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# NATIONAL POLITICAL INFRASTRUCTURE AND FOREIGN DIRECT INVESTMENT

*By Steven Globerman, Western Washington University, and*
*Daniel Shapiro, Simon Fraser University*

*Working Paper Number 37*
*December 2002*

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# 1. INTRODUCTION

It is widely argued that a country's economic performance over time is determined to a great extent by its political, institutional, and legal environment (OECD, 2001). We refer to these public institutions and policies as the national political infrastructure (NPI) of a country. The NPI thus comprises investments in effective political, economic and legal governance, which in most countries is the exclusive responsibility of the government.[1]

The national political infrastructure of a country helps to define its investment environment and thus creates favourable conditions for economic growth. Recent empirical evidence does in fact indicate that cross-country differences in growth and productivity are related to differences in political, institutional and legal environments (OECD, 2001; Hall and Jones, 1999; Keefer and Knack, 1997; Knack and Keefer, 1995; Kaufman et al. 1999b). Because the investment environment of a country affects both domestic and foreign investors, and because foreign direct investment (FDI) has been shown to promote host-country efficiency, it is a natural extension of the literature to consider the impact of NPI on cross-country differences in FDI flows. This report therefore focuses on the linkage between measures of national political infrastructure and FDI flows.

Specifically, we test the hypothesis that FDI will be attracted to regions characterized by more favourable NPIs, all other things constant. We also argue that countries with more favourable national political infrastructures will create more domestic multinational enterprises (MNEs), and they will therefore see more capital outflows, so that the net effect on capital flows may be uncertain.

We base our hypotheses on the "eclectic" theory of FDI (Dunning, 1980), which holds that multinational enterprises invest abroad in attractive locations by internalizing firm-specific (ownership) advantages. We suggest that one factor contributing to a location's attractiveness is its national political infrastructure. At the same time, a domestic environment that protects property rights and promotes economic transparency is likely to foster domestic innovation and thus firm-specific advantages which, in turn, result in capital outflows.

There is a relatively extensive empirical literature focusing on the characteristics of locations that seem to either attract or repel foreign investors.[2] While it seems plausible that FDI will be attracted to regions characterized by more favourable political infrastructures, all other things constant, most of the relevant literature has focused on economic determinants of FDI inflows, and there is very little discussion of the determinants of capital outflows. It is, of course, true that the international business literature has acknowledged the importance of country-specific political risk (Kobrin, 1976). As a consequence, empirical analyses of FDI now routinely include some kind of variable to control for inter-country differences in the broad political environment (Tuman and Emmert, 1999; Mody and Srinivasan, 1998; Stevens, 2000; Bevan and Estrin, 2000; Morisset, 2000; Altomonte, 2000), albeit with somewhat mixed results (Dawson, 1998).[3]

It is difficult to generalize about the statistical impact of political governance attributes, in part because these attributes are measured in different ways in different studies. Moreover, although many previous studies adopt measures that are closely related to the notion of national political infrastructure, there has as yet been no systematic attempt to directly relate NPI measures to FDI flows for a wide cross-section of countries. Nor has there been much discussion regarding the specific infrastructure elements that are especially robust determinants of FDI.

In this study, we use newly developed indices to examine the effects of NPI on *both* FDI inflows and outflows for a broad sample of (at most) 144 developed and developing countries over the period 1995-97. Specifically, we use the six governance indices developed by Kaufman et al. (1999a) to measure national political infrastructure. These six indices, described below, cover a broad range of institutional and policy outcomes and are available for a large sample of countries. In particular, they include factors not commonly found in the FDI literature, notably measures of the rule of law, the regulatory environment, and graft.

National political infrastructure is not the only infrastructure that can contribute to economic well-being and create a favourable climate for FDI. Investments in human capital, physical infrastructure and the environment may also be important. In the context of FDI, the absence of educated and healthy workers can be a significant deterrent to foreign entry. As increasing amounts of FDI becomes skill- and efficiency-seeking, access to an educated and skilled workforce becomes essential.[4] There is evidence that a more highly educated populace does in fact attract FDI (Mody and Srinivasan, 1998), but the role of health has not been explored to our knowledge. Similarly, environmental regulation may increase the costs of doing business and thus deter FDI. On the other hand, a clean environment may be associated with a higher quality of life, and thereby attract FDI. To date, there are only a limited number of studies linking environmental policies to FDI (List, 2001; Smarzynska and Wei, 2001; and Wheeler, 2001), with no consistent evidence of a race to the bottom with respect to environmental policies. That is, there is no consistent evidence of a negative relationship between FDI inflows and higher environmental standards.

In this study, we account for aspects of human capital development and the environmental regime using the Human Development Index (HDI) developed by the United Nations, and the Environmental Sustainability Index (ESI) developed jointly at Columbia University, Yale University and the World Economic Forum. The HDI is a composite index created by combining GDP per capita, an education outcome index and a health status index. The ESI measures environmental sustainability using a variety of measures.

The primary purpose of this study is therefore to assess the contribution of national political infrastructure characteristics to the determination of inward and outward FDI flows, and to compare their impact with other measures of non-physical infrastructure such as health, education and the environment. Our report is thus concerned with assessing the importance of "non-traditional" variables in a relatively traditional model of FDI behaviour. Globally, these measures are often associated (directly or indirectly) with the broad notion of a location's quality of life. Policies influencing quality of life in a region are attracting increasing attention from public officials seeking to make their region attractive to foreign investors.[5]

In order to examine these issues, we employ two sets of FDI data, both covering the period 1995-97. The first set measures total FDI inflows and outflows to/from a sample of 144 developed and developing countries (UNCTAD, 2000). The second set uses U.S. Bureau of Economic Analysis data to measure the inflows of U.S. FDI to these same countries (not all of which were recipients). We refer to the former as the global model, and the latter as the U.S. model.

For the global model, we employ relatively standard techniques to estimate the impact of NPI on the amount of capital inflows and outflows, holding constant other factors, including those discussed above. For the global model, all countries in the sample are FDI recipients. For the U.S. model, however, there are a large number of countries where no positive FDI inflows from the United States were recorded over our sample period. We therefore employ a two-stage estimation procedure to account for the possibility of sample selection bias (Heckman, 1979). We first estimate the likelihood of a country enjoying positive FDI inflows from the United States, and then we estimate the determinants of the magnitude of the positive inflows. In the first stage, the probit method is used to estimate the probability

that the United States invests in a particular country. In the second stage, ordinary least squares (OLS) estimates of the determinants of the amount of FDI (given that it is positive) are provided.

For both models, we provide separate estimates of our equations for samples including both developing and developed countries, as well as for developed countries alone. In addition, for the U.S. sample, we investigate the possibility that the determinants of FDI, in particular the importance of NPI, differ across industries. We thus provide separate estimates for U.S. FDI flows in high-technology industries.

For the global model, our results clearly indicate that NPI is an important determinant of both FDI inflows and outflows. The results suggest that investments in governance infrastructure not only attract capital, but also create the conditions under which domestic MNEs emerge and invest abroad. It would appear that investments in governance infrastructure are subject to diminishing returns, so that the benefits, in terms of inflows, are most pronounced for smaller and developing economies. For the U.S. model, the results also point to the importance of NPI, but in a somewhat different way. National political infrastructure is an important determinant of whether a country receives U.S. FDI, but it is less important in determining the amount, given that the country is a recipient.

The study proceeds as follows. In the next section we survey the relevant FDI literature. In the third section we define national political infrastructure, and compare and contrast our definition to other related concepts. In the fourth section, we discuss our measure of NPI, as well as other measures we employ, notably measures of human development and environmental sustainability. Sections where we describe the global FDI model, its estimation technique and results, and then the U.S. FDI model and its estimation and results follow, respectively. A summary and conclusions are provided in the final section.

## 2. EMPIRICAL RELATIONSHIP BETWEEN FDI AND SOCIO-POLITICAL ATTRIBUTES

There is a vast empirical literature focusing on the determinants of FDI. Most of the available studies are not primarily concerned with the influence of NPI elements. There are two broad types of studies that focus more particularly on the relationship between FDI flows and quality-of-life measures, or political attributes. One comprises surveys of MNE executives and government officials, in which expert opinions about the relevance of political or socio-cultural attributes are solicited. The second encompasses econometric models of FDI patterns that incorporate socio-cultural or political variables.

### Surveys and Other Expert Opinions

A number of available surveys provide somewhat conflicting evidence on the importance of socio-cultural and political determinants of FDI patterns. In one relatively early study, Piper (1971) analyzed USAID files of pre-investment surveys of U.S. executives contemplating foreign investments under that specific government financial assistance program. He concluded that, with very few exceptions, political and social variables tend to be given relatively little emphasis in foreign investment decisions. Conversely, another survey of U.S. executives published at around the same time attributes substantial importance to the political environment (Bennett and Green, 1972). Specifically, the survey investigated the relationship between political stability and marketing FDI, where the latter is defined as manufacturing and trade resulting in products and services being marketed abroad. A notable positive relationship was identified by that survey.

A U.S. government survey published in the mid-1980s reports the opinions of industrial development professionals (Laszlo, 1984). This survey sought to isolate variables that are considered significant to potential foreign investors in choosing a community in which to locate FDI. The variables identified included (in order of importance) highways, proximity to markets, reasonable taxes, a favourable labour climate, reasonable costs and wages, and pleasant living conditions. From the responses, Laszlo draws the inference that quality of life in a community is of significance to location decisions, particularly to a foreign investor who is considering relocating a large number of management personnel and their families into the community. Aspects of living conditions and community services that especially matter are the quality of public education in or near the community, health, recreational and cultural amenities, and the quality and cost of housing. These all contribute to pleasant living conditions.

More recently, Peterson, Malhota and Wagner (1999) report the responses to a survey of executives from Japanese MNEs who evaluated reasons for their companies' decisions to come to the United States as producers. "Incentive packages" ranked at the low end of factors that induced companies to invest in the United States. Instead, "proximity to customers" and "quality of life" were the two top factors cited by the respondents. Other factors mentioned included education and training, physical infrastructure, business and environmental regulation, and fiscal stability.

Another recent survey, this one conducted among senior officials of North American industry associations, identified the factors influencing the willingness of businesses to invest in Canada (Public Policy Forum, 2000). The industry representatives interviewed offered positive comments about the quality of Canada's workforce and its university educational system as attractions to invest in Canada. However, Canada's quality of life, including its relatively clean and crime-free cities, was viewed as

having little impact on the decisions of firms to invest in Canada or to relocate their Canadian assets. Nor were Canada's social programs identified as a distinct advantage or disadvantage to corporate investors. Rather, the primary factor cited by the decision-makers interviewed was Canada's competitiveness. One might infer from the responses that Canada's competitiveness is not prominently conditioned by the country's quality of life.[6]

In summary, available survey evidence provides an ambivalent assessment of the impact of national political and socio-cultural attributes on FDI decisions. In contrast, it does highlight the importance of more conventional economic factors such as the availability of a trained and educated workforce, as well as physical infrastructure such as transportation and communication facilities. To some extent, disagreement about the importance of political and socio-cultural attributes could reflect differing definitions of those attributes. It might also reflect a potential indirect influence of these factors. For example, their influence might be relevant, at the margin, when economic influences are relatively similar across countries. Or they might condition the availability of economic infrastructure attributes, such as human capital.[7] The surveys summarized above do not attempt to identify potential interactions between economic and non-economic variables, or other indirect channels through which non-physical infrastructure measures might influence FDI behaviour.

## Econometric Studies

Econometric studies offer a second broad source of evidence bearing upon the linkages between infrastructure attributes and FDI flows. Existing studies tend to emphasize economic determinants and highlight the particular importance of market size as a determinant of FDI location decisions. At the same time, the evidence regarding the importance of non-economic variables is much more equivocal.

Kobrin (1976) was among the first to explicitly incorporate political, social and cultural variables in a model of FDI location choice. After controlling for market size, socio-economic development was not a statistically significant variable explaining inward FDI.[8] As noted above, econometric studies of FDI now typically control in some way for political factors. Dawson's (1998) review of the literature concludes that the available evidence on this linkage is mixed. His own research suggests that, while economic freedom is significantly correlated with inward investment, political and civil liberties are not. In a related vein, Grosse and Trevino (1996) find that home country political risk is not a significant factor influencing outward FDI to the United States, while Morisset (2000) finds that political risk is unrelated to FDI in Africa. Conversely, Mauro (1995) finds that a high level of corruption deters foreign investment in a country. More recent evidence suggests that political and institutional factors are important determinants of FDI in Central Europe (Bevan and Estrin, 2000; Altomonte, 2000) and in Latin America, by American firms (Stevens, 2000), as well as Japanese firms (Tuman and Emmert, 1999).[9]

On balance, it is difficult to generalize about the statistical impact of quality of life and political governance attributes. There is no consistent evidence of a significant link between FDI and such attributes, in part because they are measured in different ways in different studies. Given the limited and inconclusive econometric evidence on the linkages between FDI and non-traditional infrastructure attributes, additional research seems appropriate.

## 3. NATIONAL POLITICAL INFRASTRUCTURE

Broadly speaking, the NPI comprises public institutions and policies created by governments as a framework for economic and social relations. We are most concerned with those elements of the NPI that can affect investment decisions of multinational enterprises (MNEs). A "positive" political infrastructure would therefore include: an effective, impartial and transparent legal system that protects property and individual rights; public institutions that are stable, credible and honest; and government policies that favour free and open markets. These conditions encourage FDI, and presumably private domestic investment, by protecting privately held assets from arbitrary direct or indirect appropriation. In a related manner, the same conditions encourage sunk cost investments by MNEs that facilitate efficient operations in host countries.

As we use the term, national political infrastructure is similar to the notion of social infrastructure used by Hall and Jones (1999) in that the definition includes both institutions and policies. We prefer our terminology because it is readily distinguishable from related notions of physical infrastructure, social capital and human capital. National political infrastructure, so conceived, can be contrasted with physical infrastructure and human capital. Physical (public) infrastructure is conventionally thought to include investments in the construction and maintenance of communications, transportation and utility networks. Human capital reflects less tangible investments in people, mainly in the form of education and health. To the extent that education and health are provided by government or influenced by public policy, human capital may be thought of as human infrastructure. Indeed, Vining and Weimer (2001) define infrastructure broadly as including both human capital and physical infrastructure on the grounds that they both facilitate investment and growth, and are subject to market failure.

NPI can also be distinguished from social capital. Social capital refers to the networks and shared values that encourage social cooperation, trust and, possibly, economic growth (OECD, 2001; Knack and Keefer, 1997). Unlike much physical capital and political infrastructure, social capital resides in social relationships. Indeed, to the extent that transactions rely on sanctions and trust (Humphrey and Schmitz, 1998), one may think of sanctions (legal recourse, regulation) as elements of the political infrastructure, while trust emerges from moral and social norms. Nevertheless, social capital and physical and political infrastructure may overlap because social capital can involve public organizations such as schools or government agencies (OECD, 2001, Chapter 3). It might also be augmented by investments in physical and political infrastructure, as well as in human capital. In this regard, there is some evidence to suggest that the existence of social capital (trust) is "linked to better performance of government institutions, including publicly provided education" (Knack and Keefer, 1997: 1253).

In fact, a measure of social capital was excluded from this study for two main reasons. First, there is no consensus in the literature as to the appropriate way to specify social capital in studies focusing on differences in performance among organizations or geographical regions.[10] Second, and related to the first, the relationship networks underlying social capital can be formed in many different ways. One would presumably need to aggregate the various forms of relationship networks into broader indices comparable to governance indices. In this regard, we are unaware of the existence of reliably estimated "meta-indices" of social capital for even a few of our sample countries. While the exclusion of social capital might contribute to biased estimates of the coefficients for included infrastructure variables, to the extent that social capital is systematically correlated with the latter, the literature says little about whether social capital and governance infrastructure are strongly correlated in either a positive or negative direction.

National political infrastructure is related to measures of country-specific risk commonly used in the international business literature (Keefer and Knack, 1997; Mody and Srinivasan, 1998; Bevan and Estrin, 2000). Private rating agencies typically determine these measures by assigning weights to various economic, political and institutional factors that define the investment environment. These factors are not conceptually much different from those used to define NPI. Indeed, we show below that there is a very high statistical correlation between our measures of NPI and one commonly used measure of country-specific risk. Nevertheless, the measure of NPI we use is arguably more comprehensive.

## 4. MEASURING NATIONAL POLITICAL INFRASTRUCTURE

National political infrastructure is measured in our study by the six governance indicators estimated by Kaufmann, Kraay, and Zoido-Lobaton (1999a and 1999b). These indices (which we will refer to as KKZL indices) describe various aspects of the political and governance structures of a broad cross-section of countries, including measures of political instability, rule of law, graft, regulatory burden, voice and political freedom, and government effectiveness.[11] The indices have been estimated (using an unobserved components model) employing 31 different qualitative indicators from 13 different sources, including BERI, DRI/McGraw Hill, the Heritage Foundation, the World Bank, the World Economic Forum and the Economist Intelligence Unit. Thus, they are in a sense meta-indices, encompassing many of the various measures used in previous studies. Aggregate indicators drawn from a variety of sources should provide more precise measures of governance than individual indicators. A further advantage is that these measures are available for an unusually large sample of countries (between 145 and 158 countries). For these reasons, we believe that the KKZL indices are superior to other indices that have been used in empirical studies.

A disadvantage is that the indicators are estimated, and thus subject to measurement error. However, the magnitude of the measurement errors can be estimated, which facilitates interpretation of how "informative" each indicator is about the broader concept of governance (Kaufman et al. 1999a). In addition, the indices are highly correlated with each other such that it is very difficult to use them all in a single equation (Table 1). Therefore, we have created an aggregate measure estimated as the first principal component of the six measures. We refer to this aggregate measure of national political infrastructure as NPII.

**Table 1**
**Correlation Matrix: Governance Infrastructure and Other Measures**
**N = 144**

| | Mean (st. dev.) | HDI | GDPC | EDUC | LIFE | NPII | VOICE | INSTAB | GOV | REG | LAW | GRAFT | ESI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **HDI** | 0.68 (0.19) | 1.00 | | | | | | | | | | | |
| **GDPC** | 0.63 (0.25) | 0.93 | 1.00 | | | | | | | | | | |
| **EDUC** | 0.75 (0.18) | 0.90 | 0.70 | 1.00 | | | | | | | | | |
| **LIFE** | 0.68 (0.18) | 0.94 | 0.81 | 0.80 | 1.00 | | | | | | | | |
| **NPII** | 0.01 (0.96) | 0.69 | 0.69 | 0.53 | 0.60 | 1.00 | | | | | | | |
| **VOICE** | 0.06 (0.93) | 0.59 | 0.59 | 0.50 | 0.52 | 0.85 | 1.00 | | | | | | |
| **INSTAB** | -0.02 (0.93) | 0.64 | 0.66 | 0.52 | 0.58 | 0.88 | 0.67 | 1.00 | | | | | |
| **GOV** | -0.02 (0.88) | 0.63 | 0.69 | 0.44 | 0.55 | 0.95 | 0.75 | 0.78 | 1.00 | | | | |
| **REG** | 0.07 (0.78) | 0.51 | 0.56 | 0.37 | 0.44 | 0.84 | 0.73 | 0.66 | 0.75 | 1.00 | | | |
| **LAW** | 0.04 (0.92) | 0.69 | 0.75 | 0.51 | 0.60 | 0.94 | 0.69 | 0.87 | 0.88 | 0.72 | 1.00 | | |
| **GRAFT** | -0.01 (0.90) | 0.65 | 0.71 | 0.49 | 0.55 | 0.93 | 0.75 | 0.74 | 0.93 | 0.67 | 0.87 | 1.00 | |
| **ESI** | 49.49 (11.30) | 0.65 | 0.62 | 0.61 | 0.53 | 0.78 | 0.73 | 0.63 | 0.72 | 0.64 | 0.67 | 0.75 | 1.00 |

Notes:
HDI is the Human Development Index published by the United Nations Development Program, averaged for 1995 and 1997. HDI combines three measures, GDP per capita (GDPC); education, measured by a combination of adult literacy and the combined gross primary, secondary and tertiary enrolment (EDUC); and life expectancy at birth (LIFE). Index range is 0.0-1.0.

NPII is the first principal component of a series of governance indicators estimated by Kaufmann, Kraay and Zoido-Lobaton (KKZL, 1999a) for the World Bank. The KKZL indices are themselves estimated by aggregating a number of measures for 1997. VOICE (Voice and Accountability) includes measures of political and civil liberties as well as freedom of the press. INSTAB (Political Instability and Violence) includes measures of political violence, terrorism and ethnic conflict. GOV (Government Effectiveness) includes measures of government efficiency. REG (Regulatory Burden) includes measures of the degree of regulation and market openness, including tariffs, and import, export and FDI restrictions. LAW (Rule of Law) is a measure that includes costs of crime, contract enforcement, and property rights. GRAFT (Graft), includes measures of corruption. Indices range from –2.5 to 2.5.

ESI is the Environmental Sustainability Index, published by The Center for International Earth Science Information Network (CIESIN) at Columbia University, and was created with the Yale University Center for Environmental Law and the World Economic Forum. The ESI index is based on 22 factors that contribute to environmental sustainability, such as air quality, public health and environmental regulation. The index is based on data for 2000 and ranges from 0 to 100. It is available for only 114 countries.

## 5. MEASURING OTHER VARIABLES

In order to control for both physical infrastructure and human capital, we employ the Human Development Index (HDI) published by the United Nations. This index is now available for 168 countries, although not for every year. The HDI is derived from three sub-indices: GDP/population, educational literacy and enrolment, and life expectancy at birth. Each of these sub-indices is also available. We have calculated the average value of the HDI for 1995 and 1997. The health and education components are direct measures of human capital. The GDP/population component is a measure of wealth that we use as a proxy measure for the amount of physical infrastructure.[12]

Because neither the HDI nor the KKZL indices directly measure environmental quality or environmental regulation, we also employ the Environmental Sustainability Index (ESI), created by the World Economic Forum, in conjunction with Columbia University and Yale University. The ESI index is derived from 22 factors that contribute to environmental sustainability including air quality, public health and environmental regulation. Therefore, it reflects environmental infrastructure in the form of policy choices made by governments, as well as human capital reflected in public health conditions.

We treat the HDI and ESI indices as measures of human capital and physical and environmental infrastructure, but they may also measure development outcomes. As a consequence, the three indices (NPII, HDI and ESI) may be related. In particular, effective governance may be a determinant of development outcomes, as measured by HDI or ESI.[13] Nevertheless, we include these measures because development outcomes are also relevant to any discussion of FDI flows. The FDI literature suggests that host-country wealth (normally measured by GDP per capita) is an important determinant of FDI flows (Dunning, 1993). Moreover, some recent evidence suggests that the location decisions of foreign investors may be influenced by quality-of-life variables, of which GDP per capita is but one (Peterson, Malhota and Wagner, 1999). Given that GDP per capita is not necessarily a good measure of well-being or quality of life (OECD, 2001), the HDI and ESI indices may serve as such measures and therefore attract FDI.

The means and correlation coefficients for the main indices (NPII, HDI and ESI) and their components are presented in Table 1.[14] All measures are quite highly correlated, but the within-group values are typically higher than those between groups. In particular, the HDI and NPII indices are highly correlated with their individual component measures.[15] Therefore, it is inappropriate to include individual component measures in the estimating equation, as it would provide little additional information than that obtained by including only the HDI and NPII indices.

The HDI and NPII indices are correlated ($r = 0.69$), which is not surprising given that the HDI index likely measures both inputs and output. The ESI variable is the least correlated with any other measure, and it is the only variable that explicitly accounts for environmental quality. However, it is not available for as large a sample of countries (122 in total, but only 114 in our sample).

We experimented with various combinations of the KKZL and HDI sub-indices. For example, we created a human capital index that was the sum of the education and health sub-indices of the HDI. This variable still had high collinearity with HDI and the GDP per capita component of the index. Similarly, we created a new variable from the KKZL indices that is the sum of the government efficiency, regulatory burden, and legal system efficiency indices. This variable also had high collinearity with NPII, and with the remaining KKZL indices.

As noted earlier, the KKZL indices are estimated and, therefore, possibly subject to measurement error. We attempted to assess their reliability by comparing them to a measure of political risk published by Institutional Investor magazine. This measure is a composite index derived from a variety of sub-measures, but its components are not published. As noted above, the measure is often used in the FDI literature (Mody and Srinivasan, 1998; Bevan and Estrin, 2000). The KKZL indices and their first principal component (NPII) are all highly correlated with the Institutional Investor risk variable. For example, the correlation coefficient between the latter and NPII is $r = 0.87$. Thus, despite the possibility of measurement error, it would appear that the KKZL measures are robust, at least in relation to "expert" judgments of national political environments.[16]

## 6. MODELLING GLOBAL FDI INFLOWS AND OUTFLOWS

The basic question we seek to address is whether national political infrastructure, as measured by NPII, affects global FDI inflows and outflows across countries. In doing so, we also consider the impact of physical and environmental infrastructures, as well as human capital. In order to estimate the impacts of the variables of interest, we need to hold constant other potentially important influences on FDI within the confines of a parsimonious model. The model chosen to estimate FDI inflows is specified as equation (1).

(1) $\text{Ln FDI}_{it} = \beta_0 + \beta_1 \text{ Ln GDP}_{it-1} + \beta_2 \text{ National Political Infrastructure Index (NPII)}_{it} + \beta_3 \text{ Human Development Index (HDI)}_{it-1} + \beta_4 \text{ Environmental Sustainability Index (ESI)}_{it} + \text{other control variables and interactive terms} + \varepsilon_{it}$

Globerman and Shapiro (1999) have argued that FDI inflows and outflows are symmetrical. The presumption is that capital outflows may be stimulated by the same factors that encourage capital inflows. Specifically, superior governance encourages inward FDI, as well as capital investment more generally. Some of the successful firms created through the domestic investment process may, in turn, invest abroad as world-class multinational companies. In effect, superior governance encourages capital investment and the expansion of businesses that, in turn, are associated with increases in inward and outward FDI. Accordingly, the same specification is also used to estimate equations whose dependent variables are either capital outflows (Ln FDO), or net capital flows, defined as Ln ($FDI_{it} - FDO_{it}$). In the next sub-section, we discuss in more detail how the statistical model was selected and specified.

### Control Variables

A large number of variables have been considered in the literature as possible determinants of inward FDI.[17] In fact, however, surprisingly few are consistently significant across the broad set of empirical studies that have been performed. One variable that is consistently statistically significant is a measure of the host country's size, usually identified by a measure of real gross domestic product (GDP).[18] The theoretical linkage between real GDP and locational advantage is straightforward. A larger market implies that distribution costs will be lower when production and distribution facilities are sited in that market where, presumably, the bulk of a seller's customers will be located. As a related point, a clustering of other producers in the large market may create or accentuate agglomeration economies that, in turn, lower costs for all producers present in that market. Contributing to the relevant agglomeration economies may be the availability of highly specialized inputs that cannot be found in smaller markets.[19]

Other variables provide less consistent results. As noted, GDP per capita is often employed as a measure of how well-off consumers are in a country. The problem with this variable is that it is also an implicit measure of wage rates, since productivity levels are highly correlated with wage rates, as well as with GDP per capita. All other things constant, higher wage rates will discourage inward FDI. Similarly, relative wage rates will implicitly reflect productivity differences among countries. Hence, they will not necessarily reflect differences in unit labour costs that, in principle, are what they are meant to measure. Consequently, it is not surprising that GDP per capita and relative wage rates are frequently either statistically insignificant or appear with the "wrong" sign in FDI regression equations.[20]

We followed the literature in selecting control variables reflecting the openness of the economy (imports + exports/GDP), labour costs (wages and salaries per employee in manufacturing), taxation (government tax revenues/GDP), exchange rate instability (measured by dummy variables classifying the

country's exchange rate regime as fixed against the U.S. dollar, fixed against some other currency, managed floating or free floating)[21], and three measures of physical infrastructure (Internet hosts per 10,000 people; telephone mainlines per 1,000; and millions of kilowatt-hours of electricity generated/GDP). None of these control variables, with the exception of the number of telephones per capita, was ever statistically significant in any specification estimated. Moreover, many were available for a smaller sample than the variables ultimately included.

It is not surprising that some of these variables were not found to affect FDI flows, despite some theoretical and empirical support for their relevance in the literature. The potential ambiguity of relative wage measures was discussed earlier. With respect to tax differences, the conceptually appropriate measure to compare across countries is the marginal effective tax rate. This rate differs among industrial sectors and is extremely difficult to measure (Chen, 2000). Broader measures (such as tax revenues/GDP) do not measure the impact of taxation at the margin. As well, there is considerable intra-country variation in tax rates within large countries, and simple averages may disguise the ability of a particular region to attract FDI. Finally, any aversion to high taxes might be mitigated by their link to the provision of infrastructure that, in turn, is highly valued by international investors.

The fact that we could find no link between FDI flows and most measures of physical infrastructure is at odds with the recent literature, which tends to find a positive and statistically significant effect.[22] In our case, the problem was one of multicollinearity between measures of physical infrastructure and measures of GDP or HDI (mainly the GDP per capita component). Larger and richer countries are characterized by more physical infrastructure. For example, the correlation coefficient between telephones per capita and HDI is $r = 0.94$. When our physical infrastructure measures were regressed against FDI in the absence of GDP and HDI, they were statistically significant and positive. For this reason, HDI must be considered, as a practical matter, to measure both physical infrastructure and human capital.

Similarly, the openness of an economy, measured by trade flows as a ratio of GDP, is likely related to a host country's legal and political framework that, in turn, is supportive of business investment. Although trade variables were never significant, the regulatory burden (REG) index of NPII is, to a great degree, a measure of openness, since it includes measures such as tariffs and other trade restrictions, resulting in collinearity between the trade measure and the NPII index. In fact, our results indicate that open economies attract FDI.

The relationship between FDI and the exchange rate is more complex. The relevant issue is whether greater volatility of exchange rates discourages FDI. On the surface, it would seem to be the case, since risk-averse investors presumably view such volatility as a direct cost (if hedging is used to reduce the volatility) or an indirect cost (if risk is unhedged). However, to the extent that MNEs operate across a number of exchange rates, the volatility of any one currency might actually reduce the overall volatility of an MNE's cash flow. This will be the case, for example, if the movements of one currency are weakly, or negatively correlated, with movements of other currencies in which the MNE operates. In this case, currency volatility might be largely offsetting for MNEs operating across a "basket" of currencies. In short, it is theoretically unclear how trade openness and exchange rate volatility affect FDI flows, and our results may reflect this theoretical ambiguity.

## The Dependent Variable

Several conceptual issues arise with respect to the specification of the dependent variable. They include: 1. Should FDI stocks or flows be used? 2. Should real or nominal values of FDI be used?

With respect to the first issue, to the extent that inward and outward FDI have been going on for a long time, recent and relatively large changes in FDI behaviour may not be apparent if FDI stock figures are used. That is, changes in stocks on a year-to-year basis will be quite small when they occur against an absolutely large accumulated base value. As a result, it may be difficult to identify the empirical factors affecting FDI stock values given relatively small variations in the FDI stock dependent variable. In addition, data on FDI stocks are not always calculated in the same way across countries (UNCTAD, 1998, Annex B), which may result in measurement errors. Moreover, inward and outward FDI behaviour is more comprehensively measured for flows than for stocks.

Finally, the NPI, HDI and ESI indices are available only for relatively recent years. It would be inappropriate to relate stock values of FDI, accrued over previous decades, to recent values of the relevant indices, since the stock values will likely reflect historical influences that are not necessarily captured by our independent variables. While we shall argue that the various indices are relatively stable in the short-run, it would be presumptuous to assume that the values are relatively stable over periods of decades.

With respect to the second issue, the book value of FDI for a country can differ from the real (or market) value, given inflation and the imperfect adjustments for inflation that are offered by converting currency values into U.S. dollars. To the extent that real FDI values exceed nominal (or book) values, stocks of FDI in countries that have a relatively long history of hosting FDI will be understated relative to the stocks of countries that have been attracting substantial amounts of inward FDI only recently.

In fact, there are no explicit price deflators available for FDI stocks, and the use of domestic capital asset price deflators for these stocks may be no more reliable than simply using book values (Bellak and Cantwell, 1996). Evidence for the United States also shows that the choice of valuation technique can have a large impact on measured FDI. For example, using a current cost method of revaluing U.S. inward and outward FDI over the period 1982-89, the outward FDI stock grew by 43 percent compared to around 17 percent using historical cost values. However, using a market value method of revaluation, the outward FDI stock grew by over 250 percent during the same period (Landefeld and Lawson, 1999). Obviously, absolute measures of FDI can be substantially affected by the choice of valuation method. On the other hand, the measured effects of independent variables may not be grossly affected by the precise specification of the FDI dependent variable. For example, there seems to be relatively little difference created by the use of one or the other specification, at least in models of Canadian inward and outward FDI flows (Globerman and Shapiro, 1999).

## Specifying the Model

The model is specified in such a way that both FDI flows and GDP are measured in logarithms, with the GDP coefficient measuring the elasticity of FDI flows. Given its GDP level, a country will be more or less attractive to foreign investors based upon the extent and nature of its infrastructure and quality of life.

Alternative specifications to (1) were considered and tested. In particular, we estimated models in which the dependent variable was specified as being the ratio of FDI (inflows or outflows) to GDP, and the Ln GDP term was dropped as an explanatory variable. This specification was rejected because the dependent variable was typically clustered within a narrow range, and this limited variation produced very unreliable parameter estimates and low degrees of explanatory power when either OLSQ or Tobit estimation methods were employed. As an alternative, the logistic transformation of the FDI/GDP ratio was calculated and employed as the dependent variable. This specification produced results similar to those reported below. Indeed, there is virtually no difference in the level of significance of the

explanatory variables, and none of our conclusions would change as a consequence of using this alternative specification.

In addition, we estimated models in which the dependent variable was specified as the proportion of total global FDI received by any country (PFDI), or the logistic transformation of PFDI. These measures were highly correlated with Ln FDI, suggesting some indifference as to the choice among them. Thus, the results are in fact similar, regardless of how the dependent variable is measured, and so we only present results based on the (natural) logarithmic specification (with GDP also expressed in natural logs). This specification offers greater flexibility in that it allows the elasticity of FDI with respect to GDP to be estimated, and permits us to introduce lagged GDP as an explanatory variable.

As for independent variables, we arrived at the final specification by eliminating all control variables that were not statistically significant in preliminary estimations or that were subject to extreme multicollinearity (such as telephones per capita). As noted above, few of the other control variables for which data were available were ever statistically significant with the exception of GDP per capita. Since GDP per capita is part of the HDI index, we control only for GDP (measured in logarithms) in our reported results. Standard F-tests indicate that this model is preferred over ones that also include the control variables discussed above.[23]

The simple specification described by equation (1), without interaction terms, was subjected to RESET specification tests (discussed below). When the specification failed the RESET test, we considered specifications in which the NPII, HDI and ESI indices were interacted with the Ln GDP term.[24] When the inclusion of the interactive term (or terms) allowed the specification to pass the RESET test, they are reported. To the extent possible, all independent variables were lagged relative to the dependent variable. The measurement of the variables is discussed in the next section.

## Data and Measurement

The sources and measurement of all variables are summarized in Table 2. We were able to measure most variables for a cross-section of 144 countries. The ESI variable was available for only 114 countries, while only 98 countries recorded FDI outflows. At the time the data were collected, 1997 marked the last year for which FDI data were available. However, use of a single year's data on FDI flows can be misleading, particularly for small countries, where a single transaction in a given year can create temporary and possibly large variations in recorded FDI flows, including negative values. In order to minimize this possibility, we chose to average the FDI data over the period 1995-97. At the same time, the NPII measures were available for only one year (1997), and the HDI indices were not available for every year, thus limiting our ability to create a useful time-series panel.

In fact, there is remarkable temporal stability in most of the relevant variables employed in this study. For example, FDI inflows in 1995 and 1996 have a simple correlation coefficient of 0.975. The correlation coefficient for FDI inflows in 1996 and 1997 is 0.986. Outward FDI flows are also highly correlated on a year-to-year basis. Specifically, the correlation coefficient between outward FDI in 1995 and 1996 is 0.965. For the years 1996 and 1997, the simple correlation coefficient is 0.981.

Key independent variables are also highly correlated over the mid-1990s sample period. For example, the index of human development (HDI) constructed for 1995 has a simple correlation coefficient of 0.979 with the same index calculated for 1997. The sub-index measuring educational attainment for 1995 has a simple correlation coefficient of 0.992 with the same index for 1997. Finally, real GDP in 1995 has a correlation coefficient of 0.999 with real GDP in 1997.

**Table 2**
**Global FDI Model:**
**Variables, Definitions and Data Sources**

| Variable | Definition | Source |
|---|---|---|
| **FDI** | FDI inflows in $US, averaged for 1995-97. | UN World Investment Report, 1998 |
| **FDO** | FDI outflows in $US, averaged for 1995-97. | UN World Investment Report, 1998 |
| **FDIN** | Net FDI flows (FDI inflows minus FDI outflows) averaged for 1995-97. | UN World Investment Report, 1998 |
| **GDP** | Real GDP in 1990 $US, averaged for 1994-96. | United Nations Statistical Yearbook, 1999 |
| **HDI** | Human development index, averaged for 1995 and 1997. The index combines GDPCI, EDUCI AND LIFEI. | United Nations Development Programme, various years |
| **GDPCI** | GDP per capita index, measuring standard of living, averaged for 1995 and 1997. | United Nations Development Programme, various years |
| **EDUCI** | Education index, combining adult literacy, and primary, secondary and tertiary enrolment ratios, averaged for 1995 and 1997. | United Nations Development Programme, various years |
| **LIFEI** | Life expectancy at birth index, averaged for 1995 and 1997. | United Nations Development Programme, various years |
| **NPII** | First principal component of governance indices (LAW, INSTAB, REG, GOV, GRAFT, VOICE, developed by Kaufman et al., 1997a). | Kaufmann et al., World Bank, 1999a, available at: http://www.worldbank.org/wbi/governance/datasets.htm#dataset |
| **LAW** | Rule of law index; measures contract enforcement, property rights, theft and crime, etc. | Kaufmann et al., World Bank, 1999a |
| **INSTAB** | Political instability and violence index; measures armed conflicts, social unrest, ethnic tensions, terrorist threats, etc. | Kaufmann et al., World Bank, 1999a |
| **REG** | Regulatory burden index; measures government intervention, trade policy, capital restrictions, etc. | Kaufmann et al., World Bank, 1999a |
| **GOV** | Government effectiveness index, measures red tape and bureaucracy, waste in government, public infrastructure etc | Kaufmann et al., World Bank, 1999a |
| **GRAFT** | Graft and corruption index; measures corruption among public and private officials, extent of bribery, etc. | Kaufmann et al., World Bank, 1999a |
| **VOICE** | Voice and accountability index, measures civil liberties, political rights, free press, fairness of legal system, etc. | Kaufmann et al., World Bank, 1999a |
| **ESI** | Environmental sustainability index, 2000; measures the health of the environmental system. | Available at: www.ciesin.columbia.edu/indicators/ESI |

In summary, values of relevant dependent and independent variables in models of FDI behaviour change relatively slowly over time.[25] As a consequence, although adjustments to changes in the relevant independent variables do not occur immediately, departures from equilibria are arguably ordinarily small, at least relative to past FDI behaviour. Discrete and substantial short-run departures from equilibrium values for the dependent and independent variables would presumably be associated with much lower year-to-year correlations of each variable than we identify in our sample, as discussed above. As a result, cross-section distributions of the relevant variables may, for our sample time period, reasonably approximate a steady-state equilibrium. Given the highly correlated values of the dependent variables across our sample of countries, the precise choice of year(s) for those variables does not appear to be a crucial issue.

To the extent possible, we attempted to measure the independent variables for a prior period. GDP is measured in U.S. dollars and averaged over the period 1994-96. The GDP variable was lagged both to allow for adjustment lags and to reduce the potential for a bias created by the dependent variable (FDI) causing higher values of GDP. HDI and its sub-indices are averaged over the years 1995 and 1997. NPII and its sub-indices were only available for 1997, but it is doubtful that their values would change much over a relatively short period. The earliest year for which ESI was available was 2000, but it is also doubtful that this index would change abruptly over time. Of course, it would be preferable to lag all explanatory variables (or at least to test for appropriate lags) but data constraints did not allow us to do so.

We conclude that a cross-section sample of countries should allow for the identification of a long-run relationship between FDI and infrastructure attributes. Since FDI values are also highly correlated on a year-to-year basis over the mid-1990s, as are the values of the independent variables, it seems unnecessary to estimate different cross-sections over time, or to pool cross-sections over time. A single cross-section in which the relevant variables are averaged over the sample period seems a sufficiently robust approach to modelling in this case.

## Multicollinearity

Despite the parsimony of the basic model, there is still a potential problem created by intercorrelations among the independent variables of interest. In addition to the correlations among the infrastructure variables presented in Table 1, Ln GDP is correlated with HDI ($r = 0.92$) and with NPII ($r = 0.69$). These correlations underscore the potential difficulty of identifying statistically the influence of specific infrastructure measures in FDI models that include conventional economic variables such as GDP. It is difficult to determine the level at which the correlation might cause multicollinearity problems. If we adopt the Klein rule of thumb that the $R^2$ of the correlated variables should be less than that of the estimated equation, then a correlation of 0.8 or more between any two independent variables could be problematic.

## 7. ESTIMATION AND RESULTS: THE GLOBAL MODEL

### The FDI Model

The basic results for the global FDI model are presented in Tables 3 and 4. Each reported equation was estimated by OLS, with heteroscedastic-consistent standard errors. The dependent variable is measured in logarithms, as is GDP. The other variables (HDI, NPII, ESI) are indices and were not transformed. We tested for specification error through a series of RESET tests (one and two power). For the full sample (defined below), it was found that any equation with NPII alone always failed the RESET test (one power), but passed comfortably when NPII was interacted with Ln GDP. The implication of this finding will be discussed below. All other equations passed the RESET tests.

We were also concerned about measurement errors, particularly with respect to the governance variables. These variables were estimated by Kaufmann et al. (1999a), and therefore each observation has a standard error. For each of the KKZL variables, we took the ratio of the standard error to the mean estimate, and included a dummy variable in the equations where this ratio took on extreme values (greater than two) for any measure. Inclusion of this dummy variable did not alter the results reported below.

Table 3 shows the results for the full sample of countries (n = 144), as well as for a sample that excludes OECD members, Hong Kong and Singapore (n = 115). The latter sample is referred to as developing and transition economies. Because there were fewer observations for ESI, and a more limited sample size, we present two sets of results for each sample: one for the largest possible sample (n = 144 and n = 115) excluding ESI, and one for a restricted sample (n = 114 and n = 86) that includes ESI.

For the full sample, the first model (1) presented in Table 3 is a simple regression of Ln FDI on Ln GDP (lagged one period). This model produces a surprisingly high level of explanation for cross-section estimation ($R^2 = 0.64$), which suggests that GDP acts as a control variable for a variety of economic factors. The coefficient on the GDP term is highly significant and suggests an elasticity that is not statistically different from unity. When we add HDI, NPII and the interaction of NPII and Ln GDP (model 2), or these variables plus ESI (model 4), the explanatory power of the equations improves. However, the only variable that is statistically significant in both equations is NPII (positive) and its interaction with Ln GDP (negative, although significant only at the 10 percent level in model 4).[26]

This specification suggests that while governance improvements can attract FDI, they do so at a diminishing rate. That is to say, there are "diminishing returns" to governance improvements, so that the greatest effects will be felt by smaller economies (which are typically poorer). Thus, larger and richer countries have less to gain (at the margin) from governance improvements than do smaller and poorer economies. The smaller impact of governance improvements on FDI in larger countries might be a statistical artifact of relatively limited variation in the governance index across developed countries. To assess this possibility, we calculated the standard deviations of the NPII variable across the full sample of countries, as well as the separate sample of developing and transition economies. In fact, we found that the standard deviations of NPII for the latter sample were *lower* than that for the whole sample. In this regard, the smaller impact of governance on FDI as GDP increases seems a worthy topic for further research. A possible interpretation is that investors are more willing to bear the costs associated with dealing with factors such as government bureaucracy and costly regulations when other potential benefits (as proxied by market size) are large.

**Table 3**
**Regression Results, FDI Inflows**
**Dependent Variable: Ln FDI**

| | All Countries Dependent Variable: Ln FDI | | | | | Developing and Transition Economies Dependent Variable: Ln FDI | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **(1)** | **(2)** | **(3)** | **(4)** | **(5)** | **(6)** | **(7)** | **(8)** | **(9)** | **(10)** |
| **Ln GDP** | 0.951*** (0.059) | 0.826*** (0.080) | 0.764*** (0.062) | 0.791*** (0.085) | 0.737*** (0.070) | 0.893*** (0.088) | 0.903*** (0.093) | 0.845*** (0.078) | 0.862*** (0.107) | 0.861*** (0.085) |
| **Human Development Index (HDI)** | | -0.374 (0.881) | | 0.874 (0.872) | | | -0.328 (0.850) | | 0.470 (0.798) | |
| **Education Index (EDUC)** | | | 1.190** (0.556) | | 2.068*** (0.669) | | | 1.183*** (0.570) | | 1.703*** (0.689) |
| **Political Infrastructure Index (NPII)** | | 2.083*** (0.735) | | 1.525** (0.774) | | | 0.969*** (0.219) | | 0.569*** (0.209) | |
| **Regulation Index (REG)** | | | 1.101*** (0.156) | | 1.076*** (0.214) | | | 1.080*** (0.173) | | 1.043*** (0.239) |
| **Environment Sustainability Index (ESI)** | | | | 0.005 (0.015) | -0.021 (0.014) | | | | 0.023 (0.019) | -0.009 (0.020) |
| **Ln GDP*NPII** | | -0.124** (0.062) | | -0.090* (0.049) | | | | | | |
| **Constant** | -3.857*** (0.587) | -2.260*** (0.644) | -2.980*** (0.549) | -2.635** (0.930) | -3.636*** (0.821) | -3.413*** (0.806) | -2.980*** (0.732) | -3.698*** (0.697) | -4.456** (1.124) | -4.208*** (1.106) |
| **$R^2$** | 0.64 | 0.73 | 0.78 | 0.72 | 0.78 | 0.49 | 0.61 | 0.68 | 0.61 | 0.69 |
| **n** | 144 | 144 | 144 | 114 | 114 | 115 | 115 | 115 | 86 | 86 |

Figures in parentheses are heteroscedastic-consistent (White) standard errors.
*** $p < 0.001$; ** $p < 0.05$; * $p < 0.01$.

The HDI and ESI coefficients are not statistically significant in these specifications, although they are each significant, and positive, when entered individually (with Ln GDP). There are grounds for concern that collinearity among the independent variables is hampering reliable estimation of the individual coefficients. Some indirect evidence that the HDI index has a statistically relevant influence on FDI is provided by substituting the educational component of HDI for the HDI variable and the regulation component of NPII for the NPII variable (Equations 3 and 5). The simple correlation coefficient between REG and EDUC ($r = 0.37$) is lower than the simple correlation coefficient between HDI and NPII ($r = 0.69$), and lower than for any other combination of sub-indices. Both REG and EDUC are less correlated with NPII and HDI than are other sub-indices.

Equations 3 and 5 provide improved explanatory power, with both the EDUC and REG coefficients positive and statistically significant. This result suggests that the HDI index suffers more from a collinearity problem with the NPII index than do the individual components of the HDI index. In any case, the result with respect to EDUC certainly suggests that educational infrastructure encourages FDI in the expected way. As before, the ESI index remains statistically insignificant.

**Table 4**
**Regression Coefficients, NPII and HDI Sub-indices**
**Dependent Variable: Ln FDI**

| | (1) | | (2) | |
|---|---|---|---|---|
| | All Countries | | Developing and Transition Economies | |
| | Coefficient (standard error) | $R^2$ | Coefficient (standard error) | $R^2$ |
| **HDI** | 2.890*** (0.943) | 0.67 | 2.095*** (0.740) | 0.52 |
| **GDP per Capita**[1] | 1.674*** (0.569) | 0.66 | 1.194*** (0.606) | 0.50 |
| **Education**[1] | 2.365*** (0.604) | 0.67 | 1.960*** (0.616) | 0.52 |
| **Life Expectancy**[1] | 2.142*** (0.747) | 0.66 | 1.642*** (0.768) | 0.50 |
| **ESI**[3] | 0.037*** (0.011) | 0.69 | 0.053*** (0.016) | 0.58 |
| **NPII** | 0.744*** (0.136) | 0.73 | 0.930*** (0.182) | 0.61 |
| **Rule of Law**[2] | 0.609*** (0.161) | 0.69 | 0.640*** (0.211) | 0.54 |
| **Voice and Accountability**[2] | 0.669*** (0.144) | 0.71 | 0.795*** (0.164) | 0.58 |
| **Political Instability/Violence**[2] | 0.649*** (0.157) | 0.70 | 0.638*** (0.197) | 0.56 |
| **Government Effectiveness**[2] | 0.748*** (0.146) | 0.71 | 0.909*** (0.225) | 0.57 |
| **Regulatory Burden**[2] | 1.119*** (0.154) | 0.77 | 1.105*** (0.198) | 0.69 |
| **Graft**[2] | 0.595*** (0.136) | 0.68 | 0.721*** (0.218) | 0.57 |
| **n** | 144 | | 114 | |

Figures in parentheses are heteroscedastic-consistent (White) standard errors.
Each equation contains an unreported constant term and Ln GDP.
*** $p < 0.001$.
[1] Indicates variables that are components of the HDI index.
[2] Indicates variables that are components of the NPII index.
[3] For this variable, n = 114 for the all-country sample, and n = 86 for the developing and transition economies sample.

To assess the possibility that the stage of a country's development, as distinct from a country's size, conditions the relationship between FDI and infrastructure measures, we examined a sub-sample of developing and transition economies (the full sample less OECD members (as at 1996), Hong Kong and Singapore).[27] The results are reported in Table 3, columns (6) to (10). One difference between these results and those obtained for the full sample is that the interaction term between NPII and Ln GDP is never statistically significant in the estimating equations for the smaller sample of countries, and the non-interactive version passed the RESET test. As a consequence, no interactive specification is reported.

Although the explanatory power of the equations estimated for the developing economies is lower than for the full sample, the coefficient estimates and levels of significance are quite similar. The finding that the impact of political governance does not diminish with size among developing countries suggests that they stand to benefit more at the margin from such improvements than do richer countries. It is also noteworthy that we find no evidence that FDI flows are attracted to developing economies where environmental conditions are poor.[28]

We also note that, for both samples, a variety of alternative specifications were estimated with various combinations of the main indices (NPII, HDI and ESI) and sub-indices. We have already determined that individual components of the broader indices such as EDUC and REG are positively related to FDI flows. In order to examine the potential impact of the other components of the HDI and NPII indices, we estimated equations that contain various combinations of Ln GDP, sub-indices of HDI and NPII, and the interaction of Ln GDP and an infrastructure sub-index. The results indicate that no interactive term is statistically significant for any of the sub-indices, and that when all sub-indices are entered into an equation at once, only two variables are statistically significant (and positive): education and regulatory burden. In addition, government effectiveness (GOV) is often nearly statistically significant and positive. In order to give some sense of the relative contributions of these variables, we present in Table 4 results where variables are individually included in an equation with Ln GDP. For comparative purposes, this table also includes the NPII, HDI and ESI indices.

The results confirm the importance of governance infrastructure, as measured by NPII and the KKZL indices. NPII provides more explanatory power than ESI and HDI as measured by the coefficients of determination, and this is true of both samples. In general, the NPII index provides more explanatory power than do any of its components (except regulatory burden), while the HDI index does not offer much advantage over any of its components. The results also suggest that education is the most important among the HDI variables (education, per capita GDP, and life expectancy), as judged by the size of its coefficient; this is also true for both samples. When considering the variables that comprise the governance index (NPII), the coefficient for regulation is larger than any of the other coefficients, suggesting that open economies with free markets will attract more FDI than economies in which external and internal competition are discouraged. This is true regardless of a country's stage of development, although the effect is marginally weaker for the developing country sample. In both samples, the second most important governance variable is effective government, and it is stronger for developing countries than for developed countries.

Perhaps the most important result to emerge from Table 4 is that the HDI coefficient and all of its component coefficients are lower in the sample of developing and transition economies, while the NPII coefficient and most of its component coefficients are higher. This suggests that governance is relatively more important to developing and transition economies, while wealth and human capital are relatively more important to developed countries.

In summary, our results point in a consistent direction. Specifically, they confirm the well-established fact that the size of a national economy strongly conditions how attractive that location is to foreign investors. They also strongly support the notion that governance infrastructure has an important

direct influence on FDI, although that influence diminishes as countries become larger. An additional inference is that FDI will be more strongly affected by improvements in political governance in developing countries than in developed countries. Of the governance indicators considered, the evidence suggests that regulatory burden and government effectiveness are the most important determinants of FDI flows for all countries.

There is less reliable evidence regarding other variables, where issues of collinearity and causality arise. In particular, the Human Development Index is not significant in the presence of NPII. One possible reason is that HDI is, in fact, an output measure determined by NPII, as suggested by Kaufman et al. (1999b). However, when we estimate a model with independent variables that are relatively uncorrelated with each other, there is evidence that education levels are important independent determinants of FDI flows. Furthermore, there is no evidence that the impact of this variable decreases with the size of the country. Finally, we find no evidence indicating that FDI is in any way attracted to locations with weaker environmental regulations or with inferior environmental quality.

## The FDO Model

Globerman and Shapiro (1999) argue that the same factors encouraging inward FDI influence outward FDI (henceforth FDO), although the precise nature of the relationship between FDO and some of the independent variables is not clear *a priori.* On the one hand, factors creating a favourable domestic business environment may both attract foreign capital and limit capital outflows. In this case, the infrastructure variables that encourage FDI will discourage FDO, and will carry opposite signs in the relevant equations. On the other hand, as noted above, the factors encouraging foreign-owned MNEs to establish affiliates in a country may also encourage the growth of domestically owned MNEs that will establish their own affiliates abroad. For example, human development initiatives might encourage a clustering of skilled assets that, in turn, strengthens firm-specific advantages of companies located in the cluster. The latter, in turn, might encourage increased outward foreign direct investment. Similarly, "good" political governance likely encourages investments in long-lived assets that, in turn, contribute to firm-specific advantages in international markets.

The FDO undertaken by domestically owned MNEs might therefore not be necessarily motivated by factors such as "bad" political governance; rather, it might be motivated by efficiency considerations that are related to increased international vertical and horizontal specialization undertaken by the domestically owned MNEs. In this context, the infrastructure variables that directly encourage FDI may indirectly encourage FDO.[29]

Thus, an effective domestic governance infrastructure could well encourage capital outflows by successful domestic firms. Moreover, the relationships between infrastructure variables and FDO may be more complex than the relationships between infrastructure measures and FDI. For example, already established investments by MNEs might be characterized by relatively large sunk costs. As a result, factors that have a relatively large negative impact on inward FDI may have a much smaller impact on FDO.[30]

Clearly, if one is interested in the overall impact of infrastructure variables on MNE investments in a country, one should consider both FDI and FDO. Hence, we estimated the model summarized in equation (1) using both the logarithm of FDO and the logarithm of FDI minus FDO as dependent variables.[31] Analogous estimates to those reported in Table 3 are reported in Table 5. As before, each equation was subjected to RESET specification tests resulting in the reported specifications. Each reported equation therefore passed the RESET test.

**Table 5**
**Regression Results, FDI Outflows and Net FDI Flows**

| | All Countries | | | | | Developing and Transition Economies | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Dependent Variable | | | | | Dependent Variable | | | | |
| | Ln FDO | | | Ln (FDI – FDO) | | Ln FDO | | | Ln (FDI – FDO) | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| **Ln GDP** | 1.355*** (0.092) | 1.012*** (0.131) | 1.052*** (0.098) | 0.002 (0.204) | -0.309 (0.325) | 0.948*** (0.142) | 1.176*** (0.147) | 1.189*** (0.129) | 0.924*** (0.126) | 0.901*** (0.094) |
| **Human Development Index (HDI)** | | 1.120 (0.131) | | -0.141 (2.734) | | | 1.856 (1.976) | | -0.862 (2.316) | |
| **Education Index (EDUC)** | | | 1.086 (1.257) | | 3.713* (2.243) | | | 0.830 (1.316) | | 1.163 (1.501) |
| **Political Infrastructure Index (NPII)** | | -1.434 (1.150) | | 18.489*** (2.263) | | | -5.433** (2.438) | | 0.021 (0.530) | |
| **Regulation Index (REG)** | | | -3.724** (1.582) | | 20.859*** (3.794) | | | -6.446** (2.540) | | -2.253 (1.391) |
| **Environment Sustainability Index (ESI)** | | -0.010** (0.004) | -0.011*** (0.004) | 0.007 (0.076) | -0.123* (0.073) | | -0.009* (0.005) | -0.012** (0.005) | 0.083 (0.069) | 0.034 (0.055) |
| **Ln GDP*NPII** | | 0.252*** (0.093) | | -1.872*** (0.194) | | | 0.660** (0.264) | | | |
| **Ln GDP*REG** | | | 0.538*** (0.140) | | -1.992*** (0.403) | | | 0.818*** (0.261) | | 0.331** (0.133) |
| **Constant** | -9.843*** (0.976) | -7.268*** (1.205) | -7.875*** (1.001) | 5.065 (3.190) | 10.704*** (3.766) | -6.348*** (1.355) | -9.378*** (1.400) | -8.976*** (1.234) | -6.743** (2.703) | -6.037*** (1.970) |
| **$R^2$** | 0.60 | 0.74 | 0.76 | 0.56 | 0.38 | 0.33 | 0.44 | 0.50 | 0.38 | 0.43 |
| **n** | 98 | 98 | 98 | 98 | 98 | 70 | 70 | 70 | 70 | 70 |

Figures in parentheses are heteroscedastic-consistent (White) standard errors.
*** $p < 0.001$; ** $p < 0.05$; * $p < 0.01$.

The FDO results are both similar to, and different from, the FDI results. In both cases, it is clear that market size is a crucial determinant of FDI flows. As economies grow, there is a tendency for both capital inflows and outflows to increase. This is true for both samples of countries. However, as the net FDI equations for the total sample indicate (columns 4 and 5), there is no relationship between Ln GDP and Ln (FDI - FDO), so that the two effects cancel out on average. The same is not true of developing and transition economies, where the Ln GDP coefficient is positive and statistically significant (columns 9 and 10), suggesting that for these economies increases in market size result in net positive capital flows.

As was the case for FDI, NPII is an important determinant of FDO for both samples (columns 2 and 7). However, in the case of FDO, the results suggest that improvements in the national political infrastructure will restrict capital outflows for small economies and encourage capital outflows for larger economies.[32] However, the former effect only holds for very small economies, so that for most countries the effect is positive. As political infrastructure improves, most countries should expect to see increased capital outflows. For the total sample, the evidence (column 4) suggests that the net effect is positive for smaller economies, but negative for larger ones, with the latter effect dominating for economies with Ln GDP greater than 9.7 (compared to a mean of 10.6).[33] However, when the sample is restricted to developing and transition economies, the linear specification is found to be appropriate, and the NPII coefficient is not statistically significant. Thus, the evidence suggests that, for smaller economies, improvements in governance will either result in positive net capital flows, or will have no effect on balance, while for larger economies improvements in governance will likely create the conditions for successful domestic firms to expand abroad, thereby resulting in smaller (or even negative) net capital flows.

As was the case for FDI, there is no evidence that HDI affects capital outflows. Moreover, when we substitute the education index (EDUC) for HDI, and the regulation index (REG) for NPII in order to minimize the effects of multicollinearity (columns 3 and 8), we find that education is not a significant determinant of FDO in either sample. Investments in education are therefore not found to result in capital outflows. For the total sample, the net effects of education on capital flows are positive (column 5), while for developing and transition economies the net effect is zero (column 10).

The regulatory burden term performs in much the same way as the overall NPII index. Movements toward the creation of more open and free markets will limit capital outflows for small economies, but not for larger ones, and the turning point occurs before the mean level of GDP is reached. The net effect on the total sample is such that reducing the regulatory burden will have a net positive effect on FDI flows in small countries, but the overall effect will be negative beyond a critical size that is reached before the sample mean GDP level is reached. Thus, relatively small and poor countries will experience net inflows as a consequence of creating more open markets.

Finally, the results presented in Table 5 show no evidence that there is capital flight from areas where environmental conditions, including the regulatory framework, are supportive of a sustainable environment. Indeed, the relevant ESI coefficient is negative and statistically significant in the FDO equations for both samples. The higher the index of environmental sustainability, the lower the capital outflows. For the most part, the ESI index is not related to net capital flows.

As for FDI, we examined the impact of the various indices and sub-indices when they were entered individually (or with interactive terms) with Ln GDP. In order to save space, we do not present these results.[34] In general, we found that the individual indices (NPII, HDI) provide stronger explanatory power than any individual sub-index. We confirmed that education and health are not significant determinants of FDO flows for developing and transition economies, and that the regulatory burden term is the most important of the NPII terms (as judged by $R^2$) for both samples. For the total sample, it is generally true that raising any of the sub-indices will cause capital outflows to increase in large economies, and these will also result in lower net FDI flows for larger countries.

In summary, we find fairly strong evidence suggesting that improvements in national political infrastructure will also affect capital outflows, and thus net FDI flows. In general, the effects are strongest for large economies, and are likely most important when liberalization of the economic environment is involved. There is one area where liberalization may not affect net FDI flows and that is environmental regulation. Finally, the education infrastructure is not related to capital outflows, and it may therefore have a positive net effect on FDI flows.

## Canada as an "Outlier"

In a similar type of study of infrastructure impacts, Kobrin (1976) found that the relationship for Canada was different than the average relationship, in the sense that the residual estimated for Canada was larger than average. Canada received more FDI than would be predicted by his model. Kobrin ascribed this to Canada's geographical proximity to the United States. The latter presumably creates a different sensitivity of FDI flows to and from Canada than would be expected from the average impacts of standard infrastructure variables. Since Kobrin's study is fairly dated, his findings with respect to Canada may be worth updating. An updating is also suggested by the fact that U.S. FDI in Canada has become a smaller share of total FDI in Canada over the past few decades. Hence, any special linkage to FDI flows with the United States might have weakened during the years elapsed since Kobrin's analysis.

In order to evaluate whether Canada represents an outlier in our study, the residuals from selected equations in Tables 3 and 5 are identified for Canada, as well as for several other small, open economies. This comparison is meant to determine whether Canada received more (or less) FDI than would be predicted by its size and political infrastructure. The results are summarized in Table 6.

Looking first at the FDI results (columns 1 to 3), it can be seen that based on its size alone, the model suggests that Canada receives more than its predicted amount of FDI, although the residual difference is modest. However, when the infrastructure variables are added, Canada receives less FDI than would be predicted for a country with its size and infrastructure, but again the amounts are modest. Indeed, Canada seems to lie very close to the estimated regression line.

However, when net FDI is considered (columns 4 to 6) it is seen that Canada's net FDI is lower than the model would predict. When only size is considered (column 4) the residual is quite large, suggesting that for a country of its size, Canada has more outward flows than would be predicted. The addition of infrastructure variables reduces the degree of over-prediction, but nevertheless the broad results of the estimated model suggest that net inflows to Canada are lower than would be predicted for a country of its size and infrastructure.

Another perspective is obtained by examining the residuals for other small, open economies. Some over-prediction is also evident for Austria with respect to gross FDI flows, and with the Netherlands with respect to net FDI flows, but only Canada shows a consistent pattern of over-prediction for both gross and net flows.[35] The more consistent pattern of over-prediction for Canada than for other small, open economies is provocative. Taken at face value, this pattern suggests that Canada is not getting its "expected" share of gross and net FDI given its location advantages and attributes. The relevance of this inference is tempered both by the small size of the negative residuals for Canada from the gross FDI equation, and by the fact that the Netherlands also has negative residuals from the net FDI equation.

Nevertheless, there may be merit in investigating further whether the otherwise beneficial impacts of Canadian infrastructure investments are mitigated by the fact that they are in relatively close proximity to the United States. Specifically, unique features of the U.S. economy, not captured by our models, may diminish the attractiveness of Canada as a location for third-country direct investments in North America.

**Table 6**
**Regression Residuals for Selected Countries**

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | **LFDI, LGDP** | **LFDI LGDP, EDUCI, REG** | **LFDI LGDP, EDUCI, REG, ESI** | **LNFDI, LGDP** | **LNFDI LGDP, EDUCI, REG, ESI, REG*LGDP** | **LNFDI LGDP, NPII NPII*LGDP** |
| **Austria** | 1.53 | -0.30 | -0.25 | 5.45 | 9.07 | 9.11 |
| **Belgium** | -0.54 | 1.04 | 0.73 | 6.62 | 7.61 | 8.11 |
| **Canada** | 0.39 | -0.08 | -0.02 | -9.17 | -2.37 | -2.58 |
| **Netherlands** | 1.21 | 0.35 | 0.36 | 10.57 | -4.07 | -3.97 |
| **Sweden** | 0.38 | 0.82 | 0.88 | 6.87 | 12.13 | 12.03 |
| **(Min; Max)** | (-5.49; 2.94) | (-2.92; 2.97) | (2.84; 2.62) | (-12.10; 10.06) | (-11.41; 12.13) | (-11.03; 12.03) |

Residuals are calculated as actual minus fitted values for the relevant equation from Table 3 or 5. The top row indicates the relevant equation. The first variable is the dependent variable, followed by the independent variables. LFDI is the log of gross FDI, LGDP is the log of GDP, HDI is the Human Development Index, NPII is the first principal component of the KKZL governance indicators, and LNFDI is the log of net FDI.

## 8. MODELLING U.S. FDI FLOWS

The second model that we employed focuses on whether national political infrastructure is an important determinant of U.S. outward FDI flows. This question is of particular interest from a Canadian perspective, since the United States remains the largest source of inward FDI for Canada. We therefore seek to estimate much the same model as presented above, with U.S. FDI replacing total FDI as the dependent variable. In addition, we address the question of whether the impact of NPI differs according the industry in which the investment occurs, and more specifically whether NPI is more important in determining FDI in high-tech industries.

The estimation of such a model is complicated by the fact that there were no positive FDI flows into a number of countries from the United States over our sample period. Thus, any attempt to estimate the determinants of U.S. FDI may be subject to sample selection bias if the sample is limited to countries that are recipients of U.S. FDI. Consequently, we use a two-stage estimation procedure to account for the possibility of sample selection bias (Heckman, 1979). We first estimate the likelihood of a country enjoying positive inflows of FDI from the United States, and then estimate the determinants of the magnitude of the positive inflows. In the first stage, the probit method is used to estimate the probability that the United States invests in a particular country. The dependent variable is thus a dummy variable equal to 1 if the United States invests in that country, and equal to 0 otherwise. In the second stage, ordinary least squares (OLS) estimates of the determinants of the amount of FDI (given that it is positive) are provided. The second-stage equation includes Mill's ratio, which is derived from the first-stage estimates and accounts for selection bias. Separate estimates of our equations are provided for the total sample (including both developing and developed countries), and for developing and transition economies separately.

The basic question we seek to address is whether the national political infrastructure, as measured by NPII, affects U.S. FDI flows across countries. Our two-stage model is summarized in the following equation:

$$(2) \qquad FDI_{it}^* = \alpha_0 + \alpha_1 NPII_{it} + \alpha_2 X1_{it-1} + \varepsilon_{1it},$$

where $FDI_{it}^*$ is a latent variable, defined such that $FDI_{it} = 1$ (country *i* is a recipient of U.S. FDI) if $FDI_{it}^* > 0$, and $FDI_{it} = 0$ (country *i* is not a recipient of U.S. FDI) if $FDI_{it}^* = 0$ or $< 0$;[36] X1 is a vector of control variables, including HDI and ESI; and $\varepsilon_{1it}$ is a normally distributed error term. We hypothesize that $\alpha_1 > 0$.

$$(3) \qquad \text{Ln } FDI_{it} = \beta_0 + \beta_1 NPII_{it} + \beta_2 X2_{it-1} + \beta_3 \text{Mills} + \varepsilon_{2it},$$

where Ln FDI is the natural logarithm of the dollar value of U.S. FDI flows received by country *i* at time *t*; NPII is as above; X2 is a vector of control variables, some of which are the same as X1 above; Mills is the inverse of Mill's ratio derived from (2); and $\varepsilon_{2it}$ is a normally distributed error term. We hypothesize that $\beta_1 > 0$.

Equation (2) is a simple probit specification whereby a country is an FDI recipient if it surpasses a critical value of an index, FDI*. The value of the index is a linear combination of its national political infrastructure (NPII) and other variables (X1). Equation (3) is a basic linear equation, confined to observations where FDI > 0, and is similar to the global FDI model summarized above in equation (1). The U.S. model includes the inverse of Mill's ratio to test for sample selection bias (Heckman, 1979).

## Data and Measurement

U.S. FDI is measured in terms of flows, averaged over the period 1995-97, just as in the global model. In the first stage of the estimation process, the dependent variable is defined to take a value of unity if, on average, there were positive U.S. FDI flows to the sample country during the sample period (1995-97), and zero otherwise.[37] In the second stage, the logarithm of the average dollar value of U.S. FDI received is used as the dependent variable.[38] For the United States, we were able to obtain industry-level FDI data that allow us to probe the influence of political infrastructure on FDI in high-technology industries. High-technology industries are defined as chemical and allied industries, and electric and electronics industries, and U.S. FDI in high technology is the sum of FDI in these industries.

Of the 144 countries making up the global sample, 88 were recipients of U.S. FDI flows. The 88 countries served as the basis for the second-stage estimates.[39] Developing and transition economies were again defined as non-OECD members less Hong Kong and Singapore, resulting in 115 countries so classified, of which 62 were FDI recipients. For the high technology sector, 39 countries were recipients of FDI.

The explanatory variables are for the most part the same as those used in the global model. Since all variables are candidates for inclusion in both the first- and second-stage models, we do not distinguish between them at this point. However, for the U.S. model, we added several variables that were not used in the global model. We included two dummy variables to account for physical and cultural differences between the host country and the United States. The former is measured by a dummy variable that equals one if the country is contiguous with the United States (Canada and Mexico). These countries are also signatories, along with the United States, to the North American Free Trade Agreement (NAFTA), which lowers barriers to FDI. Thus, this variable is expected to be positively related to FDI. We refer to this variable as PROXIMITY, but it may well reflect NAFTA effects. Cultural distance is measured by common language, with a dummy variable that equals one if the recipient country has English as an official language (ENGLISH). Common language is expected to facilitate FDI flows, and we consequently expect the coefficient to be positive.

Although we believe that physical infrastructure terms are captured by GDP per capita (and HDI), we have included another term as a control variable: telephones per 1,000 people (expressed in logarithms). We included this variable because it proved to have explanatory power in addition to that of HDI in preliminary estimates of some equations. It is specifically included to represent the communications infrastructure of a country, which may be particularly important for high-tech FDI. The coefficient is expected to be positive.[40]

Finally, unlike the global model, we found that dummy variables identifying countries that operated with fixed exchange rates (in 1996) were at times significant determinants of U.S. FDI flows. We distinguish countries whose currencies were pegged to the U.S. dollar (FIXUS) from those whose currencies were fixed, but not against the U.S. dollar (FIXNUS). If currency volatility discourages FDI flows, countries operating under fixed exchange rate regimes should be characterized by more FDI than those operating under floating rate regimes, all other things constant.[41] Thus, we expect that countries with fixed exchange rates should attract more FDI, but since we are dealing with U.S. FDI flows, these effects may be limited to countries that peg their currencies to the U.S. dollar. The variables and data sources for the U.S. FDI model are summarized in Table 7.

**Table 7**
**U.S. FDI Model:**
**Variables, Definitions and Data Sources**

| Variable | Definition | Source |
|---|---|---|
| **FDIUS** | U.S. FDI outflows, averaged over 1995-97 and expressed in logarithms. | U.S. Bureau of Economic Analysis, various years |
| **FDITECH** | U.S. FDI outflows in chemicals and allied products and electric and electronic equipment, averaged over 1995-97 and expressed in logarithms. | U.S. Bureau of Economic Analysis, various years |
| **-NPII and its components (LAW, INSTAB, REG, GOV, GRAFT, VOICE);**<br>**-HDI and its components (GDP per capita, EDUCI, LIFEI)**<br>**-ESI**<br>**-GDP** | As defined and measured in Table 2. | |
| **TEL** | Telephone mainlines per 1,000 people in 1997, expressed in logarithms. | World Bank Development Report |
| **PROXIMITY, NAFTA** | Dummy variable = 1 for Canada and Mexico. | |
| **ENGLISH** | Dummy variable = 1 if English is an official language. | CIA World Fact Book |
| **FIXUS** | Dummy variable = 1 if the country uses a fixed exchange rate, with currency pegged to the U.S. dollar. | IMF International Financial Statistic Yearbook, 1996 |
| **FIXNUS** | Dummy variable = 1 if the country uses a fixed exchange rate with currency pegged to another currency or composite currency | IMF International Financial Statistic Yearbook, 1996 |

## 9. ESTIMATION AND RESULTS: THE U.S. FDI MODEL

The model to be estimated is represented by equations (2) and (3) above. Equation (2) is estimated by maximum likelihood techniques, while equation (3) is estimated by ordinary least squares with heteroscedastic-consistent standard errors. The Mill's ratio is derived from the probit equation, as discussed above. The estimation technique is a standard application of the method developed by Heckman (1979), and explained in Greene (1993: 711-13).

Although all control variables are candidates for inclusion in each equation, data and statistical constraints excluded some variables from the first-stage estimates. Specifically, data on exchange rates and the environmental sustainability index (ESI) were not available for the full sample of 144 countries and these variables were not included. Likewise, the proximity variable could not be included because it perfectly predicted FDI = 1, and would not allow convergence of the parameter estimates. Thus, the probit model includes as explanatory variables NPII, HDI, ENGLISH, Ln GDP and Ln Telephones per capita. Lagrange multiplier specification tests (Verbeek, 2000: 188) rejected the need to include higher order terms for NPII and HDI.

The second-stage equation includes all control variables from the global model plus ENGLISH, PROXIMITY and the exchange rate dummy variables. We also estimated models that included the measures for labour costs, trade exposure, and government revenues discussed previously, but these were never statistically significant in any specification; therefore, we have excluded them from the model. We tested for specification errors through a series of RESET tests (one and two power). The simple linear specification described by equation (3) passed the tests, and, therefore, no interactive or higher order terms were included.

Multicollinearity remains a potential problem. The correlation coefficients for the different samples that we employ are not very different from those presented in Table 1. In particular, the simple correlation coefficient between HDI and NPII is 0.74, thus indicating a potential multicollinearity problem. The severity of the problem depends on the explanatory power of the estimated equation. Generally, the $R^2$ values of the equations estimated by OLS were greater than 0.50, which is acceptable.

### Results

The primary results for the FDI models are found in Table 8 (first-stage probit estimates) and Table 9 (second-stage OLS estimates). Each table presents results for total U.S. FDI flows to all countries, total U.S. FDI flows to developing and transition economies, and U.S. high-tech FDI flows to all countries.

### First-stage Results

In the first stage of the estimation process (Table 8), the dependent variable is defined to take a value of unity if, on average, there were positive U.S. FDI flows to the sample country during the sample period (1995-97), and zero otherwise. As discussed above, the full set of control variables is not included in these equations. We also excluded the telephone term from the first two sets of equations, because it was never statistically significant in any preliminary estimation. In general, the estimates show good explanatory power as indicated by their ability to correctly classify countries.

**Table 8**
**Probit Estimates, U.S. FDI**
**(First Stage)**

| | All Countries | | Developing and Transition Economies | | All Countries, High-tech Industries | | |
|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| **Constant** | -2.458*** (0.830) | -2.922*** (0.783) | -2.096*** (0.866) | -2.454*** (0.831) | -8.951*** (1.731) | -6.744*** (1.522) | -6.322*** (1.038) |
| **Ln GDP** | 0.404*** (0.093) | 0.333*** (0.081) | 0.352*** (0.101) | 0.283*** (0.088) | 0.511*** (0.101) | 0.503*** (0.099) | 0.542*** (0.097) |
| **Human Development Index (HDI)** | -1.646 (0.999) | | -1.446 (0.934) | | 7.730** (3.230) | 3.248*** (1.204) | |
| **ENGLISH** | 0.591 (0.367) | 0.617* (0.358) | 0.521 (0.371) | 0.547 (0.364) | 0.899** (0.432) | 1.001** (0.413) | 0.759* (0.400) |
| **Political Infrastructure Index (NPII)** | 0.578*** (0.190) | 0.375** (0.145) | 0.584*** (0.217) | 0.391** (0.173) | 0.174 (0.211) | | 0.372** (2.361) |
| **Ln Telephones** | | | | | 0.602* (0.313) | | |
| **Number of Observations** | 144 | 144 | 115 | 115 | 144 | 144 | |
| **Number of Positive Observations** | 88 | 88 | 62 | 62 | 40 | 40 | |
| **Log of Likelihood Function** | -72.74 | -74.35 | -68.70 | -69.92 | -44.31 | -46.19 | |
| **Fraction of Correct Predictions** | 0.706 | 0.699 | 0.669 | 0.660 | 0.886 | 0.867 | |

The dependent variable equals 1 if the United States invests in that country (industry), and 0 otherwise.
Figures in parentheses are standard errors computed from analytic second derivatives (Newton).
*** $p < 0.001$; ** $p < 0.05$; * $p < 0.01$.

These results indicate that political infrastructure is an important determinant of the probability that a country will receive U.S. FDI. In general, there is little difference in the results between the total sample and that restricted to developing and transition economies. In both cases, political infrastructure and market size are the primary determinants of whether a country will receive U.S. FDI. On the other hand, quality of life, as measured by HDI, is not statistically significant. Nor is this the result of multicollinearity. Specifically, removing HDI (columns 2 and 4) does not noticeably alter the explanatory power of the equations, and the coefficients are relatively stable. When NPII is removed from the equation (not shown), HDI does not become statistically significant. In general, U.S. firms are more likely to choose to locate in countries characterized by a relatively large domestic economy, with a relatively "advanced" national political infrastructure. These factors dominate wealth, education and health.

The results for high-technology FDI are more complicated. While the overall statistical fit of the probit model is quite good, as evidenced by the high fraction of correct predictions, multicollinearity is apparently a greater problem. In column (5), the results are presented when all variables, including the number of telephones per capita, are included. Once again, GDP is important as indicated by the consistently high statistical significance of its estimated coefficient. In column (5), the coefficients for HDI and ENGLISH are significant at the 0.05 level, while the coefficient for Ln Telephones is nearly significant at this level. However, NPII is statistically insignificant in this specification. Thus, it would appear that there is some evidence that communications infrastructure, language skills, wealth and human capital are more important for FDI in high-technology industries than for all industries. Moreover, these results suggest that political infrastructure is not important for FDI in high-technology industries.

As noted above, the telephone term is highly collinear with HDI, and in column (6) this term, together with NPII, is dropped. As can be seen, the results do not change qualitatively. More importantly, when HDI is removed and NPII is included (column 7), the latter is statistically significant. Thus, collinearity appears to influence the results, and we cannot conclude that political infrastructure is unimportant in high-tech FDI. Nevertheless, the stronger statistical performance of the HDI variable in the sample of technology-intensive industries could suggest a greater relevance of quality-of-life and human capital considerations to FDI location decisions made by high-technology firms. It should be noted also that the language coefficient remains statistically significant. Overall, it would appear that political infrastructure plays an important role in determining whether a country will be a recipient of U.S. FDI, although its importance in high-tech industries is shared with quality-of-life and human capital factors.

## Second-stage Results

Table 9 reports the second-stage regression results where the dependent variable is specified as the natural log value of U.S. FDI (total or high technology). The table contains results for the full sample of countries (n = 88), for the sample of developing and transition economies (n = 62), and for the sample of countries that receive high-tech investments (n = 39). The table presents three different specifications for each of the three samples. The first specification includes Mill's ratio, which in all cases is not statistically significant.[42] Therefore, we find no evidence of sample selection bias. Consequently, we focus on results that do not include Mill's ratio. The second specification is the same as the first, but without Mill's ratio, and the third specification includes the environment sustainability index (ESI), which is available for fewer observations. All reported equations passed the RESET tests.

Once again, the coefficient for the GDP variable is positive and highly significant in all equations and for all samples. Market size is therefore a critical determinant of both the probability of receiving FDI, and of the amount received by any particular country. Although this result is robust across samples, the estimated coefficient is lower for high-tech industries, suggesting that market size is relatively less important for FDI in technology-intensive industries.

In addition, we find that the HDI index is positive and statistically significant across specifications and samples, but that NPII is not. This result persists for all samples, even when HDI is not included in the specification (results not shown). This finding represents a distinctive difference from our statistical analysis of global FDI flows, in which HDI is almost always statistically insignificant.

**Table 9**
**Regression Results, U.S. FDI**
**(Second Stage)**

| | All Countries | | | Developing and Transition Economies | | | All Countries, High-tech Industries | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **Ln GDP** | 0.930*** | 0.759*** | 0.729*** | 1.375*** | 0.799*** | 0.831*** | 0.374 | 0.519*** | 0.511*** |
| | (0.217) | (0.098) | (0.111) | (0.506) | (0.108) | (0.118) | (0.389) | (0.132) | (0.140) |
| **Human Development Index (HDI)** | 6.899** | 2.774** | 3.771** | 6.947* | 2.883** | 3.036** | 12.814** | 14.022*** | 13.683*** |
| | (3.238) | (1.249) | (1.373) | (4.093) | (1.230) | (1.441) | (6.339) | (4.641) | (5.032) |
| **Political Infrastructure Index (NPII)** | 0.222 | -0.032 | -0.064 | 0.731 | -0.253 | -0.285 | -0.142 | -0.162 | -0.130 |
| | (0.259) | (0.228) | (0.300) | (0.809) | (0.393) | (0.453) | (0.409) | (0.373) | (0.491) |
| **Proximity** | 1.077 | 1.403** | 1.325** | | | | 0.703 | 0.595 | 0.662 |
| | (0.704) | (0.567) | (0.631) | | | | (0.637) | (0.608) | (0.604) |
| **ENGLISH** | 1.016** | 0.802** | 0.860** | 1.344 | 0.358 | 0.383 | 1.144 | 1.468*** | 1.395*** |
| | (0.477) | (0.336) | (0.340) | (1.062) | (0.380) | (0.390) | (0.875) | (0.446) | (0.472) |
| **Fixed Exchange Rate – U.S.** | 1.652*** | 1.703** | 2.046** | 2.037** | 2.080** | 2.142*** | 0.338 | | |
| | (0.617) | (0.709) | (0.849) | (0.837) | (0.968) | (0.732) | (0.382) | | |
| **Fixed Exchange Rate – Other** | -0.619 | -0.493 | -0.454 | -0.597 | -0.479 | -0.533 | -0.093 | | |
| | (0.497) | (0.488) | (0.595) | (0.517) | (0.480) | (0.572) | (0.561) | | |
| **Ln Telephones** | -0.508 | | | -0.506 | | | 0.931 | 0.932* | 0.892* |
| | (0.440) | | | (0.509) | | | (0.629) | (0.538) | (0.522) |
| **Environment Sustainability Index (ESI)** | | | 0.000 | | | 0.023 | | | -0.004 |
| | | | (0.017) | | | (0.026) | | | (0.021) |
| **Mill's Ratio** | 1.292 | | | 3.919 | | | -0.552 | | |
| | (1.275) | | | (3.165) | | | (1.333) | | |
| **Constant** | -8.634*** | -5.440*** | -5.852*** | -4.642** | -5.869*** | -7.402*** | -3.461 | -6.557** | -6.185* |
| | (3.263) | (1.140) | (1.494) | (1.930) | (1.182) | (1.646) | (7.921) | (2.991) | (3.335) |
| **$R^2$** | 0.66 | 0.65 | 0.65 | 0.51 | 0.50 | 0.52 | 0.51 | 0.55 | 0.51 |
| **n** | 88 | 88 | 77 | 62 | 62 | 52 | 39 | 39 | 37 |

The dependent variable is Ln FDI. Figures in parentheses are heteroscedastic-consistent (White) standard errors.
*** $p < 0.001$; ** $p < 0.05$; * $p < 0.01$.

For the developing and transition economies and the high-tech industries, the NPII coefficient is not close to being statistically significant, although it is always positive. For total FDI flows to all countries, the coefficient is positive and approaches statistical significance at the 95 percent level. Thus, we are led to conclude that the amount of FDI received by a country depends more on its wealth and human capital than on its political infrastructure, and this is particularly true for developing countries and high-tech industries. Indeed the HDI coefficient for high-tech industries is three to four times higher than that for all industries. However, it is possible that particular aspects of the political infrastructure are still important, a point that will be discussed below.

The remaining control variables have different impacts, depending on the sample. For all industries and all countries, both the proximity and language variables are positive and statistically significant. Other things being equal, both Canada and Mexico receive additional U.S. FDI, likely the combined result of location and NAFTA membership. However, in the sample of developing and transition economies, countries with English as an official language do not receive more U.S. investment, other things held constant. Since Canada and Mexico are not included in this sample, there is no proximity term. On the other hand, proximity is not statistically significant for the sample of high-technology industries, but language is.

Countries with fixed exchange rates do tend to attract more total FDI, but only if their exchange rate is pegged to the U.S. dollar. This holds for all countries, but not for all forms of FDI. Specifically, we find no evidence that this variable affects FDI in high-technology industries. The exchange rate variables could not be included in the same equation with ESI (column 9) because of singularity problems, and they are omitted from the estimates reported in column (8) to maintain comparability. However, they are never statistically significant when included in the high-technology equations.

There is some evidence that the presence of a strong communications infrastructure, as proxied by telephones per capita, is more important in attracting high-tech FDI. The coefficient for this variable is never statistically significant in any equation where total FDI is the dependent variable, but it is statistically significant (albeit only at the 10 percent level) when high-tech FDI is the dependent variable.

Finally, we find no evidence that U.S. FDI flows are in any way attracted to locations with weaker environmental regulations or with inferior environmental quality. This statement holds true for all countries, developed and developing, and for all industries, including high technology.

In general, it appears that U.S. FDI flows can usefully be modeled as a two-stage process. In the first stage, decisions are made about whether or not new or additional direct investments will be made in specific countries. In the second stage, decisions are made about the magnitude of the investments to be made. In the first stage, political infrastructure is a significant factor. In the second stage, aspects of the human development index are especially important.[43]

## Decomposing Indices

The results considered thus far suggest that political infrastructure is significantly more important in influencing whether or not high-technology firms invest in specific countries than in influencing how much is invested in those countries. In this section, we investigate the possibility that specific elements of the NPII index may be more influential than the overall index that we have used until now.

As noted above, it is not possible to include all components of the NPII measure in the same equation. We therefore estimate versions of both the first- and second-stage equations with NPII replaced by one of its components. These results are presented in Table 10. Rather than report all of the estimated coefficients for each specification, we present only the estimated coefficient for the relevant component of NPII. To facilitate comparisons, we also show the results for NPII itself. In order to minimize multicollinearity problems, we present estimates obtained from a specification that did not include HDI. Thus, the probit estimates include Ln GDP and the ENGLISH dummy variable (plus a constant), while the OLS estimates include these variables plus the proximity and exchange rate variables.

In the first-stage probit estimates, the NPII coefficient is positive and statistically significant for all samples. When HDI is included, the same result obtains except in the case of high-technology industries, consistent with the results presented in Table 8. It can be seen, however, that not all components of NPII are themselves statistically significant. In particular, there is little evidence that the rule of law or political instability are significant determinants of whether a country will receive FDI, and this is true of all samples. Likewise, in all samples, the most important sub-indices, as judged by both the magnitude of the coefficients and the predictive power of the equation, are government effectiveness and the regulatory burden. The latter term is the most important, with predictive power exceeding that of NPII, and with a coefficient that is larger than those for all other governance measures. It is important to note that for the first two samples, the results are quite robust in that they hold even when HDI is included in the specification. For the high-technology sample, none of the sub-indices except the regulatory burden term is significant when HDI is included. Thus, countries that adopt policies favouring free and open markets are more likely to be recipients of U.S. FDI, and this result seems robust to different specifications and different samples. However, it is also true that other governance factors are important, though possibly not in all circumstances.

The second-stage results are somewhat different. It will be recalled that the NPII term was not statistically significant when HDI was included in the model – for any sample. When HDI is excluded, the results shown in Table 10 suggest that NPII is marginally significant in the all-country sample for total FDI, but not otherwise. Nor are any of the sub-indices statistically significant in any sample when HDI is included (results not shown). However, when HDI is excluded, as in Table 10, it can be seen that government effectiveness and the regulatory burden again emerge as significant factors, though not always strongly, and only in the all-country sample. Thus, there is some evidence that aspects of good governance might also determine the amount of U.S. FDI received by a country. Good governance implies maintaining effective and transparent government institutions, as well as implementing policies that favour free markets. For total FDI flows, minimizing graft is also important. It is noteworthy that none of the governance variables, including graft, is statistically significant in the sample of developing and transition economies.[44]

In summary, our results point in a consistent direction. Specifically, they confirm the well-established fact that the size of a national economy strongly conditions how attractive that location is to foreign investors. They also strongly support the notion that the political infrastructure is an important direct determinant of whether a country will receive U.S. FDI, although it is of lesser importance in determining the amount that the country will receive. An inference suggested by our results is that countries wishing to receive FDI, most of which are small and developing, should consider improvements in political governance. Of the governance indicators considered, the evidence suggests that the regulatory burden and government effectiveness are the most important.

**Table 10**
**Regression Coefficients, NPII Sub-indices**

| | (1) | | (2) | | (3) | |
|---|---|---|---|---|---|---|
| | **All Countries** | | **Developing and Transition Economies** | | **High Technology** | |
| | **First Stage (Probit)** | | | | | |
| | **Coefficient (standard error)** | **%** | **Coefficient (standard error)** | **%** | **Coefficient (standard error)** | **%** |
| **NPII** | 0.375** (0.145) | 0.70 | 0.388** (0.172) | 0.66 | 0.372** (0.157) | 0.86 |
| **Rule of Law** | 0.194 (0.148) | 0.68 | 0.134 (0.168) | 0.63 | 0.199 (0.163) | 0.86 |
| **Voice and Accountability** | 0.314** (0.143) | 0.68 | 0.309* (0.168) | 0.63 | 0.371** (0.160) | 0.86 |
| **Political Instability/ Violence** | 0.134 (0.137) | 0.68 | 0.088 (0.150) | 0.63 | 0.199 (0.166) | 0.85 |
| **Government Effectiveness** | 0.413** (0.169) | 0.71 | 0.421** (0.204) | 0.65 | 0.487** (0.184) | 0.87 |
| **Regulatory Burden** | 0.848*** (0.199) | 0.77 | 0.851** (0.203) | 0.75 | 1.140*** (0.319) | 0.88 |
| **Graft** | 0.377** (0.171) | 0.68 | 0.391* (0.216) | 0.61 | 0.306* (0.163) | 0.86 |
| **n** | 144 | | 115 | | 144 | |
| | **Second Stage (OLS)** | | | | | |
| | **Coefficient (standard error)** | **$R^2$** | **Coefficient (standard error)** | **$R^2$** | **Coefficient (standard error)** | **$R^2$** |
| **NPII** | 0.313* (0.172) | 0.66 | 0.209 (0.339) | 0.52 | 0.350 (0.252) | 0.54 |
| **Rule of Law** | 0.160 (0.186) | 0.65 | -0.092 (0.318) | 0.51 | 0.286 (0.236) | 0.52 |
| **Voice and Accountability** | 0.263 (0.171) | 0.65 | 0.282 (0.318) | 0.50 | 0.122 (0.201) | 0.51 |
| **Political Instability/ Violence** | 0.241 (0.193) | 0.65 | 0.077 (0.305) | 0.51 | 0.219 (0.247) | 0.51 |
| **Government Effectiveness** | 0.451** (0.192) | 0.67 | 0.408 (0.357) | 0.52 | 0.488* (0.291) | 0.55 |
| **Regulatory Burden** | 0.522* (0.310) | 0.66 | 0.244 (0.384) | 0.51 | 1.315** (0.555) | 0.60 |
| **Graft** | 0.303* (0.180) | 0.66 | 0.225 (0.378) | 0.51 | 0.360 (0.244) | 0.54 |
| **n** | 88 | | 62 | | 39 | |

Figures in parentheses are standard errors. For OLS, they are heteroscedastic-consistent (White) standard errors. For Probit, % refers to correct predictions. For Probit, each equation contains unreported terms for Ln GDP and language. For OLS, unreported terms are Ln GDP, language, proximity (not in the sample of developed countries), and exchange rates.
*** $p < 0.001$; ** $p < 0.05$; * $p < 0.01$.

## Canada an Outlier

We repeated the exercise done for the global model by examining the residuals calculated from the second-stage estimates, for Canada and other countries. The residuals reported in Table 11 show that predicted values of U.S. FDI for Canada generally exceed actual values, although the differences are relatively small when proximity, language and political infrastructure variables are included. Indeed, they are smaller than those for other small, open economies such as Sweden and Austria. In this sense, Canada is not a "special" case as suggested by Kobrin. The Canadian experience with U.S. FDI, given Canada's GDP, political infrastructure, location and language characteristics, is quite representative of the experiences of other countries. However, it should also be noted that when the location and language variables are omitted, the model tends to under-predict U.S. FDI in Canada by a more substantial amount. For example, the results presented in column (1) of Table 11 show that, based on market size alone, the residual for Canada is positive, and relatively large. In this context, Canada is a "special" case because it is the only English-language country contiguous to the United States.

**Table 11**
**Regression Residuals for Selected Countries**

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | LN USFDI LGDP | LN USFDI LGDP, PROX, ENGLISH | LN USFDI LGDP, PROX, ENGLISH HDI, NPII, TEL | LN USFDI LGDP, PROX, ENGLISH HDI, NPII, TEL, ESI |
| **Austria** | -0.88 | -0.65 | -0.92 | -0.99 |
| **Belgium** | 1.35 | 1.59 | 1.27 | 1.31 |
| **Canada** | 1.60 | -0.49 | -0.44 | -0.47 |
| **Netherlands** | 2.40 | 2.64 | 2.44 | 2.41 |
| **Sweden** | -0.74 | -0.50 | -0.66 | -0.74 |
| **(Min; Max)** | (-3.81; 3.34) | (-3.58; 3.56) | (-3.50; 2.80) | (-3.65; 2.64) |

Residuals are calculated as actual minus fitted values for the relevant equation from Table 9, for the sample of all countries. The top row indicates the relevant equation. The first variable is the dependent variable, followed by the independent variables. LN USFDI is the log of U.S. FDI, LGDP is the log of GDP, HDI is the Human Development Index, NPII is the first principal component of the KKZL governance indicators, ESI is the Environmental Sustainability Index, TEL is the number of telephones per capita (logarithm), and PROX and ENGLISH are dummy variables for proximity to the United States and English language countries.

## SUMMARY AND CONCLUSIONS

The purpose of this study is to assess whether and to what extent political infrastructure attributes of national economies influence FDI flows into and from those economies. Previous research has established fairly persuasively that physical infrastructure attributes such as communications encourage inward FDI, although available studies tend to ignore the impact of physical infrastructure on outward FDI. The available evidence with respect to non-physical infrastructure attributes is more ambiguous. In particular, there is no consensus of opinion regarding the importance of social and political attributes of nations to FDI inflows. As with physical infrastructure, the relationship between social and political attributes and outward FDI has been virtually ignored.

The apparently emerging perspective among some national policymakers that a region's quality of life is an important locational advantage to MNEs enhances the relevance of additional examination of the linkages between the socio-political infrastructure and FDI. This study focuses on a set of political environment variables in seeking to identify whether or not they are linked to gross and net FDI flows. A relatively large sample of countries for the period of the second half of the 1990s forms the basis of our study. For total world FDI, gross and net FDI equations are specified and estimated based upon a parsimonious relationship between FDI and real GDP. A similar specification is used to estimate gross FDI equations for total FDI and high-technology U.S. FDI.

Reliable estimation of the regression coefficients for individual political infrastructure measures is hampered by collinearity among many of the measures. Nevertheless, relatively robust findings are identified for political infrastructure attributes. In particular, good political governance is characterized by open and transparent legal and regulatory regimes, as well as by policies promoting competition on both a domestic and international level. Globally, both gross and net FDI flows respond positively to good governance, although the positive effect is a decreasing function of the size of real GDP when total FDI flows are considered.[45]

For the most part, U.S. FDI flows respond to the same stimuli as total FDI flows. However, analysis of the U.S. data reveals that the FDI decision may usefully be viewed as a two-stage process. In the first stage, candidate countries are selected, while in the second stage, FDI is allocated among those selected countries. It appears that political infrastructure factors are more important in the first stage. Countries that do not meet minimum standards of governance are unlikely to receive U.S. FDI. Countries that do meet these standards will receive more FDI when they have higher levels of wealth, health and education. These results are consistent with those for total FDI flows, in that they suggest that smaller economies will benefit more from investments in good governance.

For the U.S. sample, no evidence of sample selection bias was found. The absence of sample selection bias suggests that the results of previous studies that estimated only the second-stage equation are not biased. However, they may be incomplete. Had we relied exclusively on second-stage estimates, we would not conclude that political infrastructure is as important as it, in fact, is for U.S. FDI flows.

There is some evidence that U.S. FDI flows in high-technology industries respond to somewhat different determinants than is the case for all industries. The differences are particularly marked in the first stage, where political infrastructure was found to be less important than wealth and human capital. The probability that a country will be the recipient of high-tech FDI increases with its investments in human capital and higher GDP per capita. In the second stage, the amount of high-tech FDI received is

more closely linked to wealth and human capital, language, and the telecommunications infrastructure than is the case for the total sample of industries.

The results with respect to social attributes such as good public educational institutions, good health care systems and a clean environment are less reliable. Certainly, they support, on balance, the relevance of such infrastructure measures in terms of encouraging inward FDI. Moreover, there is no indication that the positive effects on FDI are a diminishing function of real GDP. Taken as a whole, our results support the view that non-physical infrastructure plays a significant role in influencing MNE investment decisions.

Our results also provide some support for the claim that initiatives to promote environmental protection and remediation encourage, rather than discourage, inward FDI. This is again qualified by the presence of statistical problems, described earlier. Nevertheless, these problems do not obviate the conclusion that there is no support for assertions made by some that governments will engage in an environmental "race-to-the-bottom" in order to attract and retain direct investments.[46] Indeed, our results suggest that weakening environmental protection is more likely to discourage than encourage FDI.

Our empirical evidence provides no strong support for several assertions regarding other factors that allegedly influence FDI flows. In particular, measures of tax burden and exchange rate volatility are not statistically significant determinants of *global* FDI flows in the full sample of countries. It may be the case that the average measures of tax burden used in our analysis are unreliable proxies for the more relevant marginal tax rates of the sample countries. As a result, our findings with respect to the tax burden variable may be unreliable. This possibility provides some cause for hesitation in unequivocally asserting that improvements in infrastructure that, in turn, impose higher tax burdens will encourage inward FDI.

However, we do find that fixed exchange rate regimes attract larger flows of U.S. FDI. This result is indirectly consistent with other studies that find that currency stability promotes inward FDI flows. In our case, it is fixity to the U.S. dollar that matters, which is unsurprising given that we focus on FDI flows originating from the United States. On the surface, it is a bit puzzling that this relationship is not statistically significant for high-technology industries. Perhaps the latter face relatively inelastic demand curves and therefore have less difficulty passing on the relevant costs associated with hedging foreign exchange risk. Exploration of this and other possible explanations is a topic for future research, as is the reason why this result has been obtained only for U.S. FDI.

Our findings might lend some support to arguments for public investment in infrastructure attributes that have other intrinsic social benefits. For example, support for improvements to national health care systems can be defended on grounds that improved health care generates public goods-type externalities. Increased inflows of FDI that themselves create spillover efficiency benefits for host economies offer an additional source of social benefit to an overall benefit-cost appraisal of government health care expenditures. For many developing countries, public goods arguments for improved health and educational systems, as well as a cleaner environment, trump considerations about their impacts on FDI in any case.

Perhaps our most important conclusion is that political governance matters, and improved political governance does not necessarily oblige governments to make large investments of taxpayers' money. In this regard, our findings reinforce similar conclusions drawn in UNCTAD (1998) and Altomonte (2000). Indeed, improved governance might be more consistent, in many cases, with a smaller economic and regulatory role for government. Improved political governance leads to increased inward FDI, especially for smaller developing countries. The associated efficiency gains from inward FDI, in turn, contribute to the faster growth of GDP and GDP per capita. The latter developments make the countries in question even more attractive to foreign investors. In effect, improved political infrastructure

contributes to a "virtuous cycle" of economic growth, especially for smaller countries that do not experience the diminishing returns to governance experienced by larger countries.

To be sure, Canada rates relatively highly on our indices of political infrastructure. Nevertheless, further efforts to dismantle remaining restrictions on inter-provincial and international trade and investment, as well as renewed enthusiasm for increased competition in key sectors such as transportation and communication, would presumably act as an inducement to inward FDI, as well as direct stimulants to improved domestic productivity. Indeed, any set of policies that broadly promotes economic growth will indirectly promote increased inward FDI by encouraging a higher level of real GDP.

Finally, it should be recognized that policies promoting inward FDI would likely indirectly encourage increased outward FDI by promoting the emergence and growth of successful home-country MNEs. However, this development should not be seen necessarily as a "cost" of investing in infrastructure. Nor does it imply lower overall rates of capital investment in countries with improving governance infrastructures. Rather, intra- and inter-industry FDI flows among countries can contribute to specialization in production along the same lines as intra- and inter-industry trade. Such specialization, itself, can be a source of improved productivity and real economic growth.

Available data dictated that we focus on the nation-state as the unit of analysis. However, regions are increasingly emerging as "clusters" for specific types of foreign investment, and those clusters frequently cut across political boundaries. Our findings therefore highlight the potential importance of regional trade and investment agreements that harmonize attributes of political infrastructure across political jurisdictions. Additional research focusing on the relationship between the political infrastructure and related variables and FDI originating in other developed countries would shed further light on the importance of political "reform" as an instrument of economic growth in developing countries.

## NOTES

1 In a subsequent section, we further discuss our notion of national political infrastructure and distinguish it from the related, but different concept of social capital.

2 Dunning (1993) offers an extensive review of empirical studies of the determinants of FDI. Globerman and Shapiro (1999) provide an updated literature review with particular emphasis on the influence of government policies.

3 Available studies also identify the specific impact of government "corruption" on FDI flows. See, for example, Wei (2000).

4 Dunning (1993) offers an extensive discussion of the different types of FDI and of the factors that seem most important in attracting each type.

5 For example, the national government of Australia is promoting the country's quality of life as a means to attract FDI (Witcher, 2000). The Australian government apparently sees lifestyle as an increasingly important consideration on the part of executives who run the types of businesses that Australia is trying to attract. In a similar vein, the Canadian government has stressed the importance of bolstering spending on social programs, especially health care, partly as an tool to enhance Canada's attractiveness as a location for business (Beauchesne, 2000).

6 Some respondents noted that individuals with above-average incomes in the United States have access to high-quality health care and live in areas that are as safe as most places in Canada. This survey finding contradicts earlier findings by the Canadian Policy Research Network suggesting that lifestyle assets, especially health care, education, the environment and social programs, are priorities for employees in Canada. See Beauchesne (2000).

7 For example, a political regime that does not respect property rights is likely to discourage investments, including those associated with the acquisition of human capital.

8 It is relevant to note that Kobrin deleted Canada from his sample of countries on the grounds that Canada had large residuals in his regression equations. Kobrin interpreted this result as evidence of Canada's "special" relationship with the United States owing to physical and cultural proximity.

9 Altomonte (2000) finds that subjective assessments of the local legal institutional framework made by MNE management perform better in econometric models of FDI location decisions than do "objective" measures of the institutional framework.

10 See, for example, Putnam (1995); Pennings, Lee and van Witteloostuijn (1998); Nahapiet and Ghoshal (1998); and Sparrowe, Liden, Wayne and Kraimer (2001).

11 The data are available at: http://www.worldbank.org/wbi/governance/datasets.htm#dataset. Further detail is provided in Kaufmann et al. (1999a, Appendix A) and in Table 1 of this study. The full set of variables employed in the study and their sources are presented in Table 2.

12 We did collect data on physical infrastructure, but this variable was typically highly correlated with GDP per capita. These measures are discussed below.

13 Kaufman et al. (1999b) suggest that their governance measures are important causal determinants of development outcomes, including GDP per capita and health status.

14 The indices are all reported in their original scales, and these scales are also used in the regression analysis. However, the results are robust to scale transformations, including logarithmic. The ESI is derived from 22 sub-indices, a number too large for individual analysis.

15 NPII was also measured as the sum of the six underlying indices. The correlation coefficient between this measure and the first principal component that we use is r = 0.99.

16 We also calculated the correlation between NPII and a broad measure of quality of life in various cities around the world provided by William Mercer (1999). The correlation coefficient is r = 0.88.

17 Dunning (1993) identifies an exhaustive list of such variables and also discusses empirical evidence regarding their importance. For additional summaries of available evidence, see Caves (1996) and Globerman and Shapiro (1999).

18 Some studies identify a near perfect positive correlation between FDI and GDP across host countries. See, for example, Morisset's (2000) study of African countries.

19 The various sources of agglomeration (or external) economies are discussed in Krugman (1991).

20 Altomonte (2000) references several studies that provide ambivalent findings on the relationship between labour costs and the geographical distribution of FDI.

21 The presumption is that a country will adjust its currency against the major currency (or currencies) in which its trade and investment flows are most heavily concentrated. As such, if currency volatility discourages FDI flows, countries operating within fixed exchange rate regimes should be characterized by more FDI than those operating within floating rate regimes, all other things being constant.

22 See, for example, Kumar (1996), Zhao and Zhu (2000), Cheng and Kwan (2000), Wheeler and Mody (1992), Mody and Srinivasan (1998), and Loree and Guisinger (1995).

23 Rather than pruning variables, another approach would be to use factor analysis to cluster variables, an approach taken by Kobrin (1976). A shortcoming of this approach is that it implicitly assumes that all variables in a factor grouping have identical impacts on the dependent variable. Moreover, it is often difficult to determine what the common basis of the factors is, and this makes it difficult to identify public policy options and trade-offs.

24 We also considered specifications that included a squared Ln GDP term. The relevant coefficient was never statistically significant in equations that involved Ln FDI or Ln FDO as the dependent variable. However, it was at times significant when Ln (FDI –FDO) was employed as the dependent variable. This point is discussed in a subsequent section.

25 This is more likely to be true for developed than for developing countries. In particular, marked short-run changes in the "political" environment surrounding FDI have been identified for certain African countries (Morisset, 2000).

26 Similar interactive terms were estimated for the other variables (ESI and HDI), but none were found to be statistically significant.

27 For a discussion of this concern, as well as empirical evidence for Asian MNEs, see Zhao and Zhu (2000), and Erramilli, Agarwal and Kim (1997).

28 There is a potential variable measurement problem, since the ESI index is measured for the year 2000. However, it seems unlikely to us that the values of this variable changed substantially between, say, the mid-1990s and 2000. Moreover, this finding is broadly consistent with those of Smarzynska and Wei (2001), and Wheeler (2001).

29 There is no notion implied here that FDI is necessarily good while FDO is bad for a country. Both flows contribute to increased specialization of international production, which should improve real incomes internationally.

30 This argument is developed in Rugman (1990).

31 The sample size is reduced, since a number of countries recorded FDI but not FDO. This reduction allowed us to use a single sample with ESI in all estimates. Ln (FDI-FDO) was calculated by separating countries with net inflows and outflows, and assigning a negative value to the latter.

32 The point at which Ln GDP encourages capital outflows occurs where Ln GDP = 5.6 for the total sample, and Ln GDP = 8.2 for the sample of developing and transition economies. The respective means (standard deviations) are 10.4 (2.7) and 9.6 (1.6). In both cases, it is only in the very smallest economies that improvements in governance do not result in capital outflows.

33 A referee has suggested that this result may be due to a non-linear relationship between net flows and Ln GDP. We therefore estimated equations that included a squared Ln GDP term, but omitted the interaction between Ln GDP and NPII. For the total sample, both the Ln GDP term and its square were statistically significant (positive and negative, respectively), with the negative effect dominating for the largest economies (Ln GDP>20). Thus, larger economies are more likely to experience net outflows. The NPII term in this equation was negative and statistically significant, suggesting that improvements in political governance tend to favour capital outflows. However, the explanatory power of this equation (adjusted $R^2 = 0.35$) was lower than the comparable equation reported in Table 5, column (4). The squared term was not statistically significant in the sample of developing and transition economies.

34 The results are complicated by the fact that some of the preferred specifications include an interactive term and some do not. In general, specifications for the total sample include interactive terms, while those for the sample of developing and transition economies do not.

35 The geographical proximity of Austria and the Netherlands to the much larger German economy creates a closer parallel to the Canadian case than is true for, say, Sweden.

36 Inward FDI can be negative, since the FDI variable measures net inflows. Hence, a negative value indicates net outward FDI.

37 We began with the sample of 144 countries used in the global model, of which 88 countries received positive U.S. FDI flows over the period 1995-97. The remaining countries either received no FDI, negative FDI, or were recorded as missing values. We classified all of these as having no FDI. This particular classification does not affect the results. For example, excluding missing values from the "no FDI" category does not alter our conclusions.

38 We estimated second-stage equations in which the dependent variable was specified as the proportion of total global FDI received by any country (PFDI), or the logistic transformation of PFDI. These measures were highly correlated with Ln FDI, suggesting some indifference as to the choice among them. The results are in fact similar, regardless of measure, and so we only present results based on the (natural) logarithmic specification.

39 However, the Environmental Sustainability Index (ESI) was available for only 115 of the 144 countries, and for only 77 of the 88 that received positive FDI flows.

40 Consistent with the argument made above, this variable is highly correlated with GDP per capita ($r = 0.94$).

41 Several studies document a negative association between measures of foreign exchange volatility and FDI flows. See, for example, Kogut and Chang (1996), and Barrell and Pain (1997).

42 The Mill's ratio is derived from the first-stage probit estimates using the specifications in columns (1), (3) and (5) of Table 1. The use of other specifications does not alter the results in any way.

43 We do not suggest that such a two-stage process is unique to U.S. firms. We are able to model U.S. FDI flows as a two-stage process because we are able to observe countries in which there is no U.S. investment. That was not possible for aggregate FDI flows, where all countries in the sample appear to have received some investment.

44 It has been suggested that outliers, particularly China, may cause this result. In fact, inspection of the residuals did not suggest that China was an outlier, and its deletion from the sample did not alter the results.

45 This result is consistent with an interpretation suggested by Altomonte (2000). Namely, that the "quality" of a host country's legal framework is positively related to expected future rates of economic growth. Hence, FDI will be attracted to countries with higher quality legal frameworks, because of the superior economic performance that those frameworks encourage. If the economic benefits of higher quality legal frameworks are subject to diminishing returns, the linkage between FDI and political governance might be non-linear.

46 Thomsen (2000) discusses these and related objections to international investment.

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