

Can Openness Deter Corruption?*

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Abstract

In this paper we estimate the effect of openness on corruption for a broad cross section of countries during the period 1980-1995. As indicators of international openness in the goods markets, we use import and export intensity (given by the shares of imports and exports in GDP). Foreign direct investment (FDI) inflows as a share of GDP is used as a measure of international openness in the assets markets. Our results support a causal relationship from higher levels of openness leading to less corruption. In particular, imports as share of GDP are robustly related to corruption. When we compare the effect of a one-standard-deviation increase in import intensity and in GDP per capita we find that they lead, respectively, to decreases of 0.3 and 0.6 points in a corruption index. This result is encouraging: a by-product of increased trade openness appears to be a reduction in corruption. We also find a strong negative association between the level and variability of tariff barriers and the degree of corruption.

1. Introduction

Corruption is a phenomenon present in all economies in the world, irrespective of level of development as well as social and cultural history. The actual level of corruption, however, varies greatly between countries. Moreover, high levels of corruption have been found to lead to lower rates of economic growth.¹ In spite of its importance as an economic phenomenon, the determinants of corruption have not been subjected to extensive empirical examination. Several reasons contribute to this fact. Corruption is a complex social as well as economic phenomenon and its non-economic determinants are not easily taken into consideration. In addition, corruption is difficult to quantify and, until recently, researchers did not have access to dependable and quantifiable corruption indices.

The international dimension of corruption gained visibility in the past decade. This comes as an implicit recognition of the difficulty of national strategies to single-handedly control the phenomenon. As a result, the United States Foreign Corrupt Practices Act was instituted, prohibiting American businesses from bribing foreign officials. More recently, in December 1997, the OECD ratified the Convention on Combating Bribery of Foreign Public Officials in International Business Transactions. Both of these initiatives resulted from the need to act in industrialized countries to control corruption around the world. In spite of its jump to the limelight, empirical estimates of the impact of international trade and investment on corruption are very scarce.

This paper analyzes the determinants of corruption, focusing on the effect of a country's international openness on the domestic level of corruption. For our purposes, openness is defined as a country's exposure to international trade and foreign direct investment flows, measured as the share of imports, exports and foreign investment on Gross Domestic Product (GDP). We also investigate the direct effect of tariff barriers and their variability on corruption levels. The significance of the question at hand is clear: corruption is a pervasive phenomenon, which is very difficult to extricate. If openness deters corruption, liberalization policies can be used as an effective policy to bring about beneficial institutional change.

This paper adds to the current literature in three ways. First, we use a larger set of openness concepts, from trade to investment to import barriers. In this way we are able to better understand what types of openness have what effects on corruption. In addition, by quantifying these effects precisely we can assess the relative impact of capital versus trade flows on the level of corruption.

¹ See Mauro (1995) for evidence that both economic growth and private investment are negatively affected by the extent of corruption at the national level.

Second, we develop powerful instruments for the degree of country openness, which are then used to interpret the causal relation between openness on corruption, properly addressing the issue of reverse causation. The instruments for openness rely on a country's geographical and cultural proximity to the major economies and the trade and investment flows of the latter. Third, our study examines a larger sample of countries than previous studies of openness and corruption, thus obtaining a better sense of the robustness of the results.

The paper is organized as follows. Section 2 reviews the theoretical and empirical literature linking trade and foreign direct investment to corruption. This section also reviews the connection between corruption and economic growth. Section 3 presents the data, specification and the empirical methodology employed. Section 4 presents the results and section 5 concludes.

2. Openness and Corruption: An Overview

Corruption is likely to arise when there are resources that can be easily appropriated or transferred and discretionary power in allocating them.² In markets characterized by some form of imperfect competition, there are rents to be appropriated, a necessary condition for the emergence of corruption. The second necessary ingredient for corruption to arise is the presence of individuals with discretionary power over market outcomes, especially if these individuals are imperfectly accountable for their decisions. This definition suggests that corruption is mainly associated with the activities of the public sector. Thus, as is common in the literature, we will not address corruption when both parties involved are private since corruption usually involves a private and a public party. This is only natural since most private goods and activities use public or publicly provided goods and services as complements.³

The natural antidote for corruption is competition. Rose-Ackerman (1988) points out that "the role of competitive pressures in preventing corruption may be an important aspect of a strategy to deter bribery (...)"⁴ For a bribe to be undertaken it needs to alter the profits accrued to all bribing parties. In perfectly competitive markets, economic profits are exogenously determined and equal to zero. Since outcomes are not subject to manipulation by market players, there is no scope for corruption. As an alternative to introducing competition in the

² Klitgaard (1988) provides an elegant conceptualization of the determinants of corruption as the sum of "monopoly power" and "discretion" minus "accountability". Rose-Ackerman (1975) mentions that the bribed individual is necessarily "in a position of power, created either by market imperfections or an institutional position which grants him discretionary authority".

³ As pointed out in Shleifer and Vishny (1993)

⁴ Rose-Ackerman (1975) acknowledges the use of other instruments as the law to deter corrupt practices and Ades and Di Tella (1997) mention, in addition to tough laws, the payment of higher wages to public officials.

market, competition may be introduced in the provision of public services.⁵ However, this type of “institutional engineering” in the provision of public services is very rare.

In a recent paper, Bliss and Di Tella (1997) present a model in which the equilibrium number of firms and the amount of corruption are endogenously determined. Competition relates to the level of corruption because corrupt officials and market participants can benefit from the reduction of market competition. However, even in this simple model the impact of competition on corruption depends on third variables such as the cost structure and the uncertainty that officials face. In other words, the empirical impact of competition on corruption is an open question.

Competition is a difficult concept to measure and cannot easily be varied at will by policymakers. Country openness to international trade and investment, on the other hand, is a policy variable. In addition, it is convenient to obtain exogenous measures of variation in competition that can take into account the problem of reverse causality. Openness indicators of trade and foreign investment intensity are partly determined by country’s characteristics such as proximity to markets and partly explained by changes in the partner country behavior, variables that are exogenous to the country itself. As such, a study of the impact of openness on corruption will be particularly illuminating.

2.1. How Costly Is Corruption?

The effect of corruption on economic growth remains theoretically unclear. Leff (1964) and, more recently, by Shleifer and Vishny (1993) actually raise the possibility that some types of corruption may increase welfare. In the presence of inefficient institutions, corruption may be an avenue to entrepreneurship, especially if the associated payment and private benefit are predictable. This is not more than the well-known second-best result: when a distortion is in place, the introduction of a second distortion may be welfare improving.

Bhagwati (1982) presents a detailed taxonomy of directly unproductive activities (DUP), dividing them into four cases, according to whether the initial and final situations are distorted or distortion-free. In the case where an initially distorted situation becomes distortion free through corruption, say, the payment of bribes to politicians to dismantle tariff barriers, corruption may be beneficial. In the most common situation, the move from an initially distorted economy to a distorted economy with corruption, second best analysis applies and a beneficial outcome may arise. Bliss and Di Tella (1997) present an alternative taxonomy

⁵ Rose-Ackerman (1978) demonstrates how the presence of even a small number of honest officials can drive corrupt officials out, if people can reapply for service through alternative channels.

which refers to two types of corruption: *cost reducing* or *surplus-division*. Corruption of the cost-reduction type may be welfare enhancing.

In contrast to the theoretical analysis, the empirical evidence has provided strong evidence that the efficiency costs of corruption outweigh possible benefits. Mauro (1995) shows that corruption has a negative impact on investment and growth. He reports that a one-standard-deviation increase in corruption causes investment to drop by 5 percent of GDP, and overall growth to decline by 0.5 percent per year. Keefer and Knack (1995) confirm the existence of a direct negative effect of corruption on growth, in addition to its effect on investment. Kaufmann and Wei (1999) use survey data to analyze the relation between bribe payments, management time spent with bureaucrats and individual firm's cost of capital. They find that firms paying more bribes also spend more, not less, time negotiating with bureaucrats and face a higher cost of capital. They take these results as evidence that the level of corruption is endogenous and that the business community would benefit from a strong exogenous commitment to low bribes provided, say, by international law.⁶

Corruption harms growth through a variety of channels. First and foremost, corruption is a tax that dampens private incentives for investment and capital accumulation. This is because a fraction of the return to entrepreneurship is not privately appropriated, leading individuals to provide less of it. However, corruption is more arbitrary than standard taxation. Wei (1997b), finds that the uncertainty associated with corruption has particularly detrimental effects. Moreover, corruption leads to an increase in informal sector activities and decreases a country's economic growth.⁷

Corruption also creates difficulties to governments raising revenue to finance public services essential for economic growth. The amount and the quality of government provision may suffer. Corruption is likely to affect the composition of public services as well. Because bribes are harder to collect in some transactions than in others, corrupt officials have an incentive to change the composition of public provision independently of their social benefits. Mauro (1998) presents evidence indicating that corruption leads to a decrease in the provision of education services and interprets it as stemming from the fact that it is harder to "collect bribes on textbooks and on teacher salaries than on large infrastructure projects."⁸ Shleifer and Vishny (1993) suggest that large-size projects offer more opportunities for corruption, especially if their value is

⁶ Or, we should add, economy-wide, permanent and credible competitiveness-enhancing measures such as trade and investment liberalization.

⁷ See Loayza (1996) for theory and some evidence.

⁸ Mauro (1996) presents a model where, if bribes are collected as a percent of income, corruption does not affect the amount and composition of government expenditure. So any evidence that this is not the case can be interpreted as evidence that corruption is not just a tax, and officials actually influence the composition of expenditure to facilitate bribe collection.

difficult to monitor (the true cost of a dam is harder to assess than the cost of textbooks). Hines (1995) shows that trade in military aircraft is very vulnerable to corruption. In areas such as health provision the picture is less clear-cut: on the one hand there are large purchases (medical equipment and installations) but also payments that are harder to fiddle with (health workers salaries).

Corruption may also harm growth in subtler, less quantifiable ways. Murphy, Shleifer and Vishny (1991) argue that when the returns to rent-seeking activities are comparatively high, the most talented people will be diverted from (socially) productive activities to directly unproductive activities.⁹

2.2. Trade and Corruption

A protectionist trade policy is an important source of rents. When the definition of duties (and exceptions) which apply to the different products are subject to political influence, public officers yield substantial discretionary power. There are rents to be appropriated by private parties, both producers of competing goods, who benefit from higher import prices, or buyers of foreign goods, whom benefit from lower priced imports. These private interests are willing to bribe officials to have their way. In contrast, free trade leaves little room to the policymaker's discretion, thus becoming an effective policy tool in the fight against corruption.

Krueger (1974) developed a theoretical model focusing on trade-restrictions as originators of rents and an inducement to corruption. In her model, corruption results from competition for import licenses giving access to lower cost imports. Bhagwati and Srinivasan (1980) analyze the case where agents attempt to appropriate a share of the tariff revenue resulting from the adoption of protectionist policies. Brock and Magee (1978) pioneered the theoretical analysis of lobbies seeking the imposition of protectionist tariffs. In this area, most theoretical efforts have been made in understanding the influence of domestic political actors on trade policies. However, Helpman (1995) has recently emphasized the importance of two-way interactions between trade policy (often defined in the international arena) and domestic special interest groups.

The empirical analysis of the link between trade openness and corruption is scarce. Ades and Di Tella (1999) examine it in the context of the effects of rents on corruption and find that economies where companies are isolated from foreign competition display higher levels of corruption. They use the share of imports in GDP as an independent variable to find that an increase in international

⁹ A substitution effect, in addition to the "income" effect of reducing the productivity of existing projects.

exposure leads to less corruption.¹⁰ The authors use distance to trading partners as a measure of exogenous exposure to competition from foreign firms¹¹ and find that an increase in distance is in fact related to higher levels of corruption.

The typical trade openness measures are measures of trade intensity, i.e., the share of imports, exports (or their sum) divided by GDP. These measures respond to the structural characteristics of an economy, its external environment and to economic policy decisions. But other measures are important, too. The level and variability of tariffs are policy choices, which directly affect the opportunity of private agents to collect rents through bribes. The higher and more variable are trade barriers, the higher the level of corruption we may expect since the benefits that can be extracted from policy choices made by officials increase.

2.3. Foreign Direct Investment and Corruption

Investment projects, both originating at home or abroad, have some element of a “hostage relationship”: before the investment is actually made it is impossible to foresee perfectly all contingencies that may affect its performance. This fact provides public officials with an opportunity to collect bribes after the investment is made. The provision of infrastructure services, for instance, may be an important bargaining tool.

For several reasons, foreign-owned firms may be particularly prone to be involved in corruption. First, average income disparity between the typical investor and host countries makes even a small bribe from the point of view of the investor go a long way in influencing the behavior of the corrupted official. Second, in undemocratic societies the use of public funds is poorly monitored and officials are tempted to use them to influence the location of foreign investment. Moreover, if the foreign investor obtains market power, she may be willing to bribe officials since this cost will be recovered through higher prices charged from consumers. All the elements that facilitate the emergence of corruption are present: market power and discretionary decision making by imperfectly accountable public officials. Moreover, as reported in Tanzi and Davoodi (1997), in some investor countries the commissions paid to foreign officials are not only legal but also tax deductible. The OECD is currently moving to criminalize “commissions” to foreign officials, suggesting the importance of the connection between foreign direct investment and corruption.

Foreign direct investment is often associated with large infrastructure projects or privatization of firms, which offer opportunities for corruption, given both the size of the rents involved and the possibility of passing costs onto the

¹⁰ They also find that countries that rely more heavily on natural resource-based exports tend to be more corrupt.

¹¹ Say, because transport costs shelter local producers.

consumers. Tanzi and Davoodi (1997) present strong results of a positive association between corruption levels and the provision of infrastructure.¹²

On the other hand, foreign direct investment may lead to less corruption. The mobility of international capital and foreign standards of probity impact local officials as foreign investment becomes more important to the local economy.¹³ Rose-Ackerman (1975) suggests that corruption may become more frequent if its discovery leads to long-term negative consequences to the firms and individuals involved. The argument can be made that once foreign direct investment is undertaken, it has elements of rigidity that make it more sensitive to involvement in corrupt activities say, relative to trade. According to Hines (1995) American multinationals routine engagement in bribery changed since 1977, when a U.S. law criminalized the corruption of foreign officials. Using various controls to estimate the effect of the anti-bribery laws on American business abroad, Hines (1995) uncovers a substantial decrease in American investment abroad following the ratification of the law. Wei (1997a) finds evidence that American and European investors are averse to corruption in the host countries.¹⁴ Both these results pertain to the effect of corruption on investment. In this paper we are interested in the reverse direction of causality.

3. Data and Specification

As indicators of an economy's openness we use imports, exports and foreign direct investment inflows in percent of GDP. The dependent variable in this study is the International Country Risk Guide indicator. We use both yearly data for the 1982 to 1995 period as well as five-year averages. Smaller samples based on this same data have been used in the literature on the causes and consequences of corruption.

3.1 Determinants of Corruption

Other than openness, there are other variables that may affect the level of corruption. Cultural and social factors may be important. LaPorta et al. (1998) explain the quality of government by a series of variables, economic and cultural in nature. They find that cultural variables such as the origin of the legal system and a country's religious distribution are significantly associated with the quality of government. Since corruption and quality of government are likely to be very closely related, it is sensible to use cultural characteristics such as these as controls in our estimations. Another variable that may be important is the degree

¹² Consistent with the fact, mentioned above, that education, unlike public investment, is under-financed in more corrupt countries. See Mauro (1998).

¹³ Kimberley (1997) reports on this link.

¹⁴ The author finds evidence that Japanese investors are somewhat less averse to corruption in their choice of countries to locate investments.

of a country's ethnic heterogeneity. Shleifer and Vishny (1994) show that ethnolinguistic diversity leads to a more erratic and thus more harmful kind of corruption.¹⁵ Tanzi (1994) suggests that in developing countries, where non-economic ties are strong, government officials tend to benefit their next of kin and ethnic group.

The level of public spending/taxation and its composition may also affect the opportunities for corruption. Tanzi (1998) presents the general argument for the relationship between fiscal policy variables and corruption. Governments that have a substantial involvement in the economy are possibly more prone to private pressures that can be associated with corruption. The structure of tax systems can be associated with the level of corruption, too: high levels of taxation based on complex tax systems provide opportunities to take advantage of loopholes through the corruption of officials. Mauro (1998) shows that corruption leads to less spending on education. Another possible determinant of the supply of corruption is the relative wage of public sector employees. Ades and Di Tella (1997) have presented tentative evidence that the higher the salaries of politicians the lower the corruption.

The structure of the economy also affects the level of corruption. An important stock of natural resources can be associated with more corruption. Since natural resources are naturally immobile and associated with the territory they are in, their exploitation cannot bypass the cooperation of local governments. This makes it a major source of rents. Leite and Weidmann (1999) present a model where economies abundant in natural resources are prone to display higher levels of corruption. They find that higher levels of natural resources are positively related to higher levels of corruption. Tornell and Lane (1998) develop a common-pool theoretical model for a country relying on undiversified commodity exports. An increase in the price of that commodity leads to a fight for public revenues between groups, and this results in overspending. This so-called "voracity" effect of price increases on commodity exporters is likely to foster corruption. Sachs and Warner (1995), on the other hand, have shown that natural resource economies tend to grow more slowly and suggest that this may be due in part to a lower efficiency of government.

Finally, historical variables such as a colonial past and the youth of the nation as an independent entity may impact the extent of corruption. Public institutions take time to create and adapt to local circumstances so that younger nations may be more prone to corruption. Institutions inherited from a former colonial power, on the other hand, may be ill adapted to local needs so that they become vulnerable to irregular practices.

¹⁵ Mauro (1995) uses ethnolinguistic diversity as the instrument for corruption in his study of the effects of corruption on growth.

3.2 Specification

In all our specifications we include the level of GDP per capita as an independent explanatory variable. A country's economic growth is associated with the development of better institutions, both because it becomes a priority and because the country can afford it. GDP per capita is thus very closely related with corruption. In our sample the simple correlation between the two variable is -0.68.

In line with the discussion above, we use a series of control variables that are likely to affect corruption:

- year dummies capturing the likely change in corruption over time due to non-specified factors;¹⁶
- the level of ethno-linguistic fractionalization, that is, the likelihood that two citizens in a given country belong to a different ethnic or linguistic group;
- a dummy indicating whether the country is a major oil exporter, as an indicator of the reliance of the economy on natural resources;
- dummies that indicate the origin of the country's legal system, as an indicator of the legal and cultural determinants of corruption (the different dummies are for British, French, German and Scandinavian);
- the percentage of the population that correspond to each of the following faiths: Catholic, Protestant, Muslim and other;
- a dummy which takes the value 1 if the country was a colony after 1820;
- a dummy which takes the value 1 if the country acquired independence after the second world war;
- the share of public expenditures in GDP;
- region dummies indicating whether the country is located in Sub-Saharan Africa, East Asia, Latin America or is part of the OECD;

In the case of tariff barriers, and given the smaller sample available, we use a more parsimonious specification, with income per capita and regional dummies added to our variable of interest.

3.3 Causality

There is relatively abundant literature on the effects of corruption on openness, particularly on foreign direct investment. Wei (1997a, b) and Hines (1995) estimate the impact of the level and variability of corruption on foreign direct investment flows and find them to be robust and economically significant. In the current paper we are interested in the other direction of causality: the effect of a higher degree of country openness on corruption. As mentioned in section 2, corruption is likely to explain as well as be explained by openness so that the issue of causality becomes key to interpret our results. We address the issue of

¹⁶ Alternatively a year trend was used. The results were

reverse causality by using instrumental variables for imports, exports and FDI as a share of GDP.

Appendix II provides a detailed explanation on the creation of instruments for a country's openness to trade and to foreign investment. The objective is to find exogenous variables that affect openness but are exogenous to a country's institutional behavior, namely corruption. For each openness indicator we build four new variables that capture its exogenous element. For each country in the sample we compute its bilateral distance to each of the 20 largest countries,¹⁷ as well as dummies which take the value of 1 if both countries share a land border, an official language or the major religion. This approach is based on several empirical studies which use the gravity equation approach and have found geographical proximity, common language and land border to wield exceptional power to explain bilateral trade flows.¹⁸ As for investment, Wei (1997a) shows how common linguistic ties and geographical proximity positively affect foreign direct investment flows. The impact of these cultural and geographical characteristics on FDI is found to be sizable. Thus, we obtain indicators of geographical and cultural proximity between the countries in the sample and the most important economies in the world.

We then take the constant US dollar value of exports, imports and foreign investment outflows of the 20 largest economies and weigh them by the proximity variables¹⁹. For each country in the sample, the sum of the exports by the large countries weighted by the proximity variables, constitute the instruments for the country's imports. Similarly, imports and FDI outflows by these large countries weighed by the proximity weights provide instruments for a country's exports and FDI inflows, respectively. Thus, as one of the large economies increases its imports, we assume that this is likely to have a positive and significant effect on the exports of countries that are closer, share a land border, a common language or a common religion. The instruments for exports and foreign direct investment are constructed in similar ways, measuring the constant dollar outflows from the largest economies and weighing them by the same four geographical and cultural variables. Notice that these instruments are time varying and are measured as the *absolute levels* of exports, imports and FDI outflows of the large countries. They are then used as regressors to explain the level of imports, exports and FDI inflows *in percentage of GDP*, for all the countries in the sample.

¹⁷ The 20 largest economies according to Gross Domestic Product in 1990 are: Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Iran, Italy, Japan, Korea, Mexico, Netherlands, Poland, Spain, Turkey, United Kingdom and United States.

¹⁸ See, for instance, Frankel et al. (1993).

¹⁹ Religious and linguistic proximity as well as common land border deliver the weights 1 and 0 whereas bilateral distance provides a continuous weight, decreasing with distance

4. Results

In this section we present estimates of the impact of openness –measured by imports, exports and foreign direct investment-- on the level of corruption. We use yearly data. We also present evidence on the association between the level and variability of tariff barriers and the degree of country corruption.

Openness and Corruption

Table I below presents the summary statistics for yearly data on the three openness indicators used, the corruption index and the log of per capita GDP in our sample. The trade variable, imports as share of GDP, ranges from 2.98 to 224.21 percent of GDP. Exports as share of GDP fluctuate in a similar range whereas foreign direct investment inflows range between 0 and 98 percent of GDP. Corruption is measured as an index ranging from 0 to 6, with higher values indicating more corruption. The standard deviation of each variable should be considered when evaluating its impact on corruption. In particular we will be interested in the relative magnitude of feasible changes in import and export intensity as compared to changes in FDI and the level of GDP per capita.

Table I
Imports, Exports, FDI and Corruption
Summary Statistics

	Nr Obs	Mean	St Dev	Minimum	Maximum
Imports/GDP	1744	39.74	26.30	2.98	224.21
Exports/GDP	1744	33.64	24.16	3.34	215.38
FDI/GDP	1749	7.67	9.57	0.01	98.12
Corruption	1101	3.45	1.52	0	6
Log pcGDP	1664	8.11	1.06	5.70	10.26

Note: Units are share of GDP in percentage points except for corruption and Log pcGDP.

Tables II through IV present the estimates for the effect of imports, exports and foreign investment on corruption using annual data. In each table the columns (1) to (3) refer to the association between the actual openness indicator and corruption whereas columns (4) to (6) correspond to the estimates using instrumental variables. For comparability, we present parallel specifications for Ordinary Least Squares and Instrumental Variable estimates. The most parsimonious specification (columns (1) and (4)) includes just the openness variable, the logarithm of per capita Gross Domestic Product and year dummies. We then add a broad set of controls suggested in the literature on the determinants of corruption, as reviewed in the previous section. Finally, we add a set of region dummies.

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In Table II we can verify that import intensity is associated with less corruption and this association tends to be statistically significant. Whereas only in the simpler specification the actual level of imports is not statistically associated with corruption, when we instrument for imports, the association is always significant at the 1 percent level. Moreover, the size of the coefficient on instrumented imports is always larger than that on actual imports for the equivalent specification (compare columns 4, 5 and 6 with columns 1, 2 and 3 respectively, of Table II).

As to the general fit of the regression, our different specifications explain between 40 and 66 percent of the total variation in corruption. A substantial fraction of this variation is explained by the level of income per capita. This is expected since economic development goes hand in hand with institutional development so that countries, which become richer tend to be less corrupt. The effect of Log pc GDP is extremely robust and economically important. If a country goes from the lowest to the highest level of income per capita, 5.70 to 10.26 according to Table I, corruption is expected to decrease by 2.8 points out of a mean of 3.5 and a maximum of 6. This is a very substantial effect. A comparison of the effect of a standard deviation increase in import intensity and in GDP per capita is illuminating: they lead to a decrease of 0.3 and 0.6 points in corruption, respectively. Given the difficulty of increasing the average level of country GDP per capita compared with the relatively straightforward policy of opening trade, this bodes well for the use of openness to fight corruption. Year dummies, though not always individually significant, tend to capture a downward trend in the average level of corruption over time.²⁰

Other variables come out as strongly associated with corruption, too. Relatively young nations, which became independent after World War II, tend to be more corrupt. These are mainly located in Asia and Africa.²¹ On the other hand, as suggested in the above section, countries that rely heavily on natural resources, as captured by the oil dummy, are more corrupt. In countries with either of these characteristics corruption is on average higher by 0.8 points, a considerable amount, comparable to the effect of income per capita. As to the region dummies, East Asia and specially Latin America tend to be significantly more corrupt than other regions. Cultural and institutional variables such as the religious composition and the origin of the legal system are also associated with corruption. Relative to countries with a larger share of protestant population, countries with more adherents of other religions have higher levels of corruption. For instance, a 10 percent increase in the share of Muslim population increases the average level of corruption by 0.103, according to column (6) of Table II. As

²⁰ The coefficients on the time dummies are not reported for space reasons. The use of a time trend confirms the tendency for corruption to decrease in the sample period, 1982 to 1995.

²¹ The increase in the coefficient on Postwar independence when region dummies are added is probably due to the high correlation between these two variables.

to the legal system, English, French or German origin tend to be associated with more corruption than Scandinavian origin (the dummy that is excluded in most specifications). These effects however, are not very robust. Finally, and unlike the hypothesis advanced by some authors, the share of public spending in GDP does not have a statistically significant effect on corruption.

Table III presents results for export intensity. Again, the results for the actual level of exports are mixed whereas those for the instrumented level of exports are unequivocal. The higher the level of exports, the lower is corruption.²² The coefficients on columns (4) through (6) are statistically significant and robust. They are also economically significant: a one-standard-deviation increase in export intensity leads to a decrease in corruption of about 0.3 points. The control variables that come out as important are, naturally, in line with results for imports. Income per capita and the Oil and Postwar Independence dummies are all extremely important as determinants of corruption. The institutional and regional variables also have a similar behavior. This is not surprising, given that exports and imports as share of GDP are extremely correlated across country and across time. However, one should be reminded that the instruments for import and export intensity are different. Whereas the former are the level of absolute exports of the 20 largest economies,²³ the instruments for export intensity are the level of imports from those same 20 economies. Moreover, as will be verified when we examine the five-year period data, the impact of exports on corruption is not as robust as that of imports.

Table IV presents mixed results for the effect of Foreign Direct Investment on corruption. Whereas the actual level of FDI is not statistically related to corruption on a yearly basis, the exogenous component of FDI comes out as causing both less and more corruption, depending on the set of controls chosen. For the most complete specification, higher levels of foreign investment lead to more corruption. In general the results on Foreign Direct Investment are very sensitive to the specification.

²² Moreover, as was the case for imports, the coefficient on instrumented exports is always larger, in absolute value, than the coefficient on actual exports.

²³ Country-specific since they are weighted by cultural and geographical proximity to the country in cause.

Table II
Import Intensity and Corruption
Yearly Data - OLS and IV Estimates

	Ordinary Least Squares			Instrumental Variables		
	(1)	(2)	(3)	(4)	(5)	(6)
Imports	0.0016 (0.0013)	-0.0039 * (0.0018)	-0.0071 ** (0.0018)	-0.0154 ** (0.0032)	-0.0222 ** (0.0033)	-0.0116 ** (0.0036)
Log pcGDP	-0.8747 ** (0.0324)	-0.6768 ** (0.0517)	-0.5547 ** (0.0573)	-0.8666 ** (0.0323)	-0.6768 ** (0.0497)	-0.6192 ** (0.0561)
Fraction	-	-0.0034 * (0.0016)	0.0001 (0.0014)	-	-0.0017 (0.0016)	0.0019 (0.0013)
Ever Colony	-	0.4985 ** (0.1009)	-0.5152 ** (0.1038)	-	0.4285 ** (0.0987)	-0.4284 ** (0.1011)
Postwar Independence	-	0.2766 * (0.1228)	0.9192 ** (0.1298)	-	0.3751 ** (0.1136)	0.8255 ** (0.1239)
Oil	-	1.0848 ** (0.1094)	0.7932 ** (0.1194)	-	1.0138 ** (0.1031)	0.8553 ** (0.1148)
Percent Catholic	-	0.0203 ** (0.0030)	0.0105 ** (0.0022)	-	0.0162 ** (0.0030)	0.0084 ** (0.0021)
Percent Muslim	-	0.0165 ** (0.0030)	0.0115 ** (0.0023)	-	0.0130 ** (0.0029)	0.0103 ** (0.0022)
Percent Other Relig.	-	0.0149 ** (0.0029)	0.0066 ** (0.0022)	-	0.0095 ** (0.0030)	0.0047 * (0.0023)
Legal UK	-	-0.3834 (0.2512)	0.2526 (0.1652)	-	0.1342 (0.2584)	0.4164 * (0.1803)
Legal France	-	-0.2896 (0.2561)	0.2760 (0.1756)	-	0.0694 (0.2537)	0.3976 * (0.1796)
Legal Germany	-	-0.4169 ** (0.2348)	0.0911 + (0.1803)	-	-0.0506 (0.2353)	0.3267 + (0.1867)
Legal Scandinavian	-	-	-	-	-	-
Public Expenditure	-	-0.0077 (0.0048)	-0.0075 + (0.0043)	-	-0.0086 + (0.0047)	-0.0085 * (0.0043)
East Asia	-	-	0.4649 ** (0.1655)	-	-	0.3639 * (0.1685)
Latin America	-	-	1.1654 ** (0.1473)	-	-	1.1819 ** (0.1424)
OECD	-	-	-0.5116 ** (0.1468)	-	-	-0.3261 * (0.1525)
Sub-Saharan Africa	-	-	-0.3256 ** (0.1071)	-	-	-0.2870 ** (0.1115)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
No. of Observations	1353	1058	1058	1372	1066	1066
R-squared	0.39	0.58	0.66	0.38	0.59	0.66

Note: Standard errors, reported in parentheses below coefficient, are heteroskedastic-consistent. Constant term not displayed. ** means significant at the 1 % level, * significant at the 5 % level and + significant at the 10 % level.

Table III
Export Intensity and Corruption
Yearly Data - OLS and IV Estimates

	Ordinary Least Squares			Instrumental Variables		
	(1)	(2)	(3)	(4)	(5)	(6)
Exports	0.0044 ** (0.0014)	-0.0011 (0.0018)	-0.0044 * (0.0018)	-0.0221 ** (0.0030)	-0.0262 ** (0.0034)	-0.0144 ** (0.0036)
Log pcGDP	-0.9054 ** (0.0324)	-0.6985 ** (0.0533)	-0.5592 ** (0.0599)	-0.8449 ** (0.0316)	-0.6458 ** (0.0502)	-0.6097 ** (0.0564)
Fraction	-	-0.0028 + (0.0016)	0.0011 (0.0013)	-	-0.0014 (0.0016)	0.0021 (0.0013)
Ever Colony	-	0.5158 ** (0.1008)	-0.4764 ** (0.1037)	-	0.3064 ** (0.1029)	-0.4728 ** (0.1036)
Postwar Independence	-	0.1865 (0.1198)	0.8352 ** (0.1269)	-	0.4511 ** (0.1163)	0.8667 ** (0.1278)
Oil	-	1.1211 ** (0.1088)	0.8605 ** (0.1179)	-	0.9697 ** (0.1014)	0.8370 ** (0.1132)
Percent Catholic	-	0.0194 ** (0.0030)	0.0098 ** (0.0022)	-	0.0169 ** (0.0029)	0.0088 ** (0.0021)
Percent Muslim	-	0.0157 ** (0.0029)	0.0108 ** (0.0023)	-	0.0130 ** (0.0028)	0.0102 ** (0.0022)
Percent Other Relig.	-	0.0143 ** (0.0029)	0.0064 ** (0.0022)	-	0.0086 ** (0.0029)	0.0042 + (0.0023)
Legal UK	-	-0.3838 (0.2518)	0.2195 (0.1660)	-	0.2459 (0.2570)	0.4846 ** (0.1802)
Legal France	-	-0.2632 (0.2576)	0.2715 (0.1787)	-	0.1442 (0.2508)	0.4455 * (0.1790)
Legal Germany	-	-0.3384 (0.2365)	0.1513 (0.1861)	-	0.0240 (0.2333)	0.3699 * (0.1854)
Legal Scandinavian	-	-	-	-	-	-
Public Expenditure	-	-0.0078 + (0.0048)	-0.0076 + (0.0043)	-	-0.0089 + (0.0047)	-0.0087 * (0.0043)
East Asia	-	-	0.4143 (0.1699)	-	-	0.3633 * (0.1668)
Latin America	-	-	1.1715 ** (0.1430)	-	-	1.1613 ** (0.1429)
OECD	-	-	-0.4897 ** (0.1465)	-	-	-0.2977 + (0.1521)
Sub-Saharan Africa	-	-	-0.3211 ** (0.1091)	-	-	-0.2990 * (0.1085)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
No. of Observations	1353	1058	1058	1372	1066	1066
R-squared	0.40	0.58	0.66	0.39	0.60	0.66

Note: Standard errors, reported in parentheses below coefficient, are heteroskedastic-consistent. Constant term not displayed. ** means significant at the 1 % level, * significant at the 5 % level and + significant at the 10 % level.

Table IV
Foreign Direct Investment and Corruption
Yearly Data - OLS and IV Estimates

	Ordinary Least Squares			Instrumental Variables		
	(1)	(2)	(3)	(4)	(5)	(6)
FDI	-0.0060 (0.0038)	0.0006 (0.0053)	-0.0044 (0.0044)	-0.0435 ** (0.0111)	0.0076 (0.0132)	0.0338 ** (0.0132)
Log pcGDP	-0.9540 ** (0.0353)	-0.7409 ** (0.0544)	-0.7118 ** (0.0596)	-0.9944 ** (0.0379)	-0.7636 ** (0.0584)	-0.7649 ** (0.0616)
Fraction	-	-0.0011 (0.0018)	0.0023 (0.0014)	-	-0.0012 (0.0019)	0.0027 + (0.0016)
Ever Colony	-	0.4271 ** (0.1094)	-0.4071 ** (0.1101)	-	0.4544 ** (0.1127)	-0.3955 ** (0.1122)
Postwar Independence	-	0.0908 (0.1131)	0.5317 ** (0.1359)	-	0.0749 (0.1194)	0.4615 ** (0.1420)
Oil	-	0.9594 ** (0.1212)	0.8125 ** (0.1300)	-	0.9793 ** (0.1305)	0.8717 ** (0.1422)
Percent Catholic	-	0.0196 ** (0.0034)	0.0083 ** (0.0026)	-	0.0188 ** (0.0037)	0.0077 ** (0.0028)
Percent Muslim	-	0.0161 ** (0.0034)	0.0087 ** (0.0027)	-	0.0157 ** (0.0037)	0.0084 ** (0.0029)
Percent Other Relig.	-	0.0138 ** (0.0033)	0.0042 (0.0026)	-	0.0131 ** (0.0036)	0.0047 + (0.0029)
Legal UK	-	-0.4408 (0.2798)	0.2772 (0.1987)	-	-0.4433 (0.3114)	0.0982 (0.2322)
Legal France	-	-0.1663 (0.2836)	0.4803 * (0.2124)	-	-0.1207 (0.3041)	0.5034 * (0.2303)
Legal Germany	-	-0.2788 (0.2612)	0.3461 (0.2179)	-	-0.1813 (0.2846)	0.4579 + (0.2362)
Legal Scandinavian	-	-	-	-	-	-
Public Expenditure	-	-0.0129 ** (0.0050)	-0.0114 * (0.0046)	-	-0.0155 ** (0.0053)	-0.0142 ** (0.0051)
East Asia	-	-	0.3171 + (0.1669)	-	-	0.2102 (0.1843)
Latin America	-	-	0.9117 ** (0.1652)	-	-	0.8328 ** (0.1628)
OECD	-	-	-0.4747 ** (0.1744)	-	-	0.5454 ** (0.1821)
Sub-Saharan Africa	-	-	-0.5055 ** (0.1197)	-	-	0.6796 ** (0.1354)
Year Dummies						
	Yes	Yes	Yes	Yes	Yes	Yes
No. of Observations	1060	852	852	971	782	782
R-squared	0.45	0.62	0.68	0.46	0.62	0.69

Note: Standard errors, reported in parentheses below coefficient, are heteroskedastic-consistent. Constant term not displayed. ** means significant at the 1 % level, * significant at the 5 % level and + significant at the 10 % level.

In sum, there is robust evidence of a beneficial impact of both imports and exports on the level of corruption. This effect is quantitatively comparable to that of a higher GDP per capita on corruption.

Below we present the graphs of the partial regression plots for the instrumented openness variables and corruption, for the most complete specifications (column (6) of Tables II through IV). Figures I, II and III plot the residual of regression of the corruption variable on all variables *except* the instrumented openness indicator on the residual of a regression of the latter on all other independent variables. The figures allow us to assess, among other things, whether the results are driven by a few outliers. As can be verified, for imports and exports we do not seem to have a problem of outliers. For Foreign Direct Investment, the range of variation of the instrumented variable is relatively small, that is, instrumented FDI as share of GDP varies between -10 and plus 10 , compared with, say, the range of -18 and plus 29 for imports. As a result the observations are concentrated in a central region so that the results are more sensitive to the specification. This explains the change of sign of the coefficient on FDI in columns (6) of Tables IV and VII.

Figure I
Openness and Corruption Partial Regression Plots
Yearly Data - Imports

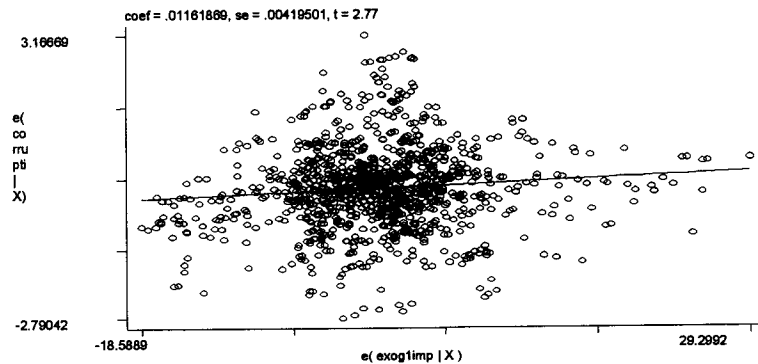


Figure II
Yearly Data - Exports

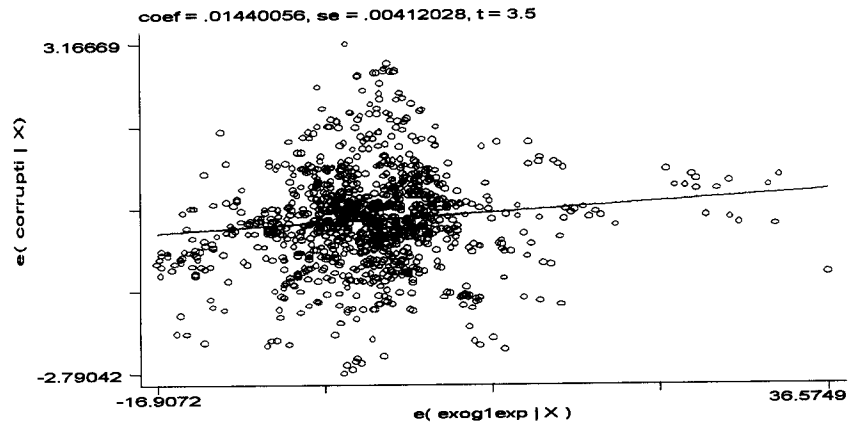
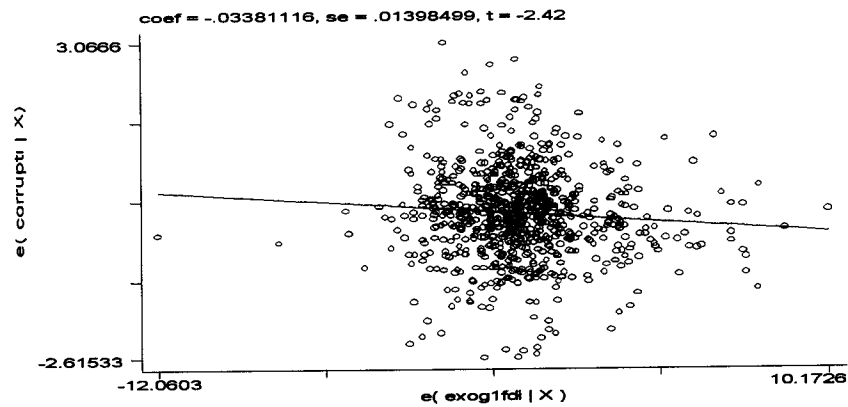


Figure III
Yearly Data - Foreign Direct Investment



We now proceed to test the results for misspecification using the Ramsey RESET test.²⁴ This test uses powers of the dependent variable as regressors to test for the presence of omitted variables. In simple terms, if the coefficient of the square, third power or fourth power of corruption comes out as a significant, this is taken as an indication that we have omitted relevant variables and the regression is misspecified. The null hypothesis is that there are no omitted variables so that rejection of an F-test indicates misspecification. In Table V we present the results for test of specification in column (6) of Tables II through IV. We find that we can never reject the null hypothesis that there are no omitted variables. This is true for the yearly data as well as for the five-year average data.

²⁴ See Kennedy (1998).

Table V
Testing for Misspecification

	Yearly Data
Imports	F(3, 1032) = 9.60 Prob > F = 0.0000
Exports	F(3, 1032) = 8.89 Prob > F = 0.0000
Foreign Direct Investment	F(3, 954) = 8.22 Prob > F = 0.0000

Note: The tests apply to the specification in column (6) from Tables II through IV.

Tariffs and Corruption

In this section we attempt to identify whether tariff barriers, a more direct indicator of openness, have an effect on corruption. From the World Bank (1998) we have compiled data on tariffs as a share of import value, unweighted as well as weighted by imports of each category. Both of these measures are available for the total basket of import goods, for primary imports and for manufactured imports. In addition to the level of trade barriers, we use the variability of the level of tariffs across import categories as a possible determinant of corruption. A high variability of trade barriers across goods can be associated with more corruption in two ways: more tariff variability implies more gains from influencing policy-makers and officials in classifying goods; on the other hand, the higher variability can result from precisely such policy manipulation by private interests.

Table VII below presents the summary statistics for the tariff barriers indicators and their volatility. The sample refers to the average of the 1990-1994 five-year average. Statistics are provided for the unweighted and weighted tariff level, the latter being weighted by the amount of exports, both measured in percent of imports. Volatility is measured as the standard deviation of unweighted tariffs across import categories. Data is available for all import sectors, primary and manufacturing. As can be verified, primary imports display a slightly lower range of values, especially when unweighted. Total tariffs and tariffs on manufacturing imports display similar behavior. The standard deviation of the tariff measures is about ten times as high as the standard deviation of the logarithm of per capita GDP.

Table VII
Tariff Barriers (Level and Variability) and Corruption
Summary Statistics

	Nr Obs	Mean	St Dev	Minimum	Maximum
Tariff	61	15.23	13.57	0	81.8
Variability Tariff	61	11.55	8.91	0	47.6
Weighted Tariff	61	14.33	13.74	0	83
Tariff Primary	61	14.62	11.93	0	74.1
Variability Tariff Primary	61	11.93	7.69	0	38.4
Weighted Tariff Primary	61	10.17	9.37	0	49.5
Tariff Manufacture	61	15.40	14.51	0	84.1
Variability Tariff Manufacture	61	10.73	9.74	0	52.2
Weighted Tariff Manufacture	61	15.65	15.49	0	93.6
Corruption	57	4.121	1.34	1.3	6
Log pcGDP	59	8.44	1.05	6.25	9.80

Note: Units are share of Imports in percentage points except for corruption and Log pcGDP.

In Table VIII we present results for the effect of the level of tariffs on corruption. The conclusion is unequivocal. In this parsimonious specification, higher tariff levels are associated with less corruption. The effect is substantial: a 10 percentage points increase in the average tariff level leads to an increase of about 0.25 in corruption. This is true for weighted or unweighted tariff levels, and for all imports as well as primary or manufactured imports.

Higher levels of income per capita, on the other hand, are associated with less corruption. The coefficient on per capita income is similar to that in the larger samples used earlier in this paper, an indication of the robustness of the specification. Moreover, as before, East Asian and specially Latin American countries display higher average levels of corruption. The size of these regional dummy coefficients is in line with previous estimates.

Table VIII
Tariff Levels and Corruption
Five -Year Data - Ordinary Least Squares

	Weighted			Unweighted		
	All Imports	Primary Goods	Manufactured Goods	All Imports	Primary Goods	Manufactured Goods
Tariff Measure	0.0257 ** (0.0091)	0.0493 ** (0.0145)	0.0213 * (0.0081)	0.0258 ** (0.0087)	0.0279 ** (0.0088)	-0.0247 ** 0.0084
Log pcGDP	-0.7531 ** (0.1579)	-0.6544 ** (0.1767)	-0.7741 ** (0.1558)	-0.7541 ** (0.1583)	-0.7342 ** (0.1699)	0.7584 ** 0.1558
East Asia	1.1310 ** (0.3775)	1.1652 ** (0.3643)	1.1175 ** (0.3850)	1.1393 ** (0.3758)	1.0436 ** (0.4205)	-1.1680 ** 0.3698
Latin America	1.6689 ** (0.3921)	1.7402 ** (0.3141)	1.6419 ** (0.4091)	1.6856 ** (0.3812)	1.6056 ** (0.4063)	-1.7093 ** 0.3816
OECD	0.2567 (0.3727)	0.3431 (0.3397)	0.2311 (0.3842)	0.2496 (0.3719)	0.1418 (0.3962)	-0.2773 0.3711
Sub-Saharan Africa	-0.0996 (0.5190)	0.1056 (0.4541)	-0.1520 (0.5313)	-0.1112 (0.5111)	-0.1216 (0.5551)	0.1007 0.5051
No. of Observations	55	55	55	55	55	55
R-squared	0.82	0.85	0.82	0.82	0.82	0.82

Note: Standard errors, reported in parentheses below coefficient, are heteroskedastic-consistent. Constant term not displayed. ** means significant at the 1 % level and * significant at the 5 % level.

Table IX presents results for the variability of tariffs. We find that a higher standard deviation of the tariff rate across products leads to higher corruption levels. This is true for all sectors considered. The size of the coefficient, namely for overall and manufactured import tariffs variability, is higher than for the mere level, as reported in Table VIII. Again the coefficient on the control variables are in line with estimates above.

Table IX
Variability of Tariffs and Corruption
Five -Year Data - Ordinary Least Squares

	All Imports	Primary Goods	Manufactured Goods
Tariff Measure	0.0374 ** (0.0140)	0.0243 * (0.0154)	0.0384 ** (0.0122)
Log pcGDP	-0.8350 ** (0.1530)	-0.9149 ** (0.1626)	-0.8146 ** (0.1497)
East Asia	1.1590 ** (0.3525)	0.9821 * (0.4507)	1.1955 ** (0.3431)
Latin America	1.7791 ** (0.3591)	1.5124 ** (0.4633)	1.8049 ** (0.3469)
OECD	0.2976 (0.3651)	0.0751 (0.4478)	0.3734 (0.3529)
Sub-Saharan Africa	-0.2358 (0.4606)	-0.4603 (0.5596)	-0.2016 (0.4555)
No. of Observations	55	55	55
R-squared	0.82	0.80	0.83

Note: Standard errors, reported in parentheses below coefficient, are heteroskedastic-consistent. Constant term not displayed. ** means significant at the 1 % level and * significant at the 5 % level.

5- Conclusions

This paper makes a systematic attempt to estimate the effects of openness on corruption. The impact of corruption on variables such as foreign direct investment has been relatively well studied. The reverse causality, however, which analyzes the effect of openness on corruption remains an issue of policy debate with a shallow empirical base. Thus, we estimate the effects of higher levels of imports, exports and foreign direct investment inflows (as shares of Gross Domestic Product) on corruption. To address the causality issue we develop and use powerful instruments that correct for reverse causation.

Several important results arise. First, imports are the main channel through which openness to the international economy provides incentives for lower corruption. There is an association between actual import intensity and the level of corruption but when we instrument for import intensity the effect is more robust and quantitatively stronger. This evidence indicates that imports are not only associated with less corruption but also reduce corruption. There is also a robust effect of exports on decreasing corruption. The effect of foreign direct investment on corruption tends to be negative but is less robust.

Can Openness Deter Corruption?

Interestingly, given the typical deviation of import and export intensity in the sample, the effect of openness indicators on corruption is of the same magnitude as that of income per capita on corruption. This is important since a policy of trade openness is more easily pursued than a general policy of raising the economy's average income.

Our results also confirm perceived regional differences in average levels of corruption, as well as a general trend towards lower levels of corruption. Finally we confirm cultural characteristics and the abundance of natural resources are strongly associated with corruption. A dummy capturing the fact that the country is an oil exporter comes out consistently as positive and significant, confirming previous studies. Cultural characteristics such as the religious composition of the population and the origin of the legal codes are important determinants of corruption, with the percentage of protestant in the population being associated with less corruption and a French origin of the legal code with more. Finally, there is evidence that countries that have recently gained independence tend to be more corrupt.

In an attempt to determine more directly the effect of openness on corruption we present results indicative of a strong association between the level and variability of tariff barriers and corruption. The association is statistically significant and economically important, again comparable to the impact of higher per capita income on corruption. Thus, policies of lowering trade barriers and decreasing their variability across product categories will not only further economic efficiency but may also lead to institutional change.

The results of this paper strongly point to a beneficial effect of country openness on corruption. Our evidence shows that higher levels of openness reduce corruption, thus adding another argument for trade and FDI liberalization policies. More needs to be done in analyzing the channels through which openness decreases corruption but our evidence suggests that competition in the goods and assets markets both contribute to deter corruption.

References

- Ades, Alberto, and Rafael Di Tella (1997), "The New Economics of Corruption: A Survey and Some New Results," *Political Studies*, Summer 1997, Vol. 45, N 3, pp. 496-516.
- Ades, Alberto and Rafael Di Tella (1999), "Rents, Competition and Corruption," forthcoming *The American Economic Review*.
- Bardhan, Pranab (1997), "Corruption and Development: A Review of Issues", *Journal of Economic Literature*, 35, 1320-1346.
- Bhagwati, Jagdish (1982), "Directly Unproductive, Profit-Seeking (DUP) Activities", *Journal of Political Economy*, 90, 988-1002.
- Bhagwati, Jagdish and T. N. Srinivasan (1980), "Revenue Seeking: A Generalization of the Theory of Tariffs", *Journal of Political Economy*, 88, 1069-87.
- Bliss, Christopher and Rafael Di Tella (1997), "Does Competition Kill Corruption?," *Journal of Political Economy*, October, Vol 105, N 5, 1001-23.
- Brock, William and Stephen Magee (1978), "The economics of Special Interest Politics: the Case of the Tariff", *American Economic Review Papers and Proceedings*, 68, 246-50.
- Frankel, Jeffrey, Ernesto Stein and Shang-Jin Wei (1993), "Continental Trading Blocs: Are They Natural, or Super-Natural?," NBER Working Paper No. W4588
- Helpman, Elhanan (1995), "Politics and Trade Policy", NBER Working Papers 5309.
- Hines, James (1995), "Forbidden Payment: Foreign Bribery and American Business", NBER Working Papers 5266, Cambridge.
- Kaufmann, Daniel and Shang-Jin Wei (1999), "Does 'Grease Money' Speed Up the Wheels of Commerce?," NBER Working Paper 7093.
- Keefer, Philip and Stephen Knack (1995), "Institutions and Economic Performance: Cross-Country Tests Using Alternative Institutional Measures", *Economics and Politics*, 7, November 207-227.
- Kennedy, Peter (1998), "A Guide to Econometrics", MIT Press.

Can Openness Deter Corruption?

Kimberley, Ann (ed.) (1997), "Corruption and the Global Economy", Institute for International Economics, Washington, DC.

Klitgaard, Robert (1988), "Controlling corruption", Berkeley and London: University of California Press, 1988.

Krueger, Anne (1974), "The Political Economy of the Rent Seeking Society", *American Economic Review* 64, no. 3, June, p. 291-303.

LaPorta, Rafael, Florencio Lopez de Silanes, Andrei Shleifer and Robert Vishny, (1998), "The Quality of Government", NBER Working Paper 6727.

Leite, C., and Weidmann, J. (1999), "Does Mother Nature Corrupt? Natural Resources, Corruption and Economic Growth", International Monetary Fund Working Paper, Washington DC.

Leff, Nathaniel (1964), "Economic Development through Bureaucratic Corruption", *American Behavioral Scientist*, 8-14.

Loayza, Norman (1996), "The Economics of the Informal Sector: A Simple Model and Some Empirical Evidence from Latin America", The World Bank, Washington DC.

Mauro, Paolo (1995), "Corruption and Growth", *Quarterly Journal of Economics*, 110.

Mauro, Paolo (1998), "Corruption and the Composition of Government Expenditure", *Journal of Public Economics*, 69, p. 263-279.

Mauro, Paolo (1996), "The Effects of Corruption on Growth, Investment and Government Expenditure", *Corruption and Growth*, IMF Working Papers, IMF, Washington DC.

Murphy, Kevin, Andrei Shleifer and Robert Vishny (1991), "Allocation of Talent: Implications for Growth", *Quarterly Journal Of Economics*, 106.

Rose-Ackerman, Susan (1975), "The Economics of Corruption", *Journal of Public Economics*, 4, 187-203.

Rose-Ackerman, Susan (1978), "Corruption: A Study in Political Economy", New York, Academic Press.

Rose-Ackerman, Susan (1988), "Bribery", in *The New Palgrave Dictionary of Economic Thought*, edited by John Eatwell, Murray Milgate and Peter Newman, London, Macmillan.

Sachs, Jeffrey and Andrew Warner (1995), "Natural Resource Abundance and Economic Growth", HIID Development Discussion Paper No. 517, Harvard University.

Shleifer, Andrei and Robert Vishny (1993), "Corruption", *Quarterly Journal Of Economics*, 108, p. 599-617.

Shleifer, Andrei and Robert Vishny (1994), "Politicians and Firms", *Quarterly Journal Of Economics*, 109, p. 995-1025.

Summers, Robert and Alan Heston (1991), "The Penn World Table (Mark 5): An Expanded Set of International Comparisons, 1950-1988", *Quarterly Journal of Economics*, 106(2), May, 327-68.

Tanzi, Vito (1994), "Corruption, Governmental Activities and Markets", IMF Working Papers 94/99, IMF, Washington DC.

Tanzi, Vito and Hamid Davoodi (1997), "Corruption, Public Investment, and Growth", IMF Working Papers, IMF, Washington DC.

Tanzi, Vito (1998), "Corruption Around the World - Causes, Consequences, Scope, and Cures", IMF Working Papers, IMF, Washington DC.

Tornell, Aaron and Philip Lane (1998), "Voracity and Growth", *American Economic Review*, forthcoming.

Tullock, Gordon (1967), "The Welfare Costs of Tariffs, Monopolies and Theft", *Western Economic Journal*, 5, 224-32.

Wei, Shang-Jin (1997a), "How Taxing is Corruption on International Investors?", NBER Working Paper No. 6030.

Wei, Shang-Jin (1997b), "Why is Corruption So Much More Taxing Than Tax? Arbitrariness Kills", mimeo, Harvard University.

World Bank (1998), "World Development Indicators", World Bank, Washington DC.

Appendix I

Data Sources and Definitions

Imports - Source: World Bank (1998). **Definition:** Imports as a share of economy's GDP. **Unit:** Percent.

Exports - Source: World Bank (1998). **Definition:** Imports as a share of economy's GDP. **Unit:** Percent.

Foreign Direct Investment- Source: World Bank (1998). **Definition:** Gross inflows of foreign direct investment as a share of domestic economy's GDP. **Unit:** Percent.

Tariff Barriers - World Bank (1998). **Definition:** Average level and standard deviation of tariffs on all products, primary products and manufactures. **Unit:** Percent.

Corruption- Source: ICRG (1998). **Definition:** Indicator of corruption as reported by international consultants. **Unit:** 0 to 6, with higher values denoting less corruption.

GDPpc- Source: World Bank (1998). **Definition:** Level Gross Domestic Product per capita at the beginning of the five year period. **Unit:** US Dollars PPP.

Legal Origin – Source: LaPorta et al. (1998). **Definition:** The country of origin of the legal codes in vigor. **Unit:** Dummy.

Percent Religious Group – Source: LaPorta et al. (1998). **Definition:** Percent of the population affiliated with Catholic, Protestant, Muslim and other religious groups. **Unit:** Percent.

Ethno-Linguistic Fractionalization – Source: Mauro (1995). **Definition:** The likelihood that two individuals in the same country belong to different ethnic and linguistic groups. **Unit:** Percent.

Oil – Source: Barro and Lee (1993). **Definition:** Dummy for oil exporting-countries. **Unit:** Dummy.

Ever Colony – Source: Barro and Lee (1993). **Definition:** Dummy for countries which were colonies after 1825. **Unit:** Dummy.

Post War Independence – Source: Barro and Lee (1993). **Definition:** Dummy for countries achieving independence after the Second World War. **Unit:** Dummy.

Appendix II

Instrumenting for Openness

In this appendix we explain the procedure to develop new, more powerful, instruments for indicators of a country's openness as measured by imports, exports and foreign direct investment inflows. In the context of the present paper we wanted to find variables that were exogenous and did not affect the degree of corruption directly. We have built four new variables that are likely to affect openness but can at the same time be reasonably seen as totally exogenous to a country's policy choices. The procedure was the following:

1. Select the 20 largest economies by Gross Domestic Product in 1990. The full list includes Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Iran, Italy, Japan, South Korea, Mexico, Netherlands, Poland, Spain, Turkey, the United Kingdom and the United States.

2. Compute, for each pair country in the sample – one of 20 largest economies, 4 variables that indicate the geographic and cultural closeness between each country in the sample and each of the 20 largest. The variables are: bilateral distance, dummy taking the value 1 if the country pair has a common land border, dummy taking the value 1 if the country pair has the same majoritarian religion and dummy taking the value 1 if the country pair shares an official language.

3. Take the constant US dollar value of exports, imports and foreign investment outflows of each of the 20 largest economies, averaged for each 5 year period, and multiply them by the dummy variables constructed in 2. For bilateral distance, multiply the trade and investment flows by the inverse of the distance. The sum in each of the four categories (distance, contiguity, religion and language) constitutes the instrument for the trade and investment openness of each country in the sample.

For example, each country in the sample will have four exogenous variables that will serve as instruments for its degree of trade openness, defined as:

$$\begin{aligned} \text{TradeDI}_{\text{country } i \text{ in the sample}} &= \text{SUM}_{\text{country } j=1 \text{ to } 20 \text{ of largest economies}} \{(\text{Inverse of Bilateral Distance}_{ij}) * \text{Exports}_j\} \\ \text{TradeCO}_{\text{country } i \text{ in the sample}} &= \text{SUM}_{\text{country } j=1 \text{ to } 20 \text{ of largest economies}} \{\text{Contiguous}_{ij} * \text{Exports}_j\} \\ \text{TradeRE}_{\text{country } i \text{ in the sample}} &= \text{SUM}_{\text{country } j=1 \text{ to } 20 \text{ of largest economies}} \{\text{Religion}_{ij} * \text{Exports}_j\} \\ \text{TradeLA}_{\text{country } i \text{ in the sample}} &= \text{SUM}_{\text{country } j=1 \text{ to } 20 \text{ of largest economies}} \{\text{Language}_{ij} * \text{Exports}_j\} \end{aligned}$$

The same four-fold of variables is built in a similar way for foreign investment outflows of the 20 largest economies, so that we are left with a group of exogenous variables that capture the export, import and trade impulses from the largest economies and weigh them by the geographical and cultural proximity to each of the economies in the sample. These exogenous variables are thus different for each of the openness indicators and, not least important, vary through time. This is a substantial improvement relative to previous instruments for trade that were solely based on unchanging country characteristics.

We regress imports, exports and FDI over GDP on the exogenous instruments listed above. These first stage regressions have a strong predictive power, with R2 around 0.30. The correlation between the exogenous and actual openness indicators range from 0.21 for FDI to 0.35 and 0.38 for exports and imports, respectively. Thus, though the correlation is high, the variables are far from displaying identical behavior. The coefficient on the exogenous determinants of openness are significant and mostly come out with the expected sign. The causal effect of imports, exports and foreign direct investment on a country's level of corruption is then computed as the coefficient, in a second stage regression, of the predicted value of the dependent variable in the regression above.