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Author: Tracy L Danner

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THE EFFECT OF FOREIGN DIRECT INVESTMENT AND RULE OF LAW ON ECONOMIC GROWTH

Tracy Danner

Advised by:
Professor Robert G. Murphy

ABSTRACT. Rule of law has recently emerged as a possible solution for the promotion of functioning market economies and economic growth in developing countries. It has been argued that an established legal system provides individuals with a clear understanding of the law and consequently, should be more influential on the behavior and decisions of those individuals. This study explores the effects of an established rule of law environment on the relationship between foreign direct investment and economic growth. Several previous studies have analyzed the direct relationship between foreign investment and economic growth. However, none of these studies control for varying levels of legal incentives and property protection. Established legal institutions provide the type of stability that makes investment in a given country more attractive to foreign companies. I also test whether the combination of rule of law and FDI affect the estimated rate of GDP growth. The combination of these two effects would imply that FDI is more likely to create positive economic growth when applied to an economy with established legal institutions. Although the analysis does not fully support the effect of this rule of law–FDI interaction on growth, my analysis does suggest that FDI inflows are most efficient at promoting growth in countries with less legal development.

Keywords: *rule of law, foreign direct investment, growth, institutions*

1. Introduction

In the richest countries it is clear that technological change, institutional innovation, learning by doing, and social capital, to name a few factors, are fundamental drivers of the economy.

World Bank
“Where is the World’s Wealth?”

INSTITUTIONS AND RULE OF LAW

For many years, economists argued that the reason for the difference in development levels between wealthy and poor countries was attributable to geographical variance in natural resources and climatic conditions. According to this theory, favorable weather and location provided some countries with more resources and greater accessibility to markets. These advantages are often considered to be responsible for pushing Europe and the United States towards the modern market economy and eventually, contributing to the creation of unprecedented levels of development.

However, in the most recent edition of “Where is the Wealth of Nations?” Kirk Hamilton and other authors from the World Bank concluded that the sum of natural and produced capital is an insufficient means of accounting for the world’s wealth.¹ In essence, their conclusions led them to believe that there was more to accumulated wealth than location and resources. Even after adding up the value of natural resources and the stock of available produced capital, including equipment, structures and urban

¹ In this study, total wealth is measured as the net present value of future consumption. The authors measured “total wealth by assuming a future consumption stream and calculating the net present value in year 2000” (Where is the Wealth of Nations, 2006, p. 23).

$W_t = \int_t^{\infty} C(s) \cdot e^{-r(s-t)}$, where W_t is the total wealth in year t , $C(s)$ is consumption in year s , and r is the social rate of return from investments. (ibid, p. 144).

land, there was still a very large segment of value that was unaccounted for in their wealth equation. The authors deemed this remaining value to be from a source of “intangible wealth,” or that value which stems from such intangible factors like “raw labor, human capital, social capital, and other factors such as the quality of institutions” (Where is the Wealth of Nations, 2006, p. 4). In fact, they determined that the largest contributor to their wealth residual was a variable that was originally included to capture both institutional and social capital impacts – the rule of law. In their regression, “a 1 percent increase in rule of law pays large dividends, boosting intangible capital by 0.83 percent” (ibid, p. 13). The next highest contributing factor was education, or human capital, with an elasticity of 0.53. This leads the authors to conclude that institutional and social capital factors explain the majority of the variance between the amounts of intangible wealth across countries.

If the most significant difference between the wealth of rich and poor countries is produced by the presence of strong institutions, we can infer that this condition must in some manner contribute to a heightened level of economic activity. The question is how? What is it about these intangible factors that allows countries to move beyond the limitations imposed by natural endowments and initiate positive economic development?

INSTITUTIONS

Trust, effective governance, law and individual rights are all part of what Douglass North has described as society’s institutions. Quite different from physical organizations, “institutions are the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction. In consequence they

structure incentives in human exchange, whether political, social, or economic” (North, 1990, p. 3). Whether they are formally constraining, like the idea of rule of law and individual rights, or informally constraining, such as common behavioral norms, institutions influence the decisions of individuals within a given society. The idea that rational humans are controlled by such rules and constraints should not be controversial – we have in effect simply expanded the individual’s set of behavioral constraints, commonly defined by time and/or money, to include the influence of society’s rules on each individual’s set of choices. North describes the effect of institutions best in his *Institutions, Institutional Change and Economic Performance*:

Institutional constraints include both what individuals are prohibited from doing and, sometimes, under what conditions some individuals are permitted to undertake certain activities. As defined here, they therefore are the framework within which human interaction takes place. They are perfectly analogous to the rules of the game in a competitive team sport. That is, they consist of formal written rules as well as typically unwritten codes of conduct that underlie and supplement formal rules, such as not deliberately injuring a key player on the opposing team. And as this analogy would imply, the rules and informal codes are sometimes violated and punishment is enacted. Therefore, an essential part of the functioning of institution is the costliness of ascertaining violations and the severity of punishment. (p. 4)

North’s last comment explains that the enforcement and punishment of code violations is just as important as the establishment of these rules, in order for institutions to function effectively. If an individual can repeatedly observe unpunished violations of society’s supposed institutions, then they will believe that they too can violate these norms without cost. That is why when there is little or no enforcement of these standard limitations within a society, the incentives for individuals to follow the “rules” disappear. Over time, arbitrary enforcement of formal institutions negates the purpose of establishing institutional constraints, which - under optimal conditions - is “to reduce uncertainty by establishing a stable (but not necessarily efficient) structure to human

interaction” (ibid, p. 6). Without the stability afforded by reliable enforcement, the positive impact on the cooperative behavior of individuals, and more collectively the economy, is significantly reduced.

LAW

The most common measurement for understanding how well a country has established these institutions and consequently enforces them is defined as a rule of law, and it is for this reason that I have decided to use this concept to analyze the impact of institutional constraints on economic growth. The idea behind a “rule of law” can be vague concept because of the range of ideas embodied by the term; however, Kenneth W. Dam enumerates the basic tenets of a rule of law as described within the existing literature:

1. Legal rules should be written down and available to all residents of the realm: No secret law.
2. Rules should apply, and be enforced, equally and dispassionately for all, regardless of position or station. Further, the state and the ruler should also be subject to the law: Nobody is above the law.
3. Individuals have a right to have rules that favor them enforced for their benefit. In other words, they are entitled to access to justice on a nondiscriminatory basis no matter who they are and who the defendant may be. (p. 16)

These guidelines for understanding the rule of law concern many legal applications, ranging from constitutional law and the protection of individuals from the government, all the way down to criminal law and protecting individuals against the risk of theft and other everyday crimes. Of the multitude of legal applications, a working body of property and contract law remains the most pertinent to the question of economic development.

Property rights are designed to give owners maximum freedom to produce or develop their own property as they see fit, so long as they do not impede upon this right for other property owners. This freedom increases the willingness of owners to spend time and money investing in their property, and can produce beneficial spillover effects for the rest of the economy. When owners feel unsure of how well their property will be protected, they are unlikely to invest in the development of the property because they cannot accurately predict a secure rate of return on their investment and they risk losing a substantial amount of assets. Clague, et al. argue that “the risk of such loss is greater the more one specializes and the more one depends on complex exchanges,” which would help explain why some developing countries have been unable to make the transition to functioning large scale market economies (Clague, 1997, p. 69). The environment is such that the level of legal incentives is insufficient to motivate businesses to expand and realize scale economies. Uncertainty often stems from both a fear of government seizure of goods or revenues, and a fear of physical destruction at the hands of other individuals. The investment decision must weigh the probability of such occurrences against the expected rate of return, and for many investors that insecurity can mean the difference between building the plant that would create jobs and stimulate economic growth, or not. In fact, Clague, et al. found:

strong evidence that those underdeveloped nations respecting property... rights accumulate capital and increase the incomes of their populations at substantially higher rates than other developing countries – even when controlling for the large variations in starting points, in levels of schooling and in the price of investment goods. (p. 76).

Therefore, in order to encourage business and other investment opportunities, the legal institutions must be sufficiently protective of the rights of individual property owners and other investors.

The creation and enforcement of contract law is equally important to the organization of business incentives and the promotion of economic growth. Early market economies were based on a simultaneous exchange of goods and payment. In this environment, merchants were able to minimize the risk of losing revenues, and consumers could guarantee delivery of their order; it was the most secure way to conduct business. A more developed and complex economy, however, requires the extension of credit in order to reach a larger market of consumers. In a society where producers cannot confidently depend on third-party enforcement, they will limit the extension of credit to individuals whom they may trust through reputation or know on a personal basis. However, the effective functioning of such legal “institutions affect[s] the performance of the economy by their effect on the costs of exchange and production” (North, 1990, p. 5). If producers can confidently utilize contracts to extend credit to unknown individuals, then they can increase the quantity supplied to a more efficient level and the market can extract a higher level of both consumer and producer surplus. This confidence in the ability and the willingness of the government to enforce contracts also reduces the costs associated with ascertaining every individual’s creditworthiness prior to an exchange.

In countries where we observe a lack of property rights and contract enforcement, whether due to a lack of formally defined law or an arbitrary enforcement of formally defined laws, we also expect to see a significantly lower volume of

complex, but potentially advantageous transactions (Clague, 1997). Under these unstable conditions, individuals typically “choose to be more self-sufficient and engage less frequently in complex and non-self-enforcing transactions. In the extreme, peasants [will] produce most of their own food rather than relying on market exchange” (ibid, p. 69). Although it is rationally intuitive for individuals to pursue this self-reliant strategy, it has significant detrimental effects for the economy and society as a whole. Individual production reduces the amount of time and resources available to firms that would otherwise have been interested in producing on a larger scale. As a result of this reduction in mass production capacity, society is forced to sacrifice potential gains from economies of scale, as well as domestic opportunities to invest in technological innovations. Thus we find that a lack of legal institutions within a society reduces an individual’s incentives to engage in the open, market economy that would promote economic growth.

FDI AND GROWTH

Economists have argued over the effects of foreign direct investment (FDI)² on host countries for several decades and this debate has become increasingly important over time as both FDI flows and concerns about economic development increase simultaneously. According to the UN Council on Trade and Development’s World Investment Prospects Survey for 2007-2009, more than 2/3 of respondents to the survey expect to increase their investment expenditures abroad, and most of these firms expect

² FDI is defined by Krugman and Obstfeld as “international capital flows in which a firm in one country creates or expands a subsidiary in another.” (Krugman & Obstfeld, 2006, p.157).

to increase that value significantly.³ With worldwide FDI expenditures estimated at \$1.3 trillion in 2006, this type investment holds at least the potential to influence economic development in less developed countries (UNCTAD Survey, 2007, p. 7).

While there are some economists who would prefer to say that FDI is more likely to harm developing economies, economic history has shown that this consequence cannot be strictly true. The experience of East Asia and other developing countries in recent years has made a significant argument against the universal application of the dependency theory. Economists who promote the dependency theory model would argue that allowing free import of foreign capital traps developing countries into a “neocolonial” cycle of exploitation (Farmer, 1999, p. 12). Developing countries are in effect selling their cheap resources to foreign firms and then having to buy back more expensive finished goods. This uneven exchange condemns poorer countries to a continuous cycle of selling their primary resources in order to fund expensive consumption. It is this cycle that has produced the underdevelopment seen in many developing countries today. In this way, “trade becomes an instrument of domination rather than an item of mutual benefit as characterized by the liberal [neoclassical] paradigm” (ibid, p. 12).

On the other side of the argument is the neoclassical model, which would argue for the free flow of investment funds as dictated by market conditions. Only by allowing for free movement of funds would foreign direct investment be able to encourage economic development by equalizing prices and incomes in developing

³ About 30% of respondents to the survey expected to increase FDI expenditures between 10-30% over the next three years. Another 30% of respondents expect to increase FDI more than 30% (UNCTAD Survey, 2007, p.7, Fig. 1).

countries (ibid, p. 8). Regardless of whether those investment funds are market-seeking or resource-seeking, policy makers often anticipate FDI to:

contribute to development through the augmentation of domestic savings and investment, stimulation of technology transfer, intensification of competition, introduction of new methods, expansion of exports and foreign exchange, creation of jobs, generation of tax revenue, improvement of human capital and access to global markets, and provision of financing, as well as through various other types of spillovers or positive externalities. (Dookeran, 2007, p. 123).

These are all very positive spillovers that when captured correctly, are expected to contribute to increases in the host country's own domestic productivity. A study by Lall, Featherstone and Norman found that a 1 percent increase in foreign investment is associated with a 0.121% increase in pure technical efficiency.⁴ Although the expected impact is lower than if the investment funds originated domestically (0.252%), the positive direction of the FDI variable on efficiency supports the idea that there is the potential for growth from the positive spillovers associated with FDI (Lall et al., 2000, p. 1489).

RULE OF LAW AND FDI

Unfortunately, the world's experience with the long-term effects of FDI on economic development shows that this idealized transfer of knowledge and productivity does not always occur in host countries. Studies have shown that while FDI may produce these growth-enhancing conditions, the extent to which FDI-led growth actually occurs depends significantly on country-specific characteristics to capture these spillover effects (Zhang, 2001). In his research, Kevin Zhang finds that "FDI tends to

⁴ Pure Technical Efficiency (PTE) measures the distance between a country's current state of production and the production frontier. An increase in PTE is an efficiency gain that decreases the distance between current production and the frontier.

be more likely to promote economic growth when host countries adopt liberalized trade regime, improve education and thereby human capital conditions, encourage export-oriented FDI, and maintain macroeconomic stability” (Zhang, 2001, p. 175). These four conditions are important because they provide the means and incentives for individuals in the host country to absorb the positive externalities from contact with FDI.

This absorptive condition, seen above in Zhang’s work, is especially important for Borensztein, et al. in their analysis of the effects of FDI on economic growth. They find that while FDI has on the whole a positive effect on growth, the size of the impact made by FDI is closely tied to the level of human capital in the host country (Borensztein et al., 1998, p. 134). The authors also argue that “the main channel through which FDI contributes to economic growth is by stimulating technological progress, rather than by increasing total capital accumulation in the host economy” (ibid, p. 118). The findings that FDI has the most impact via technological progress and in countries where individuals are able to absorb training and technology from foreign owners implies that there must be a sizeable spillover effect that can be realized within the domestic economy as a result of FDI.

It is through the effective capture of these spillovers that FDI will have the greatest impact on growth, assuming the gains are reinvested in domestic development. An argument frequently used against foreign direct investment is the idea that an abundance of foreign-based investment dollars will crowd-out domestic, indigenous investment. However, Borensztein et al., when they measured FDI against total investment in the host country, found that their “results are supportive of a crowding-in

effect, that is, a one-dollar increase in the net inflow of FDI is associated with an increase in total investment in the host economy of more than one dollar” (ibid, p. 17-18). This hints that foreign investment will increase domestic investment, and we are assuming that rule of law would also increase the propensity for domestic investment. If both of these assumptions are true, then we should expect to see an additionally positive growth effect from the combination of FDI in a rule of law environment.

This study analyzes the ability of a rule of law to attract FDI, as well as the extent to which a rule of law environment allows the host country to capture the positive spillovers and translate additional knowledge and income into further investment and ultimately, growth.

2. Methodology

The purpose of this study is to analyze the relationship between FDI and economic growth while controlling for the level of developed legal incentives within each respective country. I employ a two-equation model in order to address the complex relationship between the rule of law, FDI and growth. The idea to develop a two-equation model was influenced primarily by Simeon Hein’s efforts to analyze how the trade policy adopted by a country affects the impact of FDI on economic growth. He addresses two questions, namely “whether nations’ policies affect the amount of foreign investment they receive,” and whether or not “foreign investment [has] uniform and predictable effects on developing economies” (Hein, 1992, p. 507). Although Hein’s research is aimed at understanding the impact of a closed versus open liberal trade policy

on the FDI-growth relationship, it was a theoretical starting point for research related to the impact of government action on this relationship. The model employed in this study will look more toward the role of government as a legal institution-creating body to generate incentives for both foreign and domestic investors. As a result, I will be able to investigate whether a rule of law environment influences the potential for growth from FDI.

Similarly influential was Burnside and Dollar's 2000 study, "Aid, Policies, and Growth." Their work sought to understand in an explicitly specified empirical model the relationship between foreign aid and economic growth, while accounting for differences in governance. Like FDI, foreign aid is sometimes thought to be beneficial for the purpose of stimulating economic growth in developing countries. Burnside and Dollar look at whether the government's role of maintaining economic stability influences the distribution of aid dollars, as well as the ability of aid dollars to promote growth. They ultimately want to see whether aid adds an additional boost to growth when applied in an environment of good governance. The use of both of these equations is important for analyzing to what extent governance affects aid, or in the case of this study, law affects FDI. It is entirely possible that in this model a rule of law environment does attract additional FDI without necessarily affecting the ability of each FDI dollar to influence growth. Thus, measuring both of these relationships allows us to understand how we can influence growth by means of FDI.

The first equation in the model regresses FDI on various economic and social conditions found in the host country that would tend to make that specific market more

attractive to foreign investors. This equation tests whether or not rule of law is a significant motivation for investors to direct investment dollars into the market.

$$\text{FDI}_{it} = \alpha + \beta_1 y_{it} + \beta_2 \text{ROL} + \beta_3 \text{Trade} + u_i + \varepsilon_{it} \quad (1)$$

where,

- FDI_{it} = Net FDI inflows as a percentage of GDP.
- y_{it} = log of real per capita GDP at beginning of period
- ROL = measure of Rule of Law
- Trade = (Exports + Imports)/GDP
- u_i = fixed-effects error term
- ε_{it} = zero-mean scalar error term

In accordance with the Burnside and Dollar model, I have utilized the log of real per capita GDP at the beginning of the period as a measure of initial income. In terms of attracting FDI, the expectation is that log of initial income will capture diminishing expectations for the amount of FDI a country can attract as it approaches its Solow-model steady state.

The rule of law (ROL) measure used in equation (1) is the variable of most interest to this study. As defined by the World Bank's Governance Indicators report, the rule of law measures "the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence" (Kaufmann, et al., 2007, p. 4). This indicator is in essence an understanding of how fairly and predictably rules are created and enforced. The specification of this variable in the model will allow the regression to estimate the effect of a rule of law environment on investors' decision to

invest in country i . I expect this variable to produce a positive effect on investors' motivations.

I was motivated to include a trade openness variable after reading the research of Hein and others.⁵ Hein's research focused on analyzing the relative importance of a country's stated trade policy in determining the flow of foreign investment funds. He recognized that if country i is relatively open to trade, it would be easier for foreign firms to invest there and so FDI flows should be relatively higher, other things equal. The opposite can also be said for an economy that has followed a policy aimed at limiting international trade. Consequently, I consider trade openness to be an important determinant of expected FDI flows.

The second regression equation in the model estimates the relationship between FDI and growth while controlling for varying levels of legal institutions, and other conditions for growth as described in the Solow growth model. This will allow us to measure the effect of a rule of law environment on the ability of FDI to affect the rate of growth in the economy of country i .

$$G_{it} = \alpha + \beta_1 y_{it} + \beta_2 FDI + \beta_3 ROL + \beta_4 FDI * ROL + \beta_5 SSER + u_i + \varepsilon_{it} \quad (2)$$

where,

- G_{it} = rate of growth of GDP (nominal dollars)
- y_{it} = log of real per capita GDP at beginning of period
- FDI = Net FDI Inflows as % GDP
- ROL = measure of Rule of Law
- SSER = rate of secondary school enrollment of eligible aged children
- u_i = fixed-effects error term
- ε_{it} = zero-mean scalar error term

⁵ See Davidson (1980), and de Mello, Jr. (1999)

The log of initial income is included in this regression as well as (1) in order to capture the expected growth pattern that emerges from convergence as dictated by the Solow growth model. The Solow growth model expects that income in a given country will ultimately approach its own unique steady state. Based on this principle, we should expect to see similar steady states across two countries if the savings rate, population growth rates, and rate of technological progress are the same. In the case when two countries are expected to converge to the same steady state, the model predicts that we will observe faster growth in poorer countries as they accelerate to converge with the more developed country. In order for the less capital abundant country to catch up to its more advanced steady state partner, it must grow at a faster rate. In the case in which the conditions stated above are not the same across countries, each country will converge to its own unique steady state. This is known as conditional convergence. This is why it is important to allow the model to reflect different growth rates based on country i 's proximity to its own unique steady state.

In this regression (2), it was essential to include a measure of FDI flows to country i . FDI here is measured as a percentage of GDP to control for differences in market size. By including this variable, we will be able to observe the expected change in growth as a result of changes in FDI flows. Similarly important is the rule of law variable, as expressed in regression (1). However, only by interacting the two variables – rule of law and FDI – will we really be able to address the fact that FDI may have a different effect for countries that have experienced diverse legal environments.

Burnside and Dollar also utilized this technique in their research; they include both aid and governance individually, as well as interacted.

Although this study is not specifically focused on the relationship between education and economic growth, there is general consensus in the literature that education is an important condition for economic growth. Because of this, it is important to include secondary school enrollment rates in equation (2) so that we may control for different levels of education across countries. Education is an extremely hard concept to quantify and judge because the reported quality can differ so greatly across countries. For this reason, I have decided to utilize a measure of education based on the percent of children of eligible age who attend secondary school. There is no explicit judgment about quality in this measure, but I will assume that in countries where the level of children attending school is high, the country has made education a priority, at least to some degree, and so the quality should also be greater. Therefore, I expect to see that the higher the percentage of eligible children enrolled in school, the greater their expected ability to capture the knowledge spillover effects from FDI, and eventually, promote growth.

3. Data and Statistical Issues

DATA

In order to study the impact of rule of law and FDI on economic growth, I collected data on the variables that I deemed would most influence FDI allocation and the rate of growth. The dataset for this study was compiled primarily from the World Bank's "World Development Indicators" database, with the exception of the rule of law

data. Compiling the supporting data from the singular World Bank database should provide some consistency in collection and measurement criteria across the different variables. The collection of this data was limited by the availability of the rule of law data, which constrained the span of the present study to ten years in length. Exact variable definitions are available in the appendix.

The rule of law data were collected from the 2006 World Governance Indicators (WGI) study, which was completed by Kaufmann, Kraay and Mastruzzi from the World Bank. The study provides an indicator figure, a measure of the margin of error, and a percentile rank. For this study, I utilized the basic indicator, which runs on a continuous scale from -2.5 to 2.5, so as to best capture changes both within and between countries over the ten-year time span. The governance scores are normally distributed around a zero mean, which allows us to use the measurements in the dataset as they are presented by the WGI study.

The WGI study is innovative in its decision to synthesize data from multiple sources about the condition of the various aspects of governance. Survey data are frequently subject to measurement error based on the perspective of the source. However, the series of WGI studies attempts to balance this error by collecting data from several different perspectives. The governance indicators are derived from sources including “public sector, private sector and NGO experts, as well as thousands of citizen and firm respondents” (Kaufmann et al., 2007, abstract). The authors ultimately found that their use of several sources was beneficial to the quality of indicators produced. They conclude that their research has been so successful “that even after taking margins of error into account, the WGI permit meaningful cross-

country comparisons as well as monitoring [individual] progress over time” (ibid, abstract).

Despite the achievements of this study, the dataset still has its limitations. Since the compilation of data on governance across countries is necessarily subject to measurement error, we cannot take the governance ratings as a perfect indicator of the environment. This is why Kaufmann, et al. include the margin of error in their findings. They suggest that for cross-country comparisons, “when confidence intervals for governance based on our reported margins of error overlap in comparisons ... this suggests that the data do not reveal statistically (or for that matter practically) significant differences” (ibid, p. 1). These ratings have improved and the margins of error have declined as the study has aged, due primarily to an increase in the number of data sources and the standardization of sources over time. For simplification in this study, I have assumed that the reported indicators are a sufficiently close estimate, and therefore have not included the measure of the margin of error into my calculations.

The goal at the outset of my study was to include as many countries from around the world in the dataset. Therefore, the original sample of countries included all 212 states included in the WGI dataset. However, countries had to be eliminated based on the availability of data, or lack thereof. Several countries were deleted from my dataset because numbers were unavailable from the World Bank dataset for one or more variable. Although this elimination was necessary to streamline the dataset, it also tended to erase potentially interesting observations from our consideration, including Afghanistan, Cuba, North Korea, Iraq, and Somalia. Given their reputations for unstable domestic conditions, it would have been very interesting to be able to analyze the

impact of legal institutions on the rate of economic growth in these particular countries. However, it is very likely that FDI flows to these countries are too low to be of consequential use for this model. A complete list of all 156 countries utilized in the study can be found in the appendix (Table 2).

STATISTICAL ISSUES

Growth is a long-run phenomenon that we can really only begin to see perspective on over a long period of time. To illustrate, Burnside and Dollar's study utilized data from twenty-four years. They divided the period into six subsets, each being four years in length. Unfortunately, the availability of rule of law data, as an integral part of this study, limits us to a ten-year period (1996-2006). In order to best approximate this subset method in the shortened time frame, I split the ten years into three periods, 1996-2000, 2000-2003, and 2003-2006. The growth data have been annualized over these three periods and recorded as an observation for the first year of the subset.⁶ While this is a fairly reasonable approximation, we may ultimately have to acknowledge that the data are too short on perspective to provide us with definitive answers. As more data become available in the World Governance Indicators database, it would be interesting to revisit this model and reassess the regressions.

As a panel data model where these two equations vary over both time t and country i , the dynamic of the error term must be analyzed and fitted into the model. Given that our time frame for this study is a relatively small set of ten years, many of the sources of heterogeneity between countries will remain constant over that time span. For example, social factors like health and education can influence growth via

⁶ $G_{it} = ((GDP_{t+j}/GDP_t)^{(1/j)} - 1) * 100$. For the first period, 1996-2000, $j=4$. For the other two periods, 2000-2003 and 2003-2006, $j=3$.

productivity and investment in country i . Unfortunately, such social factors are also quite unlikely to change in any significant manner over the course of ten years. Therefore, any unobserved factors that are incorporated in the error term, we will assume are constant over time within a particular country i . The presence of such unobserved sources of heterogeneity do not pose econometric issues on their own, but can create biases when these unobserved factors are correlated to other independent variables.

In this study there does exist a significant positive correlation between such social factors related to growth and the independent variable, log of initial income. For example, despite a limited amount of available data, we do know that there exists a correlation of about 0.81 between the log of initial income and secondary school enrollment rates. This would tend to indicate that as income increases, countries tend to exhibit higher standards of education. Similar intuition follows as well for other social factors not explicitly specified in this study, including the example of health and health care used above. Ultimately, the education variable SSER was removed from the growth function for reasons discussed later. Therefore, any explanatory power from the education variable is now contained in the error term. Since we know that there tends to be this correlation between initial income and social factors, a fixed-effects model would most accurately capture any bias created by these unspecified sources of heterogeneity.

In the early stages of this study, I had originally intended to include two dummy variables to account for geographical regional variance in both FDI receipts and growth. The two dummies - D_{EA} for East Asia, and D_{SSA} for Sub-Saharan Africa – were meant to

capture the different experiences of these two regions. For example, Sub-Saharan Africa has historically received a very small percentage of the FDI made available each year. According to the UNCTAD survey, the prospects of Sub-Saharan Africa remain low in terms of expected FDI flows; it ranked lowest in investment preferences for 2006 and is expected to remain in that position through 2009.⁷ Unique in the opposite direction is the experience of East Asia, which is expected to remain on top of the list of prospective foreign investment locations through 2009.

Unfortunately, the fixed effects model prohibits us from utilizing the dummy variables for the two geographic regions since it is possible to create a linear combination of the dummies for geography and the fixed effect such that there no longer exists a unique solution. This was seemingly problematic given that previous theory and evidence seem to point at the importance of isolating the impact of these two regions. East Asia and Sub-Saharan Africa consistently rank at the top and bottom, respectively, for FDI receipts, and to a lesser degree, growth. However, when either dependent variable is expressed as a function of East Asia and Sub-Saharan Africa only, the resultant F-statistic supports the exclusion of the geographic dummies.⁸ With F-statistics below the critical value of 3.01⁹, we can conclude that there is not a statistically significant relationship between the set of dummy variables and the dependent variable, FDI allocation or growth, respectively.

⁷ See Figure 8. “Investment preferences by host region, 2006 and 2007–2009” (UNCTAD survey, 2007, p. 24).

⁸ F-statistics were determined using OLS regressions for both functions. When FDI receipts is regressed as a function of the two dummy variables, the F-statistic equals 0.04. When GDP growth is regressed, the F-stat equals 0.46.

⁹ The critical value was determined given $p=2$ numerator degrees of freedom and $n-p-1=472$ denominator degrees of freedom. $F_{\alpha} = 3.01$.

4. Empirical Work

FDI ALLOCATION

According to the STATA-derived fixed effects estimation, FDI is a positive function of our variables for rule of law and trade (Table 3). In accordance with expectations, an increase in either of these two independent variables will increase the amount of FDI allocated to country i . Specifically, a one percentage-point increase in the ratio of trade to GDP, other things equal, will increase the FDI to GDP ratio by 0.09 percentage points. Similarly, a one-unit change in the rule of law indicator will increase the FDI ratio by 1.076 percentage points. However, since this rule of law indicator runs on a relatively small five-point scale, the potential for change is relatively limited in comparison to the other variables. With a t-statistic of 1.08, the rule of law variable is not even marginally significant at the 10% level. The absence of statistical significance here may be a direct consequence of the limited dataset. While we cannot be completely confident of the size of the influence that rule of law has on FDI receipts, the probability is relatively high that the relationship is positive.¹⁰ All the remaining variables in the function are significant at the 5% level, so we can be more confident in the accuracy of those estimators.

The R^2 indicates that this functional expression explains about 12% of the variation between observations within a country i . Conversely, this expression only explains about 7.5% of the variation observed between countries. This discrepancy indicates that factors like legal institutions and openness to trade are more significant for understanding changes in FDI receipts over time within a country, than between

¹⁰ The 95% confidence interval for the rule of law variable is [-0.8853841, 3.03797].

multiple locations. If this is the case, then other factors must be more significant for when firms are deciding between different locations. Davidson's work, "The Location of Foreign Direct Investment Activity," supports this last notion by arguing that cultural similarity, regional experience and geographic proximity are the most significant determinants of the location of FDI. I did not include such measures due to the difficulty of calculating these measures for use in a general model, but their exclusion would explain some of the disparity between the two values for R^2 . Regardless, the model for FDI allocation as specified exhibits a marginally positive relationship between rule of law and FDI receipts, even if this relationship is more relevant within a given country than between countries.

GDP GROWTH

The results of the fixed effects growth regression illustrate that GDP growth is a positive function of FDI receipts and rule of law (Table 4). While the coefficients on these two variables turned out in accordance with expectations, the coefficient on the variable of most interest to this study did not. The purpose of the GDP growth function was to analyze the additional impact that FDI inflows might have on growth if rule of law was adjusted. The regression presents a negative effect from this interaction term, which is contrary to what was expected. The partial derivative indicates that in level-form a one percentage-point increase in the FDI ratio will change GDP growth by $0.132 - 0.109rol$.¹¹ This derivative is a decreasing function, indicating that the effect on growth must at some point hit the zero-level and in turn, become negative. That critical

¹¹ $\partial GDP \text{ growth} / \partial FDI = 0.132 - 0.109rol$.

point is when rule of law equals 1.2.¹² If the rule of law indicator is estimated at below 1.2, then an increase in FDI flows would accelerate GDP growth. If rule of law is above 1.2, then any increases in FDI flows will decelerate GDP growth. Perhaps this critical value of 1.2 implies a maximization in the efficiency of a rule of law. In this study the rule of law has been captured as a linear function, but it is possible that it does not behavior linearly. This misspecification maybe why the regression results found the rule of law variable to be only minimally significant in all specifications of the growth equation.

Another possible explanation for the negative interaction variable is that the regression results are true. The rule of law variable as described in this study, is really a measure of the expected fairness in a legal institution. The underlying data ask whether rules are made, and whether they are followed through on. While we would all like to believe the best solution should be a maximization of said fairness, perhaps too much fairness disables the capacity of domestic individuals to capture the spillovers from FDI and translate them into domestic investment and growth. Foreign investors may be legally protected to the point where they are able to extract for themselves the entire benefit from their investment. As a result, there would be no spillovers available for the local individuals to capture.¹³ If the maximization of legal fairness reduces the availability of spillover to domestic agents, then there is a real possibility that rule of law reduces the GDP growth potential from foreign investment. However, I believe

¹² The critical value for rule of law is found by setting the partial derivative equal to zero and solving for rol.

¹³ The debate over ideal patent length in the realm of intellectual property law is akin to this notion.

that both the scope and level of sophistication in this study need to be developed before such concrete conclusions can be drawn.

The R^2 values indicate that about 5% of the variation observed within a given country can be explained by the growth regression used above, and about 27% of the variation between countries. From this we can understand that rule of law and FDI inflows explain more of the growth variation between countries than within a single country over time. This result would seem to support Zhang's work on the importance of country-specific characteristics. FDI and rule of law can explain about a quarter of the cross-country variation. However, other variables are more relevant to understanding growth within one country. Many such characteristics were not specified in this general model, and I may have excluded those characteristics that help countries capture the spillover effects from FDI most efficiently.

As a note, my original growth specification included a variable measuring secondary school enrollment rates as a way to control for differing levels of human capital. Human capital is often discussed as a country-specific variable that helps determine whether or not a country will be able to benefit from FDI spillovers. However, upon completing the regression analysis, it became clear that the scarcity of data for the SSER variable was an issue for producing statistically significant results. We lose data on 35 countries as a result of including the SSER variable in the growth specification. Without the data from these countries, our results are noticeably weakened. For example, the overall R^2 value rises from 0.0000 to 0.1797 by removing the SSER variable. Unfortunately, the education variable is very statistically significant in every specification of the growth regression. While considering the decision to drop

SSER, all of the statistics illustrate that the additional data observations make a positive difference. By dropping the SSER variable, the standard error on all other variables decreased and the explanatory power of the growth regression as a whole increased significantly. Had the availability of education data been more comprehensive, the SSER variable would have probably contributed positively to the results.¹⁴ Instead, I dropped the variable, and assume that by dropping it, the marginal effect of human capital on GDP growth is captured in the fixed effects error term. This is reasonable given that school enrollment rates as a source of heterogeneity are not likely to change much over the 10-year time frame. Consequently, the regression results are significantly strengthened and all but one variable become statistically significant at the 5% level (Table 4).

5. Conclusions

This study, while it may not have produced the exact results I was expected based upon my research, did produce some other interesting conclusions. First being that rule of law, or the expectation of legal fairness, does affect the decisions of firms investing abroad. I found that there was a positive, although not statistically significant estimate for the effect of ROL on FDI allocation. By utilizing the fixed-effects model, we were able to see that this rule of law may be more influential for firms as they increase or decrease their foreign investment within a given country, than for a firm looking to invest in one of several countries. In the latter situation, other factors like

¹⁴ Specification #3 has an R^2 for within a single country equal to 0.1238. The SSER variable is most likely responsible for the comparative increase between #4 and #3 of the explanatory power of the growth regression within countries. See Table 4.

cultural similarity, geographical proximity and other costs may play a greater role in the ultimate decision (Davidson).

Second, by looking at the interaction of ROL and FDI in the growth function, we saw that there was a negative and statistically significant result. While it is entirely possible that the results are capturing the actual relationship between these two factors, I believe that there maybe some misspecification error. This misspecification maybe in the statistics, or it may be in the data itself. It is possible that there is a different indicator or measure that more accurately describes the legal incentives for investing firms. I would like to see this study expanded on with regards to time and specifications, so as to resolve this issue. It would also be interesting to see how the results change as data from additional years are added to the WGI study database.

As these results stand now, however, we can begin to make implications for policy. The positive relationship between ROL and FDI allocation means that countries looking to increase their share of such investment should be working to increase and enforce lawfulness. International aid directed at reworking legal institutions, if successful, should attract additional foreign investment. We also saw that FDI is expected to increase GDP growth rates when ROL is below the critical value of 1.2. It would then appear reasonable to increase foreign investment as a way to promote economic growth in developing countries, as these are typically the countries with lower levels of developed legal institutions.

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Appendix

Table 1

Variable	Description	Source
Annualized GDP Growth	GDP growth annualized over three periods, 1996-2000, 2000-2003 and 2003-2006	World Bank, World Development Indicators
Per Capita PPP	GDP per capita converted using PPP rates. Data in constant 2000 international \$.	World Bank, World Development Indicators
Foreign Direct Investment	Net inflows, measured as % of GDP	World Bank, World Development Indicators
Trade	Sum of exports and imported goods and services, measured as % of GDP	World Bank, World Development Indicators
Secondary School Enrollment Rate	Ratio of children at official school age enrolled in secondary school to number of official school age children in population	World Bank, World Development Indicators
Rule of Law	Extent to which agents have confidence in and abide by the rules of society (-2.5:2.5 scale)	Kaufmann, Kraay, Mastruzzi, World Governance Indicators (2006)
East Asia Dummy		
Sub-Saharan Africa Dummy		

Appendix

Table 2

Albania	Egypt, Arab Rep.	Lesotho [^]	Spain
Algeria	El Salvador	Lithuania	Sri Lanka
Angola [^]	Equatorial Guinea [^]	Macedonia, FYR	St. Kitts and Nevis
Argentina	Eritrea [^]	Madagascar [^]	St. Lucia
Armenia	Estonia	Malawi [^]	St. Vincent and the Grenadines
Australia	Ethiopia [^]	Malaysia*	Sudan [^]
Austria	Fiji*	Mali [^]	Swaziland [^]
Azerbaijan	Finland	Mauritania [^]	Sweden
Bangladesh	France	Mauritius [^]	Switzerland
Belarus	Gabon [^]	Mexico	Syrian Arab Republic
Belgium	Gambia, The [^]	Moldova	Tajikistan
Belize	Georgia	Mongolia*	Tanzania [^]
Benin [^]	Germany	Morocco	Thailand
Bhutan	Ghana [^]	Mozambique [^]	Togo [^]
Bolivia	Greece	Nepal	Tonga*
Botswana [^]	Grenada	Netherlands	Trinidad and Tobago
Brazil	Guatemala	New Zealand	Tunisia
Bulgaria	Guinea [^]	Nicaragua	Turkey
Burkina Faso [^]	Guinea-Bissau [^]	Niger [^]	Uganda [^]
Burundi [^]	Guyana	Nigeria [^]	Ukraine
Cambodia*	Haiti	Norway	United Kingdom
Cameroon [^]	Honduras	Oman	United States
Canada	Hong Kong, China*	Pakistan	Uruguay
Cape Verde [^]	Hungary	Panama	Uzbekistan
Central African Republic [^]	Iceland	Papua New Guinea*	Vanuatu*
Chad [^]	India	Paraguay	Venezuela, RB
Chile	Indonesia*	Peru	Vietnam*
China*	Iran, Islamic Rep.	Philippines*	Yemen, Rep.
Colombia	Ireland	Poland	Zambia [^]
Comoros [^]	Israel	Portugal	Zimbabwe [^]
Congo, Dem. Rep. [^]	Italy	Romania	
Congo, Rep. [^]	Jamaica	Russian Federation	
Costa Rica	Japan	Rwanda [^]	
Cote d'Ivoire [^]	Jordan	Samoa*	
Croatia	Kazakhstan	Senegal [^]	
Cyprus	Kenya [^]	Seychelles [^]	
Czech Republic	Korea, Rep.*	Sierra Leone [^]	
Denmark	Kuwait	Singapore*	
Djibouti	Kyrgyz Republic	Slovak Republic	
Dominica	Lao PDR*	Slovenia	
Dominican Republic	Latvia	Solomon Islands	
Ecuador	Lebanon	South Africa [^]	

* East Asia

[^] Sub-Saharan Africa

Appendix

Table 3

Regression Estimates
(Estimated Standard Error in Parentheses)
Dependent Variable: FDI

Fixed Effects Regression		
Variable	Estimated Coefficient (Standard Error)	
	<u>Specification #1^a</u>	<u>Specification #2</u>
Intercept	31.78243** (11.24101)	32.74263** (111.27304)
Log of Initial Income	-4.169735** (1.340296)	-4.276994** (1.343603)
Rule of Law (ROL)	-	1.076293 (0.9968229)
Trade	0.0893072** (0.0153268)	0.0896648** (0.0153262)
Number of Observations	457	457
Number of Groups	155	155
R ²	0.0541	0.0674
within	0.1190	0.1224
between	0.0597	0.0748

a. Specification #1 excludes Rule of Law variable

** Statistically significant at the 5% level.

Appendix

Table 4

Regression Estimates
(Estimated Standard Error in Parentheses)
Dependent Variable: GDP Growth

Fixed Effects Regression				
Variable	Estimated Coefficient (Standard Error)			
<u>#4^c</u>	<u>Specification #1^a</u>	<u>Specification #2^b</u>	<u>Specification #3</u>	<u>Specification</u>
Intercept	-15.29068 (12.65654)	-17.22211 (12.73317)	-11.78542 (12.65029)	13.31163 (10.03972)
Log of Initial Income	0.8178933 (1.570738)	1.086167 (1.579893)	0.3257639 (1.1573976)	-1.142421 (1.187432)
Foreign Direct Investment (FDI)	0.0816798* (0.050679)	-	0.1228245** (0.0527605)	0.1317737** (0.0474955)
Rule of Law (ROL)	-	-0.2403315 (0.9035675)	0.2939265 (0.917873)	0.426406 (0.8552972)
FDI*ROL	-	-	-0.112839** (0.045352)	-0.1085036** (0.0399695)
Secondary School Enrollment (SSER)	0.1945233** (0.0525651)	0.194618 ** (0.0529448)	0.2037064** (0.052203)	-
Number of Observations	321	321	321	465
Number of Groups	120	120	120	155
R ²	0.0027	0.0049	0.0000	0.1797
Within	0.0957	0.0842	0.1238	0.0570
Between	0.0087	0.0132	0.0006	0.2708

- a. Specification #1 excludes Rule of Law variable
b. Specification #2 excludes FDI variable
c. Specification #4 excludes SSER variable

*Statistically significant at the 10% level.
**Statistically significant at the 5% level.