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Negative Alchemy?
Corruption, Composition of Capital Flows, and Currency Crises

Shang-Jin Wei and Yi Wu

10.1 Motivation

This paper studies the impact of corruption on a country's composition of capital inflows. The importance of this composition was recently highlighted by the currency crises in East Asia, Russia, and Latin America. Several studies (starting with Frankel and Rose 1996 and followed by Radelet and Sachs 1998 and Rodrik and Velasco 1999) have shown that the composition of international capital inflows correlates to the incidence of currency crises. In particular, three types of composition measures have been highlighted in the literature as being particularly relevant to the discussion of currency crises: (a) the lower the share of foreign direct investment in total capital inflows, (b) the higher the short-term debt-reserves ratio, or (c) the higher the share of foreign currency–denominated borrowing in a country's total borrowing, the more likely a currency crisis becomes.

In this paper, we will discuss all three dimensions of the composition of capital flows, but with a greater emphasis on the foreign direct investment (FDI) share in total capital inflows, as we have a larger set of observations and more reliable measure in this area. We will explain this later. One possible reason that a low FDI share in total capital flow is associated with a higher probability of crises is that bank lending or other portfolio invest-

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ment may be more sentiment-driven than is direct investment. Hence, a small (unfavorable) change in the recipient countries' fundamentals may cause a large swing in the portfolio capital flows (e.g., from massive inflows to massive outflows). This can strain the recipient country's currency or financial system sufficiently to cause or exacerbate its collapse (Radelet and Sachs 1998; Rodrik and Velasco 1999; Reisen 1999).

There are at least two views on the causes of crises. On the one hand, it is increasingly common to hear the assertion that so-called crony capitalism may be partly responsible for the onset or the depth of a crisis. Direct statistical evidence for this hypothesis is still sparse, with the notable exception of Johnson et al. (2000).[1] On the other hand, many researchers argue that (fragile) self-fulfilling expectations by international creditors are the real reason for the currency crisis. Crony capitalism and self-fulfilling expectations are typically presented as *rival* explanations.

In fact, the two hypotheses may be linked. The extent of corruption in a country may affect that country's composition of capital inflows in a way that makes it more vulnerable to international creditors' shifts in expectations.

In a narrow sense of the word, *corruption* refers to the extent to which firms (or private citizens) must bribe government officials in their interactions (for permits, licenses, loans, and so forth).[2] However, we prefer to think of corruption more broadly as shorthand for poor public governance, which can include not only bureaucratic corruption, but also deviations from rule of law or excessive and arbitrary government regulations. All the existing empirical indicators of the different dimensions of public governance are so highly correlated that we do not think that we can separately identify their effects at this stage.

A small number of previous papers have looked at the effect of corruption on FDI. Mixing corruption with twelve other variables to form a composite indicator, Wheeler and Mody (1992) failed to find a significant relation between corruption and foreign investment. However, the insignificant result may be due to a high noise-to-signal ratio in the composite indicator. Using U.S. outward investment to individual countries, Hines (1995) did find that foreign investment is negatively related to host country corruption, which he interpreted as evidence of the effect of the U.S. Foreign Corrupt Practices Act. Using a matrix of bilateral international direct investment from twelve source countries to forty-five host countries, Wei (2000a) found

1. For surveys of the literature on corruption and economic development, see Bardhan (1997), Kaufmann (1997), and Wei (1999). More recent papers on corruption include Wei (2000d) and Bai and Wei (2000). None of the surveys covers any empirical study that links crony capitalism with currency crises.

2. We use the term *crony capitalism* interchangeably with *corruption.* Strictly speaking, crony capitalism refers to an economic environment in which relatives and friends of government officials are placed in positions of power and government decisions on allocation of resources are distorted to favor friends and relatives. In reality, crony capitalism almost always implies a widespread corruption, because private firms and citizens in such an environment find it necessary to pay bribes to government officials in order to get anything done.

that the behavior of the FDI flows from the United States and those from other source countries, with respect to host country corruption, is not statistically different. More importantly, however, corruption not only has a negative and statistically significant coefficient, but it also has an economically large effect on inward FDI. For example, in a benchmark estimation, an increase in corruption from the level of Singapore to that of Mexico would have the same negative effect on inward foreign investment as raising the marginal corporate tax by 50 percentage points. Using firm-level data, Smarzynska and Wei (2000) found that host country corruption induces foreign investors to favor joint ventures (over wholly owned firms).

None of the above papers has a measure of government policies toward FDI. Such data are not readily available. The current paper employs two new indexes of government policies toward FDI that are compiled from investment guides for individual countries produced by PricewaterhouseCoopers (2000). Although FDI is an important element of this study, the main focus is the effect of corruption on the composition of capital inflows (FDI versus borrowing from foreign banks, in particular). We are not aware of any studies that have examined this question except for Wei (2000b). This paper extends the previous paper in several ways. While Wei focuses on the connection between the ratio of bank loan to FDI and corruption, and bases the analysis on bilateral data, this paper also checks the relative share of portfolio flows versus FDI as well as using more aggregate data from the balance of payments reported by the countries to the International Monetary Fund (IMF). In addition, we report results on a possible relationship between corruption and the maturity structure of foreign borrowing, and between corruption and a country's ability to borrow internationally in its own currency.

Before we proceed to a more formal analysis, it may be useful to have a quick glance at the data. The argument that capital flow composition matters requires that different capital flows have a different level of volatility. For every member country of the IMF for which relevant data are available for 1980–96, we compute the standard deviations of three ratios (portfolio capital inflow to GDP, borrowing from banks to GDP, and inward FDI to GDP).[3] The results are summarized in the upper half of table 10.1 and visually pre-

3. Hausmann and Fernandez-Arias (2000) argue that the classification of capital inflows into FDI and other forms may not be accurate and that it is possible for a reversal of an inflow of FDI to take the form of an outflow of bank loans or portfolio flows. As a result, calculations of relative volatility of the different forms of capital flows are not meaningful. We hold a different view. The misclassification can come from two sources: random measurement errors and intentional misreporting by international investors. In the first instance, if capital flows are misclassified at the margin due to random errors, the labels on FDI and other forms of capital flows are still useful. In the second instance, foreign investors may intentionally misreport types of capital flows. Because there is a cost associated with misreporting, there is a limit on the magnitude of the error of this type as well. In the empirical work to be presented later in the paper, the bilateral FDI data are based on FDI source country governments' survey of their firms. The bilateral bank lending data are based on international lending banks' reporting to their governments (which then forward them to the Bank for International Settlements). There are no obvious incentives for multinational firms or international banks to misreport their true FDI or loan positions to their governments.

Table 10.1 **Volatility of FDI/GDP, Bank Loan/GDP, and Portfolio Flow/GDP (1980–96)**

	FDI-GDP	Loan-GDP	Portfolio-GDP
A. As Measured by Standard Deviation			
Whole sample[a]			
Mean	0.012	0.041	0.014
Median	0.008	0.033	0.009
Emerging markets[b]			
Mean	0.012	0.046	0.012
Median	0.008	0.035	0.004
OECD[c]			
Mean	0.008	0.020	0.021
Median	0.007	0.014	0.020
Selected countries			
Indonesia	0.007	0.017	0.009
Korea	0.002	0.037	0.014
Malaysia	0.023	0.034	0.023
Mexico	0.007	0.033	0.026
The Philippines	0.009	0.026	0.017
Thailand	0.007	0.028	0.012
B. As Measured by Coefficient of Variation			
Whole sample[a]			
Mean	1.176	1.567	2.764
Median	0.947	1.204	1.702
Emerging markets[b]			
Mean	1.269	2.192	0.813
Median	1.163	1.177	2.042
OECD[c,d]			
Mean	0.737	–1.353	8.508
Median	0.595	1.530	1.004
Selected countries			
Indonesia	0.820	0.717	1.722
Korea	0.591	2.039	1.338
Malaysia	0.490	4.397	3.544
Mexico	0.452	2.048	2.088
The Philippines	0.921	0.956	1.979
Thailand	0.571	0.629	1.137

Sources: Total inward FDI flows, total bank loans, and total inward portfolio investments are from the IMF's *Balance of Payments Statistics* CD-ROM; GDP data are from the World Bank's *GDF* and *WDI* central database.

Notes: Only countries having at least eight nonmissing observations during 1980–96 for all three variables, and having populations greater than or equal to one million in 1995, are kept in the sample. OECD countries (with membership up to 1980) include the following: Australia, Austria, Canada, Denmark, Finland, France, Ireland, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom, and the United States. "Emerging markets" are all countries not on the previous list and having a GDP per capital in 1995 less than or equal to US$15,000 (in 1995 US$).

[a]103 countries

[b]85 countries

[c]18 countries

[d]In the case of the volatility of the loan-GDP ratio for the OECD countries, the large difference between the mean and median (–1.353 vs. 1.530) is driven by one outlier (Japan, with a value of –49).

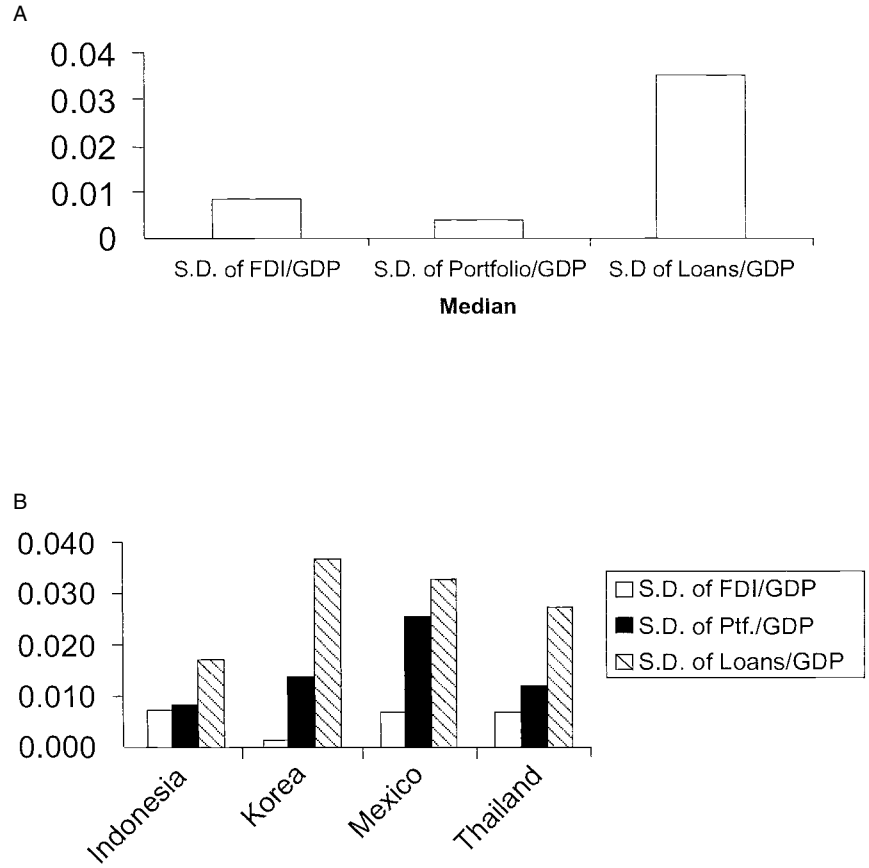

Fig. 10.1 Relative volatility of different capital flows: *A*, Standard deviations over 1980–96 emerging markets: 85 countries; *B*, Standard deviations over 1980–96.
Source: Authors' calculations.

sented in figure 10.1. For all countries in the sample (103 countries in total), the volatility of FDI-GDP ratio is substantially smaller than the loan-GDP ratio and somewhat smaller than the ratio of portfolio flows to GDP. For the non–Organization for Economic Cooperation and Development (OECD) countries as a group, the FDI-GDP ratio is also much less volatile than the loan-GDP ratio, although its median is higher than the portfolio flow to GDP ratio. The lower part of the same half of the table presents the volatility of the three ratios for a number of individual countries that featured prominently in the recent currency crises. Each country shows a loan-GDP ratio that is at least twice and as much as fifteen times as volatile as the FDI-GDP ratio. For each of these countries, the portfolio capital to GDP ratio is also more volatile than the FDI-GDP ratio. If the sample period is extended to include 1997–98, the differences in volatility would be even more pronounced (not

reported). Alternatively, we may look at the coefficient of variation (standard deviation divided by the mean) of these three ratios. These results are presented in the lower half of table 10.1. Again, for the group of emerging-market economies, FDI-GDP is less volatile than the loan-FDI ratio according to this measure. On the other hand, FDI-GDP is less volatile than the portfolio-GDP ratio according to the median, but not the mean, of the group. Therefore, the data are consistent with the hypothesis that FDI is less sentiment-driven and hence more stable as a source of foreign capital.[4]

Corruption is bad for both international direct investors and creditors. Corrupt borrowing countries are more likely to default on bank loans or to nationalize (or otherwise diminish the value of) the assets of foreign direct investors. When this happens, there is a limit on how much international arbitration or court proceedings can help to recover the assets, as there is a limit on how much collateral the foreign creditors or direct investors can seize as compensation.[5]

One may argue that domestic investors have an informational advantage over international investors. Among international investors, international direct investors may have an informational advantage over international portfolio investors (and presumably banks). International direct investors could obtain more information about the local market by having managers from the headquarters stationed in the country that they invest in. As a consequence, the existence of cross-border informational asymmetry may lead to a bias in favor of international direct investment. This is the logic underlying Razin, Sadka, and Yuen's (1998) theory of a "pecking order of international capital flows." However, the existence of corruption could temper this effect. The need for international investors to pay bribery and deal with extortion by corrupt bureaucrats tends to increase with the frequency and the extent of their interactions with local bureaucrats. Given that international direct investors are more likely to have repeated interactions with local officials (for permits, taxes, health inspections, and so forth) than international banks or portfolio investors, local corruption would be more detrimental to FDI than other forms of capital flows. Likewise, direct investment involves greater sunk cost than bank loans or portfolio investment. Once an investment is made, when corrupt local officials begin to demand bribes not to set up obstacles, direct investors would be in a weaker bargaining position than international banks or portfolio investors. This ex post disadvantage of FDI would make international direct investors more cautious ex ante in a corrupt host country than international portfolio investors.[6]

4. The pattern reported here is the opposite of that in Dooley, Claessens, and Warner (1995).

5. In the old days, major international creditors and direct investors might rely on their navies to invade defaulting countries to seize more collateral. Such is no longer a (ready) option today.

6. Tornell (1990) presented a model in which a combination of uncertainty and sunk cost in real investment leads to underinvestment in real projects even when the inflow of financial capital is abundant.

There is a second reason that international direct investment is deterred more by local corruption than international bank credit or portfolio investment. The current international financial architecture is such that international creditors are more likely to be bailed out than international direct investors. For example, during the Mexican and subsequent Tequila crises and the more recent Asian currency crisis, the IMF, the World Bank, and the Group of Seven (G7) countries mobilized a large amount of funds for these countries to prevent or minimize the potentially massive defaults on bank loans. Thus, an international bailout of the bank loans in an event of a massive crisis has by now been firmly implanted in market expectations. (In addition, many developing country governments implicitly or explicitly guarantee the loans borrowed by the private sector in the country.[7]) In contrast, there have been no comparable examples of international assistance packages for the recovery of nationalized or extorted assets of foreign direct investors except for an insignificant amount of insurance, which is often expensive to acquire. This difference further tilts the composition of capital flows and makes banks more willing than direct investors to do business with corrupt countries.

Both reasons suggest the possibility that corruption may affect the composition of capital inflows in such a way that the country is more likely to experience a currency crisis. Of course, the composition of capital flows affects economic development in ways that go beyond its effect on the propensity for a currency crisis. Indeed, many would argue that attracting FDI as opposed to international bank loans or portfolio investment is a more useful way to transfer technology and managerial know-how.

As some concrete examples, table 10.2 shows the total amount of inward FDI, foreign bank loans, portfolio capital inflows, and their ratios for New Zealand, Singapore, Uruguay, and Thailand. Figure 10.2 summarizes the comparison by pie charts. On the one hand, New Zealand and Singapore (are perceived to) have relatively low corruption (the exact source is explained in the next section) and relatively low loan-FDI and portfolio investment-FDI ratios. On the other hand, Uruguay and Thailand (are perceived to) have relatively high corruption and relatively high loan-FDI and portfolio investment to FDI ratios. These examples, then, are consistent with the notion that local corruption correlates to patterns of capital inflows. Of course, these four countries are merely examples. Consequently, there are two questions that must be addressed more formally. First, does the association between corruption and composition of capital flows generalize beyond these four countries? Second, after we control for a number of other characteristics that affect the composition of capital inflows, will we still find the positive association between corruption and the loan-FDI ratio?

7. McKinnon and Pill (1996, 1999) argue that the government guarantee generates moral hazard, which in turn leads the developing countries to overborrow from the international credit market.

Table 10.2 **Quality of Public Governance and the Composition of Capital Inflows**

	New Zealand	Singapore	Uruguay	Thailand
Corruption (TI index)	0.6 (less corrupt)	0.9	5.7	7.0 (more corrupt)
Ratios (averaged over 1994–96)				
Loan-FDI	0.11	0.44	1.77	5.77
Portfolio-FDI	0.07	0.09	1.40	1.76
Absolute amount (averaged over 1994–96)				
Loan	920	10,500	794	2,500
Portfolio	610	2,200	627	761
FDI	8,400	23,600	448	432

Source: Total inward loans, portfolio investment, and FDI are from the IMF's Balance of Payments Statistics CD-ROM.

Notes: To minimize the impact of the year-to-year fluctuation, the reported numbers are averaged over 1994–96. The corruption index is explained in appendix B. "Absolute amount" is the amount the three inflows in millions of U.S. dollars.

Aside from measuring composition of capital inflows in terms of the relative share of the FDI versus non-FDI, two other compositions of capital flows have been suggested to be relevant in discussing currency crises. The first is the term structure of foreign borrowing. It has been suggested that the higher the share of short-term borrowing in a country's total borrowing, the more likely the country may run into a future crisis (Rodrik and Velasco 1999). The second is the currency denomination of the foreign borrowing. It has been hypothesized that the greater the share of international borrowing that is denominated in a hard currency (most often the U.S. dollar), the more likely a country may run into a future crisis. In this connection, the inability of a country to borrow internationally in its own currency (which would have reduced the probability of a crisis) has been termed "original sin" (Hausmann and Fernandez-Arias 2000). The limitation of the data places a more severe constraint on measuring well these two compositions of international borrowing. Nonetheless, in the later part of the paper, we will also report some preliminary findings regarding possible links between corruption and these measures of the composition of foreign borrowing.

We organize the rest of the paper in the following way. Section 10.2 describes the data. Section 10.3 presents the methodology and the statistical results of the analyses, and Section 10.4 concludes.

10.2 Data

The key components of international capital flows in the empirical investigation are bilateral direct investment and bilateral bank loans. To our

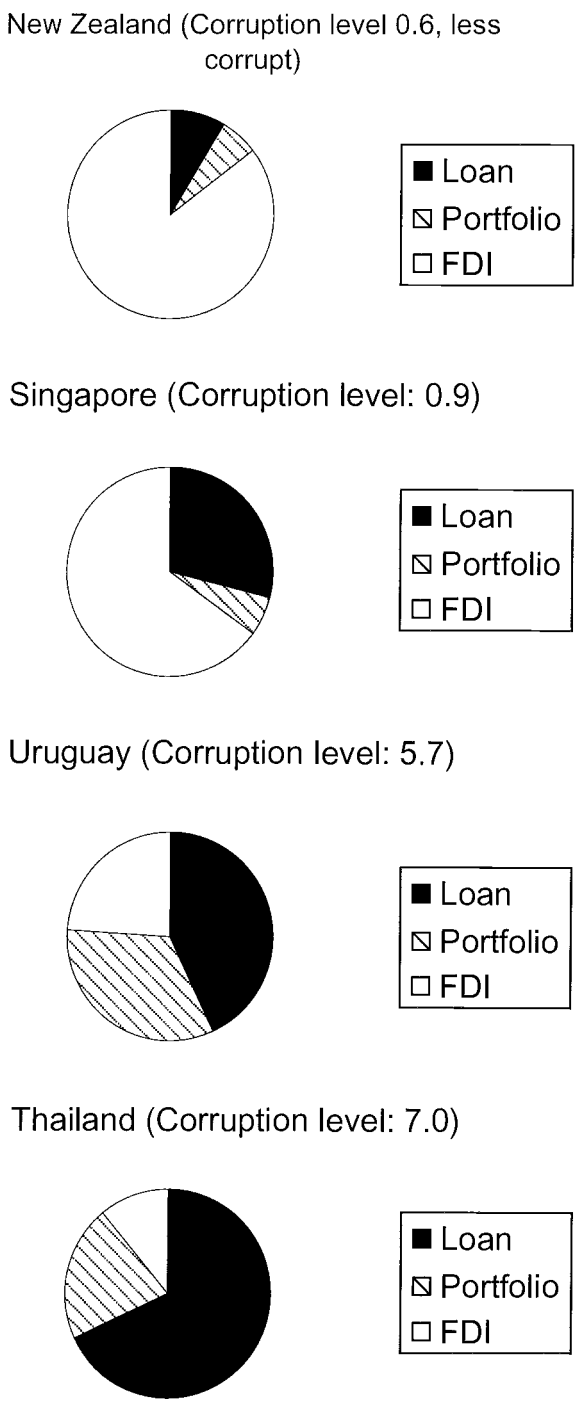

Fig. 10.2 Quality of public governance and the composition of capital inflows
Source: Authors' calculations.

Table 10.3 List of Countries in the Sample

	Countries
	Bilateral Foreign Direct Investment
Source countries	Australia, Austria, Canada, Finland, France, Germany, Iceland, Italy, Japan, Korea, the Netherlands, New Zealand, Norway, Poland, Sweden, Switzerland, United Kingdom, United States
Host countries	Algeria, Argentina, Australia, Austria, Belgium-Luxembourg, Brazil, Bulgaria, Canada, Chile, China, Colombia, Costa Rica, Czech Republic, Denmark, Egypt, Finland, France, Germany, Greece, Hong Kong, Hungary, Iceland, India, Indonesia, Iran, Ireland, Israel, Italy, Japan, Korea, Kuwait, Libya, Malaysia, Mexico, Morocco, the Netherlands, New Zealand, Norway, Panama, the Philippines, Poland, Portugal, Romania, Russia, Saudi Arabia, Singapore, Slovak Republic, Slovenia, South Africa, Spain, Sweden, Switzerland, Taiwan, Thailand, Turkey, Ukraine, United Arab Emirates, United Kingdom, United States, Venezuela
	Bilateral International Bank Loans
Lending countries	Austria, Belgium, Canada, Finland, France, Germany, Italy, Japan, Luxembourg, the Netherlands, Spain, United Kingdom, United States
Borrowing countries	Albania, Argentina, Armenia, Australia, Azerbaijan, Belarus, Benin, Bolivia, Brazil, Bulgaria, Cameroon, Chad, Chile, China, Colombia, Congo (Republic of the), Costa Rica, Côte d'Ivoire, Czech Republic, Ecuador, Egypt, El Salvador, Estonia, Fiji, Georgia, Ghana, Greece, Guatemala, Guinea, Guinea-Bissau, Honduras, Hungary, Iceland, India, Indonesia, Israel, Jamaica, Jordan, Kazakhstan, Kenya, Korea, Kyrgyzstan, Latvia, Lithuania, Madagascar, Malawi, Malaysia, Mali, Mauritius, Mexico, Moldova, Morocco, Mozambique, Namibia, New Zealand, Nicaragua, Niger, Nigeria, Pakistan, Paraguay, Peru, the Philippines, Poland, Portugal, Romania, Russia, Senegal, Slovakia, South Africa, Taiwan, Tanzania, Thailand, Tonga, Tunisia, Turkey, Uganda, Ukraine, Uruguay, Uzbekistan, Venezuela, Vietnam, Zambia, Zimbabwe

knowledge, other forms of capital flows are not available on a bilateral basis for a broad set of capital-exporting countries examined in this paper.

The *bilateral FDI* data are an average over three years (1994–96) of the stock of FDI from eighteen source countries to fifty-nine host countries. Table 10.3 presents a list of all source and host countries in our sample. The data come from the OECD's *International Direct Investment 1998.* To reduce year-to-year fluctuation in the data due to measurement error, the simple average over 1994–96 (year-end stocks) is used.

The *bilateral bank lending* data are an average over three years of the outstanding loans from thirteen lending countries to eighty-three borrowing countries. After we exclude missing observations, there are altogether 793

country pairs. The data come from the Bank for International Settlement's (BIS's) *Consolidated International Claims of BIS Reporting Banks on Individual Countries* and are given in millions of dollars. To reduce measurement errors in a given year, we use the simple average over three years (1994–96, year-end outstanding amounts).

Next we consider *term structure of bank lending.* The BIS data identify loans with "maturity up to and including one year," "maturity over one year up to two years," "maturity over two years," and "unallocated maturity." These data are disaggregated by borrowing countries but not by the lender-borrower pairs. Consequently, we construct a measure of the term structure of borrowing at the borrowing country level as the ratio of all outstanding bank loans with maturity up to and including one year to total loans. We also construct an alternative of the importance of short-term borrowing as the ratio of the short-term borrowing (loans up to and including one year) to the sum of total loans and inward FDI.

The *corruption* level, by its very nature (secrecy and illegality), is difficult to measure. Three types of measures of corruption are available, and all are perception-based subjective indexes. The first is a rating given by consulting firms' in-house consultants or experts. Representative indexes are produced by the Business International (BI, now part of the Economist's Economic Intelligence Unit), and by Political Risk Services (which calls its product an International Country Risk Group [ICRG] rating). The second type is based on surveys of business executives (or other people in the country in question). The rating for a country is typically the average of the respondents' ratings. Examples of this include indexes in the *Global Competitiveness Report* (*GCR*) and *World Development Report* (*WDR*), which will be explained in more detail shortly. The third type is based on an average of existing indexes. The best-known example is the index produced by Transparency International (TI), a Germany-based nongovernmental organization devoted to fighting corruption. A drawback of this type of index is that mixing indexes with different country coverage and methodologies could potentially introduce more noise to the measure.

Overall, corruption ratings based on surveys of firms are preferable to those based on the intuition of in-house experts, for two main reasons. First, the executives who respond to the *GCR* or *WDR* surveys presumably have more direct experience with the corruption problem than do the consultants who typically have to rate many countries each. Second, to the extent that each individual respondent has idiosyncratic errors in judgment, the averaging process in the *GCR* or *WDR* indexes can minimize the influence of such errors. In this paper, we use the indexes from the *GCR* and *WDR* surveys as our basic measure of corruption.

The *GCR* index is derived from the *Global Competitiveness Report 1997,* produced jointly by the Geneva-based World Economic Forum and Harvard Institute for International Development. The survey for the report was

conducted in late 1996 on 2,827 firms in fifty-eight countries. The *GCR* survey asked respondents (in question 8.03) to rate the level of corruption in their country on a scale of 1 to 7, based on the extent of "irregular, additional payments connected with imports and exports permits, business licenses, exchange controls, tax assessments, police protection or loan applications." The *GCR* corruption index is based on the country average of the individual ratings.

The *WDR* index is derived from a World Bank survey in 1996 of 3,866 firms in seventy-three countries in preparation for its *World Development Report 1997.* Question 14 of that survey asks: "Is it common for firms in my line of business to have to pay some irregular, 'additional' payments to get things done?" The respondents were asked to rate the level of corruption on a scale of 1 to 6. The *WDR* corruption index is based on the country average of the individual answers. For both corruption indexes, the original sources are such that a higher number implies lower corruption. To avoid awkwardness in interpretation, they are rescaled in this paper so that a high number now implies high corruption.

Since each index covers only a (different) subset of countries for which we have data on FDI or other forms of capital flows, it may be desirable to form a composite corruption index that combines the two indexes. The two indexes are derived from surveys with similar methodologies and similar questions. The correlation between the two is 0.83. We follow a simple three-step procedure to construct the composite index: (a) use *GCR* as the benchmark; (b) compute the average of the individual ratios of *GCR* to *WDR* for all countries that are available in both *GCR* and the *WDR;* and (c) for those countries that are covered by *WDR* but not *GCR* (which are relatively rare), convert the *WDR* rating into the *GCR* scale by using the average ratio in (b).

For *government policies toward FDI,* we rely on detailed descriptions compiled by the PricewaterhouseCoopers (PwC) in a series of country reports entitled "Doing Business and Investing in China" (or in whatever country may be the subject of the report). This series is written for multinational firms intending to do business in a particular country and is collected in one CD-ROM entitled "Doing Business and Investing Worldwide" (PwC 2000). For each potential host country, the relevant PwC country report covers a variety of legal and regulatory issues of interest to foreign investors, including "Restrictions on Foreign Investment and Investors" (typically chap. 5), "Investment Incentives" (typically chap. 4), and "Taxation of Foreign Corporations" (typically chap. 16).

With a desire to convert textual information into numerical codes, we read through the relevant chapters for all countries that the PwC covers. For "restrictions on FDI," we create a variable taking a value from zero to 4, based on the presence or absence of restrictions in the following four areas:

1. Existence of foreign exchange control (may interfere with foreign firms' ability to import intermediate inputs or repatriate profits abroad)
2. Exclusion of foreign firms from certain strategic sectors (particularly national defense and mass media)
3. Exclusion of foreign firms from additional sectors that would otherwise be considered harmless in most developed countries
4. Restrictions on foreign ownership (e.g., prohibition of 100 percent ownership)

Each of the four dimensions can be represented by a dummy that takes the value 1 (in the presence of the specific restriction) or zero (in the absence of the restriction). We create an overall FDI restriction variable that is equal to the sum of these four dummies. FDI restriction is zero if there is no restriction in any of the four categories and 4 if there is restriction in each category.

Similarly, we create an FDI incentives index based on information in the following areas:

1. Existence of special incentives to invest in certain industries or geographic areas
2. Tax concessions specific to foreign firms (including tax holidays and tax rebates, but excluding tax concessions specifically designed for export promotion, which is in a separate category)
3. Cash grants, subsidized loans, reduced rent for land use, or other nontax concessions specific to foreign firms
4. Special promotion for exports (including the presence of export processing zones, special economic zones, etc.)

An overall FDI incentives variable is created as the sum of the above four dummies, so it can take a value of zero if there is no incentive in any of the four categories and 4 if there are incentives in all of them.

Our coding of the incentives/restrictions measures is still coarse and may not capture the true variations of the government policies. Nonetheless, it is important to have a way to control for these types of government policies in a statistical analysis of international capital flows. Our contribution is to create a first-of-its-kind index. We let the data speak to the usefulness of such an index.

Table 10.3 lists all the countries in our sample. Table 10.4 presents the summary statistics for some key variables and the coefficients of the pairwise correlation among the three measures of corruption and GDP per capita.

10.3 Statistical Analyses

Studying the effect of corruption on the composition of capital inflows is equivalent to asking whether corruption may have a differential impact on

Table 10.4 **Summary Statistics**

Variable	*N*	Mean	Standard Deviation	Minimum	Maximum
Corruption					
GCR/*WDR* combined	99	3.62	1.19	1.3	5.5
Transparency International	85	5.12	2.40	0	8.6
Tax rate (highest corporate income tax rate)	56	32.39	6.86	0	42
FDI incentives	49	1.65	0.69	0	3
FDI restrictions	49	1.69	1.18	0	4
Per capita GDP, 1994–96	154	5,792	9,222	104	43,602
ln(loan-FDI), bilateral 1994–96	288	1.53	2.21	–8.06	8.75
ln(loan-FDI), balance of payments, 1994–96	125	0.31	2.00	–4.84	6.18
ln(portfolio-FDI), balance of payments, 1994–96	89	–0.66	1.98	–5.28	5.77

Correlation Matrix

		Corruption		
	GDP Per Capita	TI	*GCR*	*WDR*
GDP per capita	1			
Corruption (TI)	–0.82	1		
Corruption (*GCR*)	–0.78	0.87	1	
Corruption (*WDR*)	–0.72	0.86	0.83	1

Source: See appendix B.

different forms of capital flows. In this section, we proceed by sequentially examining FDI, international bank lending, and the ratio between the two.

10.3.1 Corruption and Foreign Direct Investment

We first examine the effect of local corruption on the volume of inward FDI. Our specification can be motivated by a simple optimization problem solved by a multinational firm. Let K_j be the stock of investment the multinational firm intends to allocate to host country j. Let t_j be the rate of corporate income tax in host country j, b_j be the rate of bribery the firm must pay per unit of output, and r be the rental rate of capital. Let $f(K_j)$ be the output of the firm in host country j. There are N possible host countries in which the firm can invest. The firm chooses the level of K_j for $j = 1, 2, \ldots N$, in order to maximize its total after-tax and after-bribery profit:

$$\pi = \sum_{j=1}^{N} [(1 - t_j - b_j) f(K_j) - rK_j]$$

Note that as a simple way to indicate that tax and corruption are distortionary, we let $(1 - t_j - b_j)$ premultiply output rather than profit. The optimal

stock of FDI in country j, K_j, would of course be related to both the rate of tax and that of corruption in the host country: $K = K(t_j, b_j)$, where $\partial K/\partial t <$ and $\partial K/\partial b < 0$.[8]

Let FDI_{kj} be the bilateral stock of FDI from source country k to host country j. In our empirical work, we begin with the following benchmark specification:

$$\log[FDI_{kj}] = \sum_i \alpha_i D_i + \beta_1 \text{tax}_j + \beta_2 \text{corruption}_j + \boldsymbol{X_j}\delta + \boldsymbol{Z_{kj}}\gamma + e_{kj},$$

where D_i is a source country dummy that takes the value of 1 if the source country is i (i.e., if $k = i$), and zero otherwise; $\boldsymbol{X_j}$ is a vector of characteristics of host country j other than its tax and corruption levels; $\boldsymbol{Z_{kj}}$ is a vector of characteristics specific to the source-host country pairs; e_{kj} is an independently and identically distributed (i.i.d.) error that follows a normal distribution; and α_i, β_1, β_2, δ, and γ are parameters to be estimated.

This is a quasi–fixed effects regression in that source country dummies are included. They are meant to capture all characteristics of the source countries that may affect the size of their outward FDI, including their size and level of development. In addition, possible differences in the source countries' definition of FDI are controlled for by these fixed effects under the assumption that the FDI values for a particular country pair under these definitions are proportional to each other except for an additive error that is not correlated with other regressors in the regression. We do not impose host country fixed effects, as doing so would eliminate the possibility of estimating all the interesting parameters, including the effect of corruption.

Using the combined *GCR*/*WDR* rating as the measure of corruption, the regression is run and reported in column (1) of table 10.5. Most variables have the expected signs and are statistically significant. A rise in host country tax rate is associated with less inward FDI. Government incentives and the restrictions on FDI have a positive and a negative coefficient, respectively, consistent with our intuition. Most importantly, corruption has a negative and statistically significant effect on FDI. Note that in the regressions, we have standardized the corruption measure (by subtracting the mean and dividing it by the sample standard deviation) so that the point estimate can be interpreted as the response of the left-hand side variable with respect to a 1–standard deviation increase in corruption. Therefore, using the *GCR*/*WDR* measure of corruption (columns [1]–[2] of table 10.5), a 1–standard deviation increase in corruption is associated with a 40 percent decline in FDI. In other words, the negative effect of corruption is not just

8. More sophisticated generalization includes endogenizing the level of corruption (and tax) such as in Shleifer and Vishny (1993) or Kaufmann and Wei (1999). These generalizations are outside the scope of the current paper.

Table 10.5 Corruption and Foreign Direct Investment

	GCR/WDR		Transparency International	
Measure of Corruption	Fixed Effects (1)	Random Effects (2)	Fixed Effects (3)	Random Effects (4)
Corruption	–0.427**	–0.407**	–0.502**	–0.508**
	(0.103)	(0.168)	(0.111)	(0.183)
Tax rate	–0.031**	–0.034*	–0.030**	–0.034*
	(0.011)	(0.019)	(0.011)	(0.019)
FDI incentives	0.403**	0.324**	0.400**	0.345**
	(0.095)	(0.162)	(0.095)	(0.157)
FDI restrictions	–0.335**	–0.323**	–0.324**	–0.308**
	(0.058)	(0.098)	(0.058)	(0.096)
Log(GDP)	0.857**	0.942**	0.909**	0.994**
	(0.053)	(0.091)	(0.055)	(0.091)
Log(per capita GDP)	–0.039	–0.121	–0.125	–0.218
	(0.086)	(0.143)	(0.096)	(0.158)
Log distance	–0.555**	–0.856**	–0.557**	–0.844**
	(0.060)	(0.067)	(0.060)	(0.067)
Linguistic tie	1.426**	1.041**	1.409**	1.049**
	(0.211)	(0.194)	(0.210)	(0.195)
Exchange rate volatility	0.053	–2.752	0.210	–2.354
	(1.968)	(3.033)	(1.960)	(2.954)
Adjusted R^2/overall R^2	0.74	0.74	0.74	0.74
N	628	628	628	628

Source: Authors' calculations.

Notes: Standard errors are in parentheses. Fixed effects regression: log FDI_{kj} = source country dummies + $bX_{kj} + e_{kj}$, where FDI_{kj} is FDI from source country k to host country j. All regressions include source country dummies whose coefficients are not reported to save space. Random-effects specification: Y_{kj} = source country dummies + $bX_{kj} + u_j + e_{kj}$, where u_j is the host-country random effect. Log(FDI), log(GDP), and log(per capita GDP) are averaged over 1994–96. Exchange rate volatility = standard deviation of the first difference in log monthly exchange rate (per US$) from January 1994 through December 1996. The corruption measure is standardized (i.e., corruption in the regressions = [original corruption – sample mean]/[sample standard deviation]). Hence, the coefficient on corruption can be read as the response of the left-hand-side variable with respect to a 1 standard deviation increase in corruption.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

statistically significant, but also quantitatively large. This finding is qualitatively in line with Wei (2000a), which employed a different econometric specification.

We perform several robustness checks. First, we add host country random effects to the specification. The regression result is reported in column (2) of table 10.5. The point estimate on corruption declines slightly, but remains negative and significant. We also adopt an alternative measure of corruption from the TI and repeated the regressions (columns [3]–[4]). The qualitative results are unchanged. The estimated elasticity of FDI with re-

Table 10.6 Corruption and Bank Lending

	GCR/*WDR*		Transparency International	
Measure of Corruption	Fixed Effects (1)	Random Effects (2)	Fixed Effects (3)	Random Effects (4)
Corruption	0.376**	0.390**	0.197†	0.135
	(0.092)	(0.120)	(0.127)	(0.166)
East of investing in securities and bonds market	0.219**	0.262**	0.110	0.161
	(0.088)	(0.115)	(0.089)	(0.116)
Log(GDP)	1.004**	1.054**	0.984**	1.052**
	(0.054)	(0.068)	(0.060)	(0.076)
Log(per capita GDP)	0.366**	0.356**	0.388**	0.337**
	(0.063)	(0.081)	(0.096)	(0.125)
Log distance	–0.244**	–0.428**	–0.224**	–0.432**
	(0.072)	(0.082)	(0.076)	(0.085)
Linguistic tie	0.633**	0.818**	0.556**	0.776**
	(0.207)	(0.198)	(0.210)	(0.200)
Exchange rate volatility	–5.917**	–7.253**	–5.359**	–6.598**
	(1.564)	(1.966)	(1.618)	(2.060)
Adjusted R^2/overall R^2	0.72	0.73	0.71	0.72
N	396	396	396	396

Source: Authors' calculations.

Notes: See notes to table 10.5

**Significant at the 5 percent level.

†Significant at the 15 percent level.

spect to corruption is somewhat larger: a 1–standard deviation increase in corruption in the host country is associated with a 50 percent drop in inward FDI.

10.3.2 Corruption and Composition of Capital Inflows

We now move to the central empirical question in the paper: does corruption affect the composition of capital inflows? This is equivalent to asking whether corruption affects FDI and international bank loans differently. We start by examining the relationship between corruption and bilateral bank loans, in a manner analogous to our previous studies of bilateral FDI (except that government policies toward FDI and tax rate on foreign-invested firms are omitted).[9]

Table 10.6 reports four regressions, with different specifications (only source country fixed effects, or additional host country random effects), or with difference sources of corruption measures (*GCR*/*WDR* and TI). The results are basically consistent (and somewhat surprising). When corrup-

9. We have not found a consistent data source on government policies toward international bank borrowing across countries, nor are we able to construct such a series from the PwC country reports.

tion is measured by the *GCR*/*WDR* index, it has a positive and statistically significant coefficient. In other words, in contrast with the previous results on FDI, corruption in borrowing countries seems to be associated with a higher level of borrowing from international banks. In appendix D, we also restrict the sample to a single lending country (such as France, Japan, or the United States). Generally speaking, the coefficient on corruption in the loan regression continues to be positive (although not always significant).

The earlier part of the paper suggests two stories in which international direct investors are more discouraged by local corruption than international banks. The first is that greater sunk costs or greater *ex post* vulnerability of the direct investment would make direct investors more cautious *ex ante* than international banks in doing business in a corrupt host country. The second is the greater probability of an implicit or explicit bailout provided by the current international financial system to international loans than international direct investment. These stories explain only a compositional shift away from FDI toward bank loans in corrupt recipient countries. Are they also consistent with an absolute increase in the borrowing from international banks by corrupt countries? One possibility is that FDI and international bank loans are imperfect substitutes. In a corrupt recipient country, precisely because of the lost FDI due to corruption, there are relatively more activities that must be financed by borrowing from international banks.[10]

In columns (3) and (4) of table 10.6, an alternative measure of corruption by the TI index is used. This time, corruption still has a positive coefficient, although the estimate is not statistically different from zero when host country random effects are added.

When we combine the results on FDI and bank loans, it would seem natural to expect that corruption would raise the ratio of bank loans to FDI. To verify that this is indeed the case, we also check directly the connection between the ratio of bank loans to FDI and host country corruption. We perform a fixed-effects regression of the following sort:

$$\log\left(\frac{\text{loan}_{kj}}{\text{FDI}_{kj}}\right) = \begin{matrix}\text{source country}\\ \text{fixed effects}\end{matrix} + \beta\text{corruption}_j + X_{kj}\boldsymbol{\Gamma} + e_{kj}$$

β is a scalar parameter and $\boldsymbol{\Gamma}$ is a vector of parameters with an appropriate dimension. The regression results are reported in columns (1–4) in table 10.7. As expected, the coefficient on corruption is positive and statistically

10. Following a suggestion from Martin Feldstein, we have added other determinants of FDI, specifically tax, government restrictions on inward FDI, and government incentives for FDI into the loan regression. Our objective is to determine whether other factors that discourage (or encourage) FDI would show up as encouraging (or discouraging) international bank loans. Unfortunately, these variables are statistically not different from zero. An example of this is reported as column (2) of appendix D.

Table 10.7 Composition of Capital Flows

	GCR/WDR		Transparency International		*GCR/WDR*	
Measure of Corruption	Fixe d Effects (1)	Random Effects (2)	Fixed Effects (3)	Random Effects (4)	IV, Fixed Effects (5)	IV, Fixed Effects (6)
Corruption	0.662**	0.680**	0.707**	0.720**	0.296†	0.285†
	(0.128)	(0.225)	(0.176)	(0.290)	(0.181)	(0.182)
Tax rate	0.021	0.021	0.021	0.020		
	(0.017)	(0.031)	(0.018)	(0.029)		
FDI incentives	0.194	0.244	–0.056	–0.019	0.111	0.095
	(0.152)	(0.260)	(0.160)	(0.254)	(0.156)	(0.157)
FDI restrictions	0.440**	0.446**	0.458**	0.446**	0.336**	0.333**
	(0.086)	(0.157)	(0.088)	(0.145)	(0.093)	(0.093)
Log(GDP)	–0.569**	–0.651**	–0.597**	–0.655**	–0.274**	–0.254**
	(0.107)	(0.186)	(0.110)	(0.174)	(0.115)	(0.118)
Log(per capita GDP)	0.172*	0.205	0.272**	0.302	0.034	0.033
	(0.098)	(0.181)	(0.125)	(0.210)	(0.103)	(0.103)
Log distance	0.350**	0.543**	0.357**	0.525**	0.123	0.111
	(0.094)	(0.114)	(0.096)	(0.114)	(0.132)	(0.132)
Linguistic tie	–0.699**	–0.680**	–0.722**	–0.700**	–0.753**	–0.803**
	(0.305)	(0.287)	(0.313)	(0.292)	(0.289)	(0.296)
Exchange rate volatility	–0.661	–0.007	–1.351	–0.755		–1.793
	(2.060)	(3.505)	(2.216)	(3.488)		(2.226)
Overidentifying restriction (*p*-value of the test)					0.43	0.40
Adjusted R^2/overall R^2	0.49	0.52	0.46	0.50	[a]	[a]
N	225	225	225	225	180	180

Source: Authors' calculations.

Notes: Dependent variable: log(loan) – log(FDI), averaged over 1994–96. IV = instrumental variables. See also notes to table 10.5.

[a] R^2 for IV regressions are not reported, as they do not have the standard interpretation.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

†Significant at the 15 percent level.

significant at the 5 percent level. Using the point estimate in the first regression, we see that a 1–standard deviation increase in corruption is associated with roughly a 66 percent increase in the loan-FDI ratio (e.g., roughly from 100 to 166 percent).

Based on the first regression in table 10.7, figure 10.3 presents a partial scatter plot of loan-FDI ratio against corruption, controlling for several characteristics of the host countries as described in the regression. A visual inspection of the plot suggests that positive association between corruption and capital composition is unlikely to go away if we omit any one or two observations. Hence, the evidence suggests that a corrupt country tends to

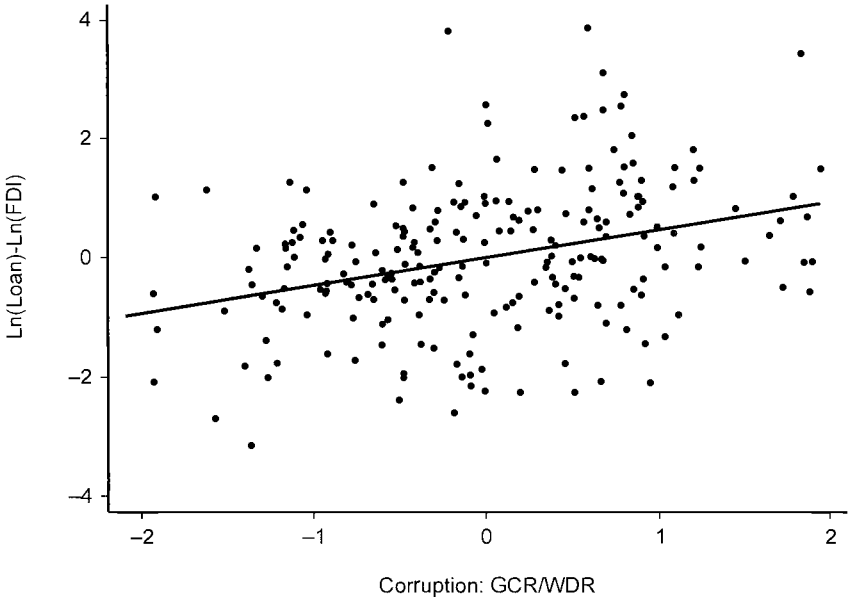

Fig. 10.3 Composition of capital inflows and corruption (partial correlation based on table 10.7, column [1])
Source: Authors' calculations.

have a composition of capital inflows that is relatively light in FDI and relatively heavy in bank loans.

Also note that because FDI is more relationship-intensive (as proxied by physical and linguistic distances) than bank loans, the coefficients on geographic distance and the linguistic tie dummy are positive and negative, respectively.

One might be concerned with possible endogeneity of the corruption measure. For example, survey respondents may perceive a country to be corrupt in part because they observe very little FDI going there. In this case, the positive association between the loan-FDI ratio and corruption can be due to a reverse causality.

We perform instrumental variable (IV) regressions on our key regressions. Mauro (1995) argued that ethnolinguistic fragmentation is a good IV for corruption. His ethnolinguistic indicator measures the probability that two persons from a country are from two distinct ethnic groups. The greater the indicator, the more fragmented the country. In addition, La Porta et al. (1998) argued that legal origin or colonial history has an important impact on the quality of government bureaucracy. These variables

are used as instruments for the corruption measure. A first-stage regression suggests that ethnically more fragmented countries are more corrupt. In addition, it suggests that countries with a French legal origin (including colonies of Spain and Portugal) are more corrupt than former British colonies.

The IV regressions are reported in the last two columns of table 10.7. A test of overidentifying restrictions does not reject the null hypothesis that the instruments are uncorrelated with the error term. The results from these two IV regressions are still consistent with the notion that corruption deters FDI more than bank loans. Therefore, countries that are more corrupt tend to have a capital inflow structure that relies relatively more on bank borrowing than FDI.

Our sample is potentially censored. A source country may choose not to invest at all in a particular host country precisely because of the corruption level and other characteristics of that country. In that case, either FDI or bank lending or both may be zero. The regression procedure used so far would drop these observations. However, our left-hand side variable, the ratio of bank loans to FDI, does not lend itself naturally to a Tobit specification. For this reason, the following transformation of the ratio is constructed as the left-hand side variable: log(bank lending+0.1) – log(FDI + 0.1). The results are presented in table 10.8. With this new variable, there is a small increase in the number of observations (from 225 to 231). The most important message from table 10.8 is that the earlier conclusion remains true: Corruption tilts the composition of capital inflows away from FDI and toward international bank loans.

10.3.3 Portfolio and Direct Investments from the United States

Although bilateral data on portfolio investment other than bank credits are not available for the whole set of capital-exporting countries examined in the previous sections, we can obtain data on portfolio investment originating from the United States (to a set of developing countries). In this section, the data on U.S. outward capital flows are used to examine whether the ratio of portfolio to direct investment in a capital-receiving country is affected by its corruption level. We must caution at the outset that the number of observations is small (between 35 to 39, depending on the regression specification). Thus, the power of the statistical tests is likely to be low.

Six fixed effects regressions are performed and reported in table 10.9. In the first three columns, we use the *GCR*/*WDR* indicator of corruption. We see again that, at least for this subsample, the ratio of portfolio investment to FDI is also positively related to the capital-importing country's corruption level. The more corrupt a country, the less FDI it receives (relative to portfolio capital). However, when we use the TI corruption index (in the last three columns), the coefficients on corruption are no longer statistically

Table 10.8 Transformed Ratio of Loans to Foreign Direct Investment

	GCR/WDR		Transparency International		*GCR/WDR*	
Measure of Corruption	Fixed Effects (1)	Random Effects (2)	Fixed Effects (3)	Random Effects (4)	IV, Fixed Effects (5)	IV, Fixed Effects (6)
Corruption	0.675**	0.674**	0.701**	0.681**	0.382*	0.374*
	(0.151)	(0.226)	(0.210)	(0.320)	(0.199)	(0.196)
Tax rate	0.011	0.013	0.012	0.012		
	(0.020)	(0.031)	(0.021)	(0.032)		
FDI incentives	0.040	0.072	–0.196	–0.166	–0.014	–0.023
	(0.178)	(0.262)	(0.187)	(0.280)	(0.171)	(0.169)
FDI restrictions	0.546**	0.550**	0.558**	0.547**	0.427**	0.425**
	(0.101)	(0.156)	(0.103)	(0.159)	(0.103)	(0.102)
Log(GDP)	–0.591**	–0.645**	–0.615**	–0.657**	–0.323**	–0.309**
	(0.128)	(0.189)	(0.131)	(0.194)	(0.128)	(0.129)
Log(per capita GDP)	0.227**	0.239	0.314***	0.318	0.114	0.113
	(0.117)	(0.182)	(0.149)	(0.232)	(0.114)	(0.112)
Log distance	0.391**	0.477**	0.396**	0.479**	0.159	0.151
	(0.112)	(0.133)	(0.115)	(0.135)	(0.147)	(0.146)
Linguistic tie	–0.490	–0.504	–0.513	–0.522†	–0.752**	–0.787**
	(0.365)	(0.356)	(0.373)	(0.360)	(0.325)	(0.326)
Exchange rate volatility	0.563	1.091	–0.279	0.442		–1.257
	(2.368)	(3.490)	(2.553)	(3.798)		(2.451)
Overidentifying restriction (*p*-value of the test)					0.28	0.28
Adjusted R^2/overall R^2	0.48	0.51	0.45	0.50	——	——
N	231	231	231	231	183	183

Source: Authors' calculations.

Notes: Dependent variable: log(loan + 0.1) – log(FDI + 0.1), averaged over 1994–96. IV = instrumental variables. See also notes to table 10.5.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

†Significant at the 15 percent level.

significant, although they are always positive. The insignificance can be consistent with a genuinely zero coefficient or can result from a low power of the test due to the small sample size.

10.3.4 Evidence from the Balance-of-Payments Data

If we are willing to forgo bilateral data and employ data from the balance-of-payments (BOP) statistics, we may be able to include more capital-importing countries in our analysis.[11] In particular, we continue to use the ratio of portfolio inflow to FDI, or the loan–FDI ratio, as the dependent

11. Note, however, that the number of observations with the BOP data may not be greater than that with the bilateral loan-FDI data.

Table 10.9 U.S.-bilateral Portfolio Data

	GCR/*WDR*			Transparency International		
Measure of Corruption	(1)	(2)	(3)	(4)	(5)	(6)
Corruption	0.321*	0.319*	0.341†	0.283	0.324	0.307
	(0.173)	(0.171)	(0.208)	(0.247)	(0.270)	(0.275)
Tax rate			–0.023		–0.033	
			(0.036)		(0.033)	
FDI incentives			–0.218		–0.215	
			(0.255)		(0.249)	
FDI restrictions			0.214		0.167	
			(0.156)		(0.165)	
Ease of investing in securities and bonds market			0.364*		0.280	
			(0.203)		(0.199)	
Log(GDP)	0.304**	0.311**	0.371**	0.289**	0.287**	0.344**
	(0.138)	(0.152)	(0.161)	(0.124)	(0.137)	(0.155)
Log(per capita GDP)	0.506**	0.517**	0.441**	0.512**	0.557**	0.461**
	(0.100)	(0.100)	(0.152)	(0.163)	(0.177)	(0.202)
Log distance	–0.200*	–0.187†	–0.194†	–0.198**	–0.180†	–0.203†
	(0.101)	(0.113)	(0.129)	(0.085)	(0.107)	(0.127)
Linguistic tie	0.870**	0.814**	1.004**	0.853**	0.797**	0.984**
	(0.238)	(0.251)	(0.287)	(0.269)	(0.278)	(0.294)
Exchange rate volatility		3.515**	3.990†		2.436	3.281
		(1.649)	(2.367)		(2.254)	(2.739)
Government deficit		0.009	0.023		0.006	0.005
		(0.034)	(0.047)		(0.039)	(0.049)
Adjusted R^2	0.52	0.56	0.60	0.51	0.54	0.58
N	39	36	35	39	36	35

Source: Authors' calculations.

Notes: Dependent variable: log(portfolio investment) – log(FDI), averaged over 1994–96. The portfolio and FDI values are the sum of the flows over 1994–96. Also see the notes to table 10.5.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

†Significant at the 15 percent level.

variable. To minimize the effect of year-to-year fluctuation, we again average the ratios over a three-year period (1994–96).

The results are reported in the upper half of table 10.10. In column (1), where the dependent variable is the ratio of portfolio and FDI, we can see that corruption (as measured by a hybrid of *GCR* and *WDR*) is positive and statistically significant: More corrupt countries on average attract more portfolio inflows than FDI. In column (2), we examine the loan-FDI ratio as the dependent variable. The corruption variable is not significant. However, we observe that many other regressors are not significant either. If we drop two of the insignificant regressors (FDI incentives and restrictions), then the coefficient on corruption becomes positive and significant. If we further drop two additional insignificant variables (tax rate and exchange rate volatility), corruption remains positive and significant. Thus, even with the BOP data,

Table 10.10 **Corruption and Composition of Capital Inflows Based on Balance-of-Payments Data**

	Dependent Variable					
	GCR/WDR				Transparency International	
Measure of Corruption	Portfolio Flow-FDI (1)	Loan-FDI (2)	Loan-FDI (3)	Loan-FDI (4)	Portfolio Flow-FDI (5)	Loan-FDI (6)
Corruption	1.296**	0.356	0.702**	0.669**	1.046**	0.832*
	(0.319)	(0.417)	(0.347)	(0.269)	(0.382)	(0.428)
Tax rate	0.069	0.010	0.041		0.045	0.001
	(0.050)	(0.053)	(0.051)		(0.052)	(0.051)
FDI incentives	–0.260	–0.562		–0.263	–0.572	
	(0.484)	(0.582)		(0.442)	(0.506)	
FDI restrictions	0.197	0.281		0.023	0.245	
	(0.280)	(0.249)		(0.326)	(0.252)	
Ease of portfolio investment	0.288			–0.056		
	(0.471)			(0.554)		
Log (GDP)	0.559**	0.414	0.022	–0.256†	0.548**	0.332
	(0.252)	(0.349)	(0.293)	(0.165)	(0.239)	(0.313)
Log (per capita GDP)	0.861**	0.314	0.560*	0.316†	0.851**	0.641*
	(0.304)	(0.360)	(0.283)	(0.198)	(0.390)	(0.367)
Exchange rate volatility	–7.148†	–10.322	–6.070		–5.067	–11.410
	(4.406)	(12.181)	(11.489)		(5.838)	(11.525)
Adjusted R^2	0.51	0.24	0.13	0.16	0.46	0.31
N	41	39	44	73	41	39

Source: Authors' calculations.

Notes: Standard errors are in parentheses. The left-hand-side variables are in logarithm form and are averaged over 1994–96. Exchange rate volatility = standard deviation of the first difference in log monthly exchange rate (per US$) from January 1994 through December 1996. The corruption variable is standardized (i.e., corruption in the regressions = [original corruption – sample mean]/[sample standard deviation]). Hence, the coefficient on corruption can be read as the response of the left-hand-side variable with respect to a one standard deviation increase in corruption.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

†Significant at the 15 percent level.

there is evidence that corrupt countries would have greater difficulties in attracting FDI relative to bank loans. In columns (5)–(6) of table 10.10, we use a different measure of corruption (TI index). The results remain the same: Corruption discourages FDI more than bank loans or portfolio inflows.

We repeat the exercise with the left-hand side variables over a different time period (1997–98), which is the period that Hausmann and Fernandez-Arias (2000) examined. The regression results are reported in the lower half of table 10.11. Contrary to their inference, we find exactly the same pattern as in our previous tables: corrupt countries on average have relatively more difficulties in attracting FDI than the other forms of capital inflows.

Table 10.11 Corruption and Composition of Capital Inflows Based on Balance-of-Payments Data (1997–98)

	Dependent Variable							
	GCR/WDR			Transparency International			*GCR/WDR*	Transparency International
Measure of Corruption	Portfolio Flows-FDI (1)	Loan-FDI (2)	Loan-FDI (3)	Portfolio Flow-FDI (4)	Portfolio Flow-FDI (5)	Loan-FDI (6)	FDI/(FDI + loan + portfolio) (7)	FDI/(FDI + loan + portfolio) (8)
Corruption	0.570*	0.579†	0.600*	0.398	0.657*	0.725*	–0.374*	–0.481**
	(0.330)	(0.385)	(0.348)	(0.319)	(0.330)	(0.412)	(0.193)	(0.198)
Tax rate	0.102**	0.041	0.040	0.090**	0.089**	0.034	–0.045*	–0.041*
	(0.043)	(0.045)	(0.044)	(0.038)	(0.041)	(0.045)	(0.024)	(0.023)
FDI incentives	–0.733**	–0.449	–0.461	–0.601*	–0.679*	–0.465	0.030	0.048
	(0.340)	(0.366)	(0.350)	(0.312)	(0.339)	(0.362)	(0.188)	(0.183)
FDI restrictions	0.222	–0.072	–0.066	0.006	0.150	–0.109	0.010	0.024
	(0.215)	(0.230)	(0.224)	(0.201)	(0.210)	(0.229)	(0.117)	(0.114)
Ease of investing in securities and bonds market	0.394			0.652†	0.222			
	(0.407)			(0.405)	(0.402)			
Log(GDP)	0.071	0.158	0.152	0.187	0.059	0.093	–0.272**	–0.228**
	(0.191)	(0.214)	(0.207)	(0.180)	(0.188)	(0.218)	(0.100)	(0.100)
Log(per capita GDP)	0.713**	0.473†	0.479†	0.492	0.849**	0.610*	–0.350**	–0.458**
	(0.305)	(0.316)	(0.308)	(0.335)	(0.332)	(0.347)	(0.163)	(0.176)
Exchange rate volatility		0.763		19.980**		1.916	–3.058	–3.770
		(5.571)		(7.796)		(5.201)	(2.856)	(2.647)
Adjusted R^2	0.39	0.07	0.09	0.50	0.41	0.09	0.31	0.34
N	37	41	41	37	37	41	45	45

Source: Authors' calculations.

Notes: Standard errors are in parentheses. The left-hand-side variables, log(FDI), log(GDP), and log(per capita GDP) are averaged over 1994–96. Exchange rate volatility = standard deviation of the first difference in log monthly exchange rate (per US$) from January 1997 through December 1998. The corruption measure is standardized.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

†Significant at the 15 percent level.

Table 10.12 Maturity of Debt

	(Short-term bank loan)/ (total loan + FDI)		(Short-term bank loan)/ (total loan)	
	GCR/WDR	TI	*GCR/WDR*	TI
Corruption	0.040	0.155†	–0.108	0.027
	(0.082)	(0.102)	(0.083)	(0.089)
Log(GDP)	0.097*	0.067	–0.013	–0.009
	(0.049)	(0.048)	(0.036)	(0.032)
Log(per capita GDP)	0.032	0.101	–0.032	0.007
	(0.063)	(0.080)	(0.058)	(0.060)
Adjusted R^2	0.04	0.09	0.03	0.003
N	32	33	77	64

Source: Authors' calculations.

Notes: Standard errors are in parentheses. Short-term loans are loans with maturity of less than and up to one year. Bank loans for a particular recipient country are its borrowing from all BIS-reporting countries (mostly OECD countries). To maximize comparability, the value of FDI for a host country is the sum of inward FDI from OECD countries (rather than total inward FDI from the balance-of-payments source).

*Significant at the 10 percent level.

†Significant at the 15 percent level.

10.3.5 Maturity Structure of the Foreign Borrowing

A different dimension of the capital flow composition, namely, the relative share of the short-term borrowing, has been stressed in the literature as also being related to the likelihood of a currency crisis (see Rodrik and Velasco 1999).

We look into the possible connection between this measure of composition of capital inflows and corruption. The results are reported in table 10.12. It turns out that there is no robust evidence for a systematic relationship between the two. Thus, contrary to the share of FDI in total capital flows, higher corruption *per se* may not be associated with a greater reliance on short-term borrowing.

10.3.6 Currency Structure of Foreign Borrowing

Countries that experience a BOP crisis are often criticized for having either too much short-term borrowing or too much borrowing in a hard currency. Of course, both the tendency to borrow in the short term and the tendency to borrow in a hard currency are linked to a country's inability to borrow internationally in its own currency.

Using the ratio of international bonds issued in a country's currency to all international bonds issued by that country as a measure of a country's ability to borrow in its own currency, we can examine possible connections between a country's extent of corruption and this ability to borrow in its own currency. The results are reported in table 10.13. When we use the

Table 10.13 Ability to Borrow Internationally in Own Currency

	GCR/WDR				Transparency International			
Measure of Corruption	OLS (1)	OLS (2)	Tobit (3)	Tobit (4)	OLS (5)	OLS (6)	Tobit (7)	Tobit (8)
Corruption	–0.252**	–0.115**	–0.767**	0.008	–0.252**	–0.074	–0.689**	–0.067
	(0.059)	(0.052)	(0.132)	(0.185)	(0.062)	(0.077)	(0.130)	(0.187)
Log (per capita GDP)		0.109**		0.653**		0.139**		1.584**
		(0.031)		(0.167)		(0.052)		(0.403)
Adjusted R^2/pseudo-R^2	0.28	0.34	0.30	0.46	0.24	0.29	0.24	0.37
N	99	98	99	98	85	84	85	84

Source: The data were kindly provided by Ernesto Stein and Ugo Panizza.

Notes: Standard errors are in parentheses. The dependent variable is the ability of a country to borrow internationally in its own currency. Log(per capita GDP) are averaged over 1994–96. Ability to borrow internationally is measured by proportion of international securities issued in a country's own currency relative to the amount issued by that country's residents in 1998.

**Significant at the 5 percent level.

GCR/*WDR* measure of corruption, there is a negative and statistically significant association between corruption and the ability to borrow in the country's own currency. This negative association remains when we add income level as a control. On the other hand, when we use an alternative measure of corruption (the TI index) and when income level is controlled for, the coefficient on corruption is no longer significant (although still negative). We have also tried a tobit specification in which zero percent issuance of international debt in a country's own currency is assumed to be censored from below. The coefficient on corruption is negative if there is no per capita income in the regression but insignificantly different from zero if there is per capita income. Overall, there is some (weak) support for the notion that higher corruption is associated with a lower ability to borrow internationally in one's own currency. This may be considered corroborative evidence that corruption may have raised a country's likelihood to slide into a currency crisis.

10.4 Conclusion

Corruption affects the composition of capital inflows in a way that is unfavorable to the country. A corrupt country receives substantially less FDI; however, it may not be disadvantaged as much in obtaining bank loans. As a result, corruption in a capital-importing country tends to tilt the composition of its capital inflows away from FDI and toward foreign bank loans. The data support this hypothesis. This result is robust across different measures of corruption and different econometric specifications.

There are two possible reasons for this effect. First, FDI is more likely to be exploited by local corrupt officials *ex post* than foreign loans. As a result, less FDI would go to corrupt countries *ex ante.* Second, the current international financial architecture is such that there is more insurance or protection from the IMF and the G7 governments for bank lenders from developed countries than for direct investors.

Previous research (starting with Frankel and Rose 1996) has shown that a capital inflow structure that is relatively low in FDI is associated with a greater propensity for a future currency crisis. It may be that international bank loans (or other portfolio flows) swing more than direct investment in the event of bad news (whether genuine or self-generated by international investors) about economic or policy fundamentals. If so, this paper has provided evidence for one possible channel through which corruption in a developing country may increase its chances of running into a future crisis.

In the literature on the causes of currency crises, crony capitalism and self-fulfilling expectations by international creditors are often proposed as two *rival* hypotheses. Indeed, authors who subscribe to one view often do not accept the other. The evidence in this paper suggests a natural linkage between the two. Crony capitalism, through its effect on the composition of a country's capital inflows, makes it more vulnerable to the self-fulfilling-expectations type of currency crisis.

Corruption could also lead to a financial crisis by weakening domestic financial supervision and damaging the quality of banks' and firms' balance sheets. This possibility itself can be a topic for a useful research project.

Appendix A

Justification for the Econometric Specification That Links the Composition of Capital Inflows and Corruption

In the main empirical part of the paper, we have performed several regressions that examine the connection between corruption and the ratio of FDI and non-FDI capital flows. In this section, a simple model is used to demonstrate how such a reduced-form specification can be justified. For simplicity, let us consider that there are two types of international capital flows: direct investment and bank credit.

Let us suppose that the government in the capital-importing country k maximizes the two-period objective function

$$U(G_{k1}) + \delta U(G_{k2}),$$

where G_{k1} and G_{k2} are expenditures by the government in country k in period 1 and period 2, respectively, and δ is the subjective discount factor. For simplicity, we assume that the tax revenues in the two periods, T_{k1} and T_{k2}, are exogenously given. Let B_k and D_k are first-period borrowing by country k from international banks and first-period direct investment in country k, respectively. To abstract from unnecessary complications, we assume that bank credit and FDI are merely two forms of additional funding sources. No production is explicitly modeled. In this case, the gap between the first-period expenditure and tax revenue must be met by the inflow of international capital:

$$G_{k1} = T_{k1} + B_k + D_k$$

In the second period, the international credit must be repaid. Moreover, international direct investors are assumed to recoup both the investment and the gross profit.

$$G_{k2} = T_{k2} - R(B_k)B_k - R(D_k)D_k,$$

where $R(B_k)$ and $R(D_k)$ are the gross returns that international creditors and international director investors would demand from country k. Suppose R^* is the gross return on the risk-free bond (say, the U.S. government bond as an approximation), then, we assume that

$$R(B_k) = R^* + \theta B_k$$

and

$$R(D_k) = R^* + \theta D_k + \rho_k D_k.$$

Both θ and ρ_k are positive. Think of ρ_k as proportional to country k's perceived level of corruption. The positive θ reflects the assumption that the warranted returns on either bank credit or direct investment increase with the size of the capital inflow. Note that ρ_k appears in the return on the direct investment but not in that on bank credit because corruption represents a greater risk to direct investment than to bank loans (for the two reasons described in the previous section; relative to bank lending, FDI faces greater sunk costs and less protection from the international financial system).

A few points are worth noting here. First, we assume that the bank credit is obtained and later paid back by the government. In reality, either the private or the public sector can borrow from the international credit market. Many researchers have observed that the distinction between private and public borrowing is very thin because private borrowing from the international credit market often carries an implicit, and sometimes an explicit, guarantee from the government of the borrowing country. Second, while direct investment is supposed to be for the long term, investors eventually would want to recoup both the initial investment and the cumulative profits along the way.

The government's maximization problem yields the following two first-order conditions:

$$U'(G_{k1}) - \delta U'(G_{k2})(R^* + 2\theta B_k) = 0$$

and

$$U'(G_{k1}) - \delta U'(G_{k2})(R^* + 2\theta B_k + 2\rho_k D_k) = 0$$

This implies a particular relationship between the composition of capital inflow for country k and its corruption level:

$$\frac{B_k}{D_k} = \frac{\theta + \rho_k}{\theta}.$$

Hence, the higher the corruption level in country k, the less FDI it would receive relative to its bank borrowing. The ratio of non-FDI forms of capital flow to FDI can be linked to the recipient country's level of corruption.

Appendix B

Source and Construction of the Variables

Bilateral Bank Loans

Source: BIS website [http://www.bis.org/publ/index.htm]. Data are at the end of December in US$ millions. Loans to offshore banking centers are omitted.

Bilateral Foreign Direct Investment

Source: OECD, *International Direct Investment Statistics Yearbook 1998* diskettes. Unit: US$ millions (converted into US$ using the yearly average exchange rates from annex III of the book).

Total Inward FDI, Portfolio, and Other Investment

Source: IMF, Balance of Payments Statistics CD-ROM, lines 78bed, 78bgd, and 78bid, respectively.

Distance

Source for latitude and longitude: Rudloff (1981), updated from Pearce and Smith (1984). Greater circle distance (in kilometers) between economic centers (usually capital cities) in a pair of countries based on the latitude and longitude data.

Argentina. Used the average latitude and longitude of Buenos Aires, Cordoba, and Rosario.

Australia. Used the average latitude and longitude of Canberra, Sydney, and Melbourne.

Bahrain. Used the latitude and longitude data from the city of Muharraq.

Bermuda. Used the latitude and longitude data from Kindley Air Force Base.

Bhutan. Used the latitude and longitude data from [http://www.kingdom ofbhutan.com/kingdom.html].

Canada. Used the average latitude and longitude of Toronto, Vancouver, and Montreal.

Equatorial Guinea. Used the latitude and longitude data from the city of Santa Isabel.

Greenland. Used the latitude and longitude data from the city of Peary Land.

India. Used the average latitude and longitude of New Delhi, Bombay, and Calcutta.

Israel. Used the latitude and longitude data from Lod Airport (near Java and Tel Aviv).

Mauritius. Used the latitude and longitude data from the city of Diego Gracia.

The Netherlands. Used the latitude and longitude data from the city of De Bilt.

Slovak. Used the latitude and longitude data from the city of Poprad.

Sudan. Used the average latitude and longitude of Atbara Khartoum and El Fasher.

Switzerland. Used the latitude and longitude data from the city of Zurich.

Brazil. Used the average latitude and longitude of Brasilia, Rio de Janeiro, and Sao Paulo.
Panama. Used the latitude and longitude data from Panama City.
Russia. Used the average latitude and longitude of Moscow, St. Petersburg, and Nizhni.
Nizhny Novogorod. Used the data from [http://www.unn.runnet.ru/nn/whereis.htm].
Kazakhstan. Used the average latitude and longitude of Almaty, Chimkent, and Karaganda.
United States. Used the latitude and longitude data from Kansas City, Missouri.

Linguistic Tie

Source of major languages: CIA (1999).
Dummy = 1 if the two countries share a common language or have a former colonial relation.

Corruption

GCR Index

Source: World Economic Forum (1997).
Transformation: Values in this paper = 8 – original values.

WDR Index

Original source: World Bank (1997). Data are from Kaufmann and Wei (1999).
Transformation: Values in this paper = 8 – original values.

TI Index

Source: Transparency International 1998 index [http://www.gwdg.de/~uwvw/icr.htm].
Transformation: Values in this paper = 10 – original values. Thus, a larger number means more corruption.

Gross Domestic Product and GDP per Capita

Source: World Bank, *SIMA*/*GDF* and *WDR* central database. GDP data are GDP at market prices (constant 1995 US$); GDP per capita data are calculated using GDP divided by population.

Monthly Exchange Rate (end of period)

Source: IMF, International Financial Statistics, via the World Bank *SIMA* database.

Government Deficit to GDP Ratio

Source: World Bank, *SIMA*/*GDF* and *WDI* central database.

U.S. Bilateral Data

Source. U.S. Department of the Treasury website [http://www.ustreas.gov/tic/ticsec.htm]. Sum of the U.S. portfolio investments in other countries (gross sale by foreigners to U.S. residents, foreign bonds and foreign stocks), 1994–96. All amounts in US$ millions.

Legal Origins

Source: La Porta et al. (1998).

Accounting Standard

Source: La Porta et al. (1998).

Corporate Tax Rates

Source: PwC (2000), updated from World Economic Forum (1997).

Appendix C

Table 10A.1 Standard Deviation and Coefficient of Variation of FDI-GDP, Loan-GDP, and Portfolio-GDP, by Country

	FDI/GDP			Loan/GDP			Portfolio/GDP		
Country	Standard Deviation	Mean	Coefficient of Variation	Standard Deviation	Mean	Coefficient of Variation	Standard Deviation	Mean	Coefficient of Variation
Albania	0.017	0.013	1.372	0.024	0.020	1.222			
Algeria	0.002	0.001	3.518	0.013	0.001	16.046	0.000	0.000	–3.464
Angola	0.030	0.035	0.870	0.085	–0.017	–4.876			
Argentina	0.006	0.010	0.614	0.032	0.020	1.623	0.034	0.021	1.618
Australia	0.009	0.018	0.469	0.016	0.016	0.971	0.015	0.028	0.513
Austria	0.004	0.005	0.830	0.019	0.011	1.672	0.012	0.027	0.426
Bangladesh	0.000	0.000	1.319	0.009	0.025	0.346	0.001	0.000	97.667
Benin	0.020	0.013	1.551	0.060	0.013	4.570	0.000	0.000	–4.650
Bolivia	0.021	0.020	1.063	0.057	0.037	1.519	0.001	0.000	–2.925
Botswana	0.036	0.024	1.494	0.023	0.023	1.002	0.001	0.000	3.396
Brazil	0.003	0.006	0.557	0.028	0.004	7.771	0.026	0.013	2.042
Bulgaria	0.004	0.002	1.576	0.058	–0.003	–17.827	0.003	–0.001	–2.771
Burkina Faso	0.001	0.001	1.304	0.038	0.033	1.155	0.000	0.000	3.742
Burundi	0.001	0.001	0.726	0.036	0.053	0.675			
Cameroon	0.014	0.007	1.926	0.021	0.026	0.830			
Canada	0.006	0.011	0.573	0.005	0.004	1.234	0.014	0.035	0.400
Central African Republic	0.006	0.003	2.000	0.021	0.051	0.417			
Chad	0.015	0.010	1.484	0.042	0.035	1.187			
Chile	0.019	0.027	0.696	0.064	0.033	1.960	0.008	0.005	1.632
China	0.023	0.022	1.051	0.007	0.007	1.047	0.003	0.003	1.039

Colombia	0.008	0.015	0.550	0.020	0.019	1.039	0.008	0.005	1.702
Congo, Republic of the	0.010	0.008	1.163	0.245	0.106	2.309			
Costa Rica	0.010	0.025	0.417	0.107	0.028	3.821	0.007	0.000	–203.494
Côte d'Ivoire	0.009	0.006	1.507	0.060	0.052	1.145	0.001	0.000	4.386
Denmark	0.009	0.008	1.172	0.036	0.016	2.202	0.035	0.020	1.753
Dominican Republic	0.008	0.014	0.576	0.036	0.023	1.580	0.013	0.004	3.742
Ecuador	0.010	0.014	0.737	0.046	0.016	2.910			
Egypt	0.010	0.021	0.473	0.046	0.002	29.621	0.002	0.001	3.880
El Salvador	0.003	0.003	0.947	0.031	0.026	1.181	0.004	0.001	3.227
Finland	0.004	0.005	0.938	0.013	0.007	1.682	0.027	0.032	0.857
France	0.005	0.009	0.545	0.022	0.023	0.921	0.015	0.014	1.066
Gabon	0.022	0.009	2.539	0.105	0.042	2.521			
Gambia	0.016	0.013	1.172	0.044	0.047	0.933			
Ghana	0.011	0.007	1.510	0.022	0.043	0.515			
Greece	0.002	0.011	0.139	0.015	0.032	0.485			
Guatemala	0.009	0.011	0.833	0.013	0.008	1.648	0.009	0.000	40.526
Guinea	0.004	0.005	0.743	0.038	0.062	0.610			
Haiti	0.003	0.003	1.090	0.024	0.020	1.174			
Honduras	0.006	0.010	0.578	0.042	0.044	0.960			
Hungary	0.031	0.021	1.465	0.035	0.025	1.374	0.032	0.013	2.494
India	0.002	0.001	1.896	0.004	0.008	0.533	0.005	0.002	2.119
Indonesia	0.007	0.009	0.820	0.017	0.024	0.717	0.009	0.005	1.722
Iran	0.000	0.000	3.106	0.017	–0.008	–2.264			
Ireland	0.011	0.014	0.778	0.033	0.008	3.885	0.031	0.025	1.282
Italy	0.002	0.003	0.617	0.008	0.010	0.814	0.022	0.016	1.348
Jamaica	0.019	0.016	1.188	0.079	0.058	1.359			
Japan	0.000	0.000	1.301	0.007	0.000	–48.772	0.011	0.011	0.941
Jordan	0.008	0.006	1.355	0.038	0.049	0.771			
Kenya	0.003	0.003	0.857	0.032	0.016	2.078	0.000	0.000	2.631
Korea	0.002	0.003	0.591	0.037	0.018	2.039	0.014	0.011	1.338

(*continued*)

Table 10A.1 (continued)

Country	FDI/GDP			Loan/GDP			Portfolio/GDP		
	Standard Deviation	Mean	Coefficient of Variation	Standard Deviation	Mean	Coefficient of Variation	Standard Deviation	Mean	Coefficient of Variation
Laos	0.026	0.018	1.493	0.028	0.053	0.528	0.000	0.000	2.441
Lesotho	0.104	0.053	1.975	0.033	0.074	0.444			
Libya	0.012	–0.008	–1.577	0.008	0.003	2.439			
Madagascar	0.003	0.002	1.250	0.055	0.031	1.740			
Malawi	0.002	0.001	2.674	0.045	0.061	0.734	0.001	0.001	1.186
Malaysia	0.023	0.046	0.490	0.034	0.008	4.397	0.023	0.007	3.544
Mali	0.013	0.006	2.258	0.020	0.072	0.278			
Mauritania	0.010	0.009	1.082	0.089	0.126	0.703	0.000	0.000	–2.197
Mauritius	0.005	0.006	0.725	0.036	0.026	1.392	0.011	0.003	3.437
Mexico	0.007	0.016	0.452	0.033	0.016	2.048	0.026	0.012	2.088
Morocco	0.006	0.007	0.753	0.036	0.029	1.245	0.002	0.001	2.606
Mozambique	0.008	0.006	1.301	0.163	0.179	0.908			
Nepal	0.001	0.000	4.123	0.015	0.039	0.374			
The Netherlands	0.011	0.021	0.490	0.012	0.008	1.428	0.014	0.018	0.809
New Zealand	0.018	0.037	0.477	0.036	0.012	2.937	0.011	0.003	3.189
Nicaragua	0.016	0.008	1.878	0.195	0.070	2.794	0.002	0.001	3.241
Niger	0.011	0.004	2.672	0.034	0.034	0.979			
Nigeria	0.026	0.028	0.936	0.061	–0.066	–0.931	0.020	0.009	2.211
Norway	0.009	0.007	1.298	0.011	0.006	1.686	0.023	0.011	2.061
Oman	0.006	0.013	0.459	0.029	0.016	1.815			
Pakistan	0.004	0.006	0.638	0.011	0.027	0.409	0.007	0.004	1.779
Panama	0.050	0.018	2.833	0.187	0.017	10.755	0.094	0.022	4.273
Papua New Guinea	0.019	0.037	0.506	0.077	0.008	9.981	0.102	0.069	1.480
Paraguay	0.008	0.009	0.920	0.025	0.012	2.023	0.001	0.000	30.180
Peru	0.020	0.011	1.843	0.060	0.018	3.308	0.004	0.002	1.648
The Philippines	0.009	0.010	0.921	0.026	0.027	0.956	0.017	0.008	1.979

Poland	0.011	0.007	1.625	0.060	0.012	5.186	0.002	0.001	4.062
Portugal	0.010	0.015	0.688	0.034	0.014	2.407	0.019	0.016	1.199
Romania	0.005	0.004	1.234	0.051	0.003	19.273	0.012	0.004	3.023
Rwanda	0.005	0.007	0.719	0.015	0.025	0.627	0.000	0.000	2.677
Saudi Arabia	0.029	0.012	2.398						
Senegal	0.008	0.004	2.026	0.043	0.073	0.583	0.001	0.000	1.520
Sierra Leone	0.044	–0.007	–6.311	0.041	0.031	1.330	0.000	0.000	–4.000
Somalia	0.007	–0.003	–2.045	0.077	0.116	0.667			
South Africa	0.004	0.001	3.185	0.015	0.003	5.954	0.013	0.006	2.272
Spain	0.006	0.016	0.397	0.012	0.007	1.632	0.032	0.015	2.133
Sri Lanka	0.004	0.008	0.515	0.019	0.085	0.227	0.006	–0.003	–2.190
Sudan	0.000	0.000	3.858	0.020	0.025	0.811			
Sweden	0.016	0.013	1.261	0.023	0.039	0.598	0.029	0.000	132.630
Switzerland	0.006	0.011	0.483	0.007	0.004	1.835	0.021	0.024	0.889
Syria	0.005	0.002	2.139	0.046	0.036	1.277			
Thailand	0.007	0.013	0.571	0.028	0.044	0.629	0.012	0.011	1.137
Togo	0.012	0.008	1.417	0.048	0.026	1.857	0.001	0.001	1.056
Trinidad and Tobago	0.029	0.033	0.865	0.026	0.002	12.877	0.001	0.000	6.616
Tunisia	0.012	0.019	0.644	0.017	0.024	0.710	0.003	0.004	0.895
Turkey	0.002	0.003	0.637	0.025	0.005	4.623	0.008	0.007	1.056
Uganda	0.009	0.005	1.830	0.035	0.033	1.080			
United Kingdom	0.009	0.017	0.518	0.063	0.047	1.343	0.028	0.032	0.875
United States	0.003	0.008	0.425	0.000	0.000	–2.828	0.012	0.015	0.769
Uruguay	0.007	0.005	1.420	0.033	0.017	1.984	0.012	0.013	0.914
Venezuela	0.011	0.008	1.335	0.080	–0.017	–4.814	0.089	0.026	3.417
Zambia	0.019	0.020	0.926	0.089	0.075	1.186			
Zimbabwe	0.002	0.000	8.913	0.036	0.035	1.035	0.004	–0.004	–0.853
Mean	0.012	0.011	1.135	0.039	0.028	0.932	0.011	0.008	–0.579
Median	0.008	0.009	1.063	0.033	0.023	1.174	0.008	0.003	1.632

Note: Empty cells indicate missing data or zero mean.

Appendix D

Table 10A.2 Corruption and Bank Lending

	Lending Country				
	All	All	France	Japan	United States
Methodology	Fixed Effects	Fixed Effects	OLS	OLS	OLS
Measure of corruption	*GCR/WDR*	*GCR/WDR*	*GCR/WDR*	*GCR/WDR*	*GCR/WDR*
Corruption	0.376**	0.286**	0.419*	0.427	0.747**
	(0.092)	(0.107)	(0.221)	(0.363)	(0.344)
Ease of investing in securities and bonds market	0.219**	0.257*	0.253	0.402	0.591*
	(0.088)	(0.134)	(0.211)	(0.433)	(0.311)
Tax rate		–0.009			
		(0.015)			
FDI incentives		–0.081			
		(0.121)			
FDI restrictions		–0.001			
		(0.078)			
Log (GDP)	1.004**	1.065**	0.860**	1.081**	1.229**
	(0.054)	(0.109)	(0.131)	(0.222)	(0.187)

Log (per capita GDP)	0.366**	0.281**	0.078	0.492*	0.340*
	(0.063)	(0.088)	(0.156)	(0.273)	(0.220)
Log distance	–0.244**	–0.235**	0.245	–1.451**	–1.392**
	(0.072)	(0.080)	(0.179)	(0.655)	(0.624)
Linguistic tie	0.633**	0.542**	–0.528	–1.585	0.689
	(0.207)	(0.236)	(0.914)	(1.872)	(0.607)
Exchange rate volatility	–5.917**	–5.781**	–9.459**	–1.298	–15.111**
	(1.564)	(1.781)	(3.473)	(8.374)	(5.250)
Adjusted R^2	0.72	0.69	0.75	0.57	0.65
N	396	317	32	30	30

Source: Authors' calculations.

Notes: Source-country fixed effects are included in the first two regressions. Standard errors are in parentheses.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

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Comment Martin Feldstein

This is a very good paper. It is innovative and convincing. It deals with a significant problem and brings new data to bear on this issue. Its starting point

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is the general agreement that an excessive dependence on foreign loans increases the risk of currency crises because foreign banks can decide not to renew maturing loans when they suspect potential repayment problems. In contrast, foreign direct investment (FDI) is a much less volatile source of external financing. The mix of external financing and, in particular, the extent of dependence on foreign loans is therefore important to a country that is looking for strategies to reduce its vulnerability.

The central point of the paper by Wei and Wu is that domestic corruption can increase the risk of a currency crisis by shifting the availability of foreign funds from direct investment to bank loans. If corruption does reduce the inflow of FDI and if the unexploited investment opportunities that result from reduced FDI are financed instead by foreign loans, it follows that corruption indirectly increases the risk of crisis.

The Wei-Wu paper therefore focuses on whether corruption (as measured by the survey data that the authors describe) reduces FDI. The results of the regression analysis are very clear in showing that corruption does appear to reduce the inflow of FDI. An obvious question is whether the corruption variable is really capturing the effect of corruption per se or is simply a proxy for something else that is responsible for depressing FDI. For example, are countries that are more corrupt than average and that practice more than the usual amount of cronyism also countries that want to keep out foreign investment in order to save the investment opportunities for local investors?

To deal with this potential problem, Wei and Wu construct two clever indexes: One measures the attraction that the country's current policy provides to FDI, and the other measures the extent to which the country's policies discourage FDI. When the authors add these two variables to their regression, the coefficients imply that the measures of things that would attract FDI are positively associated with higher levels of FDI, and the variable measuring things that would repel FDI is negatively associated with FDI. Both of these variables are statistically significant. Most important, adding them to the regression does not change the basic result that the corruption variable discourages FDI.

There may of course be other variables that are omitted and that are correlated with corruption. One candidate for that would be the legal system itself. The work that Andrei Shleifer (and his co-authors LaPorta, Lopez-de-Silanes, and Vishney) and others have done suggests that foreign investors (especially those from the United States and Britain) would be attracted to countries that had Anglo-Saxon–type legal systems that provide greater protection for investors. Those legal safeguards might tilt the balance in favor of more FDI in such countries.

Wei and Wu do not include a measure of the legal system among the regressions but note that they use such a variable as an instrument for the corruption variable when doing instrumental variable estimation. They also re-

port that they performed an explicit test of whether the variable ought to be in the equation in its own right and concluded (rather surprisingly to me) that although the legal system variable is a good instrument, it does not belong in the equation as an explicit variable in its own right. I would be a little more comfortable if the authors performed a sensitivity analysis by including it in the regression and gave us an ordinary least squares regression estimate of the equation with corruption and legal variables both included.

However, demonstrating that corruption reduces FDI is not the same as demonstrating that corruption leads to an increased dependence on loans, and it is the dependence on loans that is the key link to the risk of international crises. Wei and Wu do show that corruption leads to an increase in the ratio of loans to FDI. However, the risk comes from the volume of foreign loans and not from the ratio of loans to FDI. The effect of corruption on the ratio of loans to FDI may simply be driven by its effect on the denominator.

What matters for the risk of crises is not the ratio of foreign loans to FDI but the level of foreign loans relative to gross domestic product (GDP) or export earnings. The ratio of foreign loans to FDI could be high with very little foreign loan exposure relative to GDP or to exports if FDI is very low. Fortunately, the paper does give us direct evidence on the effect of corruption on the ratio of loans to GDP (in table 10.6.) The positive effect of the corruption variable on the volume of foreign loans supports the idea that corruption increases foreign loans.

What remains to establish is that the positive effect of corruption on loans is the result of a shift from the discouraged FDI to the use of loans to finance the same investment. That is, the key question is this: If there are some investment opportunities and if FDI is reduced, is foreign borrowing the alternative route through which foreign capital can be tapped?

This line of reasoning would be more convincing if it could be shown that the other factors that encourage FDI reduce foreign loans whereas those factors that discourage FDI cause an increase in foreign loans. I suggested this at the conference, and Wei and Wu now provide explicit evidence in the postconference version of their paper. Because the coefficients of these additional regressions are not significantly different from zero, this test does not strengthen the conviction in the Wei-Wu mechanism.

It is nevertheless hard to think of an alternative theory that explains the other features of the Wei-Wu regressions. Although there may in principle be other explanations and other variables that ought to be considered, I do not have any specific suggestions. I believe that this paper has provided a very useful framework for thinking about the potential impact of corruption on FDI and foreign loans. The burden of proof is now on anybody who would argue that corruption does not discourage FDI and encourage the inflow of foreign loans.

I have two final thoughts about the implications of this paper. First, it

implies that the link between corruption and financial crises provides a reason to reduce corruption. That reason seems to be a valid one, but of course a country should not need that as a reason to reduce corruption. Reducing corruption is something that countries should do for many other reasons.

Second, the key to greater financial stability emphasized in this paper is not corruption per se but foreign loans and other short-term capital. A country that wants to reduce the risk of crisis can do so even if it cannot attract FDI (either because of corruption of because of other qualities of the country) by avoiding such large inflows of short-term loans and other financial liabilities.

Discussion Summary

Roberto Rigobon proposed a different view of the findings of the paper—the corporate finance view on the composition of financing. According to the corporate finance view, he said, there are two additional channels through which corruption may affect the choice of financing. That is, when asset returns or the ability of managers is highly uncertain, investors tend to choose loan financing rather than FDI. If corruption increases the variability of the ability of managers or the assets' returns, he said, then more corrupt countries will have a greater share of loan financing, as the paper finds.

On the empirical part of the paper, *Linda S. Goldberg* made two comments. The first is related to the cross-sectional approach of the paper. The authors regressed the average ratio of the different types of foreign financing between 1994 and 1996 on a country-specific corruption index plus a number of other control variables. Goldberg said that the regressions show the correlation between these variables, but they do not necessarily mean that the causality is from the corruption to the choice of foreign financing. For example, the correlation could be due to the fact that some other country-specific institutions affect the foreign financing and these institutions are highly correlated with the corruption index used in the paper.

Moreover, Goldberg said that in order to answer a more interesting question—that is, how a change of the corruption level in a country would affect its FDI relative to other forms of capital inflow—one needs to regress the changes in the share of FDI on the changes of corruption. This kind of time-series panel regression would net out other country-specific effects that could not be controlled for. *Kristin J. Forbes* raised a similar suggestion on running panel regressions and controlling for country-fixed effects.

Federico Sturzenegger shared a similar concern. He used a story to illustrate that Argentina's government and its regulatory bodies care little about the protection of minority shareholders. As a result, he said, many foreign

companies choose to invest in a private way and avoid putting money in the stock market when they invest in Argentina. The lack of protection of minority shareholders may have led to an increase in FDI relative to portfolio investment. He concluded that if corruption is correlated with weak financial institutions, then the corruption variable in the regression could capture this effect.

Simon Johnson said that many studies have shown that it is very difficult to distinguish different measures of institutions. The corruption effects found in the paper could be interpreted as the effects of institutions in general, which interpretation would also make the paper more appealing. Moreover, he said, the instruments for corruption used in the paper are measures of institutions and could be correlated with financing for many different reasons. He suggested that the authors try alternative measures of corruption, such as measures of how institutions have developed historically.

Rigobon proposed the addition of "financial development" as a control variable to account for the fact that at different stages of banking sector development there are different instruments in the banking sector. *Charles W. Calomiris* suggested that the authors look deeper into the relationship between the dependency on bank lending and the special protection that bank lending enjoys. Johnson questioned the inclusion of GDP per capita as an explanatory variable because GDP per capita itself is affected by the institutional variables, and this could lead to biased estimates of the effects of corruption. On the interpretation of the results, Forbes asked about the magnitude of the effects of corruption on capital flows.

Sebastian Edwards suggested that the authors present more details on the corruption index to show the distribution and dynamics of this variable because its definition is not very clear. For example, he said, the transparency index used in the paper is a ranking of countries from the least to the most corrupt ones. Over time, as more countries were added to the sample, their rankings changed for reasons not related to corruption.

A few people raised concerns on the hypothesis of the paper that in a more corrupt country foreign capital inflows tend to take the form of loan financing. Intuitively, the paper argues that foreign banking lending requires less contact with the local bureaucrats and thus is less subject to the local corruption. *Carlos A. Végh* suggested that the authors lay out a more solid analytical framework, because the current model basically assumes the hypothesis rather than providing a rationale for it. Moreover, Végh said that to make a portfolio investment, foreign investors also need to interact with the locals, so it is not clear which financing—FDI or portfolio investment—is subject to more corruption. The model could also incorporate the fact that bank portfolio investment is more likely to be bailed out than FDI by either the government or international institutions, such as the IMF. *Michael P. Dooley* raised a similar concern and said that FDI could be used

as a way to bypass the local credit markets and to maintain a direct control of the investment. Thus, it could potentially be a choice of foreign financing in a very corrupt system.

Nouriel Roubini commented that "corruption" and "crony capitalism" were used interchangeably in the paper, but these two terms do not always mean the same thing and should be distinguished. The findings of the paper—highly corrupt countries have higher share of loan financing—could be due to the dominance of the banking sector in emerging markets, which leads to a high ratio of loan financing. Roubini also suggested that the authors study the outliers in the sample. China, he said, could be an outlier with a high level of corruption and a high ratio of FDI. This may happen because foreign direct investors also get advantages, such as monopoly power, tax deduction, and the like, by bribing the local government.

On the meaning of the corruption variable, *Shang-Jin Wei* agreed with the general discussion. He said that he used "corruption" as shorthand to refer to weak public institutions and that it has many dimensions to it. He also said that there are attempts to give separate scores to corruption and other dimensions of institutions, but these scores are always highly correlated with each other.

On the suggestions to conduct panel regressions, Wei said that they are desirable, but not feasible at this time. The reason is that there is not much variation in the corruption index over time, and the time series data on corruption are not reliable. He puts more trust in the cross-country variation of this index. For example, he said, the corruption index of Indonesia worsened substantially after the fall of Suharto.

On the magnitude of the effect of corruption, Wei cited one of his earlier papers. He found that an increase of the corruption from the level of Singapore (very low) to that of Mexico (very high) has the same magnitude effect on FDI as an increase of the marginal corporate tax rate by about 50 percentage points.

Regarding Roubini's remark on outliers, Wei showed the partial correlation of the corruption index and the share of FDI where there is no obvious outlier. Moreover, Wei cited one of his papers to show that China is not an exception to the rule, and that Chinese FDI could have been much higher had China managed to reduce its corruption.