Street Journal* ("Smugglers Stoke B.A.T.'s Cigarette Sales in China," December 18, 1996), the Chinese consume a huge quantity of foreign-made cigarettes ("one in every three cigarettes is smoked in China"), but 90% of the imports do not pay duty. The British American Tobacco (BAT) company is the largest supplier of foreign cigarettes in China. In 1995, the company sold 400 million cigarettes that were duty-paid, 3 billion in duty-free shops, 4 billion in special economic zones (SEZs)—many of which were transported illegally to other parts of China—and 38 billion to retailers who smuggled their way directly into China. Conversations with Hong Kong businessmen indicate that there is a well-developed fee-for-service business in Hong Kong to smuggle goods through Chinese customs. There are at least four different ways to circumvent the Chinese tariffs, most of which involve paying bribes to Chinese customs officials. A business consultant who works for a major U.S.-owned consulting firm in Hong Kong indicated that 90% of foreign wine in the Chinese market was also smuggled into the country.

[3] Hines did find a significantly negative effect of corruption on U.S. FDI and interpreted it as a result of the Foreign Corrupt Practices Act. I will return to this later.

president of the World Bank. So why is the empirical evidence so elusive? Wheeler and Mody (1992) combined the corruption measure with twelve other indicators to form one regressor (what the authors called ''RISK''). These other indicators include ''attitude of opposition groups towards FDI,'' ''government support for private business activity,'' and ''overall living environment for expatriates,'' which may not be overwhelmingly correlated with government corruption, may not be precisely measured, or may not be as important for FDI as one imagines. As a result, the noise-to-signal ratio for the composite measure (RISK) may be too high to show up significantly in the regressions. In the part of the Hines' paper that deals with this question, the total inward FDI from the IMF's IFS database may also be too noisy.

The first objective of this paper is to reexamine the corruption effect on a broader panel of bilateral FDI data with a more comprehensive list of control variables. Furthermore, both host country tax and corruption could have a negative effect on inward FDI. The literature has so far not considered the two effects simultaneously. To reveal the ''bottom line,'' I will report evidence that corruption in a host country does depress inward FDI in a way that is statistically significant and quantitatively large.

The second motivation of the paper comes from the U.S. government's concern that the Foreign Corrupt Practices Act (FCPA) of 1977 may have undermined the competitiveness of American firms in the overseas markets vis-a-vis firms from Europe, Japan, and elsewhere. The FCPA came as a byproduct of the Watergate hearings in the early 1970s, when many American firms were discovered paying large bribes to foreign officials in addition to contributing to domestic political parties. As a sign of the mood of the day, the bill was passed unanimously in the Senate and the House and was signed into law by President Carter. At the time the law was enacted, it may have been hoped that other major source countries would follow suit. But, for a long time (up to February, 1999), the FCPA made the United States the only source country in the world that penalized its multinationals or their officers with fines or jail terms for bribing foreign government officials.

On a priori ground, the American multinationals may not necessarily dislike the law. Aside from the moral position of the corporate officers, the law may serve as a useful commitment device for them in the face of a demand for bribery by a foreign corrupt official. The law allows them to say something to the effect, ''I would like to pay you. But I am sorry I can't. If I do, I will go to jail.'' This commitment device is not available to companies from other source countries. If the American firms have the one and only kind of technology that the host country needs, the American firms may very well still capture the business but with a lower cost (because of no bribery). In this case, the FCPA would not hinder the U.S. investment.[4] Alternatively, if the American firms can find a way to circumvent the law (for example, by using a close substitute for outright bribery payment), their competitive position vis-a-vis other investors would not be affected either. Hence, the effect of the FCPA on the American competitiveness becomes an empirical one: Is it binding at the margin?

Using country dummies as a measure of corruption, Beck et al. (1991) found a statistically significant but quantitatively small effect of corruption on the U.S. export competitiveness. In the concluding chapter of J. David Richardson's 1993 book, *Sizing Up U.S. Export Disincentives,* the author noted under the section titled ''Surprisingly Small Estimates'' that ''across-the-board regulatory burdens, such as procedures mandated for all businesses by the Foreign Corrupt Practices Act, seemed generally unimportant'' (p. 131). The best and the most-recent evidence on U.S. FDI and exports was provided by James Hines (1995). Controlling for the growth of the host country GDP, Hines found evidence that corruption negatively affects the growth of U.S.-controlled FDI during 1977–1982, their capital/labor ratio, incidence of joint ventures, and aircraft exports. He interpreted the findings as evidence that FCPA has undermined the competitiveness of American firms relative to other countries.

There are some reasons to think that the Hines' interpretation may require some additional evidence. First, corruption may reduce FDI from non-U.S. investors to the extent that they feel morally obligated to avoid bribery. Second, American firms may be just as clever at finding covert substitutes for bribery payments as other investors.[5] Third, the degree of corruption in host countries tends to be highly correlated with many other dimensions of the government quality, such as extent of bureaucracy and red tape, or quality of legal system. These features are likely to affect non-U.S. investors as well. To attribute the U.S. FDI's negative correlation with corruption measure to the FCPA, we need to control for the response of all FDI to corruption.[6]

The classical theoretical work on corruption includes Nye (1967), Rose-Ackerman (1975, 1978), and Shleifer and Vishny (1993). In light of the literature, let me be up front

[4] For a formal model of this commitment story and empirical evidence, see Kaufmann and Wei (1999).

[5] Conversations with Chinese businessmen and officials suggest that outright financial payment is not the dominant bribery form in China (because bribe-taking officials can be prosecuted even in the Chinese court). Instead, sponsoring a ''study trip'' (read *expense-paid tours*) for officials to a foreign country (particularly that of the home country of the multinational firm) and providing financial support for family members of the officials to study or work in a foreign country are popular and legal ways to curry favor with the corrupt officials. Anecdotal evidence suggests that American firms are just as creative and active (if not more so) as investors from any other country.

[6] Hines attempted to control for this with total inward FDI as one of the regressors. The data on total FDI are from the World Bank's *World Tables,* and were originally reported by host countries as part of their national income and product accounts. The definitions and calculation methods differ considerably among the countries. Consequently, the data may have large measurement errors. In addition, because total FDI is affected by many of the same factors as the U.S. FDI, it is likely to be correlated with the error term in regressions in which the U.S. FDI is the dependent variable. This measure of total FDI is not statistically significant in any of his regressions (Hines, 1995, table 2).

about the limitations of this paper. Susan Rose-Ackerman made a distinction between bribery (including campaign contribution) to erect or change the rules/laws to favor the payers and bribery to deviate from an honest implementation of the exiting rules/laws. Shleifer and Vishny made a distinction between organized or efficient corruption (the payers can get things done after a relatively well-defined bribe) and disorganized or inefficient corruption (there is still a big residual uncertainty even after the bribe). The measures of corruption used in this paper cannot capture this conceptual richness.[7] I would suppose that the survey-based corruption measure refers mainly to the administration of rules/laws pertinent to foreign firms and probably is weighted by efficiency level as perceived by those who were surveyed.

Corruption can have many other detrimental effects on the host countries. In the economic sphere, corruption may reduce growth rate, possibly as a result of reduced domestic investment (Mauro, 1995; Knack & Keefer, 1995; Rodrik, 1996; & Kaufmann, 1996).[8] In political-economy terms, corruption often contributes to an unfair income or wealth distribution. In political terms, corruption can breed political instability. These important aspects of corruption may interact with its effect on inward FDI. This paper does not explicitly study any of these effects.

The paper is organized as follows. Section II describes the data set. Section III reports the statistical results, and section IV provides concluding remarks.

II. Data

The key variable to be explained is the bilateral stocks of FDI from twelve source countries to 45 host countries.[9] The data come from table 8 of the OECD International Direct Investment Database. The source countries include the seven largest ones in the world: the United States, Japan, Germany, the United Kingdom, France, Canada, and Italy. Many OECD member countries report both outward and inward FDI. I choose the outward FDI as it is more likely to be consistent in definition for a given source country, and it provides the greatest number of host countries in coverage.

The data on 1989 host countries' tax rate on foreign corporations is the minimum of the following two measures: the statutory marginal tax on foreign corporations as reported by Price Waterhouse (1990) and tax payment to the host governments by the foreign subsidiaries of American firms divided by their total income in that country. The data on 28 of the host countries are taken from Desai & Hines (1996, appendix table 2). The rest (seventeen countries) are obtained using the Price Waterhouse source. In an appendix table, I also provide estimates based on the statutory tax rates in 1992 as reported by Price Waterhouse and kindly provided by Rosanne Altshuler from the data used in Altshuler, Grubert and Newlon (1998).

I use three measures of corruption, all of which are based on surveys of respondents. The first one was based on surveys conducted and organized during 1980–1983 by Business International (BI), now a subsidiary of the Economist Intelligence Unit. BI reports a number of survey-based rankings of country risk factors, of which ''corruption'' is one. The BI corruption measure is an integer from 1 (most corrupt) to 10 (least corrupt) according to ''the degree to which business transactions involve corruption or questionable payments.'' The data are kindly provided by Paolo Mauro, who collected them by hand from BI's archives.

The second measure was compiled by the International Country Risk Group (ICRG). According to the Knack and Keefer paper (1995), to which the ICRG data source refers for definitions of its variables, ''lower scores indicate 'high government officials are likely to demand special payments' and 'illegal payments are generally expected throughout lower levels of government' in the form of 'bribes connected with import and export licenses, exchange controls, tax assessment, police protection, or loans.' '' The variable is supposed to be on a 0–6 scale. In reality, the minimum and maximum ratings any country receives is 1 and 5, respectively, making it effectively a 1–5 scale. There is no description of the methodology used in deriving the country ratings. Presumably, they come from in-house expert rating, like the Business International index.

The third measure is compiled by Transparency International (TI), an agency dedicated to fighting corruption worldwide. The TI index is scaled from 0 (most corrupt) to 9 (least corrupt). The TI index itself is an average of ten survey results on corruption over a number of years. The averaging procedure used by the TI could reduce measurement error if the errors in different surveys are independent. On the other hand, the ratings on different countries are derived from different surveys, potentially introducing inconsistency in the cross-country ratings. Fortunately, the BI and TI indices are highly correlated (with a correlation coefficient equal to 0.89). In the subsequent sections, I will report estimation results using both measures, while concentrating the discussion on results using the BI index.

To avoid awkwardness in interpreting the coefficients, I recode the ''corruption'' measures in this paper so that a high number reflects a high level of corruption: BI index here equals 11 minus the original BI index; ICRG here equals 7 minus the original ICRG index; and the TI index here equals 10 minus the original TI index.

The GDP and population data are from the International Monetary Fund's International Financial Statistics database.

[7] A more detailed explanation is in the next section.

[8] Both Knack and Keefer and Rodrik employ a composite measure of institutional quality, which is composed of rule of law, repudiation of contracts by governments, expropriation risk, quality of bureaucracy, and corruption in the government. These indicators are highly correlated with each other. Kaufmann (1996, summary, page I) found, among participants in Harvard University's special mid-career programs and short-term workshops during the summer of 1996, that a majority ''consider corruption about the most important challenge for economic development and growth for their countries, and also many regard vested financial interest and corruption as a key reason for the lack of sufficient economic reform progress in recent times.''

[9] The number of host countries is constrained by the availability of data on tax on foreign corporations and measures of corruption.

In a few cases for which GDP data are not available, GNP data are used instead. The wage and labor compensation data are from the International Labor Organization, with the kind assistance of Dr. Xiaolun Sun.

The dummy on linguistic tie takes the value of 1 if the source and host countries share a common language, and 0 otherwise. The data on distance measures the "greater circle distance" between the economic centers in the source-host pair. Both data have been used in Frankel et al. and Wei (1995) and Wei (1996b).

The data on 1990 adult literacy ratio is defined as 1 minus the adult illiteracy ratio in 1990. The adult illiteracy ratio comes from table 1 of the World Bank's *World Development Report 1995,* which cites the U.N. Educational, Scientific, and Cultural Organization (UNESCO) as the original source. The report does not present illiteracy rates for high-income countries but does contain a footnote that reads "according to UNESCO, illiteracy is less than 5 percent." I assign 2.5% as the illiteracy rate for these high-income countries. According to the World Bank Report's technical notes "adult illiteracy is defined here as the proportion of the population over the age of fifteen who cannot, with understanding, read and write a short, simple statement on their everyday life" (p. 231).

The information on 1990 total secondary school enrollment comes from table 28 of the same World Bank report. According to the technical notes to the table (p. 241), the data are estimates of the ratio of children of all ages enrolled in secondary school to the country's population of secondary-school-age children. It notes that the definition of *secondary school age* "differs among countries," and "is most commonly considered to be 12 to 17 years." It further notes that "late entry of more mature students as well as repetition and the phenomenon of 'bunching' in final grades can influence these ratios."

Table 1 reports summary statistics on some of the key variables. We observe that the statutory and effective tax rates are highly correlated with each other. For the three indicators of corruption, pairwise correlations are high, although the correlation between the BI and ICRG indices is the lowest among all three pairs.

TABLE 1.—SUMMARY STATISTICS

	Mean	Std Dev	Minimum	Maximum	#obs
Tax-rate (statutory)	0.34	0.11	0.10	0.59	41
Tax-rate (effective)	0.34	0.12	0.02	0.55	45
Corruption (BI)	3.70	2.49	1	10	45
Corruption (ICRG)	2.63	1.27	1	5	45
Corruption (TI)	4.55	2.63	1	10	42
Political stability	7.93	1.17	5	10	45
Hourly wage (US$)	6.82	5.22	0.18	16.15	35

Correlation Matrix (based on 41 common observations)

	Tax (effective)	Corruption (BI)	Corruption (ICRG)	Corruption (TI)
Tax-rate (statutory)	0.64	0.10	−0.03	0.09
Tax-rate (effective)		0.25	0.22	0.33
Corruption (BI)			0.73	0.89
Corruption (ICRG)				0.87

III. Statistical Estimation

A. *Preliminary Double-Log Linear Model*

I will start with a preliminary linear model (after taking logarithms for the dependent variable, FDI, and most of the independent variables, such as GDP and distance). The model will be estimated using the ordinary-least-squares (OLS) method. The dependent variable is the stock of bilateral FDI in logarithm in 1993 from source country i to host country j. Use tax_j and $corruption_j$ to denote host country j's tax rate on foreign corporations and its corruption level, respectively. Then, the basic regression specification is

$$\log(\text{FDI}_{ij}) = X_{ij}\beta + \gamma_1 \text{tax}_j + \gamma_2 \text{corruption}_j + e_{ij}$$

where X is a vector of control variables other than tax and corruption that are relevant for determining the bilateral FDI. β, γ_1, and γ_2 are parameters.

Many of the control variables included in the X vector—such as host country GDP and population—will enter in logarithmic form, as the FDI variable on the left-hand side. Hence, this specification is referred to as the *double-log linear model.* The logarithmic transformation of the left-hand-side and many right-hand-side variables helps to make the error term, e, (close to) homoskedestic, in an analogous way to the gravity model in goods trade (e.g., Frankel et al., 1995).

I will implement a quasi-fixed-effects model. That is, the X vector in all regressions will include source country dummies.[10] The source country dummies are meant to capture all characteristics of the source countries that may be relevant to its size of outward FDI, including its GDP and level of development. In addition, differences in the definition of FDI across source countries can be controlled for by the dummies under the (somewhat audacious) assumption that these definitions are proportional to each other except for an additive error term uncorrelated with other regressors in the regression. I do not include host country dummies as doing so would eliminate the possibility of estimating all the interesting coefficients including the effects of tax and corruption.

Column 1 in table 2 presents the result of the basic OLS regression using the Business International (BI) index as a measure of corruption. Included as control variables are the size of the host country by its GDP and population, both in logarithm, the distance between the source and host countries, and a dummy for whether they share a common

[10] Because the twelve source countries cover a substantial fraction of the universe of all FDI flows in the world, a fixed-effects regression may be more appropriate than a random-effects model (Hsiao, 1986). All regressions in this paper will have a constant and seven source country dummies (U.S., Japan, Germany, France, U.K., Canada, and Italy). FDI from other source countries are relatively sparse. In order to avoid singularity or near-singularity problems in the estimation, I merge all the remaining source country dummies into one constant.

language (in addition to source country fixed effects). The coefficient on the marginal (effective) tax rate (on foreign investors) is negative and statistically significant at the 5% level. An increase of one percentage point in the marginal tax rate reduces inward FDI by 4.8%. The coefficient on the corruption measure is also negative and significant. The numerical effect is remarkably large. A one-grade increase in the corruption level is associated with a 26% reduction in the stock of inward FDI,[11] or approximately equivalent to a six-percentage-point increase in the marginal tax rate. In other words, under this double-log linear specification, a worsening in the host government's corruption level from that of Singapore (with a BI rating of 1) to that of Mexico (with a BI rating of 7.75) has the same negative effect on the inward FDI as raising the marginal tax rate by 42 percentage points.[12]

The first regression yields other interesting observations. The coefficient on the distance variable is negative and statistically significant at the 5% level: A 1% increase in distance is associated with a 0.6% reduction in the FDI. Thus, international investment to some extent is a neighborhood event. On the other hand, the coefficient on the linguistic dummy is positive and significant at the 15% level: Sharing a common language or colonial history is associated with a sizable increase in bilateral FDI flow. Some authors (e.g., Rauch, 1996a, 1996b) have emphasized the importance of networks in business transactions. While it is difficult to measure the strength of network precisely, distance and linguistic tie may capture part of it, and the evidence presented here is consistent with such a theory.

B. Modified Tobit Estimation

There is a potential problem with the double-log linear specification in the previous subsection: Not all countries receive direct investment from all source countries. These zero-FDI observations are dropped from the sample when a double-log specification is implemented. If it is the case that the desired level of FDI based on the characteristics of the host country and host-source relation is zero or negative, we have the classic censored-sample problem, and dropping these observations could lead to inconsistency. Unfortunately, it is not feasible to apply the Tobit specification while maintaining the double-log structure on the two sides of the equation, as the logarithm of zero (FDI) is undefined. Hence, I define a modified Tobit specification.

$$\begin{aligned} \ln(\text{FDI}_{ij} + A) &= X\beta + u_{ij} && \text{if } X\beta + u_{ij} > \ln(A) \\ &= \ln(A) && \text{if } X\beta + u_{ij} \le \ln(A) \end{aligned}$$

in which A is a threshold parameter to be estimated and u is an i.i.d normally distributed variable with mean zero and variance σ^2. In this specification, when $X\beta + u$ exceeds a threshold value, $\ln A$, there will be a positive foreign investment, and, when $X\beta + u$ is below the threshold value, the realized level of foreign investment is zero (and desired level could be negative). Eaton and Tamura (1996) pioneered a version of this specification. It will be estimated by the maximum-likelihood method. The derivation of the likelihood function is given in an appendix.

The regression results with this specification are reported in table 2, columns 2 through 6. In column 2, I have as control variables the host country's GDP and population, both in logarithm, the distance between the host and source countries, and a possible linguistic/colonial connection between the two. The key variables are the host countries' tax rate and corruption. Both variables produce negative coefficients that are statistically significant. Hence, when zero observations are taken into account, we find that tax and corruption deter foreign direct investment.

Suppose β_1 and β_2 are coefficient estimates for tax rate and corruption, respectively. Given the specification, a $100/\beta_1$ percentage point change in tax rate and a $1/\beta_2$ change in the rating of corruption would produce the same amount of change in the stock of FDI. Therefore, a one-step increase in the corruption measure is equivalent to $100\beta_2/\beta_1$ percentage points increase in the tax rate. Using the estimates in column 2, a one-step increase in the corruption level is equivalent to a rise in the tax rate by 7.53 percentage points, other things equal. An increase in corruption level from that of Singapore to that of Mexico has the same negative effect on inward foreign investment as raising the tax rate by over fifty percentage points.[13]

The modified Tobit specification produces a larger estimate of the effect of corruption than does the simple linear specification for an intuitive reason. Investors in some source countries may find it not worthwhile to invest in highly corrupt host countries, which may be an important reason for why some bilateral FDI numbers are zero. The double-log linear specification drops these observations (as log of zero is undefined), which produces a downward bias in the estimated effect of corruption on FDI. This highlights the importance of taken into account the zero-FDI observations for the question of our interest.

Let us now turn to a number of variations of the basic specification in order to check for the robustness of the basic finding. First, I look into the effect of differential tax treatment of foreign source income in different countries. Many countries effectively exempt foreign-source income from domestic taxation. So direct investment from these countries should be sensitive to foreign tax rates. In contrast, the tax codes of the United States, United Kingdom, and Japan allow their multinational firms to claim credit for taxes paid to foreign governments (up to the limit of what they would have to pay to the home governments if the foreign-source income were derived domestically). This could make direct investment from these source countries

[11] $\exp(-0.30) - 1 = -0.259$.

[12] $[-0.30*(7.75 - 1)]/(-0.0483) = 41.9$.

[13] $[-0.18\text{X}100\text{X}(7.75-1)]/(-2.39) = 50.8$.

TABLE 2.—CORRUPTION AND FOREIGN INVESTMENT

	OLS	Modified Tobit					US Sample
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Tax-rate	−4.83*	−2.39*	−2.57*	−2.61	−3.51*	−3.66*	−3.24*
	(0.67)	(0.40)	(0.60)	(0.61)	(0.83)	(0.86)	(1.31)
Corruption	−0.30*	−0.18*	−0.18*	−0.16*	−0.11*	−0.10*	−0.16##
	(0.06)	(0.04)	(0.04)	(0.04)	(0.03)	(0.03)	(0.11)
Tax credit			0.75	0.71	0.83	0.84	
			(0.72)	(0.72)	(0.78)	(0.82)	
Political stability				0.13*	0.20*	0.17*	0.11*
				(0.06)	(0.08)	(0.07)	(0.18)
log (GDP_h)	0.46*	0.39*	0.39*	0.32*	0.02	0.04	0.87*
	(0.11)	(0.08)	(0.09)	(0.08)	(0.15)	(0.15)	(0.36)
log ($population_h$)	0.46*	0.20*	0.20*	0.26*	0.56*	0.63*	0.22
	(0.12)	(0.07)	(0.07)	(0.08)	(0.19)	(0.20)	(0.27)
log (distance)	−0.60*	−0.30*	−0.29*	−0.29*	−0.28*	−0.27*	−1.06*
	(0.07)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.20)
linguistic tie	0.97*	0.33*	0.33*	0.27#	0.31#	0.33*	1.51*
	(0.22)	(0.15)	(0.15)	(0.15)	(0.16)	(0.16)	(0.60)
OECD						0.50*	
						(0.19)	
log ($wage_h$)					0.35*	0.42*	
					(0.15)	(0.16)	
OECD × log (wage)						−0.19#	
						(0.10)	
σ		1.06*	1.05*	1.02*	1.02*	1.02*	1.02*
		(0.16)	(0.15)	(0.15)	(0.15)	(0.15)	(0.26)
c		1.7E+4*	1.6E+4*	1.6E+4*	1.6E+4*	1.7E+4*	1.6E+4*
		(2.49)	(2.94)	(2.60)	(2.92)	(2.60)	(13.8)
A		1.6E+10*	1.5E+10*	1.6E+10*	1.7E+10*	1.7E+10*	1.2E+10*
		(4.7E+6)	(2.3E+7)	(5.3E+6)	(2.3E+7)	(7.4E+6)	(1.3E+8)
source dummies	yes	yes	yes	yes	yes	yes	
#obs	346	563	563	563	453	453	41
loglikelihood	−584.5	1812.83	1820.23	1829.11	1582.00	1582.17	200.3

Notes:
(1) Eicker-White standard errors based on analytic first and second derivatives are reported in the parentheses.
(2) All reported coefficients and standard errors except the OLS estimates in column 1 are multiplied by 1,000. For example, the coefficient for tax rate in column 2 is −0.00239.
(3) *,#,## denote significant at the 5%, 10%, and 15% levels, respectively.
(4) Examples for notational convention: 1.1E+6 = 1.1 × 106 1.1E−6 = 1.1 × 10^{-6}.
(5) All regressions have source country dummies that are not reported here.

insensitive to foreign tax rates (up to a limit). On the other hand, foreign tax credit can be claimed only when profits are repatriated. Many multinational firms from U.S., U.K., and Japan choose to reinvest a substantial fraction of their foreign income in their facilities in the host country (Hines & Hubbard, 1990). In this case, their firms may still be sensitive to the tax rates of host countries. For this reason, to what extent FDI from these three source countries is sensitive to host countries' tax rate becomes an empirical question.

To investigate this, I add to the regression an interactive term, $ftc_i^* tax\text{-}rate_j$, where *ftc* is a dummy variable taking the value of 1 if the source country is either the U.S., U.K., or Japan. The result is in column 3 of table 2. The coefficient is positive but not different from zero at the 10% level. Hence, it appears that the FDIs from these three source countries are just as sensitive to the tax rate in host countries as FDIs from other source countries. More importantly, the estimated effects of tax and corruption on FDI are basically unaffected by the inclusion of this variable.

One may speculate that political stability promotes foreign investment and that corruption and political stability are negatively correlated. The causality on the corruption/stability nexus can go both ways: Official corruption may breed public discontent, which may eventually topple the government, and, alternatively, instable political environments may induce officials to have short horizons and to grab whatever rents available while they can. It may be useful to investigate the independent effect of corruption on FDI after controlling for political stability. Column 4 adds a measure of political stability in the host countries. The coefficient is positive and statistically significant. So host countries that are politically more stable attract more inward FDI. The coefficient on corruption is slightly reduced but remains negative and significant.

Column 5 adds the host country's wage level (in logarithm) to the list of regressors. This is motivated by the popular hypothesis that many FDIs chase low-cost labor in the host countries. This suggests a negative correlation between the size of inward FDI and the host's wage level. Contrary to the expectation, the estimated coefficient for the wage variable is positive (0.35) and significant at the 5% level. Although it is not consistent with the popular labor-cost hypothesis, this finding echoes many other papers in the

literature.[14] It is important to note that, for our purpose, the coefficients for the tax rate and corruption measures remain negative and statistically significant, although the size of the point estimates changes a bit.

There is a reason to suspect that the specification in column 5 may not be a fair test of the low-labor-cost hypothesis. We know that some of the FDIs move from developed countries to developing countries (primarily as part of vertically integrated firms), but many move from developed to developed countries (primarily in the form of horizontally integrated firms). Implicitly if not explicitly, the labor-cost hypothesis is postulated only for the first type of FDIs. To account for this, I let the labor cost assume potentially different roles for the two types of the FDIs. Specifically, I create an OECD dummy for all host countries that are members of OECD up to 1993. I add an interactive term, *OECD*log*(*wage*), and the dummy itself, *OECD,* to the list of regressors. The result is reported in column 6. The coefficient for log(wage) remains positive, while that for the interactive term is negative. Hence, this data set does not support the hypothesis that FDI chases cheap labor in developing countries.

With the host country's labor cost taken into account in column 5, the coefficients for tax rate and corruption measures have changed a bit. As the estimated effect of tax on FDI becomes larger and that of corruption becomes smaller, a one-grade deterioration in corruption rating is now equivalent to a 2.7 percentage point increase in tax. An increase in corruption from the Singapore level to the Mexico level would have the same negative effect on inward FDI as raising the corporate income tax rate by eighteen percentage points. Because wage data are missing for a number of host countries, it should be noted that the regression results with wage variable, such as the one in column 6, and those without wage data, such as the one in column 2, are not directly comparable.

Besides the labor-cost story, one may conjecture that a host country's education level or its endowment of skilled labor may play an important role in attracting inward FDI. This is a key feature of the new FDI theory of Markusen (1984 and 1995) and Zhang (1996). As an extension, I ran two additional regressions (not reported to save space) adding two different measures of human capital (literacy ratio and enrollment of secondary schools) one at a time. Somewhat disappointingly, neither is statistically significant. Again, the coefficients on tax rate and corruption remain largely unchanged. In addition, I have used labor compensation instead of wage rate in the regressions (not reported) with same qualitative answers, but the number of observations is substantially smaller for compensation than for wage data.

[14] Wheeler and Mody (1992) reported a positive correlation between wage level and inward FDI, exactly opposite to the hypothesis of FDI chasing low labor costs.

Because our data cover FDI from several source countries to the same set of host countries, one may worry that the error terms for observations involving the same host countries may be positively correlated. This could bias the coefficient estimate of the effect of corruption (and of other variables) and bias the standard-error estimation. As a check, we also run the same regression on the subset of all FDIs from one source country, namely the U.S., to the other 41 host countries. This, by construction, eliminates the correlation in the error terms due to a common host-country component.[15] The result is reported in column 7 of table 2. The coefficient on the corruption variable is now statistically significant at the 15% level (which is not bad given that there are only 41 observations and that nine parameters need to be estimated). However, the point estimate continues to be negative and is approximately of the same magnitude as the comparable specification for the full sample (column 4 in table 2).

C. *Binary Coding of the Corruption Measure*

The ten-step gradation (i.e., from zero to nine) in the corruption index may have imposed too much linearity in the effect of corruption on FDI. To see if the negative effect of corruption is sensitive to this fine gradation, I also experiment with a more coarse partition of the host countries. I define a dummy that takes the value of 1 for more-corrupt host countries (BI index > 6) and 0 otherwise (BI index ≤ 6). The regression result with this binary measure of corruption is presented in table 3. The qualitative picture is exactly like before: More-corrupt host countries receive less foreign investment.

D. *Alternative Indicators of Corruption*

We also adopt two other measures of corruption that have been used in the literature. The first is the corruption rating from the International Country Risk Group (ICRG). The second is the Transparency International (TI) index. The regression results are reported in table 4.

Using the average of the ICRG ratings over 1991–1993, the corruption coefficient still has a negative sign. It is now significant at the 15% level (column 1). Coded as a dichotomous variable, high-corruption (ICRG > 3 on 1–6 scale) countries are associated with a lower level of inward FDI. The coefficient on the corruption dummy is significant at the 5% level. Using the TI indicator, the corruption measure is also shown to retard the FDI much the same way as using the BI index (albeit with somewhat smaller point estimate). The coefficient is significant at the 5% level. If we

[15] Ideally, one should introduce a host-country-specifi c component in the error term and run the modified Tobit regression on the full sample. This could raise the efficiency of the estimation relative to the restricted one-source-country approach adopted here. Unfortunately, it is not possible to derive a closed-form expression for the likelihood function in this case. It will be useful to address this problem in future work.

TABLE 3.—CORRUPTION AS A BINARY VARIABLE

	(1)	(2)
Tax-rate	−2.59*	−3.84*
	(0.62)	(0.89)
Corruption	−0.27#	−0.10#
	(0.14)	(0.06)
Tax credit	0.72	0.88
	(0.68)	(0.77)
Political stability	0.17*	0.26*
	(0.07)	(0.08)
log (GDP)	0.49*	−0.07
	(0.08)	(0.17)
log (population)	0.06	0.64*
	(0.05)	(0.21)
log (distance)	−0.27*	−0.24*
	(0.06)	(0.06)
linguistic tie	0.35*	0.38*
	(0.15)	(0.16)
OECD		0.50*
		(0.21)
log (wage)		0.56*
		(0.19)
OECD × log (wage)		−0.16
		(0.11)
σ	1.02*	1.01*
	(0.14)	(0.14)
c	1.6E+4*	1.7E+4*
	(3.89)	(3.15)
A	1.6E+10*	1.7E+10*
	(4.3E+7)	(2.9E+7)
source dummies	yes	yes
#obs	563	453
loglikelihood	1830.52	1586.67

Note: Please see the footnotes to Table 2.

recode the TI index to be a dummy (high corruption if TI index $>$ 6 on a 1–10 scale), the corruption coefficient is still negative although significant only at the 15% level.

E. Are American Investors More Sensitive to Corruption?

The Foreign Corrupt Practices Act makes the U.S. the only source country that, up to now, provides an explicit penalty to its firms for bribing foreign government officials.[16] In this section, I will examine whether or not American investors are more sensitive to corruption than those from other source countries. To accomplish this, I will add to the regression an interactive term, $US_i^*Corruption_j$, where US_i is a dummy variable taking the value of 1 if the source country is the United States and 0 otherwise. There are three plausible hypotheses.

Hypothesis 1: *Corruption discourages U.S. investors in the same way as non-U.S. investors. In this case, the interactive term will have a zero coefficient.*

Hypothesis 2: *Corruption discourages only U.S. investors. Hence, the interactive term will have a negative coefficient, and the generic corruption measure will no longer be negatively correlated with FDI.*

Hypothesis 3: *Corruption discourages FDI from all investors, but it depresses those from the U.S. even more. In this case, the coefficients on both the corruption measure and the interactive term will be negative and significant.*

The estimation results are reported in table 5. In columns 1 and 2, a continuous and dichotomous measures of corruption (based on the BI index) are used, respectively. In column 1, the coefficient estimate on the newly added interactive term is −0.07, which could be consistent with hypothesis 3 above. On the other hand, the coefficient is not statistically different from zero at the 10% level, which means that one cannot reject hypothesis 1 that U.S. investors are sensitive to corruption, but no more so than an average investor from other OECD countries.

In column 2, when corruption is measured by a binary dummy, the coefficient on the interactive term (*Us*Corruption*) is still negative but not different from zero in a statistical sense.

There are several plausible and not mutually exclusive explanations for the possibility that the American investors are equally (but not more) averse to host country corruption relative to other investors. First, corruption is often an indicator for generally poor enforcement of contracts by host governments and Byzantine bureaucracy that hurt every investor, regardless of whether the source country government forbids bribery payment by its companies. Second, to the extent that investors feel repulsed by corruption, they may be deterred by it just as much as the Americans, even without a formal law like the U.S. FCPA. Finally, when bribery becomes a necessary part of the business deal, the American firms may be just as clever as other investors at finding covert means to pay it despite the FCPA.

Using the Transparency International's index for corruption, these two regressions are replicated in columns 3 and 4. The results are broadly similarly as using the BI index.

IV. Concluding Remarks

This paper studies the effect of taxation and corruption on international direct investment from fourteen source countries to 45 host countries, with two central findings. First, an increase in either the tax rate on multinational firms or the corruption level in the host governments would reduce inward foreign direct investment. An increase in the corruption level from that of Singapore to that of Mexico would have the same negative effect on inward FDI as raising the tax rate by eighteen to fifty percentage points, depending on the specification. Second, American investors are averse to host country corruption but not necessarily more so than other investors, in spite of its unique Foreign Corrupt Practices Act.

[16] On December 17, 1997, 28 member states of the OECD and five non-member states signed the Convention on Combating Bribery of Foreign Officials in International Business Transactions. This convention, in effect since February 15, 1999, having been ratified by a certain number of national law-making bodies of the signatory countries, criminalizes bribing foreign officials by firms from these countries.

TABLE 4.—ALTERNATIVE INDICATORS OF CORRUPTION (ICRG AND TI INDICES)

	ICRG Index (average of 91–93 ratings)		Transparency International Index	
	Continuous (1–5 scale)	Dichotomous (ICRG > 3)	Continuous (1–10 scale)	Dichotomous (Dummy for TI > 6)
Tax-rate	−2.69*	−2.78*	−2.37*	−2.63*
	(0.76)	(0.77)	(0.59)	(0.66)
Corruption	−0.12##	−0.47*	−0.10*	−0.19##
	(0.08)	(0.16)	(0.03)	(0.13)
Tax credit	0.09	0.05	0.75	0.79
	(0.70)	(0.74)	(0.73)	(0.75)
Political stability	0.16*	0.15*	0.15*	0.20*
	(0.07)	(0.06)	(0.07)	(0.07)
log (GDP)	0.59*	0.57*	0.42*	0.54*
	(0.11)	(0.09)	(0.09)	(0.09)
log (population)	0.07	0.11	0.16*	0.06
	(0.08)	(0.08)	(0.07)	(0.06)
log (distance)	−0.32*	−0.33*	−0.28*	−0.30*
	(0.06)	(0.07)	(0.06)	(0.07)
linguistic tie	0.47*	0.40*	0.31*	0.38*
	(0.17)	(0.17)	(0.16)	(0.17)
σ	1.12*	1.13*	1.06*	1.13*
	(0.16)	(0.16)	(0.15)	(0.16)
c	1.6E+4*	1.6E+4*	1.7E+4*	1.6E+4*
	(4.17)	(3.16)	(2.91)	(3.74)
A	1.4E+10*	1.4E+10*	1.5E+10*	1.4E+10*
	(3.6E+7)	(5.5E+6)	(4.1E+6)	(3.0E+7)
source dummies	yes	yes	yes	yes
#obs	549	549	548	548
loglikelihood	1753.5	1747.6	1815.4	1795.6

Note: Please see the footnotes to Table 2.

TABLE 5.—U.S. AS A SOURCE COUNTRY (MODIFIED TOBIT)

	Corruption (BI)		Corruption (TI)	
	Continuous (1)	Dichotomous (2)	Continuous (3)	Dichotomous (4)
Tax-rate	−2.82*	−2.68*	−2.46*	−2.45*
	(0.64)	(0.64)	(0.60)	(0.60)
Corruption	−0.17*	−0.26#	−0.09*	−0.14
	(0.04)	(0.15)	(0.04)	(0.13)
Corruption × U.S.	−0.07	−0.14	−0.09	−0.31
	(0.06)	(0.30)	(0.07)	(0.30)
Tax credit	0.87	0.75	0.97	0.83
	(0.72)	(0.70)	(0.69)	(0.69)
Political stability	0.14*	0.18*	0.16*	0.18*
	(0.06)	(0.07)	(0.07)	(0.07)
log (GDP)	0.34*	0.51*	0.42*	0.50*
	(0.08)	(0.09)	(0.09)	(0.08)
log (population)	0.28*	0.07	0.16*	0.05
	(0.09)	(0.05)	(0.07)	(0.06)
log (distance)	−0.31*	−0.28*	−0.29*	−0.28*
	(0.06)	(0.06)	(0.06)	(0.06)
linguistic tie	0.29#	0.37*	0.31*	0.36*
	(0.06)	(0.16)	(0.16)	(0.15)
σ	1.08*	1.05*	1.07*	1.05*
	(0.15)	(0.15)	(0.15)	(0.15)
c	1.6E+4*	1.7E+4*	1.7E+4*	1.7E+4*
	(4.58)	(4.89)	(3.03)	(2.97)
A	1.5E+10*	1.5E+10*	1.5E+10*	1.6E+10*
	(5.4E+7)	(6.1E+7)	(7.9E+6)	(1.3E+7)
source dummies	yes	yes	yes	yes
#obs	563	563	548	548
loglikelihood	1810.07	1817.56	1816.8	1825.4

Note: Please see the footnotes to Table 2.

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APPENDIX: LIKELIHOOD FUNCTION FOR THE MODIFIED TOBIT MODEL

Let y be the bilateral FDI flow (subscripts omitted to simplify the notations). The hypothesized model is

$$ln(y + A) = \begin{cases} X\beta + u & \text{if } X\beta + u > lnA \\ lnA & \text{if } X\beta + u \le lnA \end{cases}$$

in which A is a positive threshold parameter, and u is an i.i.d. normal variable with mean zero and variance σ^2. In this specification, when $X\beta + u$ exceeds a threshold value, lnA, there will be a positive flow of foreign investment; and, when $X\beta + u$ is below the threshold value, the realized level of foreign investment is zero (and desired level could be negative).

Notice that

$$Prob\,(X\beta + u \le lnA) = Prob\,(u \le lnA - X\beta) = \Phi\left(\frac{lnA - X\beta}{\sigma}\right)$$

Appendix Table 1.—Using Statutory Tax Rate Data

	BI Index	TI Index
Tax-rate	−2.31*	−2.19*
	(0.69)	(0.69)
Corruption	−0.14*	−0.10*
	(0.04)	(0.04)
Tax credit	0.11	0.60
	(0.65)	(0.64)
Political stability	0.11#	0.12#
	(0.06)	(0.06)
log (GDP)	0.46*	0.49*
	(0.10)	(0.11)
log (population)	0.18*	0.11
	(0.07)	(0.07)
log (distance)	−0.34*	−0.31*
	(0.06)	(0.06)
linguistic tie	0.40*	0.39*
	(0.16)	(0.16)
σ	1.07*	1.05*
	(0.15)	(0.15)
c	1.7E+4*	1.7E+4*
	(4.54)	(3.48)
A	1.5E+10*	1.6E+10*
	(5.2E+7)	(2.2E+7)
source dummies	yes	yes
#obs	549	534
loglikelihood	1766.11	1777.4

Note: Please see the footnotes to Table 2.

APPENDIX A.—HOST AND SOURCE COUNTRY COVERAGE

Host Countries		
Belgium	Israel	Kuwait
Denmark	Argentina	Saudi Arabia
Finland	Brazil	Taiwan
Switzerland	Chile	Hong Kong
Greece	Colombia	India
Ireland	Ecuador	South Korea
New Zealand	Mexico	Malaysia
Portugal	Peru	Philippines
Spain	Venezuela	Singapore
South Africa	Nigeria	Thailand
Turkey	Egypt	China
Source and Host Countries		
Canada	Japan	Netherlands
France	United Kingdom	Norway
Germany	United States	Sweden
Italy	Austria	Australia

where $\Phi(.)$ is the cumulative distribution function of a standard normal variate, and

$$Prob\,(X\beta + u > lnA) = 1 - Prob\,(X\beta + u \leq lnA) = 1 - \Phi\left(\frac{lnA - X\beta}{\sigma}\right).$$

Furthermore, the conditional density function

$$f(u|X\beta + u > lnA) = f[u = ln(y + A) - X\beta | X\beta + u > lnA] = \frac{\frac{1}{\sigma}\phi\left[\frac{ln(y + A) - X\beta}{\sigma}\right]}{1 - \Phi\left(\frac{lnA - X\beta}{\sigma}\right)}$$

where $\Phi(.)$ is the density function of a standard normal variate.

Let d be a dummy variable indicating a positive realized foreign investment. That is, $d = 1$ if $X\beta + u > lnA$, and zero otherwise. The likelihood function for an individual observation is

$$f(u|X, y; \beta, A, \sigma) = [f(u|X\beta + u > lnA)\,Prob\,(X\beta + u > lnA)]^d\,[Prob\,(X\beta + u \leq lnA)]^{1-d} = \left\{\frac{1}{\sigma}\Phi\left[\frac{ln\,(y + A) - X\beta}{\sigma}\right]\right\}^d\left[\Phi\left(\frac{lnA - X\beta}{\sigma}\right)\right]^{1-d}$$

The overall likelihood function is just the product of the individual likelihood functions over all observations.