If You Build It, Will They Come?
Foreign Aid's Effects on Foreign Direct Investment

Steve Kapfer, Rich Nielsen, and Daniel Nielson

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Abstract

While much scholarly debate has focused on the general economic growth effects of foreign aid, little work has addressed the potential and more direct link between foreign aid and foreign direct investment (FDI), which many believe fosters growth. This is no minor deficiency; FDI has increased exponentially over the last thirty years, much of it flowing into developing countries. We test the theory that infrastructure foreign aid, such as projects for communications, transportation, and energy production, will lead to increases in FDI by providing more favorable investment conditions for multinational corporations. We test this on an unbalanced panel of 52 countries from the 1982-1995 and find that, while aid generally has no statistically significant effect on inflows of FDI, aid for infrastructure has a significant and substantive effect.

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Foreign direct investment (FDI) has become one of the largest sources of capital for developing countries in recent years. Many observers see the revenues from FDI as the key to bootstrapping underdeveloped states out of negative economic cycles and stagnant growth rates. Consequently, developed countries have often urged developing countries to adopt FDI-friendly policies in hopes that the increase in capital flows will lead to more robust economic growth. Through positive externalities and spillover effects, growth should increase real income for poor citizens and promote general economic development.

The question raised: How can a state attract foreign direct investment? The relevant literature suggests that states can attract FDI by improving population health and education, providing access to natural resources, offering attractive markets, and giving incentives to foreign corporations.[1] We argue for consideration of another possible mechanism. Scholars have long recognized that countries with sufficient infrastructure to support corporate operations attract foreign investment.[2] We argue that development aid is an important force for increasing infrastructure in developing countries. Indeed, as one of their major functions since their inception, development banks have poured concrete.

On the other hand, only mixed and inconclusive evidence exists that foreign aid has a direct effect on economic growth. It may be causally linked, but there is too much noise in the data to reach definite conclusions.[3] Likewise, we do not argue that foreign aid generally has any more effect on inflows of FDI than it does on economic growth. However, we show that aid allocated to specific sectors of infrastructure within a country can positively affect the ability of that country to attract FDI, even when we control for traditional determinants of foreign investment.

In the separate literatures assessing the effects of aid and FDI on development, scholars give little consideration to linkages between the two.[4] This is surprising, because many of the goals which aid seeks to achieve are linked directly to determinants of FDI. We argue that although aid may be a dubious predictor of economic growth, it still is largely effective at accomplishing its most basic goals: the creation of infrastructure, the provision of public goods, and the support of industrial and agricultural sectors. Explanations of why aid often fails to translate into robust economic growth are the domain of more expansive papers. Here we argue that infrastructure aid *is* relatively effective at building infrastructure and that infrastructure will attract foreign investors.

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[1] Dunning, 1993.

[2] Root and Ahmed, 1979; Blaise, 2005.

[3] See Boone 1996.

[4] An exception is Kosack and Tobin 2006, who consider the separate effects of aid and FDI on development but do not suggest that one can cause the other.

We posit that aid allocated to build infrastructure is especially likely to be used for its intended purposes on two grounds. First, infrastructure can benefit elites as well as ordinary citizens, and it is unlikely to be negatively viewed by the population at large, mitigating several incentives a government faces to misuse aid. This contrasts with other types of aid such as structural adjustment, where some argue that it is simply too costly politically for governments to actually carry out the stipulated reforms.[5] Second, infrastructure is highly observable; a donor country that lends money to build a bridge can easily observe whether or not a bridge is built. It is potentially more difficult to observe the effects of projects to improve education, health, or economic policymaking.

How can infrastructure aid attract FDI? The short answer: better networks for communication, transportation, and energy transfer within a country benefit commerce generally. Infrastructure thus makes the country a better investment risk for multinational corporations, which may be seeking a local market foothold or to make use of cheaper labor markets or better access to inputs for export in global production chains. We see this as a straightforward, even self-evident claim. But we also note that the existing literature has failed to evaluate this conceptual link empirically. This manuscript fills the empirical gap.

We begin by reviewing the major arguments concerning the determinants and effects of FDI and foreign aid. In section two, we outline specific causal mechanisms which connect aid to FDI. Section three describes our variables and statistical model. In section four, we test this model empirically and provide an analysis of our results. Finally, we consider the implications of our research and offer avenues for further work.

Section 1: Review of Prior Arguments

Determinants of Foreign Direct Investment

Foreign direct investment occurs when a long-term controlling investment of at least 10 percent is made in a foreign country by a foreign investor or enterprise, such as a multinational corporation (MNC), reflecting the investor's interest and desire to control assets in the foreign economy.[6] FDI is different from outsourcing through licensing or trade agreements because the assets of the MNC move across political borders without changing ownership. This provides several benefits to MNCs that outweigh the significant costs of locating operations overseas. We focus especially on Dunning's third factor driving FDI, namely, that MNCs seek to exploit benefits specific to a foreign locale.[7]

Firms are attracted to a foreign country because of specific benefits available in that location. We consider foreign investors as unitary rational actors that seek to maximize profits by cutting costs and increasing revenues. Location-specific factors are key in this decision-making process. The availability of natural resources can draw in investors, especially if the resources can be obtained cheaply and in high quantity. Examples of this include diamonds in West Africa and oil in the Middle East, natural resources that have drawn massive amounts of foreign investment.

Moreover, large or growing markets are likely to attract firms that seek to sell their products abroad. Often an MNC finds it beneficial to have a plant located in foreign markets to speed

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[5] Loud and Nielson, 2006.
[6] UNCTAD, 1999.
[7] Dunning, 1988 and 1993, 81.

delivery and decrease transportation costs. Alternatively, if markets are perceived to have high potential for growth, investors will compete for market share by locating their operations directly in the country. Further, favorable labor markets in the form of relatively low wages and an educated workforce can be very attractive to foreign corporations. Additionally, foreign investors may wish to capitalize on favorable economic conditions in a foreign country. Often, by locating operations in multiple countries, MNCs can shift operations from areas of high cost to low cost as global economic conditions change.

The factors we briefly discuss here represent only a few of the location-specific considerations to which FDI might respond. Generally, these types of benefits are difficult for countries to change or improve. For example, fate rather than strategy seems to have dictated that China would have high levels of FDI because of its massive population and market potential.

However, foreign investors can also be attracted or deterred by government policies, perceptions of corruption, trade barriers, and, importantly for our interests here, physical infrastructure. Thus, many FDI-seeking governments offer incentives in the form of tax breaks and special policies that improve their appeal in the eyes of investors. Others attract more investment by building infrastructure and educating their populations. Some, such as Costa Rica, have even gone directly to foreign firms and lobbied to have foreign capital placed in their country.[8] MNCs understandably do not want to invest where they expect that they will not make a profit or will have their earnings appropriated by the government. Thus, the decision to invest indicates that the available location-specific benefits outweigh the risks in the perception of foreign investors.

The importance of infrastructure in attracting FDI deserves special notice in the context of this paper. Dunning includes several infrastructure-related variables in his discussion of location-specific causes of FDI. Specifically, transport and communication should be important predictors of investment. This argument is almost ubiquitous; Root and Ahmed suggest it in their early work on the predictors of manufacturing FDI, Alson et al. show that infrastructure is an important independent variable in their work on the effects of health on FDI, and others indicate that it has been an important variable in specific cases.[9] Blaise argues that "a well developed transportation infrastructure reduces the costs of importing inputs and exporting or distributing output as well as a good communication infrastructure facilitates and reduces the cost of communication of affiliates."[10] This suggests a broad consensus in the literature that FDI is attracted to states with more infrastructure, controlling for other factors.

Effects of Development Aid

Development aid encompasses financial assistance given either by countries or international organizations for the ostensible purpose of promoting development.[11] This assistance is given to alleviate poverty, build infrastructure, increase access to public goods, and address health crises and humanitarian disasters. We need not discuss the determinants of foreign aid at great length; the most important finding in the recent literature is that the vast majority of aid is given strategically based on alliances, colonial heritage, and a history of mutual cooperation, often

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[8] Moran, 2005.

[9] Root and Ahmed, 1979; Alson, Bloom, and Canning, 2006; Cheng and Kwan, 2000.

[10] Blaise, 2005.

[11] Some argue that aid is allocated for non-development purposes and therefore should not be expected to lead to increases in development. For an example, see Burmeo, 2006.

taking precedence over "objective" need.[12] But the causes of aid concern us less than its effects, which is our focus in this manuscript.

Specifying the results of foreign aid has proved difficult. Some, such as Burnside and Dollar, argue that aid can lead to robust growth given the right policy conditions.[13] Using a sample of 56 countries between 1970 and 1993, they suggest that aid is effective if states have good governance. Burnside and Dollar establish a correlation between aid and growth in the presence of good policy, but this research is directly contradicted by the work of Easterly who expands the dataset used by Burnside and Dollar and then reapplies their exact techniques, this time showing that aid has no definite effect on economic growth, regardless of domestic policies.[14]

This pessimistic view is echoed by the work of several other prominent economists. Lant Pritchett of the World Bank finds that development aid is not consistently correlated with economic growth. Of the recipient countries he samples, approximately one half had GDP growth rates of less than one percent, and sixteen of these displayed negative growth for the years tested.[15] One possible explanation for this paradox is that aid is generally spent on goods and services that the recipient government would have financed itself, whether or not it received aid.[16] Thus, aid frees up other government revenue, which may be spent wastefully. Finally, aid is sometimes consumed by the recipient government instead of being invested for the original purpose of the project.[17] Limited donor oversight enables this, as donor countries are hesitant to withdraw support from allies or trade partners, even if recipients use the aid in ways contrary to project contracts. Thus, aid can become the focal point of intense corruption as politicians and bureaucrats attempt to control where and how the aid is spent, sometimes even pocketing it directly. In addition to negative economic effects, aid potentially frees governments from the restraints incurred by the necessity of collecting tax revenues. This in turn can make central government less transparent and less responsive to popular sentiment, decreasing levels of political freedom.[18] Because of these factors, the countries most in need of development are the ones least prepared to convert development aid into growth.

More recently, Kosack and Tobin argue that economic indicators are not accurate measures of development; if more holistic measures of growth are used, aid again has a positive correlation with development.[19] Their primary finding is that because aid is fungible, it encourages human development only if governments have spending priorities which are aligned with these goals.[20] They argue that aid will be most effective when given to more democratic countries where the demand for public goods and services can influence the decisions of public officials.

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[12] Alesina and Dollar 2000. This article provides an involved discussion of the determinants of development aid.

[13] Burnside and Dollar, 2000.

[14] Easterly, 2003.

[15] Pritchett, 1997. Many scholars dispute the findings of Burnside and Dollar (2000).

[16] Tierney, 2003.

[17] Boone, 1996. Boone argues that aid generally is used for government consumption, rather than investment.

[18] Alesina and Weder, 2002; Knack, 2001.

[19] Kosack and Tobin, 2006.

[20] Fungibility refers to how a good can be spent. Money is almost completely fungible because it can be spent in almost any way. A hydro-electric dam is less fungible; it can only be spent in a certain way.

Section 2: Observable Implications

The Effects of Foreign Aid on FDI

To date, we are aware of only one study that examines the effects of foreign aid on FDI. Blaise looks at the consequences of Japanese overseas development aid (ODA) for Japanese FDI in China and finds that there is a positive relationship.[21] Blaise suggests that infrastructure may be part of the connection between Japanese ODA and FDI in China, but he does not elaborate. This study expands on these ideas by offering a theoretical framework for an aid-FDI relationship. There are several possibilities for how such a link might operate.

As discussed above, FDI is attracted to growing markets, making it possible that aid may lead to economic growth, which then increases the market size in a particular country. If this is the case, then we would expect to see countries that received more aid attracting more FDI. However, it is not evident in the literature that aid has any effect on economic growth. Such an effect is most likely diffused by other factors and, thus, we believe it unlikely that aid generally will lead to measurable increases in FDI. Although many aid projects' long-term purpose may be to create a catalyst for economic growth, we argue that this view relies on loose, rather indirect connections between aid and growth while neglecting the immediate results of aid. While we are skeptical of the general aid-FDI link, we test this alternative hypothesis in the empirical analysis below.

We begin our argument with observing the direct goals of development aid. Much of development aid (both grants and loans) is given to build infrastructure in developing countries, including projects to build roads, railways, airports, power plants, hydro-electric dams, electricity distribution grids, telephone networks and other physical facilities required by a developing country. We argue that it is reasonable to believe that a loan will result in the completion of the project if the outcomes of the project are highly observable. Infrastructure projects are among the most observable of all development lending; it is easy to observe whether a loan to build a road actually resulted in a new road. Infrastructure lending is also relatively non-fungible because donor countries cannot readily use roads or electric plants for purposes other than their intended function. Thus, we argue that if lending is given to build infrastructure, it is likely to increase the infrastructure of a country in some way, and this increase will make investment in the country more attractive, *ceteris paribus*.

Hypotheses

From the arguments above we derive the following hypotheses:

Hypothesis 1: Total foreign aid received by a country (including all grants and loans) should have no significant effect on inflows of FDI to the recipient.

Hypothesis 2: Foreign aid for infrastructure should have a measurable, positive effect on inflows of FDI.

[21] Blaise, 2005.

Section 3: Research Design and Model

We test our hypotheses on a panel level dataset of 51 developing countries from the years 1982 to 1995.[22] Our unit of analysis is a country-year *it*, where *i* is the observed country and *t* represents the time period. All countries which had sufficient data were included in our analysis. However, we found that countries which were missing data were generally the poorest and most unstable countries, leading to the possibility that there is selection bias in our sample because these countries are more likely than others to have low levels of infrastructure. Unfortunately, this potential bias is unavoidable with available data, so we proceed with caution. We use a pooled time-series cross-sectional (TSCS) method, which is appropriate for observing variation both within and between countries across time. This is the method championed by Beck and Katz (1995), but we apply it cautiously.[23] Wilson and Butler point out that in the ten years following the declaration of "What to do (and what not to do) with time-series cross-section data," many researchers have published prominent findings using this method which are not robust under even moderately rigorous testing of alternative specifications.[24] Following their suggestions, we include a fixed effects model in our checks for robustness. We first discuss the variables we use and then explain our methods and results.

Data

Dependent Variable.[25]

FDI: As our dependent variable, we use net inflows of FDI (measured in billions of US dollars) without standardizing it by GDP, population, or some other country specific variable. We label this variable 'FDI'. This resembles the dependent variable used by Li and Resnick, as well as others.[26] Theoretically, this variable is the best measure available of what we are trying to quantify—the propensity of foreign nationals to invest in a given country. This variable is different from net FDI, which consist of gross inflows of FDI, less domestic investment abroad. Net inflows of FDI are instead a measure of whether *foreign* capital is moving into or out of a country irrespective of domestic investment outside of the country. Our theory makes no mention of the domestic factors that encourage investment abroad, so there is no reason to include it in our dependent variable. Our data are from the World Development Indicators.[27]

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[22] A list of countries is included in the appendix.

[23] Beck and Katz, 1995.

[24] Wilson and Butler, forthcoming.

[25] Throughout the discussion single quotes indicate a specific variable in our model (e.g. 'GDP').

[26] Li and Resnick, 2003. They note that this type of variable is also used by Chan and Mason 1992; and Oneal 1994 to measure FDI flows.

[27] World Bank, 2005.

Key Independent Variables.

Total Aid[28]: Our theory suggests that levels of total aid should be uncorrelated with FDI, but that aid allocated for infrastructure should be positively correlated. As a measure of total aid we use the sum of all aid – both grants and loans – received by country *i* in time *t* (in billions of US dollars) from bilateral agencies and multilateral organizations as measured by the Project Level Aid Database (PLAID), which is currently being developed through a joint effort involving Brigham Young University and the College of William and Mary.[29] This database represents the most complete data available on bilateral and multilateral development assistance. To completely test the effects of total aid on FDI, we include the previous six years of total aid as lagged independent variables, because the effects of aid may diffuse over several years. These lags will be denoted as "$Aid_{(t-1)}$," "$Aid_{(t-2)}$," etc.

Infrastructure Aid, **Communication Aid**, **Energy Aid**, **and Transportation Aid**: Our theory suggests that aid aimed at promoting the development of infrastructure in areas of communication, energy capability, and transportation will lead to increased levels of FDI. In order to parse out infrastructure aid, we use sort projects from the PLAID database based on aid type, using the OECD Creditor Reporting System coding scheme. From this dataset, we draw four variables: Infrastructure Aid, Communication Aid, Energy Aid, and Transportation Aid. Each of these represent projects with OECD codes that correspond to the type of aid the variable represents. Communication aid consists primarily of aid to build telephone systems and support for radio and television services. Energy aid is generally allocated either to build a power production plant or increase the ability to distribute electrical power. Transportation aid generally builds roads, although aid for railroad, air, and sea travel are included as well. Infrastructure Aid indicates projects that fit in one of these three categories. A full list of OECD codes used, with a description of the aid types, is included in the appendix. As with the more general aid variable described above, these variables also represent the sum of the US dollar amount of all aid received by state *i* in time *t* (in billions of US dollars). As with Aid, we lag each of these variables six years and include all six lags in the specifications to measure the cumulative effects over time. We expect that values of these sector specific-aid variables will have a positive long-run effect on FDI. Conversely, we expect that Aid will be statistically insignificant.

Control Variables

We also employ a series of controls, which the relevant literature argues are robust predictors of FDI. We rely on variables suggested by Jensen,[30] Li and Resnick,[31] and others.

GDP and **Population:** In order to predict flows of FDI, it is important to account for market size and development level of a country. We use GDP to account for market size; this

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[28] Total aid includes the following sectors: Education, Health, Population Policies and Reproductive Health, Water Supply and Sanitation, Government and Civil Society, Other Social Infrastructure and Services, Transportation and Storage, Communications, Energy Generation and Supply, Banking and Financial Services, Business and Other Services, Agriculture, Forestry, Fishing, Industry, Mineral Resources and Mining, Construction, Trade Policy and Regulations, Tourism, Multisector and Cross-cutting Projects (including Environmental Projects, Women in Development, and Other Multisector Projects), Commodity and General Programme Assistance, Action Relating to Debt, Emergency Assistance, Administrative Costs of Donors, and Support to NGOs.

[29] PLAID database, Brigham Young University and College of William and Mary. National Science Foundation grant SES-0454384.

[30] Jensen, 2003.

[31] Li and Resnick, 2003.

measure is adjusted for purchasing power parity (to allow cross-country comparison) and logged (to eliminate skewness in the data). Population may also have an important effect independent of GDP, so we include it as well. This variable is also logged to adjust for skewness. Data are from the World Bank.[32]

GDP Per Capita and **GDP Growth:** FDI may also be attracted or deterred by the level of economic development within a country; foreign investment may respond differently at different stages of modernization. To proxy economic development level, we use GDP Per Capita. This is not a perfect measure of development, other studies include it as a standard regressor and we expect that values for this variable will be significant and positive. According to the literature, FDI is also attracted to economic growth. Investors want not only to invest in locations with a large available market, but in countries where the market is growing rapidly. To operationalize economic growth, we use the variable GDP Growth, which measures the percentage change in real GDP per annum. We expect that estimators of this variable will be positive. Data are from the World Bank.[33]

Capital Openness: Inhibitors to capital movement should have negative effects on FDI flows. Much FDI is attracted to areas where capital can be imported and exported at relatively low cost. Capital controls are especially detrimental to MNC operation because they prevent the repatriation of capital to the home country. To measure this, we use the variable Capital Openness, which measures eight types of capital controls, coded from the International Monetary Fund's "Annual Reports on Exchange Arrangements and Exchange Controls."[34] Lower levels of this variable indicate a more open economy.

Exchange Rate: Research also suggests that the volatility of the official exchange rate of a country can have a strong impact in the propensity of FDI to enter.[35] Large fluctuations in the local exchange rate can lead to increased costs and greater risk to an international firm. We use the variable 'Exchange Rate' to capture this effect. This variable is the averaged absolute deviation from the mean of the official exchange rate of each country over the period of the sample. The literature suggests that this variable will be negatively correlated with FDI inflows. Data are from the World Bank.[36]

Natural Resources: Natural resources also have an important theoretical connection to FDI, especially within our sample, which covers developing countries. Export-driven FDI is dependent on the location of natural resources and, in many cases, this consideration appears to outweigh factors such as risk and trade barriers, forcing MNCs to attempt to mange risk rather than forego the opportunity to extract available resources. Sometimes, foreign investors actually promote risk; FDI has been shown to encourage civil war by buying futures of natural resources from one side or the other.[37] We attempt to capture this variance using Natural Resources, which is a measure of primary exports by country *i* in 1980. This measure does not capture variation in primary resource exports over time and values are missing from some countries, so we use this variable cautiously, and only in some specifications. However, we expect that it will adequately proxy the role of natural resources in attracting FDI. We expect that Natural

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[32] World Bank, 2005.
[33] World Bank, 2005.
[34] We am grateful to Quan Li who provided me with this data.
[35] Li and Resnick, 2003.
[36] World Bank, 2005.
[37] Ross, 2004.

Resources will be a positive predictor of FDI. Data are from the Geography and Development dataset by Sachs and Warner.[38]

World FDI: Another important consideration is the total amount of FDI available in a given year. States are in a competition to gain FDI, but the total amount of FDI may vary based on global economic conditions, political factors, and technology. To illustrate this point, one needs only to observe the recent trend in FDI flows, which have increased dramatically from 1990 to 2003. Thus, across our sample, FDI is correlated with time if we do not account for the total FDI flows in each year. We use World FDI, which represents total FDI inflows per year for all countries tracked by the World Bank. We expect this variable to be positive and significant. Data are from the World Bank.[39]

Democracy: In addition to economic factors, we also consider three political factors, which have been argued to be influential on FDI in a variety of studies. First, we include Democracy to measure the effect of host country political freedom on FDI. In keeping with the literature, we use democracy data from the Polity IV project.[40] We are unsure what the overall effect of this variable will be. Jensen argues that democratization helps states attract FDI and Li and Resnick argue that democracy has both negative and positive effects on foreign investment.[41] Because democracy can both attract and deter FDI, we suspect that this variable may change direction in different specifications, yet we include it out of convention.

Corruption: We also consider the effects of corruption and government stability on FDI, although neither has proven to be as robust as other measures. We measure Corruption as a continuous variable ranging from zero to six, with low values representing high levels of corruption, and high values indicating that the central government is relatively free of corruption. The values are coded based on the following criteria: likelihood of bribes and rent seeking, "excessive patronage," nepotism, favor-seeking, and "suspiciously close ties between politics and business."[42] It is unclear from the literature what the expected correlation between corruption and FDI should be. Alsan et al. find mixed results in their model, and they note that throughout the literature, corruption appears to have a complex relationship with FDI.[43] Theoretical arguments can be made in both directions, and it is possible that corruption has different effects on different types of FDI. Our corruption data are from the ICRG, which starts in 1984.[44] Because this limits our data, we only include corruption in some specifications.

Regime Durability and **Instability**: we also include the longevity of a given regime using a measure developed by Marshall and Jaggers in the Polity IV project, which measures the number of years since the last change in regime type as indicated by a three point change in the polity score over a period of three years.[45] This variable is called Regime Durability. Theoretically, investors should be attracted to more stable and long lasting regimes because they lower the risk associated with investing in a given country. As such, we expect the coefficients of both of these variables to be positive. Data are from the Polity IV project.[46] In a similar vein, general stability may attract FDI because MNCs are generally risk-averse. We control for this using a composite

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[38] Sachs and Warner, 1997.
[39] World Bank, 2005.
[40] Marshal and Jaggers, 2000.
[41] Jensen, 2003; Li and Resnick, 2003.
[42] ICRG, 2005.
[43] Alsan, Bloom and Canning, 2006.
[44] ICRG, 2005.
[45] Marshal and Jaggers, 2000.
[46] Polity IV (Marshal and Jaggers, 2000).

measure of riots, strikes, assassinations, government crises, guerilla wars, purges, revolts, and anti-government demonstrations as created by Li and Resnick using Banks' event counts.[47]

Finally, there are several variables that some argue are theoretically important which we do not include in our specification because we doubt that these variables are critical to our work. We do not use a measure of the price of labor, which although possibly important, was impossible for us to obtain given the realities of data collection. As such, we rely on the finding of Li and Resnick that this variable was never significant, regardless of the specification.[48] Another such variable is the budget deficit of the host country, which Jensen notes has been theorized to attract FDI. He also finds that this variable is insignificant regardless of methodology.[49] Because both of these variables appear to be unimportant in prior analysts' work, we exclude them here.

Methodology

We are testing the hypothesis that general levels of aid should not have an empirical connection to FDI, while aid that specifically targets infrastructure and human development should exhibit a positive and significant correlation. Thus we specify the following linear model:

$$1)\ \mathbf{FDI}_{ti} = \alpha + \beta \mathbf{Aid}_{it-k} + \theta \mathbf{Infrastructure\ Aid}_{it-k} + \delta(X_{it}) + \varepsilon_{it} \qquad ;\ \varepsilon_{it} = \rho u_{t-1} + e_t$$

where X is a vector of the determinants of FDI, Aid_{it-k} represents a vector of lagged Aid variables, lagged one through six years, and Infrastructure $\text{Aid}_{it-\boldsymbol{k}}$ is a corresponding vector of lagged values for infrastructure aid. The statement $\varepsilon_{it} = \rho u_{t-1} + e_t$ represents a correction for autocorrelation within the error term.[50] All independent variables are lagged one time period to avoid temporal dependence (exceptions are World FDI and Exchange Rate).

Beck and Katz suggest that an uncorrected pooled OLS can lead to overly confident standard errors. They suggest a method of panel corrected standard errors (PCSE) that is appropriate for time series data similar to ours. In our primary specifications we use PCSEs and an autocorrelation correction as specified in Beck and Katz (1995). Beck and Katz (2001) are highly critical of the use of fixed effects in longitudinal datasets; they argue that it creates potentially biased estimators because variance that should be accounted for by the independent variables is instead partially controlled for by the country effects.[51] However, Wilson and Butler argue that many studies using PCSEs are not robust to simple alternative specifications such as fixed effects. We therefore test a fixed effects model in our robustness checks.

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[47] Li and Resnick, 2006. Much thanks to Quan Li who provided me with this data.
[48] Li and Resnick, 2006.
[49] Jensen, 2003.
[50] Wilson and Butler, 2006.
[51] Beck and Katz, 2001.

Section 4: Estimation, Analysis, and Robustness

Base Models

We begin by estimating several base models, which contain the relevant controls but have no foreign aid component. The results of these estimations are reported in table 1 below. We find that many of the variables explored in the literature are important. Democracy is negative and significant, suggesting that, overall, the as democracy increases, FDI decreases. However, we do not control for the positive and negative impacts of democracy on FDI that Li and Resnick find to be important, making our findings somewhat inconsequential. We find Regime Durability to be significant and positive while Instability is never significant. This suggests that FDI is risk averse but that the primary concern is for regime durability. GDP has a positive and significant coefficient until we control for Population (this phenomenon is discussed below), suggesting that market size is in fact an important factor in attracting FDI. However, we do not find that GDP Per Capita is significant until we control for population, and we never find that GDP Growth is a significant determinant of FDI. Exchange Rate, Openness, and World FDI are all significant with the expected signs. The overall R-squared value of .15 is not generally impressive, indicating that there are significant explanatory variables that have not yet been identified. However, we should also note that similar studies have also suffered from relatively low proportions of explained variance.

Table 1: Base Model

Independent Variable: **FDI** Dependent Variables	**Model 1**	**Model 2**	**Model 3**
Democracy	-0.0367**	-0.0320**	-0.0572***
	(0.015)	(0.013)	(0.020)
Regime Durability	0.0150***	0.0151***	0.0171***
	(0.0057)	(0.0055)	(0.0064)
Instability	-0.00762	-0.00819	-0.0170
	(0.012)	(0.013)	(0.021)
GDP	0.922***	-17.83**	-17.02*
	(0.28)	(8.63)	(8.90)
GDP Per Capita	0.162	18.81**	18.22**
	(0.24)	(8.63)	(8.93)
GDP Growth	0.0124	0.0120	0.0174
	(0.0094)	(0.0093)	(0.013)
Exchange Rate	-0.000118***	-0.000110***	-0.000130***
	(0.000043)	(0.000039)	(0.000048)
Openness	-0.0916**	-0.0782**	-0.0606
	(0.042)	(0.038)	(0.056)
World FDI	0.00349***	0.00376***	0.00395***
	(0.0011)	(0.0011)	(0.0014)
Population		18.77**	18.11**
		(8.72)	(8.98)
Corruption			0.226
			(0.18)
Natural Resources			-0.391
			(0.48)
Constant	-23.28***	-22.70***	-27.59***
	(5.52)	(5.39)	(6.75)
Observations	663	663	500
Number of countries	53	53	43
R-squared	0.15	0.16	0.20

Standard errors in parentheses. All standard errors are panel corrected. (*) is significant at the 10% level, (**) is significant at the 5% level, and (***) at the 1% level.

The second model adds Population, which acts as a further control for population size. When Population is included, the effects of GDP change dramatically and reverse signs. We argue that this effect is due to high multicollinearity between GDP and Population. Indeed, they have a correlation of 0.87. Because of this, we follow Li and Resnick and include only GDP in the majority of our models. However, we tested it in each specification and never found a qualitative difference in the results for the other regressors. We include population in our table reporting our primary findings to show that omitted variable bias does not affect our results. The third model includes Corruption and Natural Resources, neither of which is significant in the base model, although they are significant in some of the specifications including development aid. Because these data are missing for several countries, we do not include them for most specifications because it decreases the available sample from 51 to 42. However, we do include them in one reported specification and we tested them in all of our models. They never displayed a significant impact on the coefficients of the key independent variables.

The Effects of Aid

Next, we add the variables Aid and Infrastructure Aid to the base model. We include six lagged years of each to account for any long-term effects that either might have on FDI. The results are in Table 2. These regressions constitute the heart of our results; we find that Aid is not correlated with increased FDI in any of the lag times, but that Infrastructure Aid is positively related and significant statistically for many of the lag periods. In these specifications, one dollar of Infrastructure Aid results in approximately 1.5 dollars of FDI for the first two years, and approximately a dollar for the two following years, after which it has no statistically significant impact. This suggests that a dollar of aid draws in about 5 dollars of FDI over the following four years; a significant amount. The R-squared for these models is .33 and .38, indicating that we are explaining a more respectable amount of the variation in FDI.

Table 2: Aid Models

Dependent Var: **FDI** Independent Variables	**Model 4** (Controls)	**Model 5** (Controls)	Independent Variables	**Model 4(cont.)** (Aid Variables)	**Model 5(cont.)** (Aid Variables)
Democracy	-0.0452***	-0.0620***	**Aid$_{(t-1)}$**	0.0464	0.0249
	(0.014)	(0.018)		(0.10)	(0.13)
Regime Durability	0.00338	-0.00257	**Aid$_{(t-2)}$**	-0.0316	-0.0134
	(0.0077)	(0.0075)		(0.096)	(0.12)
Instability	-0.0204	-0.0291	**Aid$_{(t-3)}$**	-0.0161	0.00108
	(0.014)	(0.019)		(0.11)	(0.13)
GDP	-0.0235	-14.40*	**Aid$_{(t-4)}$**	-0.0336	-0.0901
	(0.35)	(8.75)		(0.12)	(0.14)
GDP Per Capita	1.098**	15.36*	**Aid$_{(t-5)}$**	-0.0329	-0.0457
	(0.46)	(8.82)		(0.14)	(0.15)
GDP Growth	0.0121	0.0127	**Aid$_{(t-6)}$**	-0.291	-0.326
	(0.012)	(0.013)		(0.19)	(0.22)
Exchange Rate	-0.0000854*	-0.000101*	**Infrastructure Aid$_{(t-1)}$**	1.289***	1.534***
	(0.000044)	(0.000054)		(0.39)	(0.45)
Openness	-0.00916	0.0167	**Infrastructure Aid$_{(t-2)}$**	1.431***	1.620***
	(0.051)	(0.065)		(0.39)	(0.44)
World FDI	0.00394***	0.00403***	**Infrastructure Aid$_{(t-3)}$**	0.892**	0.944**
	(0.0011)	(0.0013)		(0.42)	(0.47)
Population		14.28	**Infrastructure Aid$_{(t-4)}$**	0.829*	0.952*
		(8.89)		(0.47)	(0.54)
Corruption		0.347**	**Infrastructure Aid$_{(t-5)}$**	0.752	0.896
		(0.17)		(0.49)	(0.55)
Natural Resources		-2.295***	**Infrastructure Aid$_{(t-6)}$**	0.443	0.463
		(0.69)		(0.38)	(0.44)
Constant	-9.033*	-7.159			
	(5.37)	(7.06)			
Observations	607	482			
Number of countries	51	42			
R-squared	0.33	0.38			

Standard errors in parentheses. All standard errors are panel corrected. (*) is significant at the 10% level, (**) is significant at the 5% level, and (***) at the 1% level.

It is interesting to note that the coefficients of the control variables change when we include aid. The negative effect of Democracy remains roughly the same and even increases slightly. However, Regime Durability changes significantly; when we include aid it loses all statistical significance and even changes sign in the second specification. GDP and Openness also lose

statistical significance, and Exchange Rate is significant only at the 10 percent level. Not only do previously significant variables lose explanatory power, but GDP Per Capita becomes significant at the 5 percent level with a large coefficient; one dollar of GDP per capita increases FDI by approximately a dollar. Clearly, aid has powerful effects on FDI that somehow mitigate the statistical impact of more traditional variables and increase the significance of others.

We include two specifications using Infrastructure Aid, one with Population, Corruption, and Natural Resources, and one without to show that there is little substantive or statistical difference between them. Interestingly, when we include aid in the model, Corruption and Natural Resources are significant; the former has a positive coefficient indicating that higher levels of corruption actually increase FDI, while the latter is negative, suggesting that natural resources do not attract FDI. Neither of these results is intuitive or expected.

The Effects of Sector Specific Aid

We further explore these results by disaggregating the types of infrastructure aid to see how transportation aid, communication aid, and energy aid behave independent of each other.[52] The results of this regression are reported in table 3 in the appendix. Again when we do this, we lose significance in the control variables. Now, only GDP Per Capita and World FDI are statistically significant. However, the coefficients of the various types of aid become rather interesting. Again, Aid is not significantly related to FDI, although it does gain weak statistical significance in the last lag term. However, communication aid and transportation aid are highly correlated with FDI. The coefficients for the lagged values of Communication Aid are high; the average for the significant lags is around 3 dollars of FDI for every dollar of aid. It is interesting that Communication Aid is not significant initially. Instead, it becomes weakly significant after two years and is highly significant both statistically and substantively for years three, four, and five. This suggests that communication aid is not effective immediately at attracting FDI. Possibly, it takes a longer amount of time for communication aid to result in improved infrastructure. However, of the three broad categories of infrastructure we consider, communications has the greatest statistical effect on FDI, meaning that it is perhaps the most important. Each dollar of aid will eventually lead to approximately 10 dollars of FDI.

The effects of Transportation Aid are also positive and statistically significant, although they are less dramatic substantively and do not display the interesting lag time we observe with communications aid. The coefficients on each of the significant lag terms range between 2.0 and 2.7, indicating that in each of the four years after transportation aid is given, it attracts two new dollars of FDI; approximately 8 dollars total. Transportation aid has a significant impact for the first four years after it is given and its effects do not fluctuate significantly over this time period. After four years, the effect appears to diminish both substantively and significantly. These results indicate that transportation aid also attracts a significant amount of FDI.

Energy Aid displays a rather different and surprising correlation with FDI. Its coefficients are rather small and generally negative. Energy Aid is statistically significant in the third and fourth years after it is given and here its effects are decidedly negative. The coefficients suggest that one dollar of energy aid deters approximately 70 cents of FDI, leading to a 1.4 dollar decrease in FDI overall. This effect is clearly not as large as that of the other types of FDI we examine, explaining why general infrastructure aid is still positive and statistically significant even with energy aid included. However, we have no obvious intuition for this result. Perhaps

[52] Keep in mind that **Infrastructure Aid** is simply the sum of **Communication Aid**, **Transportation Aid**, and **Energy Aid**.

energy aid has fewer observable results and is more easily diverted to other things. Another possibility is that energy is not important to foreign direct investors. Neither of these presents a fully satisfying explanation for this result. We can only conclude that our hypothesized mechanism does not hold true when we consider energy aid.

Robustness

In order to check the sensitivity of our findings to alternative specifications, we test several different measures of development aid, and we also test a model using fixed effects. The results of these robustness checks are admittedly mixed, but much of the evidence supports our original findings. However, a few offer evidence against our hypotheses.

We re-specify Infrastructure Aid in four different ways to test the robustness of our results to common alternative specifications: 1) the number of infrastructure loans received by state *i* (rather than their amount), 2) the number of infrastructure loans received by state *i* divided by the population, 3) the dollar amount of infrastructure loans received by state *i* per capita, and 4) the dollar amount of infrastructure loans received by state *i* divided by GNI. The results of these tests can be found in table 4.

Our major findings are robust to measuring loan counts rather than loan amounts; an additional infrastructure loan results in $42 million more in FDI for the year immediately following and an additional $46 million the second year. The coefficients continue to be positive and large for years three and four, but they are only significant at the 10% level. We obtain similar results when we measure aid as loans per capita. Although this measurement is less intuitive, we get strong results indicating that infrastructure loans are positively and significantly correlated with FDI. Interestingly, when we measure loans per capita, many of the control variables regain their significance.

A similar effect occurs with the controls when we measure the dollar amount of infrastructure aid per capita. However, in this specification we obtain results that contradict our hypotheses; we find that Infrastructure Aid per capita has no effect on FDI while Aid per capita has a minute but statistically significant effect, suggesting that 1000 dollars of total aid will lead to about $10 dollars of FDI in the first year and decreasing amounts for subsequent years. This finding shows that our results are not robust when we specify aid as dollar amount per capita. Similarly, we find mixed results when we standardize aid by GNI. We find a significant effect in the fourth lagged year of infrastructure aid as well as a weaker effect in the fifth year. However, we also find that the first year of total aid has a significant positive effect.

These models suggest that what matters to FDI is the total amount of infrastructure in a country rather than the amount of infrastructure per person within a country or the amount of aid relative to the national income. Because of this distinction, we argue that our initial results are still highly important when interpreted properly. Aid per capita may matter because it could be having effects on individuals by improving health or education. These factors could then attract FDI. However, it is less useful to standardize infrastructure by population or GNI; we argue that what should matter is the overall level of infrastructure rather than infrastructure per capita. Thus, although these regressions introduce some caution into our results, we do not consider this a rejection of our hypotheses.

Fixed Effects

An alternative treatment of time-series analysis makes use of fixed effects. In particular, Wilson and Butler suggest that many of the results obtained using OLS with PCSEs are not

robust to fixed effects.[53] A fixed-effects model controls for unexplained variation by adding a dummy variable to the model for each country. This precludes cross-country comparison and measures only changes within panels. Wilson and Butler observe that although a cross-sectional regression may indicate a trend in a given direction, fixed effects can reveal a trend in the opposite direction, literally reversing the signs on key coefficients.[54] This is because, although the cross-sectional variation may have one correlation, the variation within a panel may be partially or completely independent of the cross-sectional variation, leading to misrepresentative results if only one or the other is used. Fixed effects are not necessarily the definitive approach to time-series analysis. Beck and Katz are rather critical of this approach.[55] Nevertheless we estimate this model to determine if our results are robust to fixed effects. The results of this model can be found in Table 6.[56]

The inclusion of fixed effects changes the model in interesting ways; some of these changes support our hypotheses and some do not. First, both Transportation Aid and Communication Aid are still significant when we include fixed effects. For transportation aid, the first and second lagged years are still significant and the coefficients indicate that for each of these years, one dollar of aid causes approximately 1.5 dollars of FDI per year, 3 dollars overall. Communication aid is most significant in the third and fifth years, with the second and fourth years being significant only at the 10 percent level. Aid for the communications sector still appears to have the largest substantive effect; one dollar of aid buys 10.5 dollars of FDI, if we include the marginally significant years. Similar to the regressions using OLS, Energy Aid does not have the same impact as other types of infrastructure aid. When we use fixed effects, the coefficients of the Energy Aid lags are switch signs and they are never statistically significant. These findings support the results we report using OLS with PCSEs.

However, when we include fixed effects, Aid is also positive and statistically significant for the majority of the lagged years. The coefficients are much smaller than for communications or transportation aid; roughly 20 cents per dollar of aid per year. However, this trend is persistent for five of the six lagged years and in most cases is highly statistically significant. This offers evidence to contradict our hypothesis that total aid should have no effect on a states ability to attract FDI. This model suggests that when we consider only the variation within a country, the sum of development aid can lead to increased FDI, meaning that if a country receives more aid, it can increase its level of FDI.

As noted before, fixed effects allow only for analysis of the variation within countries while OLS allows us to observe variation both within and between countries. Wilson and Butler note that several statistical studies display drastically different results when an OLS model is replaced with fixed effects. This is not the case with our study. The inclusion of fixed effects supports our hypothesis that aid allocated for infrastructure is positively correlated with FDI within individual panels; the results of our OLS regressions show that a similar correlation exists when we compare countries to each other. The significance of Aid in the presence of fixed effects partially falsifies our first hypothesis. However, it does not undermine the more important link between infrastructure aid and FDI.

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[53] Wilson and Butler, 2006.

[54] Wilson and Butler, 2006.

[55] Beck and Katz, 2001.

[56] We have not reported the coefficients or p values of the individual fixed effects. The majority of them were significant at the 1% level.

Section 6: Implications and Conclusion

The ability to sort and test loans by category and type represents a breakthrough in the study of development aid. Using the PLAID database, we show that although aid collectively has little observable impact on FDI, aid targeting specific sectors within a developing country leads to observable increases in FDI within that country. Furthermore, the amount of FDI attracted is significant; possibly more than five dollars of FDI for a dollar of overall infrastructure aid. The apparent caveat is that this return is not immediate. Instead, aid attracts FDI over several years, which the results suggest may be the time necessary for a country to convert aid into infrastructure and for investors to react to improved infrastructure conditions.

How do these findings fit into the larger picture of the roles of FDI and aid in development? First, although aid and FDI are not linked in general, there are linkages between specific types of FDI. Our findings suggest that if a country receives loans for communications and transportation, its levels of FDI will rise accordingly. This is encouraging for those who argue that FDI is the key to economic development and global integration and disheartening for researchers such as Kosack and Tobin who urge that developing nations need more aid and less FDI. If the former are correct and FDI is a partial answer to questions of development, then perhaps donor countries should give aid for the specific purpose of creating favorable conditions for FDI. Such loans would provide a double effect through which local populations would benefit due to enhanced infrastructure, and then benefit again as FDI responds to the improved conditions, bringing revenue, wage hikes, and beneficial spillovers. As Blaise suggests,

> "one could assert that FDI, unlike portfolio investment, promotes the dissemination of valuable knowledge and entrepreneurship in the form of research and development, production technology, marketing skills, managerial expertise, and so on. Therefore, one could expect ODA to contribute substantially to the economic growth of a recipient country not only through its direct impact, but also indirectly by promoting the inflows of FDI."[57]

However, if the opposite is true, then donor countries face a dilemma in the spirit of "catch-22"; if they give aid for the purpose of providing communications and transportation opportunities to local populations, the result may be harmful surges in FDI.[58] It is possible that other factors might be manipulated to hold FDI at bay until development has reached the threshold such that FDI helps rather than hurts,[59] but given the status quo, the positive outcomes of aid may be partially counterbalanced by the accompanying increases in FDI.

It is also possible that market-seeking FDI will be more attracted by increases in infrastructure than extractive FDI. Following the discussion in the literature review, this would suggest that infrastructure loans in countries that are targets of market-seeking FDI will reap additional benefits from aid, while countries that generally attract extractive FDI will be further hurt by infrastructure lending. This is perhaps a reason that the billions given to Sub-Saharan Africa since the 1970's have resulted in a rather checkered track record of economic development. In many of these countries, extractive FDI is by far the largest local industry, and as such is the only economic actor that is really able to use infrastructure resources fully. Providing electricity for the population may lead only to small gains in average household

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[57] Blaise 2005, 52.

[58] Heller, 1955. A central device of the book "Catch 22" is to place the main character in situations where every choice results in a bad outcome (or worse).

[59] Kosack and Tobin, 2006. Their discussion of this pattern is rather interesting to the subject at hand.

income, while the cumulative effects of resource-oriented FDI may have serious negative effects on overall wealth.

The picture is potentially less bleak when we consider that the possibility that aid, including aid targeting infrastructure, raises the general level of human development in a country. This may mean that aid will eventually attract less harmful types of FDI, which leave more externalities in the host system, as opposed to extractive FDI which often repatriates its inputs almost completely. If Kosack and Tobin are correct that aid is most effective if given to democracies, and if aid seems to promote human development much better than economic development, then countries which used aid effectively could then increase their attractiveness to forms of FDI which seek human capital and human development; the least damaging types of FDI. In any case, this research does not indicate that aid flows should be stemmed in any way. Rather, the potential for links between various flows of capital to poor countries should be considered, and policy decisions should be made with knowledge of these connections.

Whether or not the link between foreign aid and FDI is beneficial to developing countries, it is a link that cannot be ignored. This study shows that such a link exists systematically across many states. Unlike the work of Blaise, our models have generalizeable implications on the links between aid and FDI. However, the work is far from over; this paper explores the possibility of these links, but further work is necessary to show how these links function. Future research might examine the following questions. 1) How do different types of FDI respond to foreign aid? This question is currently difficult to answer because data are not easily accessible. Better data collection would be a valuable asset to the study of FDI. 2) Does aid have diminishing returns on FDI? Our models assume that the relationship between aid and FDI is linear, but this may not be the case. 3) Are there certain conditions under which aid is more likely to attract FDI? Good governance may play an instrumental role in this process. We do not include an interaction between aid and governance, but this relationship might be substantial. 4) Are there other sectors where aid might be linked to FDI? This question is motivated in part by our finding that total aid is significant in attracting FDI when we include fixed effects. It is possible that FDI might be responsive to aid allocated for health and education as well as infrastructure.

The wealth of possibilities shows that far from exhausting this topic, we have merely offered the preliminary work for a theory of links between aid and FDI. Hopefully, this manuscript will inspire a debate that will help us understand how to better assist development through foreign aid.

References

Alesina, Alberto, Beatrice Weder. 2002. Do Corrupt Governments Receive Less Foreign Aid? *The American Economic Review* 92, no. 4 (September): 1126-1137.

Alesina, Alberto, David Dollar. 2000. Who Gives Foreign Aid to Whom and Why? *Journal of Economic Growth,* 5 (March): 33-63.

Alsan, Macella, David E. Bloom, and David Canning. 2006. The Effect of Population Health on Foreign Direct Investment Inflow to Low- and Middle-Income Countries. *World Development* 34, no. 4: 613–630.

Beck, Nathaniel, and Jonathan N. Katz. 2001. Throwing Out the Baby with the Bath Water: A Comment on Green, Kim, and Yoon. *International Organization* 55, no. 2 (Spring): 487–495

---------. 1995. What to do (and not to do) with Time-Series Cross-Section Data. *American Political Science Review* 89, no. 3: 634-647.

Blaise, Severine. 2005. On the link between Japanese ODA and FDI in China: a microeconomic evaluation using conditional logit analysis. *Applied Economics* 37: 51–55

Blalock, Garrick, Paul J. Gertler. 2005. Foreign direct investment and externalities: In *Does foreign direct investment promote development?* Washington, DC: Institute for International Economics.

Boone, Peter. 1996. Politics and the effectiveness of foreign aid. *European Economic Review* 40, no. 2 (February): 289.

Burmeo, Sarah. 2006. *Donors and Development: The Use of Sector Allocation as a Tool in Foreign Aid Policy*. Unpublished paper presented at the 2006 APSA conference.

Burnside, Craig, David Dollar. 2000. Aid, Policies, and Growth. *The American Economic Review* 90, no. 4 (September): 847-868.

Chan. Steve. and Melanie Mason. 1992. Foreign Direct Investment and Host Country Conditions: Looking from the Other Side Now. *International Interaction,* 17, no. 3: 215-32.

Chau, Nancy H., and Ravi Kanbur. 2006. The Race to the Bottom, from the Bottom. *Economica* Vol. 73, 290 (May): 193.

Cheng, Leonard, and Yum Kwan. 2000. What are the determinants of the location of foreign direct investment? The Chinese experience. *Journal of International Economics* 51: 379–400.

Dunning, John H. 1988**.** *Explaining International Production.* London: Unwin Hyman.

---------. 1993. *Multinational Enterprises and the Global Economy.* Reading, Mass.: Addison-Wesley.

Easterly, William. 2003. Can Foreign Aid Buy Growth? *The Journal of Economic Perspectives* 17, no. 3 (Summer): 23-48.

----------. 2001. Does Foreign Aid Add Up? *Foreign Policy* 125 (July - August): 94.

Gorg, Holger, Eric Strobl. 2005. Foreign direct investment and local economic development: Beyond productivity Spillovers . In *Does foreign direct investment promote development?* Washington, DC: Institute for International Economics.

Heller, Joseph. 1955. *Catch-22*. Simon & Schuster, New York.

ICRG, 2005. Political Risk Indicators.

Jensen, Nathan M. 2003. Democratic governance and multinational corporations: Political regimes and inflows of foreign direct investment. *International Organization* 57, no. 3 (July 1, 2003): 587-616.

Kogut, Bruce. 1998. International Business: The New Bottom Line. *Foreign Policy* 110 (Spring): 152-165.

Kosack, Stephen, Jennifer Tobin. 2006. Funding Self-Sustaining Development: The Role of Aid, FDI and Government in Economic Success. *International Organization* 60, no. 1 (January 1, 2006): 205-243.

Li, Quan, and Adam Resnick. 2003. Reversal of fortunes: Democratic institutions and foreign direct investment inflows to developing countries. *International Organization* 57, no. 1 (January 1, 2003): 175.

Lipsey, Robert E., Fredrick Sjoholm. 2005. The impact of inward FDI on host countries: Why such different answers? In *Does foreign direct investment promote development?* Washington, DC: Institute for International Economics.

Long, Guoqiang. 2005. China's policies on FDI: Review and Evaluation . In *Does foreign direct investment promote development?* Washington, DC: Institute for International Economics.

Loud, Josh, and Daniel Nielson. 2006. *Faith and Foreign Aid.* Unpublished paper presented at the 2006 APSA conference.

Moran, Theodore H. 2005. How does FDI affect host country development? using industry case studies to make reliable Generalizations . In *Does foreign direct investment promote development?* Washington, DC: Institute for International Economics.

Oneal, John R. 1994. The Affinity of Foreign Investors for Authoritarian Regimes. *Political Research Quarterly* 47 no. 3: 565-88.

Paus, Eva. 2005. *Foreign investment, development, and globalization: can Costa Rica become Ireland?* Palgrave Macmillan.

Project Level Aid (PLAID). 2006. Brigham Young University and the College of William and Mary.

Pritchett, Lant. 1997. Divergence, Big Time. *The Journal of Economic Perspectives* 11, no. 3 (Summer): 3-17.

Root, Franklin, and Ahmed A. Ahmed. 1979. Empirical Determinants of Manufacturing Direct Foreign Investment in Developing Countries. *Economic Development and Cultural Change* 27, no. 4. (July): 751.

Ross, Michael L. 2004. How Do Natural Resources Influence Civil War? Evidence from Thirteen Cases. *International Organization* 58, no. 1 (January 1, 2004): 35-67.

Sachs, Jeffrey, and Andrew Warner. 1997. *Natural Resource Abundance and Economic Growth.* Working paper. Center for International Development and Harvard Institute for International Development. Harvard University.

Stopford, John. 1998-1999. MNCs. *Foreign Policy* 113 (Winter) : 12-24.

Tierney, Michael. 2003. *Credibility and Foreign Assistance*. Chapter of PhD Dissertation. Obtained from the author.

te Velde, Dirk Willem. 2002. *Foreign Direct Investment for Development: Policy challenges for Sub-Saharan African countries*. Overseas Development Institute. London: UK.

United Nations Conference on Trade and Development. 1997. *International Investment Towards the Year 2001*. New York.

UNCTAD. 1999. World Investment Report: Foreign Direct Investment and the Challenge of Development New York: United Nations.

----------. 2000. *World Investment Report*. Geneva.

Wilson, Sven E., Daniel M. Butler. 2006. *A Lot More to Do: The Sensitivity of Time-Series Cross-Section Analyses to Simple Alternative Specifications*. Forthcoming.

World Bank, 2005. *World Development Indicators*. CD-Rom.

Appendix.

A. List of OECD codes related to infrastructure, with descriptions:

21000 TRANSPORT AND STORAGE
21010 Transport policy and administrative management
Transport sector policy, planning and programmes; aid to transport ministries; institution capacity building and advice; unspecified transport; activities that combine road, rail, water and/or air transport.
21020 Road transport Road infrastructure, road vehicles; passenger road transport, motor passenger cars.
21030 Rail transport Rail infrastructure, rail equipment, locomotives, other rolling stock; including light rail (tram) and underground systems.
21040 Water transport Harbours and docks, harbour guidance systems, ships and boats; river and other inland water transport, inland barges and vessels.
21050 Air transport Airports, airport guidance systems, aeroplanes, aeroplane maintenance equipment.
21061 Storage Whether or not related to transportation.
21081 Education and training in transport
and storage

22000 COMMUNICATIONS
22010 Communications policy and administrative management Communications sector policy, planning and programmes; institution capacity building and advice; including postal services development; unspecified communications activities.
22020 Telecommunications Telephone networks, telecommunication satellites, earth stations.
22030 Radio/television/print media Radio and TV links, equipment; newspapers; printing and publishing.

23000 ENERGY GENERATION AND SUPPLY
23010 Energy policy and administrative management Energy sector policy, planning and programmes; aid to energy ministries; institution capacity building and advice; unspecified energy activities including energy conservation.
23020 Power generation/non-renewable sources Thermal power plants including when heat source cannot be determined; combined gas-coal power plants.
23030 Power generation/renewable sources Including policy, planning, development programmes, surveys and incentives. Fuelwood/ charcoal production should be included under forestry (31261).
23040 Electrical transmission/ distribution Distribution from power source to end user; transmission lines.
23050 Gas distribution Delivery for use by ultimate consumer.
23061 Oil-fired power plants Including diesel power plants.
23062 Gas-fired power plants
23063 Coal-fired power plants
23064 Nuclear power plants Including nuclear safety.
23065 Hydro-electric power plants Including power-generating river barges.
23066 Geothermal energy
23067 Solar energy Including photo-voltaic cells, solar thermal applications and solar heating.
23068 Wind power Wind energy for water lifting and electric power generation.
23069 Ocean power Including ocean thermal energy conversion, tidal and wave power.
23070 Biomass Densification technologies and use of biomass for direct power generation including biogas, gas obtained from sugar cane and other plant residues, anaerobic digesters.
23081 Energy education/training Applies to all energy sub-sectors; all levels of training.
23082 Energy research Including general inventories, surveys.
Note: Extraction of raw materials for power generation
should be included in the mining sector.
Energy manufacturing should be included in the industry sector.

Source: OECD

B. Countries included in our sample:

Albania
Algeria
Argentina
Bahrain
Bangladesh
Bolivia
Botswana
Brazil
Bulgaria
Chile
China
Colombia
Costa Rica
Cote d'Ivoire
Czechoslovakia
Dominican Republic
Ecuador
Egypt
El Salvador
Ghana
Guatemala
Guinea
Honduras
Hungary
India
Indonesia
Jamaica
Jordan
Kenya
Korea
Malawi
Malaysia
Mexico
Nicaragua
Pakistan
Panama
Paraguay
Peru
Philippines
Poland
Romania
Russia
Singapore
Slovakia
South Africa
Sri Lanka
Thailand
Trinidad & Tobago
Turkey
Uganda
Uruguay
Venezuela
Zimbabwe

C. Summary Statistics for Key Variables.

Variable	Mean	Stand Dev.	Minimum	Maximum
FDI	.82	2.89	-.28	40.18
Democracy	1.40	6.89	-10	10
Regime Durability	17.33	18.33	0	95
Instability	3.57	5.95	0	49
GDP (logged)	24.54	1.52	21.54	28.79
GDP Per Capita (logged)	8.02	.78	5.99	10.14
GDP Growth	3.11	5.13	-27.70	16.07
Exchange Rate	360.53	1966.58	0	14471.08
Openness	4.16	1.97	0	8
World FDI	160.24	84.48	40.32	314.25
Population (logged)	16.46	1.56	12.57	20.90
Corruption	3.12	1.11	0	6
Natural Resources	.187	.19	0	1.20
Aid	1.25	1.63	0	11.01
Aid (count)	91.28	90.64	1	677
Aid (per capita)	61.54	70.72	0	1114.34
Aid (count-per capita)	.00000886	.0000137	00000000103	.00012
Infrastructure Aid	.298	.49	0	5.41
Infrastructure Aid (count)	9.05	10.73	0	89
Infrastructure Aid (per capita)	13.17	22.32	0	403.64
Infrastructure Aid (count-per capita)	.000000742	.00000128	0	.0000134

Table 3: The Effects of Sector Aid on FDI

Independent Variable: **FDI** Dependent Variables	**Model 6**	Dependent Variables	**Model 6(cont.)**
Transportation Aid$_{(t-1)}$	2.031***	**Democracy**	-0.00819
	(0.52)		(0.011)
Transportation Aid$_{(t-2)}$	2.722***	**Regime Durability**	0.00562
	(0.61)		(0.0071)
Transportation Aid$_{(t-3)}$	1.950***	**Instability**	-0.00748
	(0.70)		(0.011)
Transportation Aid$_{(t-4)}$	2.203**	**GDP**	-0.150
	(0.88)		(0.25)
Transportation Aid$_{(t-5)}$	1.596*	**GDP Per Capita**	0.929**
	(0.90)		(0.36)
Transportation Aid$_{(t-6)}$	0.833	**GDP Growth**	0.00919
	(0.75)		(0.011)
Communication Aid$_{(t-1)}$	0.335	**Exchange Rate**	-0.0000421
	(1.57)		(0.000047)
Communication Aid$_{(t-2)}$	2.158*	**Openness**	0.0588
	(1.25)		(0.051)
Communication Aid$_{(t-3)}$	3.657***	**World FDI**	0.00207**
	(1.11)		(0.00085)
Communication Aid$_{(t-4)}$	2.823**	**Aid$_{(t-1)}$**	0.0676
	(1.21)		(0.086)
Communication Aid$_{(t-5)}$	3.585***	**Aid$_{(t-2)}$**	-0.0439
	(1.12)		(0.081)
Communication Aid$_{(t-6)}$	1.319	**Aid$_{(t-3)}$**	-0.0158
	(1.01)		(0.096)
Energy Aid$_{(t-1)}$	0.261	**Aid$_{(t-4)}$**	0.0357
	(0.49)		(0.094)
Energy Aid$_{(t-2)}$	-0.414	**Aid$_{(t-5)}$**	0.0511
	(0.33)		(0.097)
Energy Aid$_{(t-3)}$	-0.723**	**Aid$_{(t-6)}$**	-0.242*
	(0.35)		(0.15)
Energy Aid$_{(t-4)}$	-0.717*		
	(0.40)	Constant	-4.859
Energy Aid$_{(t-5)}$	-0.457		(3.60)
	(0.40)	Observations	607
Energy Aid$_{(t-6)}$	-0.0382	Number of countries	51
	(0.32)	R-squared	0.48

Standard errors in parentheses. All standard errors are panel corrected. (*) is significant at the 10% level, (**) is significant at the 5% level, and (***) at the 1% level.

Table 4: Robustness Checks

Dependent: **FDI** Independent:	**Model 7**	Dependent: **FDI** Independent:	**Model 8**
Aid$_{(t-1)}$ (count)	-10110	**Aid$_{(t-1)}$ (count PC)**	1906
	(9563)		(6449)
Aid$_{(t-2)}$ (count)	-0.00269	**Aid$_{(t-2)}$ (count PC)**	290.7
	(0.0029)		(7319)
Aid$_{(t-3)}$ (count)	-0.00264	**Aid$_{(t-3)}$ (count PC)**	-11732
	(0.0030)		(7761)
Aid$_{(t-4)}$ (count)	-0.00156	**Aid$_{(t-4)}$ (count PC)**	-1954
	(0.0031)		(7748)
Aid$_{(t-5)}$ (count)	-0.000248	**Aid$_{(t-5)}$ (count PC)**	-9883
	(0.0041)		(9980)
Aid$_{(t-6)}$ (count)	0.00467	**Aid$_{(t-6)}$ (count PC)**	-9950
	(0.0047)		(8303)
Infrastructure Aid$_{(t-1)}$ (count)	0.0420**	**Infrastructure Aid$_{(t-1)}$ (count PC)**	59117**
	(0.016)		(29808)
Infrastructure Aid$_{(t-2)}$ (count)	0.0468**	**Infrastructure Aid$_{(t-2)}$ (count PC)**	93539***
	(0.021)		(32853)
Infrastructure Aid$_{(t-3)}$ (count)	0.0365*	**Infrastructure Aid$_{(t-3)}$ (count PC)**	121613***
	(0.020)		(37036)
Infrastructure Aid$_{(t-4)}$ (count)	0.0376*	**Infrastructure Aid$_{(t-4)}$ (count PC)**	93912***
	(0.020)		(35565)
Infrastructure Aid$_{(t-5)}$ (count)	0.0264	**Infrastructure Aid$_{(t-5)}$ (count PC)**	82564**
	(0.020)		(35131)
Infrastructure Aid$_{(t-6)}$ (count)	-0.0115	**Infrastructure Aid$_{(t-6)}$ (count PC)**	36960
	(0.021)		(32388)
Democracy	-0.0232*	**Democracy**	-0.0470**
	(0.014)		(0.020)
Regime Durability	0.00767	**Regime Durability**	0.0205***
	(0.0077)		(0.0065)
Instability	-0.00690	**Instability**	-0.00751
	(0.016)		(0.014)
GDP	0.315	**GDP**	1.051***
	(0.36)		(0.34)
GDP Per Capita	1.466**	**GDP Per Capita**	0.188
	(0.62)		(0.27)
GDP Growth	0.00999	**GDP Growth**	0.0152
	(0.014)		(0.012)
Exchange Rate	-0.0000950**	**Exchange Rate**	-0.000119***
	(0.000037)		(0.000042)
Openness	-0.0106	**Openness**	-0.0914**
	(0.056)		(0.044)
World FDI	0.00265*	**World FDI**	0.00403***
	(0.0016)		(0.0014)
Constant	-20.13***	Constant	-26.95***
	(5.44)		(6.98)
Observations	607	Observations	607
Number of countries	51	Number of countries	51
R-squared	0.27	R-squared	0.16

Standard errors in parentheses. All standard errors are panel corrected. (*) is significant at the 10% level, (**) is significant at the 5% level, and (***) at the 1% level.

Table 5: Robustness Checks

Dependent: **FDI** Independent:	**Model 9**	Dependent: **FDI** Independent:	**Model 10**
Aid$_{(t-1)}$ (per capita)	0.000958**	**Aid$_{(t-1)}$ (over GNI)**	0.979**
	(0.00048)		(0.42)
Aid$_{(t-2)}$ (per capita)	0.000606	**Aid$_{(t-2)}$ (over GNI)**	0.578
	(0.00042)		(0.45)
Aid$_{(t-3)}$ (per capita)	0.000694**	**Aid$_{(t-3)}$ (over GNI)**	0.524
	(0.00032)		(0.35)
Aid$_{(t-4)}$ (per capita)	0.000762**	**Aid$_{(t-4)}$ (over GNI)**	0.190
	(0.00037)		(0.30)
Aid$_{(t-5}$ (per capita)	0.000529*	**Aid$_{(t-5}$ (over GNI)**	0.0165
	(0.00029)		(0.34)
Aid$_{(t-6)}$ (per capita)	0.00000969	**Aid$_{(t-6)}$ (over GNI)**	-0.130
	(0.00028)		(0.36)
Infrastructure Aid$_{(t-1)}$ (per capita)	-0.000997	**Infrastructure Aid$_{(t-1)}$ (over GNI)**	0.471
	(0.0018)		(1.55)
Infrastructure Aid$_{(t-2)}$ (per capita)	-0.000383	**Infrastructure Aid$_{(t-2)}$ (over GNI)**	1.098
	(0.0020)		(1.99)
Infrastructure Aid$_{(t-3)}$ (per capita)	-0.000132	**Infrastructure Aid$_{(t-3)}$ (over GNI)**	1.962
	(0.0020)		(1.59)
Infrastructure Aid$_{(t-4)}$ (per capita)	0.000429	**Infrastructure Aid$_{(t-4)}$ (over GNI)**	3.523**
	(0.0021)		(1.60)
Infrastructure Aid$_{(t-5)}$ (per capita)	0.000530	**Infrastructure Aid$_{(t-5)}$ (over GNI)**	2.961*
	(0.0021)		(1.69)
Infrastructure Aid$_{(t-6)}$ (per capita)	-0.00199	**Infrastructure Aid$_{(t-6)}$ (over GNI)**	1.863
	(0.0024)		(1.49)
Democracy	-0.0514***	**Democracy**	-0.0534***
	(0.019)		(0.018)
Regime Durability	0.0199***	**Regime Durability**	0.0207***
	(0.0069)		(0.0074)
Instability	-0.0104	**Instability**	-0.0104
	(0.014)		(0.014)
GDP	1.039***	**GDP**	1.077***
	(0.31)		(0.28)
GDP Per Capita	0.132	**GDP Per Capita**	0.431
	(0.26)		(0.30)
GDP Growth	0.0180	**GDP Growth**	0.0206
	(0.012)		(0.013)
Exchange Rate	-0.000116***	**Exchange Rate**	-0.000116***
	(0.000041)		(0.000041)
Openness	-0.0968**	**Openness**	-0.0879**
	(0.045)		(0.044)
World FDI	0.00349***	**World FDI**	0.00311***
	(0.0011)		(0.0011)
Constant	-26.13***	Constant	-29.56***
	(6.24)		(6.15)
Observations	607	Observations	606
Number of countries.	51	Number of countries.	51
R-squared	0.17	R-squared	0.17

Standard errors in parentheses. All standard errors are panel corrected. (*) is significant at the 10% level, (**) is significant at the 5% level, and (***) at the 1% level.

Table 6: Fixed Effects

Dependent: **FDI** Independent Variables:	**Model 11**	Independent Variables:	**Model 11(cont.)**
Aid$_{(t-1)}$	0.192**	**Democracy**	-0.0428***
	(0.092)		(0.016)
Aid$_{(t-2)}$	0.149*	**Regime Durability**	-0.0168**
	(0.086)		(0.0066)
Aid$_{(t-3)}$	0.207***	**Instability**	-0.00223
	(0.079)		(0.012)
Aid$_{(t-4)}$	0.254***	**GDP**	-5.085***
	(0.074)		(1.05)
Aid$_{(t-5)}$	0.391***	**GDP Per Capita**	8.047***
	(0.10)		(1.41)
Aid$_{(t-6)}$	0.179	**GDP Growth**	-0.00218
	(0.15)		(0.012)
Transportation Aid$_{(t-1)}$	1.349***	**Exchange Rate**	0.000638***
	(0.47)		(0.00019)
Transportation Aid$_{(t-2)}$	1.899***	**Openness**	0.0231
	(0.58)		(0.060)
Transportation Aid$_{(t-3)}$	0.897	**World FDI**	0.000892
	(0.70)		(0.0011)
Transportation Aid$_{(t-4)}$	1.075	Constant	53.40***
	(0.87)		(13.9)
Transportation Aid$_{(t-5)}$	0.432	Observations	607
	(0.84)	Number of countries	51
Transportation Aid$_{(t-6)}$	0.203	R-squared	0.68
	(0.71)		
Communication Aid$_{(t-1)}$	0.613		
	(1.60)		
Communication Aid$_{(t-2)}$	2.304*		
	(1.23)		
Communication Aid$_{(t-3)}$	3.006***		
	(1.13)		
Communication Aid$_{(t-4)}$	2.247*		
	(1.27)		
Communication Aid$_{(t-5)}$	3.172***		
	(1.20)		
Communication Aid$_{(t-6)}$	1.083		
	(1.08)		
Energy Aid$_{(t-1)}$	0.496		
	(0.52)		
Energy Aid$_{(t-2)}$	-0.00404		
	(0.36)		
Energy Aid$_{(t-3)}$	-0.190		
	(0.42)		
Energy Aid$_{(t-4)}$	-0.123		
	(0.49)		
Energy Aid$_{(t-5)}$	0.0415		
	(0.47)		
Energy Aid$_{(t-6)}$	0.217		
	(0.34)		

Standard errors in parentheses. All standard errors are panel corrected. (*) is significant at the 10% level, (**) is significant at the 5% level, and (***) at the 1% level.