

# Democracy, Property Rights and FDI in Developing Countries A Regional Analysis

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## **Abstract**

*The effect of institutional change on economic outcomes is a growing area of interest: academic and otherwise. This paper examines the influence of democracy and property rights on foreign direct investment (FDI), using data from 54 developing and transitional countries, between 1986 and 1997. Democracy and property rights are both shown to positively affect per capita FDI inflows generally; however, this paper finds regional differences in the relationship between institutions and FDI – driven largely by regional and country-specific idiosyncrasies – suggesting the absence of a consistent relationship between institutions and FDI inflows.*

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## 1. Introduction

Ideals of democratic governance and well-defined, well-protected property rights carry substantial importance in the realms of foreign policy, international business, and most recently, among scholars of economic development.<sup>1</sup> Many political, social and economic scholars (North 1990, for example) have suggested an important role for political and legal institutions in determining economic outcomes; for instance, regarding the effect of democratic governance or well-defined and protected property rights on economic growth. However, the effects of these institutions on the choices of multinational enterprises (MNEs), and ultimately on flows of foreign direct investment (FDI), have only recently captured substantial academic interest. Several authors (Jensen 2003, Li and Resnick 2003 and Jakobsen and de Soysa 2006, for example) have suggested that MNEs “reward” or “punish” particular institutional arrangements through their FDI decisions. These studies, however, often assume that multinational enterprises’ preferences for institutions are homogenous across quite different regional and national contexts.

This paper examines the relationship between two particular institutional features – democratic governance and property rights – and foreign direct investment inflows to developing countries. While ongoing debate surrounding this relationship has revealed significant insight, few scholars have gone beyond examining how institutional forms affect FDI decisions *in general*. Thus, this paper contributes to literature on foreign direct investment by examining the relationship between democracy, property rights and FDI

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<sup>1</sup> Sen (2000) highlights the importance of political freedoms in the process of development, while Evans (2004a), Evans (2004b) and Portes (2006) highlight the challenges of institutional development in the developing world, suggesting that the formation and adoption of uniform institutional ‘blueprints,’ can conflict with local values, norms, mores and societal roles. They suggest a more deliberative process as a method of institutional change.

within regional contexts, highlighting the absence of a homogenous relationship between institutions and FDI across regions.

The paper is organized as follows. Section two examines the case of governance, property rights and foreign direct investment in China, giving both context and motivation to this study. Section three provides a review of relevant theoretical and empirical literature, paying particular attention to the measurement of institutions and determinants of FDI. Section four presents a conceptual model of FDI, democracy and property rights. Section five discusses the ideal and actual data used in this study. Section six introduces empirical models, and presents the results of these models. Finally, section seven concludes and provides directions for further investigation.

## **2. Governance, Property Rights and FDI in China**

The complexity of relationships between systems of governance, property rights protection and the decisions of foreign investors is clear from the case of China. This brief case study does not seek to thoroughly analyze property rights, governance and foreign investment in China. Instead, it introduces deeper complexity surrounding issues of property rights and governance; thereby motivating and placing this study in a broader discussion.

In a *Newsweek* article, Schafer (2007) notes that China, the burgeoning economy far outpaces the process of legal reform, suggesting:

Though education levels are rising, for example, many judges, lawyers and prosecutors remain poorly trained. Cases are still often decided by bribes and political connections. And the [Communist] party shows no sign of ceding its control – almost all judges are party members and required to obey its orders (Schafer 2007).

The legal mechanisms through which citizens and firms can claim their rights are ineffective and remain under government supervision. However, Schafer suggests that in spite of its rudimentary court systems, China has seen booming economic growth and massive quantities of foreign investment. As she explains, “The secret: entrepreneurs have found a variety of creative solutions to get around China's unreliable courts. These include seeking mediation for business disputes from sympathetic party officials, enforcing contracts by threatening to go elsewhere, and protecting trade secrets with heightened security” (Schafer 2007). Where formal legal systems leave a gap, informal mechanisms have come to carry greater importance. However, without clearly delineated rights to property, one might question how far one of the world’s fastest-growing economies can go before the absence of formal institutions becomes a heavy burden.

With regard to social and political rights, Chinese citizens often fall victim to the loss of rights to property for the sake of state-led development. One recent high-profile story involves a couple who struggled to protect their house, located on the site of a government-backed development project, from demolition. A Los Angeles Times article quotes a Chinese sociology professor, saying that “they should leave this house standing as a monument to the Chinese people's struggle for property rights” (LA Times 2007a).

Economic activity, too, suffers from a lack of well-defined property rights. A report from Intellectual Property Rights Today suggests that “while many U.S. companies have been successful in China, foreign businesses tend to underestimate the challenges encountered when doing business in China” (Bates 2006). Particularly, the report notes that an erratic and unpredictable business environment; mercantilist, state controlled and export-oriented economic policy; and differences in cultural views of

intellectual property present challenges to foreign firms operating in China (Bates 2006). While business appears to flourish in China, many suggest that the absence of well-defined, well-enforced property rights constitutes a distinct challenge to foreign firms. However, some changes are occurring in China's legal system, notably the recent adoption of a comprehensive Property Law.

The National People's Congress of China, the body that formally makes the decisions mandated by the Chinese Communist Party, has recently recognized the precarious Chinese property rights situation; pushing a hotly debated property rights policy into law. The law (adopted on March 16, 2007) aims to "maintain the basic economic system of the country, maintain the order of market economy under socialism, ascertain the ownership of property, apply the effect of property and protect the rights of the property owner" by allowing for the registration of land use rights (the Chinese government still owns all land), registration of immovable property (such as houses and other structures), and providing new mechanisms for the enforcement of such rights (Mondaq Business Briefing 2007). One business news service explains that "although the new Property Law is not expected to directly impact foreign business in or involved with China, these laws institutionalizing private property ownership rights are expected to eventually bring large scale changes to China that will necessarily affect all businesses there" (Mondaq Business Briefing 2007).

The relationship between property rights, governance and the activities of foreign firms in China is enormously complex and rapidly changing. While the Communist Party retains control of government decision-making processes, the party has recently passed important property rights legislation. However, there are deep paradoxes between

Communist control and private property rights, requiring a critical look at how property rights systems are conceived and enforced in a Communist regime. Referring to the couple famous for defending their home from demolition, one Chinese blogger writes (as cited by a Los Angeles Times article), “if they forcibly tear down the house then the new Chinese property law is nothing but a blank piece of paper” (LA Times 2007b). Property rights and governance structures, it seems, are complex institutions. This paper aims to remain mindful of this complexity when empirically examining these institutions.

### **3. A Review of Theoretical and Empirical Literature**

#### *3.1 Theoretic Background*

Theoretical explanations of foreign direct investment, according to Agarwal (1980) fall into four overlapping categories: i) assuming the perfection of national factor and product markets (e.g. rates of return and risk of FDI), ii) considering market imperfections (e.g. information uncertainty, commitment problems and imperfect market structures), iii) addressing firm-specific reasons for investment (e.g. internalization advantages), and finally iv) considering host country conditions for FDI (e.g. political instability, labor costs and incentives for FDI). In the spirit of this last category, Schneider and Frey (1985) consider host country economic and political determinants of FDI. Potential sources of profitable foreign investment include the size of the local market, the level of and continued potential for economic growth, and workforce skill. Potential risks include balance of payments deficits, inflation rates, multilateral development aid and political instability.

An important advance in FDI theory is Dunning's (1988, 1993, 2001) eclectic paradigm of international production, originally proposed as a new way of explaining both the initial decision of firms to participate in foreign direct investment, as well as the subsequent growth of FDI. In this framework, the structure and intensity of a multinational enterprise's (MNE's) foreign direct investment depend on three specific considerations: ownership-specific advantages, internalization advantages, and location-specific advantages. Ownership-specific advantages come largely in the form of firm-specific intangible and intellectual assets, as well as common governance of productive activities across national boundaries. Ownership-specific advantages are integral to the capacity of a firm to increase value added by productive activities. Internalization advantages reflect greater organizational efficiencies and hierarchies, as well as a firm's ability to exercise monopoly power, due to control and ownership over productive assets. By exploiting internal economies and efficiencies, and by gaining monopolistic power within local economies, firms can further enhance the profitability of their foreign productive activities. Finally, location-specific advantages include resource endowments, market size, quality, price and productivity of inputs, as well as country-specific political, social and institutional environments that enable a firm's ownership-specific and internalization advantages.

Dunning (2001) suggests a strong role for institutional considerations in his framework, noting that "depending on the extent to which the country is able to create a satisfactory legal system, commercial infrastructure and business culture," the location-specific advantages will increase, and inward foreign direct investment to a country will grow (Dunning 2001, p. 181). Li and Resnick (2003) expand on this, noting that "host

government policies create location-specific conditions that affect how well a firm can exploit its advantages” (Li and Resnick 2003, p. 180).

With regard to democracy and property rights specifically, Li and Resnick (2003) argue that democratic governance contributes positively to FDI inflows through its contribution to the provision and protection of property rights across time; a claim substantiated by Olson (1993) and McGuire and Olson (1996). Outside of its contribution to property rights, however, Li and Resnick argue that democratic governance hinders FDI inflows through three potential mechanisms. First, democratic governance limits the ability of MNEs to exploit a monopolistic or oligopolistic position, in effect placing the public interest above the interest of MNEs. Second, democratic governance affects host country industrial policy so as to protect indigenous firms from multinational competitors, again by placing domestic concerns above MNE interests. Third, democracy impacts the fiscal and financial incentives offered to foreign capital.

In a more recent paper, Jakobsen and de Soysa (2006) suggest that in addition to protecting property rights, democratization is related to open cross-border trade and high levels of workforce education – conditions that are expected to attract more FDI. Further, they argue that MNEs might seek democratic countries for their well-established competitive markets, rather than simply to secure monopolistic positions. Finally, Jakobsen and de Soysa argue that democracies, in representing their own national interest, may seek the investment of MNEs as a tool for economic development, instead of protecting rent-seeking domestic firms.

Theoretic literature reviewed here places consideration of political and legal institutions within the context of multinational enterprises’ decision-making process.



Democracy is seen to enable firm-specific advantages by providing and protecting property rights. Outside of its contribution to property rights, the effect of democratic governance on FDI flows is hotly contested. However, each side of this debate assumes a consistently applicable relationship between institutional features and property rights. While political and legal institutions are undoubtedly important to FDI decisions, the consistency of their effects on FDI flows to vastly different regions and nations may not be as obvious as some authors purport.

### *3.2 Empirical Literature*

This section outlines previous empirical research focused on the measurement of institutions (specifically property rights and democracy), as well as the effect of these institutions on economic outcomes. This section continues with a discussion of literature that has empirically examined the determinants of foreign direct investment.

A number of recent empirical studies have examined the effect of institutional characteristics on economic outcomes, with particular attention given to the measurement of institutions.<sup>2</sup> Barro (1994) examines the effect of democracy on economic growth, measuring democracy using the Gastil Index of political rights.<sup>3</sup> He controls for rule of law using a measure developed by the International Country Risk Guide (ICRG), a political risk consulting service, and accounts for other variables typical in explaining growth, and finds that apart from contributing to growth through greater rule of law, free

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<sup>2</sup> Important advances in understanding and measuring the relationship between institutional characteristics and economic outcomes have been made by Acemoglu, Johnson and Robinson (2001 and 2004), who proxy institutional characteristics using 1500s and 1900s urbanization and colonization data. Though these studies present a fascinating approach to measuring institutional characteristics, their relevance to the current paper does not merit detailed attention.

<sup>3</sup> The Gastil Index was developed by the Freedom House. The index captures political rights along a single continuum from 1 to 7. However, the index does not measure various components of *institutionalized* democracy and the structure of governance. Using this index as a measure of democracy thus places political rights as the sole characteristic of democracy.

markets, small government consumption and high human capital, democracy is weakly and negatively related to GDP growth. Leblang (1996) examines the impact of both democracy and property rights on economic growth, measuring democracy using the Polity II dataset<sup>4</sup> and property rights using two proxy variables; exchange controls and total credit allocated to private sector investment as a percentage of GDP. He finds that while property rights contribute significantly to economic growth, democracy has no significant effect on growth outside of its contribution to the security of property rights.

Knack and Keefer (1995 and 1997) evaluate the effect of property rights institutions on economic growth, using two new measures of property rights. One measure of property rights is based on data from a business risk consulting firm called Business Environmental Risk Intelligence (BERI). This index of property rights is constructed by aggregating four components: contract enforceability, infrastructure quality, nationalization potential and bureaucratic delays. A second measure of property rights is based on data from a similar firm, International Country Risk Guide (ICRG). Similarly, the index is constructed by aggregating five components: expropriation risk, rule of law, repudiation of contracts by government, corruption in government and quality of bureaucracy. Knack and Keefer find evidence that using both measures, property rights strongly influence rates of economic growth and the convergence in per capita income between high and low-income countries.

Empirical literature examining the determinants of FDI inflows tends to neglect treatment of democratic governance and property rights, instead often seeking to capture

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<sup>4</sup> Polity II, and the more recent Polity III and Polity IV datasets, measures democracy as an index ranging from -10 (autocracy) to +10 (democracy). This index is constructed by aggregating five components: political competition, competitiveness of executive recruitment, openness of executive recruitment, and existence of constraints on the executive branch of government.

some element of political and social instability as a determinant of investment risk. For example, Schneider and Frey (1985) examine the determinants of variations in per-capita FDI inflows across 80 developing countries, finding market size (measured as GDP), balance of payments deficit, bilateral aid (from both western and communist countries) and political instability to be significant determinants of foreign direct investment. Similarly, Jun and Singh (1996) find that across a panel of developing countries, political risk and business operating conditions (measured using BERI data on business operating risk), as well as market size, economic growth, time effects and export orientation, significantly determine variations in FDI inflows as a share of GDP, across a panel of developing countries.

Several recent papers have given specific empirical attention to the role of democratic governance and property rights in foreign direct investment. Jensen (2003) examines the effect of democracy (measured using Polity III data) on the ratio of FDI to GDP across a panel of countries, finding that using ordinary least squares estimates, democracy positively affects FDI inflows. Li and Resnick (2003) examine the effect of both democracy (measured using Polity IV data) and property rights (measured using a property rights index developed by Knack and Keefer, based on data from ICRG) on total FDI inflows across countries and time. Li and Resnick find evidence that controlling for market size, regime durability, economic growth, exchange rate volatility and other economic determinants, and estimating the relationship with a correction for first-order serial correlation, democracy negatively affects FDI inflows, while property rights protection positively affects FDI inflows.

Finally, Jakobsen and de Soysa (2006) suggest bias in Li and Resnick's estimates, due to the use of an untransformed and highly skewed measure of FDI, as well as the unaccounted-for inclusion of China in the sample. Once these errors are corrected, democracy (measured using both Polity IV data and the Freedom House index of political and civil rights) and property rights (measured using an index based on ICRG data) both increase flows of FDI, using a similar estimation method as Li and Resnick.

Recent empirical literature has developed a variety of techniques to measure both democracy and property rights, and in addition, several studies have examined the effect of institutional variables on FDI inflows, finding that while property rights generally increase FDI inflows, the empirical relationship between democracy and FDI is complex and uncertain. However, the literature presented here has examined the relationship between institutions and FDI in general, across all countries, potentially obscuring differences between particular regions and countries. Appendix one presents a summary of the empirical literature presented here, measurements used, and relevant findings.

#### **4. A Conceptual Model of Democracy, Property Rights and FDI**

As described above, Dunning's conceptual framework for understanding international production rests on three sources of advantages for the multinational enterprise (MNE); ownership-specific, internalization, and location-specific advantages. When considering determinants of FDI inflows to developing countries, it is important to note how the location-specific advantages of particular countries – particularly their economic, political, legal and social environments – facilitate and enable firms'

ownership-specific and internalization advantages (see Dunning 2001; Jensen 2003; Li and Resnick 2003; Jakobsen and de Soysa 2006).

North (1990) defines property rights as “the rights individuals appropriate over their own labor and the goods and services they possess. Appropriation is a function of legal rules, organizational forms, enforcement, and norms of behavior – that is, the institutional framework” (North 1990, p. 33). Property rights are expected to increase FDI inflows by effectively allowing firms security of ownership and use of their physical and intangible assets, by ensuring effective registration and enforcement mechanisms, and finally, by protecting a firm’s assets from government expropriation. Given the complexity of property rights institutions, qualitatively ‘good’ property rights may take a wide variety of forms. For instance, one country may provide legal and political protection of property rights for foreign investors, while another may allow only citizens to hold formal titles to land. While ‘better’ property rights are thought to support economic activity, ‘good’ property rights may support the economic function of one group at the exclusion of another (e.g. rights for MNEs and not citizens, or vice versa).

The concept of democracy has been the subject of countless political debates and philosophical inquiries. Most simply, democracy implies the rule of the people, by direct (consensus-based) or indirect (representative-based) means. In addition to a specific institutional structure, democracy also implies a particular set of rights and freedoms of citizens, allowing for both institutional expression and legal protection of the public interest. In this regard, democracy is often thought to be the only form of political organization capable of providing and protecting individual rights to property in the long

run (Olson 1993; McGuire and Olson 1996). Thus, democracy is potentially supportive of the activities of MNEs, thereby attracting greater FDI inflows.

However, recent theoretic and empirical literature (again, Jensen 2003; Li and Resnick 2003; Jakobsen and de Soysa 2006) suggests that outside of its contribution to property rights, democracy has a notably ambiguous effect on FDI inflows. Democratic governance potentially restrains monopoly-seeking MNEs and reduces domestic incentives made available to foreign capital, in efforts to protect the rights and interests of domestic firms and citizens. Democratic governance might also provide higher investments in human capital and openness to international trade, and in addition, might pursue FDI as a tool for economic development, similarly motivated by the rights and interests of domestic citizens and firms. In all, different democratic countries may actively constrain or seek FDI inflows for different reasons.

Finally, democracy and property rights likely symbolize institutional credibility to MNEs. In this sense, multinationals may select democratic and property rights-protecting institutions because they perceive these institutions to be credible, legitimate havens for their capital. Democracies potentially gain their credibility by providing political stability and consistency, whereas the stability of autocratic governments often depends on the character of the ruling elite. Property rights, similarly, can gain their legitimacy by providing stable and consistent formal legal definition and protection of property, thereby structuring and ordering repeated economic interactions.

In order to reduce this theoretic framework to testable hypotheses, this conceptual model must introduce several important control variables, typical in FDI studies. These include the size of the domestic market, openness to trade, economic stability and

political stability; all expected to positively affect FDI inflows. From the discussion above, the expected effect of democracy on FDI inflows is ambiguous, while the expected effect of property rights on FDI inflows is generally positive. Further, this relationship is likely to differ by region, due to regional and national particularities and idiosyncrasies; regarding both the nature and structure of institutions and regional and country-specific FDI situations. To summarize a basic form of this model, in country  $i$ , year  $t$  and region  $j$ :

$$\text{FDI Inflows}_{it} = f(\text{Democracy}_{jit} (+ / -), \text{Property Rights}_{jit} (+), \text{Market Size}_{it} (+), \text{Trade Openness}_{it} (+), \text{Economic Stability}_{it} (+), \text{Political Stability}_{it} (+), \text{Region}_j (+ / -))$$

## 5. Data

### 5.1 *Ideal Data*

Measuring institutional characteristics poses a significant challenge, as demonstrated by the variety of measurements used by past authors.<sup>5</sup> Ideal measures of democracy will reflect the civil and political rights of citizens, their level of political engagement, as well the competitiveness and openness of elections, and constraints placed upon the government. These concepts are difficult to express numerically, and while easily quantifiable data (voter participation rates, for example) would allow for more direct interpretation and more tangible results, most fail to capture multiple elements of democracy and democratic governance. In this sense, an idea measure of democracy would capture a range of important components of democracy's complex institutional structure.

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<sup>5</sup> This paper's ideal measure of democracy is drawn heavily from Barro (1994), Leblang (1996), Jensen (2003), Li and Resnick (2003) and Jakobsen and de Soysa (2006), each of which briefly discuss how best to measure democratic governance. Measures of property rights rely largely on the work of Knack and Keefer (1995 and 1997), as well as discussions in Leblang (1996), Li and Resnick (2003) and Jakobsen and de Soysa (2006).

Similarly, an ideal measure of property rights will reflect a number of elements; enforcement of contracts by the government, the risk of government expropriation of property, the quality and efficiency of government bureaucracy, and the general rule of law all contribute to the security of rights to property. Again, these concepts are not easily quantified and any evaluation thereof may be somewhat subjective. In addition, without a substantial history of credible and reliable property rights, a country might reflect the characteristics of 'good' property rights and fail to gain the confidence of investors. In this sense, a measure of property rights might incorporate a temporal component, as a more durable property rights system will likely attract significantly more investment than a less durable system.

Foreign direct investment inflows are best measured as all inflows of foreign capital that grant control and operating ownership of assets (or liabilities) purchased or created in the host country. In other terms, FDI inflows are ideally measured as the net of assets and liabilities controlled and owned by foreign bodies, purchased in a given year.

As for control variables that influence the risk and profitability of foreign direct investment, an ideal measure of market size will reflect both the scope and buying power of the domestic market. Trade openness is ideally measured by the scope of a nation's international trade, relative to the size of the domestic economy. Economic stability is best measured by the capacity of an economy to respond to stresses and shocks, rather than simply measuring the stresses and shocks themselves. Maintaining economic stability is often dependent on a nation's central bank, and the resources available to respond to economy-wide stresses and shocks. Political stability will ideally be measured as the absence of political violence or upheaval, although there is some disagreement as



to whether political stability is best represented by broad indices of political risk or measures of specific instances of political violence.

## 5.2 Actual Data

This paper examines a panel of 54 developing countries<sup>6</sup> from 1986 through 1997.<sup>7</sup> The countries are distributed across Asia, Eastern Europe, Latin America, the Middle East and North Africa, and Sub-Saharan Africa. Countries used in this study – and their regional classifications – are listed in appendix two of this paper.

Unfortunately, and as indicated by the discussion above, measuring institutional arrangements presents serious challenges and limitations. In measuring democracy, this paper follows a number of previous authors, and uses the Polity IV *polity* variable, a composite measure of institutionalized democracy and autocracy. This variable ranges from -10 (complete autocracy) to +10 (complete democracy), and is constructed by aggregating five components: competitiveness of executive recruitment, openness of executive recruitment, constraints on the chief executive, regulation of political participation, and competitiveness of political participation. Each of these components is evaluated systematically and consistently across countries. Although this measure largely focuses on the institutional aspect of democracy, and not the rights and responsibilities of citizens in democratic societies (something captured by the Gastil Index of political rights, at the exclusion of institutional aspects of democracy), this paper assumes that

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<sup>6</sup> Countries used in this study are listed in the appendix. For the purposes of this paper, developing countries are countries with a maximum GDP per capita of less than \$10,000 per capita (in constant 2000 dollars) in any year in the sample.

<sup>7</sup> Though the data covers 56 countries from 1986 through 1997, some countries have as few as 8 observations (years), while others have the full 12. Allowing for some imbalances in this panel allow the analysis to incorporate a broader range of countries. If limited to the full series of 12 years for each country, the size of the panel drops to 29 countries, significantly reducing the sample size. However, the use of an unbalanced panel limits empirical techniques available, such as correction for panel-specific serial correlation. Results from balanced-panel GLS regressions, uncorrected and corrected for serial correlation, are listed in appendix two of this paper.

those rights and responsibilities are embedded in the institutional structure of democracy, and Polity IV's *polity* measure sufficiently captures a wide range of characteristics of democratic nations. Polity IV data were obtained through the Polity IV Project, a research project supported by the Center for International Development and Conflict Management at the University of Maryland and the Center for Global Policy at George Mason University.

Property rights, following previous studies, are represented using an index of property rights developed by Knack and Keefer, based on data from the International Country Risk Guide (ICRG). This index is made up of five components, representing both the quality of governance and the structure and organization of legal rights to property. These include risk of expropriation of property, repudiation of contracts by the government, bureaucratic quality, rule of law and corruption in the government. While risk of expropriation and repudiation of contracts by the government are measured on a scale of 1 to 10, with higher values representing lower risk of expropriation and better enforcement of contracts, the other three components are measured on a scale of 0 to 6, with higher values representing qualitatively 'better' conditions, as above. Following previous authors, each of these components is adjusted to a scale of 0 to 10, so that each component carries equal weight in the index. The components are then summed, creating an index of property rights potentially ranging from 0 to 50, though within the considered countries and years, the index ranges from 6.1 to 46.7. As in each of its components, higher values indicate 'better' property rights.

While these data capture a general quality of property rights systems, any evaluation of property rights systems fails to account for specific features of property

rights systems or various informal aspects of property rights. The ICRG indices on which this paper's measure of property rights rely provide a general sense of the quality of property rights in each country, while obscuring specific differences in property rights systems between countries. For instance, within the data used for this paper, the average property rights measure for China and Romania are similar (32.39 in China, 32.15 in Romania). However, anecdotal evidence suggests that property rights are enforced for most foreign investors in China through both formal and informal means, and many Chinese individuals and firms face threats of expropriation and seizure of property (Economist 2007). Contrastingly, a real estate firm in Romania explains that foreign individuals and companies can own movable assets, but not land in Romania (A1 Real Estate 2007). Effectively, these two countries with similar property rights scores have very different mechanisms by which property rights are defined and enforced. Data on property rights components were obtained through the Political Risk Group website, in Knack and Keefer's IRIS-3 dataset.

The dependent variable, foreign direct investment, is measured as the natural logarithm of net inflows of foreign direct investment (as measured in balance of payments data) per capita.<sup>8</sup> Data on FDI net inflows and population were obtained through the World Bank's *World Development Indicators*.

As for control variables, market size is represented by a scale variable (the natural logarithm of GDP in constant 2000 USD) showing economic size and a per-capita income variable (the natural logarithm of GDP per capita in constant 2000 USD) showing

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<sup>8</sup> Data on foreign direct investment is highly skewed, with few observations of incredibly high FDI inflows occupying the upper tail of the distribution. Using a per-capita measure of FDI inflows adjusts for the size of a country, and the natural logarithm corrects for some of the skewedness of the distribution, making the distribution more normal. Further, using the natural logarithm allows for some coefficients to be interpreted as elasticities. See appendix two for a comparison of transformed and untransformed variables.

the level of economic development. Trade openness is represented the sum of imports and exports as a percentage of GDP. Economic stability is measured as total reserves divided by imports. Political stability is measured as an index of civil war risk, which ranges from 0 (low stability) to 100 (high stability), based on data from ICRG. Data on total GDP, population, total imports, total exports, and total reserves were obtained from the *World Development Indicators*. ICRG data on civil war risk was obtained through a World Bank dataset called *A New Database on Foreign Direct Investment*.

Basic descriptive statistics for the entire sample and by region, country-specific statistics, a list of countries included in the analysis, and correlations between variables are included in appendix two of this paper.

## **6. Econometric Models and Results**

This section presents three empirical models and their results. The first examines a linear relationship between institutional variables and FDI across all countries; the second considers the possibility of nonlinear relationships between institutional variables and FDI; and the third considers possible regional differences in the relationship between institutional variables and FDI. Before presenting these models and their results, a number of estimation issues must be considered. First, this paper considers a panel of countries through time. The effect of institutional variables on FDI inflows might differ between cross-sectional variation and within-country variation across time; requiring the use of between effects, fixed effects and random effects estimators to capture different sources of variation. Second, the panel data used in this paper presents empirical issues of heteroskedasticity and serial correlation, implying the use of a generalized least squares

(GLS) estimator for correction. Correcting for serial correlation does not dramatically change coefficient estimates for a limited, balanced-panel sample (see appendix two), and in order to capture a wider panel of countries, this paper cautiously considers heteroskedasticity-corrected GLS estimations to be sufficient.

### 6.1 A Basic Model of FDI, Democracy and Property Rights

#### Empirical Model

$$\begin{aligned} \text{Log}(FDI / Cap)_{it} = & \beta_0 + \beta_1 \text{Log}(GDP)_{it} + \beta_2 \text{Log}(GDP / Cap)_{it} + \beta_3 \text{TRADE}_{it} + \\ & \beta_4 \text{RESERVES}_{it} + \beta_5 \text{CIVIL\_WAR}_{it} + \beta_6 \text{DEMOCRACY}_{it} + \\ & \beta_7 \text{PROPERTY\_RIGHTS}_{it} + u_{it} \end{aligned}$$

$\text{Log}(FDI/Cap)_{it}$  represents the natural logarithm of foreign direct investment net inflows per capita in country  $i$  and year  $t$ .  $\text{Log}(GDP)_{it}$  is the natural logarithm of GDP in country  $i$  and year  $t$ .  $\text{Log}(GDP/Cap)_{it}$  is the natural logarithm of GDP per capita in country  $i$  and year  $t$ .  $\text{TRADE}_{it}$  is imports plus exports as a percentage of GDP in country  $i$  and year  $t$ ,  $\text{RESERVES}_{it}$  is total reserves as a percentage of total imports in country  $i$  and year  $t$ , and  $\text{CIVIL\_WAR}_{it}$  is an index indicating the severity of the threat of civil war (with higher values indicating higher political stability), in country  $i$  and year  $t$ .  $\text{DEMOCRACY}_{it}$  is the *polity* score of country  $i$  in year  $t$ , and  $\text{PROPERTY\_RIGHTS}_{it}$  is the index of property rights protection, as described in the data section above, in country  $i$  and year  $t$ . In this model,  $u_{it}$  is a random effects error term, capturing both individual country and time effects.

As suggested by this paper's conceptual model developed above, the expected sign on  $\beta_6$  is ambiguous, while  $\beta_7$  should be positive, as democratic governance appears to have conflicting effects on FDI inflows, while property rights are generally supportive of FDI inflows. The expected signs of  $\beta_1$ ,  $\beta_2$ ,  $\beta_3$ ,  $\beta_4$  and  $\beta_5$  are positive.

## Results

Table 1 presents the results of between effects, fixed effects, random effects, and heteroskedasticity-corrected GLS estimators. A Hausman test between random effects and fixed effects estimators indicates that the model is best described by the more efficient random effects estimator. This is likely because the use of a per-capita and natural log transformed dependent variable reduces the amount of variation between countries to be explained by a given estimator.

The results from each estimation technique are generally aligned with theoretical predictions. Democracy, controlling for property rights and other control variables, is shown to have a positive and statistically significant effect on FDI inflows in all four estimations. A 1-unit increase in the *polity* score (ranging from -10 to 10) causes a 2.3 percent increase in FDI inflows per capita in the between effects estimation, a 6.3 percent increase in per capita FDI inflows in the fixed effects estimation, a 5.5 percent increase in per capita FDI inflows per capita in the random effects estimation, and a 1.8 percent increase in FDI inflows per capita using the GLS estimator. Similarly, property rights have a positive and significant effect on per capita FDI net inflows, in agreement with theoretical predictions. A 1-unit increase in the index of property rights (ranging from 6.1 to 46.7) yields a 2.5 percent increase in per capita FDI inflows in the between effects estimation, a 9.2 percent increase using the fixed effects estimator, an 8.4 percent increase using the random effects estimation, and a 5.9 percent increase using the GLS estimator.

Control variables generally carry their expected positive signs across the four estimations, with the exceptions of negative coefficients on civil war threat and GDP per

capita using fixed effects, total GDP using random effects, and reserves as a percentage of imports using GLS. Further, the log of GDP per capita and trade as a percentage of GDP are highly significant in the between and random effects estimations, as well as using GLS. This indicates their importance for determining differences in FDI inflows per capita across countries.

Table 1. Dependent Variable: Natural Log of FDI Net Inflows per Capita

Variable	Coefficients (T-Statistic, Z-Statistic for Random Effects and GLS)			
	(1) Between Effects	(2) Fixed Effects	(3) Random Effects	(4) GLS <sup>†</sup>
Log of total GDP	0.002 (0.01)	0.688 (0.86)	-0.051 (0.56)	0.051 (2.33)*
Log of GDP per Capita	0.996 (5.63)**	-0.223 (0.23)	0.813 (5.83)**	0.866 (22.88)**
Trade as % of GDP	1.574 (3.04)**	0.821 (1.71)	1.285 (3.79)**	1.132 (11.54)**
Reserves as % of Imports	0.260 (0.57)	0.630 (1.88)	0.474 (1.76)	-0.115 (1.84)
Civil War Threat	0.003 (0.34)	-0.002 (0.51)	0.001 (0.16)	0.005 (3.25)**
Democracy	0.023 (0.92)	0.063 (4.10)**	0.055 (4.44)**	0.018 (3.51)**
Property Rights	0.025 (0.74)	0.092 (6.02)**	0.084 (6.55)**	0.059 (10.48)**
Constant	-6.932 (3.44)**	-15.851 (1.19)	-5.830 (3.26)**	-7.535 (16.53)**
Observations	583	583	583	583
Countries	54	54	54	54
Years	1986 – 1997 <sup>°</sup>	1986 – 1997 <sup>°</sup>	1986 – 1997 <sup>°</sup>	1986 – 1997 <sup>°</sup>
R <sup>2</sup> Between	0.762	0.264	0.732	-
R <sup>2</sup> Within	0.255	0.296	0.292	-
R <sup>2</sup> Overall	0.587	0.244	0.589	-
Wald X <sup>2</sup> (Prob)	-	-	-	2488.12 (0.00)**

**Hausman Specification Test:**  $X^2 = 9.46$  ( $p = 0.22$ , cannot reject null hypothesis at 5% level)

\*\* Indicates statistical significance at 1% level, \* Indicates significance at 5% level.

<sup>†</sup> Iterated GLS estimator with correction for heteroskedastic panel error structure.

<sup>°</sup> With some gaps. No fewer than eight year are represented per country, to retain some balance in the panel.

## 6.2 Nonlinear Effects of Democracy and Property Rights on FDI

### Empirical Model

$$\begin{aligned} \text{Log}(FDI / Cap)_{it} = & \beta_0 + \beta_1 \text{Log}(GDP)_{it} + \beta_2 \text{Log}(GDP / Cap)_{it} + \beta_3 \text{TRADE}_{it} + \\ & \beta_4 \text{RESERVES}_{it} + \beta_5 \text{CIVIL\_WAR}_{it} + \beta_6 \text{DEMOCRACY}_{it} + \beta_7 \text{DEMOCRACY}^2_{it} + \\ & \beta_8 \text{PROPERTY\_RIGHTS}_{it} + \beta_9 \text{PROPERTY\_RIGHTS}^2_{it} + u_{it} \end{aligned}$$

Variables are as described above, with the addition of  $\text{DEMOCRACY}^2_{it}$ , the squared *polity* score of country *i* in year *t*, and  $\text{PROPERTY\_RIGHTS}^2_{it}$ , the squared index of property rights, as described in the data section above, in country *i* and year *t*.

As suggested above, the expected signs of  $\beta_6$  and  $\beta_7$  are ambiguous. If  $\beta_7$  is positive, there is a possibility of a level of democracy that minimizes per capita FDI inflows, and if  $\beta_7$  is negative, there is a possibility of a level of democracy that maximizes these inflows. The expected signs of  $\beta_8$  and  $\beta_9$  should indicate that higher property rights are associated with higher per capita FDI inflows, but the value of  $\beta_9$  will vary with the degree of nonlinearity between property rights and FDI inflows. The expected signs of  $\beta_1$ ,  $\beta_2$ ,  $\beta_3$ ,  $\beta_4$  and  $\beta_5$  are positive, as above.

### Results

Results from between effects, random effects, fixed effects and heteroskedasticity-corrected GLS estimators are shown in table 2. A Hausman test between fixed effects and random effects estimators indicates that the model is best estimated using the more efficient random effects, likely for the reasons posited above.

Again, results from each of the estimations are generally aligned with theoretical predictions. Democracy, controlling for property rights and other control variables, carries a positive and significant sign in each estimation, with the exception of the between effects model. Democracy squared carries little significance, and changes in sign



across estimators. For all countries in the sample countries, the general relationship between democracy and FDI inflows is best explained as positive and mostly linear, with higher levels of democracy associated with higher per capita FDI inflows. Property rights have a positive but insignificant effect on FDI inflows across the four different estimators. Further, property rights squared is significant only in the GLS estimation, indicating a somewhat nonlinear relationship between property rights and FDI inflows.

Table 2. Dependent Variable: Natural Log of FDI Net Inflows per Capita

Variable	Coefficients (T-Statistic, Z-Statistic for Random Effects and GLS)			
	(5) Between Effects	(6) Fixed Effects	(7) Random Effects	(8) GLS <sup>†</sup>
Log of total GDP	0.041 (0.36)	0.772 (0.89)	-0.061 (0.66)	0.047 (2.03)*
Log of GDP per Capita	0.976 (5.38)**	-0.536 (0.49)	0.817 (5.67)**	0.862 (22.93)**
Trade as % of GDP	1.670 (3.13)**	0.850 (1.77)	1.268 (3.71)**	1.078 (10.34)**
Reserves as % of Imports	0.268 (0.58)	0.599 (1.79)	0.463 (1.71)	-0.143 (2.29)*
Civil War Threat	0.003 (0.26)	-0.001 (0.30)	0.001 (0.24)	0.005 (3.22)**
Democracy	0.017 (0.62)	0.061 (3.75)**	0.055 (4.38)**	0.021 (3.62)**
Democracy <sup>2</sup>	0.005 (0.68)	0.001 (0.26)	-0.001 (0.36)	-0.001 (0.76)
Property Rights	0.163 (1.06)	0.019 (0.39)	0.033 (0.69)	-0.034 (1.08)
Property Rights <sup>2</sup>	-0.003 (0.96)	0.001 (1.52)	0.001 (1.13)	0.002 (3.12)**
Constant	-9.559 (3.07)**	-14.879 (1.05)	-4.944 (2.53)*	-6.150 (8.93)**
Observations	583	583	583	583
Countries	54	54	54	54
Years	1986 – 1997 <sup>°</sup>	1986 – 1997 <sup>°</sup>	1986 – 1997 <sup>°</sup>	1986 – 1997 <sup>°</sup>
R <sup>2</sup> Between	0.769	0.138	0.728	-
R <sup>2</sup> Within	0.190	0.300	0.295	-
R <sup>2</sup> Overall	0.577	0.149	0.587	-
Wald X <sup>2</sup> (Prob)	-	-	-	2624.17 (0.00)**
<b>Hausman Specification Test: X<sup>2</sup> = 7.05 (p = 0.53, cannot reject null hypothesis at 5% level)</b>				

\*\* Indicates statistical significance at 1% level, \* Indicates significance at 5% level.

<sup>†</sup> Iterated GLS estimator with correction for heteroskedastic panel error structure.

<sup>°</sup> With some gaps. No fewer than eight year are represented per country, to retain some balance in the panel.

Like above, the control variables carry their expected signs through all four estimations, with the exception of civil war threat and GDP per capita in the fixed effects model, total GDP in the random effects model, and reserves as a percentage of imports in the GLS model. Again, GDP per capita and trade as a percentage of GDP have highly significant coefficients in the between effects, random effects and GLS estimations, reaffirming their importance to foreign direct investment inflows across countries.

Finally, the relationship between FDI inflows, democracy and property rights, based on the results of the heteroskedasticity-corrected GLS regression, can be reduced to the following equation.<sup>9</sup>

$$\text{Log(FDI/Cap)} = 0.0207445 * \text{DEMOCRACY} - 0.0008271 * \text{DEMOCRACY}^2 - 0.033548 * \text{PROPERTY\_RIGHTS} + 0.0017514 * \text{PROPERTY\_RIGHTS}^2 + 1.93004$$

Holding property rights constant, and within the limits of the measure of democracy, this function reaches its maximum with respect to DEMOCRACY, at the highest DEMOCRACY value, 10. Holding democracy constant, and within the limits of the property rights measure, the function reaches its maximum with respect to PROPERTY\_RIGHTS at the highest PROPERTY\_RIGHTS value in the sample, 46.7, though it reaches a minimum where PROPERTY\_RIGHTS equals 9.6.

Figure 1, shown in appendix one, illustrates this relationship graphically, as a 3-dimensional plot, a contour plot, and cross-sectional plots at the respective maxima of democracy and property rights. In order to keep graphical inferences within the bounds of the data used, the plots are limited to the upper and lower bounds of property rights and

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<sup>9</sup> The coefficients on DEMOCRACY, DEMOCRACY<sup>2</sup>, PROPERTY\_RIGHTS and PROPERTY\_RIGHTS<sup>2</sup> are multiplied with those variables. The constant is the sum of the estimated constant and the coefficients of control variables multiplied by their respective means. In this case: - 6.149941 + (0.0465472\*23.51295) + (0.8620634 \* 6.923952) + (1.077655 \* 0.6275929) + (-0.143006 \* 0.366425) + (0.0054915 \* 71.51199) = 0.317007

democracy measure for all countries. The graphical representation of this relationship clearly shows the primacy of property rights in determining FDI inflows, as well as some degree of nonlinearity in the relationship between property rights and FDI. In addition, the graphical representation indicates a comparatively weak preference for democratic governance by foreign investors. These relationships, however, are highly generalized, where the institutional structures and forms of democracies and property rights are expected to differ enormously by regional and country-specific context. The third model presented by this paper seeks to capture regional heterogeneity in the relationship between institutional variables (democracy and property rights) and FDI inflows.

### 6.3 Regional Differences

#### Empirical Model

$$\begin{aligned} \text{Log}(FDI / Cap)_{it} = & \beta_0 + \beta_1 \text{Log}(GDP)_{it} + \beta_2 \text{Log}(GDP / Cap)_{it} + \beta_3 \text{TRADE}_{it} + \\ & \beta_4 \text{RESERVES}_{it} + \beta_5 \text{CIVIL\_WAR}_{it} + \sum_j \beta_j \text{REGION}_{jit} * \text{DEMOCRACY}_{it} + \\ & \sum_j \beta_j \text{REGION}_{jit} * \text{DEMOCRACY}_{it}^2 + \sum_j \beta_j \text{REGION}_{jit} * \text{PROPERTY\_RIGHTS}_{it} + \\ & \sum_j \beta_9 \text{REGION}_{jit} * \text{PROPERTY\_RIGHTS}_{it}^2 + \sum_j \beta_j \text{REGION}_{jit} + u_{it} \end{aligned}$$

Variables are as described above, with the addition of regional interaction terms and dummy variables.  $\text{REGION}_{jit} * \text{DEMOCRACY}_{it}$ ,  $\text{REGION}_{jit} * \text{DEMOCRACY}_{it}^2$ ,  $\text{REGION}_{jit} * \text{PROPERTY\_RIGHTS}_{it}$ , and  $\text{REGION}_{jit} * \text{PROPERTY\_RIGHTS}_{it}^2$  represent the interaction between regional dummy variables for each region  $j$ :  $\text{ASIA}_{it}$ , for Asian countries;  $\text{EEUROPE}_{it}$  for Eastern European countries;  $\text{LATIN}_{it}$  for Latin American countries;  $\text{MENA}_{it}$  for Middle Eastern and North African countries; and  $\text{SSA}_{it}$  for Sub-Saharan African countries; and the above-defined  $\text{DEMOCRACY}_{it}$ ,  $\text{DEMOCRACY}_{it}^2$ ,  $\text{PROPERTY\_RIGHTS}_{it}$ , and  $\text{PROPERTY\_RIGHTS}_{it}^2$  respectively. Further, dummy

variables for each region  $j$  are added, with the omission of  $SSA_{it}$ . All control variables are as defined above, and represent effects as estimated across all countries, in all regions.

The expected signs of coefficients of regional interactions and dummy variables will be ambiguous, and dependent on the specific relationship in each region between democracy and FDI inflows, or property rights and FDI inflows. In spite of this ambiguity, we expect higher property rights values to generally be associated with higher per capita FDI inflows. Again, the expected signs of  $\beta_1$ ,  $\beta_2$ ,  $\beta_3$ ,  $\beta_4$  and  $\beta_5$  are positive.

## Results

Table 3. Dependent Variable: Natural Log of FDI Net Inflows per Capita

Variable	GLS <sup>†</sup> Coefficients (Z-Statistic), by Region				
	Asia	Eastern Europe	Latin America	Middle East / North Africa	Sub-Saharan Africa
Democracy	-0.033 (3.38)**	0.270 (11.47)**	0.110 (5.71)**	0.021 (1.60)	0.030 (2.42)*
Democracy <sup>2</sup>	0.001 (0.37)	0.014 (3.46)**	-0.012 (5.21)**	-0.004 (1.55)	-0.015 (5.30)**
Property Rights	-0.001 (0.02)	-0.365 (3.68)**	-0.032 (0.66)	0.449 (4.05)**	-0.104 (1.02)
Property Rights <sup>2</sup>	0.001 (1.33)	0.006 (4.50)**	0.002 (2.53)*	-0.008 (3.96)**	0.003 (1.43)
Observations	107	39	201	69	167
Countries	9	4	18	6	17
Years	1986 – 1997 <sup>°</sup>				
Wald X <sup>2</sup> (Prob)	4543.23 (0.00)**				

Note: See appendix 3 for complete output. This table presents only those terms interacted with regional dummies

\*\* Indicates statistical significance at 1% level, \* Indicates significance at 5% level.

<sup>†</sup> Iterated GLS estimator with correction for heteroskedastic panel error structure.

<sup>°</sup> With some gaps. No fewer than eight year are represented per country, to retain some balance in the panel.

Table 3 shows results of democracy and property rights variables, from a heteroskedasticity-corrected GLS regression, while full results from between effects, fixed effects, random effects and GLS estimators are reported in appendix 3. The generalized least squares estimates are used as primary results because of the presence of

heteroskedasticity in the data.<sup>10</sup> Using these estimates, the equations shown below are constructed to describe the relationship between democracy, property rights and per capita FDI inflows for each region.<sup>11</sup> In addition, figures 2 – 6 in appendix four illustrate each equation as a 3-dimensional plot, a contour plot, and cross-sectional plots at the respective maximums of democracy and property rights for each region. Like above, to keep graphical inferences within the bounds of the data used, the graphs are limited by the upper and lower bounds of property rights and democracy in each region.

Asian Countries: See Figure 2

$$\text{Log(FDI/Cap)} = -0.033138*\text{DEMOCRACY} + 0.0008975*\text{DEMOCRACY}^2 - 0.0010884*\text{PROPERTY\_RIGHTS} + 0.0011313*\text{PROPERTY\_RIGHTS}^2 + 1.47415$$

Eastern European Countries: See Figure 3

$$\text{Log(FDI/Cap)} = 0.2697757*\text{DEMOCRACY} + 0.0141067*\text{DEMOCRACY}^2 - 0.364558*\text{PROPERTY\_RIGHTS} + 0.0064499*\text{PROPERTY\_RIGHTS}^2 + 3.41909$$

Latin American Countries: See Figure 4

$$\text{Log(FDI/Cap)} = 0.110053*\text{DEMOCRACY} - 0.0118336*\text{DEMOCRACY}^2 - 0.0317429*\text{PROPERTY\_RIGHTS} + 0.0021495*\text{PROPERTY\_RIGHTS}^2 + 1.65633$$

Middle Eastern / North African Countries: See Figure 5

$$\text{Log(FDI/Cap)} = 0.0206409*\text{DEMOCRACY} - 0.0042133*\text{DEMOCRACY}^2 + 0.4493084*\text{PROPERTY\_RIGHTS} - 0.0077105*\text{PROPERTY\_RIGHTS}^2 - 3.85158$$

Sub-Saharan African Countries: See Figure 6

$$\text{Log(FDI/Cap)} = 0.0296574*\text{DEMOCRACY} - 0.015109*\text{DEMOCRACY}^2 - 0.1040271*\text{PROPERTY\_RIGHTS} + 0.0028695*\text{PROPERTY\_RIGHTS}^2 + 3.44117$$

In Asian countries, as indicated by table 3 and figure 2 in the appendix, increases in democracy (controlling for property rights and other explanatory variables) are associated with decreases in per capita FDI inflows. In addition, increases in property

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<sup>10</sup> See the appendix for between, fixed and random effects estimations of this same model.

<sup>11</sup> To construct these equations, as above, the coefficients on DEMOCRACY, DEMOCRACY<sup>2</sup>, PROPERTY\_RIGHTS and PROPERTY\_RIGHTS<sup>2</sup> are multiplied with those variables. The intercept is calculated as the sum of the estimated constant, the region-specific dummy variable, and the coefficients of control variables multiplied by their respective means. The Mathematica code used to produce these functions is shown in the appendix.

rights are clearly supportive of per capita FDI inflows. Over the range of the sample, the estimated relationship predicts that FDI inflows will be maximized by a *polity* score of -7 (the lowest observation among Asian countries) and a property rights score of 40.7 (the highest observation among Asian countries). Overall, this relationship suggests that for the Asian countries included in this panel, foreign investors hold a preference for autocratic polities and well-protected property rights. This relationship is driven largely by cross-country differences, rather than within-country effects, as evidenced by the complete regression results reported in appendix three. Several relatively undemocratic Asian countries (for example China) receive more FDI than expected. In the case of China, property rights are enforced for foreign investors through formal and informal means, numerous incentives are offered to foreign companies, and the country has a very undemocratic political system. Foreign direct investment thus seeks the protection of property rights, while effectively “choosing” autocratic polities as host countries for their capital.

In Eastern Europe, both democracy and property rights are positive and significant determinants of per capita FDI inflows. The estimated relationship predicts that FDI inflows will be maximized by a *polity* score of 10 (the highest observation among Eastern European countries) and a property rights score of 46.7 (again, the highest observation in the region). Democracy is a particularly strong indicator of FDI inflows in Eastern Europe, driven largely by within-country effects, likely indicating the importance to foreign investors of transition from communism to fully institutionalized democracy in these countries, some of which are recovering from years of heavy Soviet influence. Another distinct explanation for these trends, however, could be the simultaneous

transition to democracy and dramatic growth of foreign direct investment from Western Europe. In this scenario, the strong effect of institutional variables on FDI is merely a coincidence of simultaneous trends, rather than evidence of institutional importance to FDI decisions.

In Latin America, increasing property rights increase per capita FDI inflows, with a property rights score of 40.6 (the highest observation among Latin American countries) maximizing FDI inflows. Controlling for property rights and other explanatory variables, a moderate to high level of democracy (a *polity* score of 4.7) maximizes per capita FDI inflows. Foreign investors to Latin America value property rights, but the most democratic Latin American countries (in this sample, Bolivia, Brazil, Costa Rica, Ecuador, Uruguay, and Venezuela) may impose substantial constraints on FDI. Further driving this finding is Mexico, a major receiver of U.S. FDI because of its proximity to the U.S., but also only scoring moderately on the *polity* measure. Unfortunately, when considering FDI inflows independent of source country, there is no way to account for distance from sources of FDI. Similarly to Asia and Eastern Europe, the relationship between institutional variables and FDI inflows is driven more by regional idiosyncrasies than consistent relationships between institutions and FDI.

In Middle Eastern and North African countries, a moderate level of democracy (a *polity* score of 2.4) and a moderate level of property rights (a property rights score of 29.1) maximizes foreign direct investment. Thus the relationships between property rights and FDI inflows, as well as democracy and FDI inflows, are each shaped like an inverted “U,” where extreme values of both measures result in lower levels of FDI inflows. This shows a difficulty among countries with the lowest property rights scores

(notably early Pakistan), as well as highest property rights scores, (some observations of Jordan and Oman) to attract substantial FDI; while countries with moderate property rights scores (notable Tunisia and later observations in Pakistan) receive relatively more FDI inflows. This could be explained by Tunisia's relative proximity to Western European countries, or by Pakistan's institutional and economic turnaround. However, there may be some room for a deeper investigation into the particulars of Middle Eastern and North African political and legal institutions and institutional context.

Finally, in Sub-Saharan Africa, a moderate level of democracy (a polity score of 1.0) maximizes foreign direct investment inflows, while higher levels of property rights increase per capita FDI, with a property rights score of 36.1 (the highest observation among Sub-Saharan African countries) maximizes FDI inflows. This relationship is likely driven by notably low per capita FDI inflows to undemocratic countries with poor property rights, as well as to some poor, yet more democratic countries (e.g. Mali and Madagascar). Perhaps allowing regional variation in economic variable, in addition to institutional variables, would correct for some of this relationship. However, also important to understanding these results is the role of Nigeria. As discussed below, Nigeria shows consistently high residuals through all regressions, likely because of the country's oil wealth and oil-related foreign investment. Nigeria scores low to moderate on the *polity* scale, though it likely attracts more per capita FDI than countries that score lower (e.g. Cote d'Ivoire and Guinea-Bissau).

Some of the clearest observations from this analysis follow. Asian countries with greater democracy tend to attract less foreign direct investment than those more autocratic countries; foreign investors to Eastern European countries tend to more highly



value democracy and the transition to democracy than investors in other regions; in Middle Eastern and North African countries property rights and democracy positively influence FDI inflows only to an extent; and finally, in Latin America and Sub-Saharan Africa, investors prefer only a moderate level of democracy. In all regions, with the exception of the Middle East, stronger property rights appear to be more important, and more consistently important, than democratic governance.

One final inference from these results concerns the role of regional particularities and idiosyncrasies in driving these distinctly different relationships between regions. In Asia, Latin American and Sub-Saharan Africa, for instance, specific countries can be identified as important to explaining each region's particular relationship. In addition, the relationship between institutional variables and FDI inflows in Asia appears to rely more heavily on cross-country differences, while the relationship in Eastern Europe is more dependent on within-country variation across time. These regional idiosyncrasies point to the absence of a truly consistent impact of democracy and property rights on FDI, instead highlighting the importance of regional and national context in understanding how institutional considerations affect FDI inflows.

#### *6.4 A Comment on Residuals*

In those regressions excluding regional interactions, Bolivia, China, Indonesia, and Nigeria consistently produce notably high residuals, indicating that the models presented in this paper have underpredicted per capita foreign direct investment flows into these countries. For the case of Nigeria, the country is one of the world's largest oil producers, and unexplained FDI may be related to oil production in that country, while higher-than-expected FDI flows into Bolivia, China and Indonesia may be related to FDI-

related policies in these countries, as well as the distance of these countries from sources of FDI. In addition, in these regressions, the countries of Bangladesh, Hungary, Jordan and Kenya consistently produce low residuals, indicating that per capita FDI inflows have been over-predicted for these countries. Reasons for these under-predictions may include the geographic location and relatively poor resource endowments of each country.

Further, in regressions with regional variables, Bolivia, the Philippines, and Nigeria have high residuals, indicating underprediction of FDI inflow. This means that relative to their respective regions, these countries have been able to attract significantly more foreign direct investment, accounting for institutional quality and typical controls. Nigeria, as explained above, likely attracts foreign investors because of its natural resource endowment, while Bolivia and the Philippines may have specific FDI-related policies, or unobserved aspects of their business environment that make them attractive to foreign direct investors. Also in this regression, Bangladesh, Jordan, Kenya and Morocco have notably low residuals, indicating overprediction of per capita FDI inflows. Relative to other Asian countries, including the so-called “Asian Tigers,” Bangladesh has not created strong links to international capital, possibly because of the country's relatively short history of self-determination. Jordan and Morocco stand out from other Middle Eastern and North African countries because of their relative lack of oil wealth, relying less on natural resource endowments than some Middle Eastern and North African countries.

In all, it is clear that not all countries have been able to attract significant foreign direct investment, given economic and institutional characteristics. Others have attracted

more foreign capital than can be explained by basic economic and institutional measures. A deeper examination of these cases may reveal deep insight into what determines flows of foreign direct investment, and might potentially provide recommendations for countries seeking to further embed foreign capital into their economies.

## **7. Conclusions and Directions for Further Research**

This paper has estimated the effects of democratic governance and property rights protection on per capita inflows of foreign direct investment. Using data from 1986 to 1997, across 54 developing countries spanning Asia, Eastern Europe, Latin America, the Middle East / North Africa, and Sub-Saharan Africa, this paper has found and presented evidence that democratic institutions (outside of their contribution to property rights) and property rights protection increase per capita FDI inflows to developing countries. This finding is largely consistent with findings of previous literature on the topic. This paper, however, has challenged the notion of a homogeneous relationship between institutions and FDI inflows. Using regional dummy variables and interaction terms, substantial differences are found between regions in how democracy and property rights influence FDI inflows. Rather than being driven by over-arching preferences for particular institutional features on the part of multinational enterprises, these differences are likely due to regional idiosyncrasies; the particularities of institutions, institutional change and FDI to specific countries.

This study recognizes some major limitations. The first, and arguably the most important, is the measurement of institutions. Institutions are incredibly complex entities, and reducing the elements of democratic governance or property rights protection to a

single index problematically places the diverse range of institutional structures on a single continuum. For example, democracy in Latin American countries with colonial heritage may differ fundamentally from democracy in Eastern European countries recovering from heavy Soviet influence. Similarly, strong property rights may mean very different things in the Middle East, Latin America, and Sub-Saharan Africa. Differences arise because of historical, social and political context, and cannot be adequately captured by simplified, albeit broad, measures of institutions. That said, valuable understanding of the relationship between general institutional forms and foreign direct investment can be determined using these broad indices. It should simply be noted that this generalized relationship says little of the particulars of institutions, and more about how general institutional forms affect FDI decisions.

Further research on the relationship between institutions and foreign direct investment may take these caveats into account. Measures of institutional characteristics might seek to account for the intricate differences between democracies or property rights regimes, rather than placing a diverse range of institutions on a single continuum. Further, analyses might take a more regional, country-specific, or local focus to examine how particular institutional features affect FDI decisions on a country-specific or local level, rather than through a highly generalized international analysis.

Democratic governance, property rights and foreign direct investment are very intricately related. This paper shows only a single facet of this complex relationship, wherein greater democratic governance and greater protection of property rights generally increase foreign direct investment, though this general relationship is found to obscure important regional and sub-regional particularities. While institutional and

economic phenomena are incredibly complex, by understanding and connecting these phenomena, we may find ways to make our societies more prosperous and more democratic.

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**Appendix 1: Summary of Empirical Literature**

<b>Article (Year Published)</b>	<b>Dependent Variable</b>	<b>Measures of Democracy &amp; Property Rights</b>	<b>Important Findings &amp; Notes</b>
<b>Institutions and Economic Outcomes</b>			
Barro (1994)	Annual growth rate of per-capita GDP	Democracy: Gastil Index of Political Freedoms	Controlling for rule of law, human capital, democracy has a weak negative effect
Leblang (1996)	Annual growth rate of per-capita GDP	Democracy: Polity II Property rights: exchange controls and credit allocated to private sector	Property rights positive; democracy only influences growth through property rights
Knack and Keefer (1995)	Annual growth rate of per-capita GDP	Property rights: indices based on BERI and ICRG	Property rights positive; evidence of convergence in income
Knack and Keefer (1997)	Annual growth rate of per-capita GDP	Property rights: indices based on BERI and ICRG	Ability of poor countries to ‘catch up’ determined largely by institutions
<b>Determinants of Foreign Direct Investment</b>			
Schneider and Frey (1985)	FDI net inflows per capita	None: only political instability	Market size, economic risk, political risk significant
Jun and Singh (1996)	FDI net inflows (% of GDP)	None: only political risk index, work days lost to social upheaval, operational risk index	Market size, trade openness (and export orientation), political risk significant
<b>Foreign Direct Investment, Democratic Governance and Property Rights</b>			
Jensen (2003)	FDI net inflows (% of GDP)	Democracy: Polity III Property Rights: Various components from Easterly	Democracy positive and robust across various specifications
Li and Resnick (2003)	Total FDI net inflows	Democracy: Polity IV Property rights: index based on ICRG data	Democracy negative, property rights positive;
Jakobsen and de Soysa (2006)	Total FDI net inflows (logged)	Democracy: Polity IV and Freedom House civil and political rights. Property rights: index based on ICRG data	Democracy positive across measures and specifications; property rights positive

## Appendix 2: Data Description and Summary Statistics

### Countries Used in Analysis and Descriptive Statistics, by Region

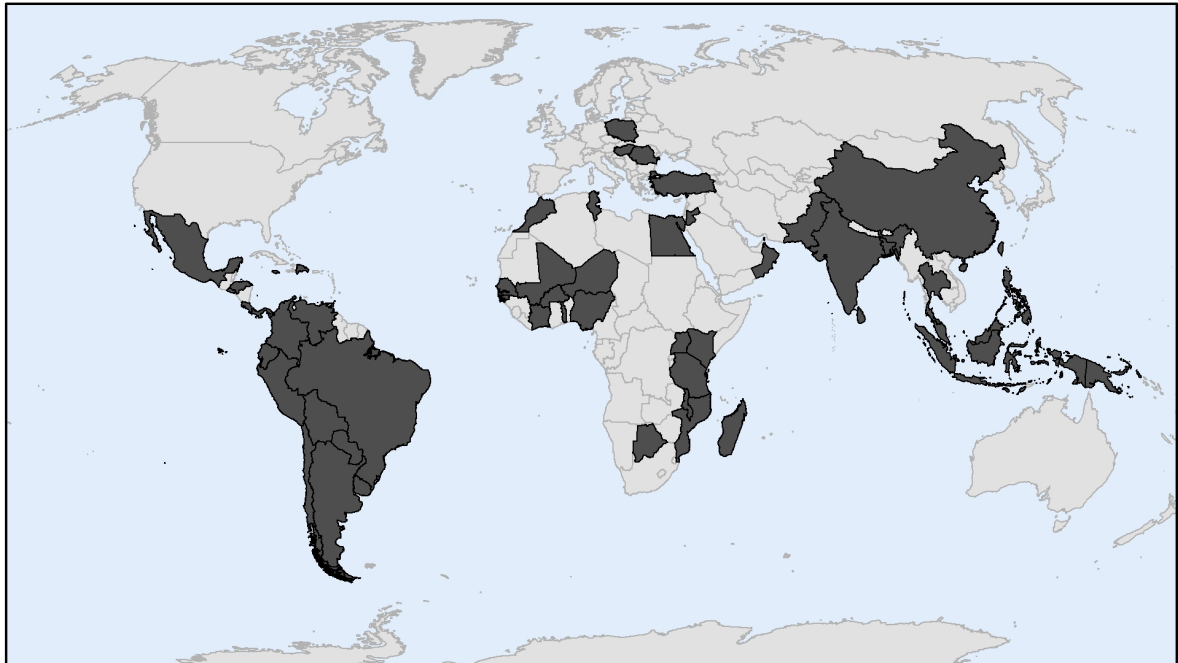
Country	Country Code	Mean <i>Polity</i> Score	Mean Property Rights Score	Mean FDI per Capita
<b>Asia</b>				
Bangladesh	2	1.42	16.80	0.14
China	8	-7.00	32.39	14.72
India	21	8.25	30.68	0.98
Indonesia	22	-7.00	25.84	11.22
Malaysia	28	3.75	34.81	165.38
Papua New Guinea	38	10.00	31.16	31.69
Philippines	41	8.00	22.73	14.09
Sri Lanka	45	5.00	25.09	6.24
Thailand	47	5.50	35.81	31.67
<b>Eastern Europe</b>				
Hungary	20	5.82	40.58	170.10
Poland	42	8.00	40.85	57.39
Romania	43	5.75	32.15	13.53
Turkey	51	8.00	30.40	10.27
<b>Latin America</b>				
Argentina	1	7.18	30.46	104.73
Bolivia	3	9.00	21.73	28.23
Brazil	5	7.83	33.73	25.78
Chile	7	4.92	33.46	133.24
Colombia	9	8.08	28.13	34.01
Costa Rica	10	10.00	33.48	66.35
Dominican Republic	12	6.17	26.05	24.00
Ecuador	13	8.75	28.73	28.03
El Salvador	15	6.50	18.06	4.27
Honduras	19	5.75	21.00	10.19
Jamaica	23	9.50	29.26	51.59
Mexico	30	1.00	29.84	62.58
Panama	37	7.00	22.01	111.26
Paraguay	39	2.00	24.97	17.89
Peru	40	4.10	23.02	51.91
Trinidad and Tobago	49	9.09	31.18	236.04
Uruguay	53	9.67	29.03	29.73
Venezuela	54	8.5	30.45	52.76
<b>Middle East / North Africa</b>				
Egypt	14	-6.00	28.50	14.69
Jordan	24	-4.55	30.15	15.74
Morocco	31	-7.50	29.40	8.11
Oman	35	-9.41	32.20	50.68
Pakistan	36	5.92	23.86	3.26
Tunisia	50	-4.42	28.20	27.56

Table continued on next page...

Continued from previous page...

Country	Country Code	Mean Polity Score	Mean Property Rights Score	Mean FDI per Capita
<b>Sub-Saharan Africa</b>				
Botswana	4	8.00	34.92	51.83
Burkina Faso	6	-6.11	23.83	0.49
Cote d'Ivoire	11	-7.36	30.03	8.68
Gambia	16	2.55	28.93	8.87
Ghana	17	-3.18	27.56	3.85
Guinea-Bissau	18	-3.17	15.84	2.08
Kenya	25	-5.64	28.98	1.01
Madagascar	26	2.09	22.79	0.94
Malawi	27	-1.50	26.49	1.45
Mali	29	1.63	15.73	3.19
Mozambique	32	-2.42	27.12	1.74
Niger	33	-3.44	25.73	2.18
Nigeria	34	-6.08	21.16	10.96
Senegal	44	-1.00	24.15	5.68
Tanzania	46	-4.67	29.32	1.85
Togo	48	-4.78	22.12	3.48
Uganda	52	-5.13	21.49	3.37

Countries Used in Analysis



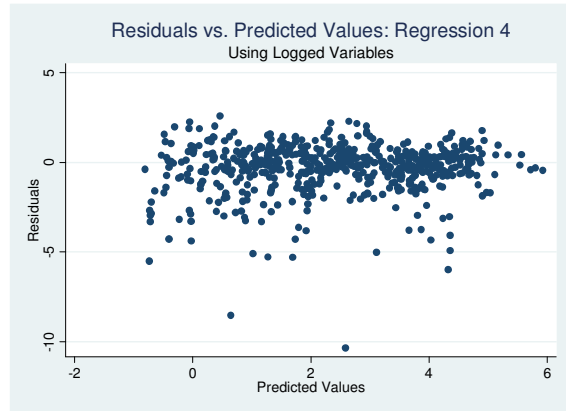
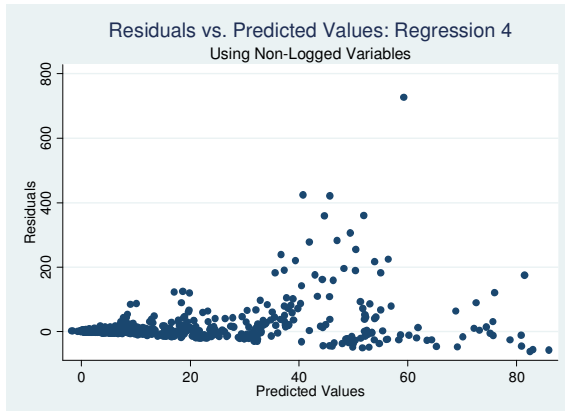
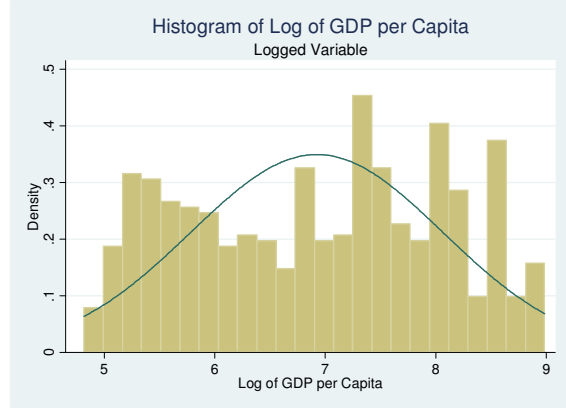
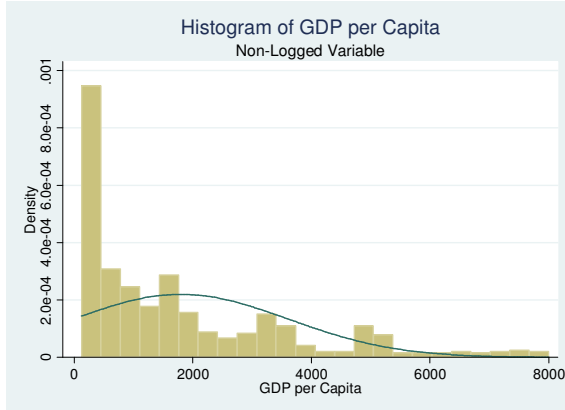
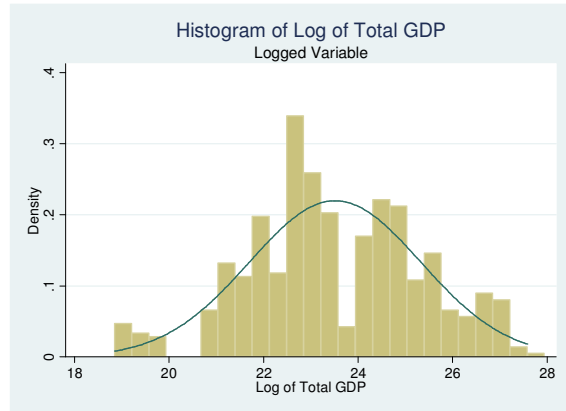
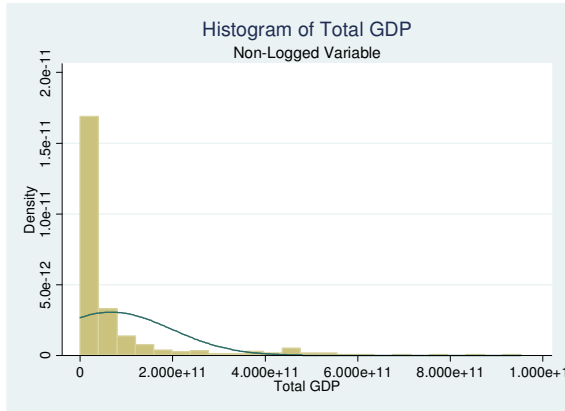
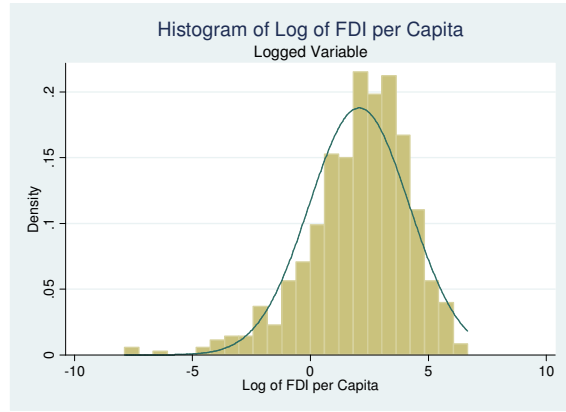
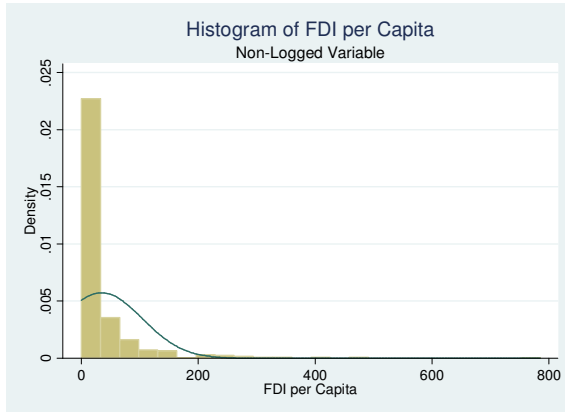
Correlations between Variables

Variable	Ln (FDI / Cap)	Ln (GDP)	Ln (GDP / Cap)	Trade	Reserves / Imports	Civil War	Democ.	Property Rights
Ln (FDI / Cap)	1.00							
Ln (GDP)	0.2699	1.00						
Ln (GDP / Cap)	0.6860	0.5161	1.00					
Trade	0.3865	-0.3312	0.1876	1.00				
Reserves / Imports	0.2384	0.2219	0.2916	-0.1085	1.00			
Civil War	0.4067	0.2426	0.3412	0.1612	0.1969	1.00		
Democ.	0.3817	0.1833	0.4130	0.0796	0.1627	0.1621	1.00	
Property Rights	0.5154	0.3631	0.4300	0.1869	0.2629	0.6689	0.2023	1.00

Summary Statistics

Variable	Observations	Mean	Std. Dev.	Minimum	Maximum
All Countries					
FDI per Capita	583	34.70197	69.57806	0.0003812	785.7505
GDP per Capita	583	1796.269	1815.031	123.6133	8000.01
Log of FDI per Capita	583	2.073936	2.123462	-7.872125	6.666639
Log of GDP per Capita	583	6.923952	1.141756	4.817158	8.987198
Trade as % of GDP	583	0.6275929	0.326316	0.1333891	1.945068
Reserves as % of Imports	583	0.366425	0.310187	-0.0095813	2.775652
Civil War Threat	583	71.51199	23.86758	0	100
Democracy	583	2.161235	6.84623	-10	10
Property Rights	583	27.70774	7.355266	6.111111	46.66667
Asian Countries					
Democracy	107	3.056075	6.34664	-7	10
Property Rights	107	28.42056	8.713138	8.888889	40.72222
Eastern European Countries					
Democracy	39	6.923077	4.009099	-7	10
Property Rights	39	35.77493	6.848139	23.77778	46.66667
Latin American Countries					
Democracy	201	6.880597	3.553262	-8	10
Property Rights	201	27.65202	6.69543	6.111111	40.55556
Middle Eastern / North African Countries					
Democracy	69	-4.318841	5.537287	-10	8
Property Rights	69	28.6562	7.106784	17.22222	39.27778
Sub-Saharan African Countries					
Democracy	167	-2.526946	5.897533	-9	9
Property Rights	167	25.04225	5.711341	12.22222	36.11111

## Comparison of Logged and Non-Logged Variables



**Limited-Sample GLS Regressions Showing Effects of Serial Correlation Correction**

Variable	Coefficients (Z-Statistic)		
	Full Sample: No Correction	Limited: No Correction	Limited: Panel-Specific AR(1) Correction
Log of total GDP	0.051 (2.33)*	-0.011 (0.38)	0.095 (1.74)
Log of GDP per Capita	0.866 (22.88)**	0.951 (21.07)**	0.995 (10.76)**
Trade as % of GDP	1.132 (11.54)**	1.165 (8.56)**	1.178 (4.93)**
Reserves as % of Imports	-0.115 (1.84)	-0.079 (0.39)	-0.300 (1.46)
Civil War Threat	0.005 (3.25)**	0.005 (2.63)**	0.001 (0.21)
Democracy	0.018 (3.51)**	0.006 (0.92)	0.011 (1.11)
Property Rights	0.059 (10.48)**	0.059 (8.21)**	0.061 (6.19)**
Constant	-7.535 (16.53)**	-6.608 (9.99)**	-9.210 (6.57)**
Observations	583	324	324
Countries	54	27	27
Years	1986 – 1997 <sup>o</sup>	1986 – 1997	1986 – 1997
Wald X <sup>2</sup> (Prob)	2488.12 (0.00)**	1810.28 (0.00)**	621.55 (0.00)**
<b>Wooldrige Test for Autocorrelation in Panel Data: F = 35.86 (0.00)**</b>			

\*\* Indicates statistical significance at 1% level, \* Indicates significance at 5% level.

<sup>o</sup> With some gaps. No fewer than eight year are represented per country, to retain some balance in the panel.

### Appendix 3: Complete Regional Regressions

Dependent Variable: Natural Log of FDI Net Inflows per Capita

Variable	Coefficients (T-Statistic, Z-Statistic for Random Effects and GLS)			
	(9) Between Effects	(10) Fixed Effects	(11) Random Effects	(12) GLS <sup>†</sup>
Log of total GDP	-0.011 (0.07)	1.952 (2.36)*	-0.083 (0.74)	0.017 (0.45)
Log of GDP per Capita	1.057 (2.62)*	-1.530 (1.43)	0.832 (3.54)**	0.889 (12.38)**
Trade as % of GDP	2.048 (2.60)*	1.024 (2.24)*	1.525 (4.31)**	1.270 (10.38)**
Reserves as % of Imports	0.259 (0.35)	0.543 (1.77)	0.535 (2.04)*	0.036 (0.31)
Civil War Threat	-0.006 (0.43)	0.004 (1.07)	0.005 (1.33)	0.004 (2.27)*
Asian Countries				
Democracy	-0.094 (1.53)	0.062 (0.84)	-0.022 (0.49)	-0.033 (3.38)**
Democracy <sup>2</sup>	0.019 (1.15)	-0.010 (0.90)	0.003 (0.42)	0.001 (0.37)
Property Rights	0.700 (1.13)	-0.058 (0.59)	0.067 (0.81)	-0.001 (0.02)
Property Rights <sup>2</sup>	-0.011 (0.89)	0.002 (1.21)	0.000 (0.08)	0.001 (1.33)
Dummy	-12.949 (1.55)	-	-1.692 (0.78)	-1.967 (1.36)
Eastern European Countries				
Democracy	0.303 (0.70)	0.274 (3.89)**	0.291 (4.44)**	0.270 (11.47)**
Democracy <sup>2</sup>	0.009 (0.24)	0.017 (1.37)	0.017 (1.41)	0.014 (3.46)**
Property Rights	-0.390 (1.11)	0.515 (1.95)	0.587 (2.24)*	-0.365 (3.68)**
Property Rights <sup>2</sup>	0.007 (1.17)	-0.005 (1.33)	-0.006 (1.65)	0.006 (4.50)**
Dummy	-	-	-15.264 (3.12)**	-0.022 (0.01)
Latin American Countries				
Democracy	0.141 (0.65)	0.056 (1.69)	0.057 (1.77)	0.110 (5.71)**
Democracy <sup>2</sup>	-0.018 (0.71)	-0.023 (3.64)**	-0.020 (3.53)**	-0.012 (5.21)**
Property Rights	0.019 (0.04)	-0.000 (0.00)	0.015 (0.20)	-0.032 (0.66)
Property Rights <sup>2</sup>	0.002 (0.21)	0.002 (1.20)	0.002 (1.26)	0.002 (2.53)*
Dummy	-3.849 (0.50)	-	-0.241 (0.12)	-1.785 (1.22)

Table continued below...

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Middle-Eastern / North African Countries				
Democracy	-0.072 (0.22)	0.011 (0.20)	0.038 (0.83)	0.021 (1.60)
Democracy <sup>2</sup>	-0.006 (0.24)	0.006 (0.71)	0.003 (0.38)	-0.004 (1.55)
Property Rights	2.679 (0.63)	0.637 (2.65)**	0.627 (2.63)**	0.449 (4.05)**
Property Rights <sup>2</sup>	-0.053 (0.79)	-0.011 (2.76)**	-0.011 (2.69)**	-0.008 (3.96)**
Dummy	-33.454 (0.53)	-	-8.141 (2.16)*	-7.293 (3.63)**
Sub-Saharan African Countries				
Democracy	0.025 (0.30)	0.020 (1.08)	0.034 (2.02)*	0.030 (2.42)*
Democracy <sup>2</sup>	-0.003 (0.17)	-0.011 (1.88)	-0.017 (3.38)**	-0.015 (5.30)**
Property Rights	-0.126 (0.27)	0.069 (0.44)	-0.005 (0.03)	-0.104 (1.02)
Property Rights <sup>2</sup>	0.002 (0.17)	0.000 (0.01)	0.001 (0.40)	0.003 (1.43)
Constant	-3.811 (0.60)	-36.856 (2.70)**	-3.588 (1.29)	-4.231 (2.94)**
Observations	583	583	583	583
Countries	54	54	54	54
Years	1986 – 1997 <sup>o</sup>	1986 – 1997 <sup>o</sup>	1986 – 1997 <sup>o</sup>	1986 – 1997 <sup>o</sup>
R <sup>2</sup> Between	0.876	0.003	0.801	-
R <sup>2</sup> Within	0.123	0.456	0.444	-
R <sup>2</sup> Overall	0.529	0.008	0.683	-
Wald X <sup>2</sup> (Prob)	-	-	-	4543.23 (0.00)**
<b>Hausman Specification Test:</b> $X^2 = 22.69$ ( $p = 0.30$ , cannot reject null hypothesis at 5% level)				

\*\* Indicates statistical significance at 1% level, \* Indicates significance at 5% level.

† Iterated GLS estimator with correction for heteroskedastic panel error structure.

<sup>o</sup> With some gaps. No fewer than eight year are represented per country, to retain some balance in the panel.



**Appendix 4: Figures**

Figure 1. Estimated Relationship between Democracy, Property Rights, and Per Capita FDI Inflows: Across All Countries

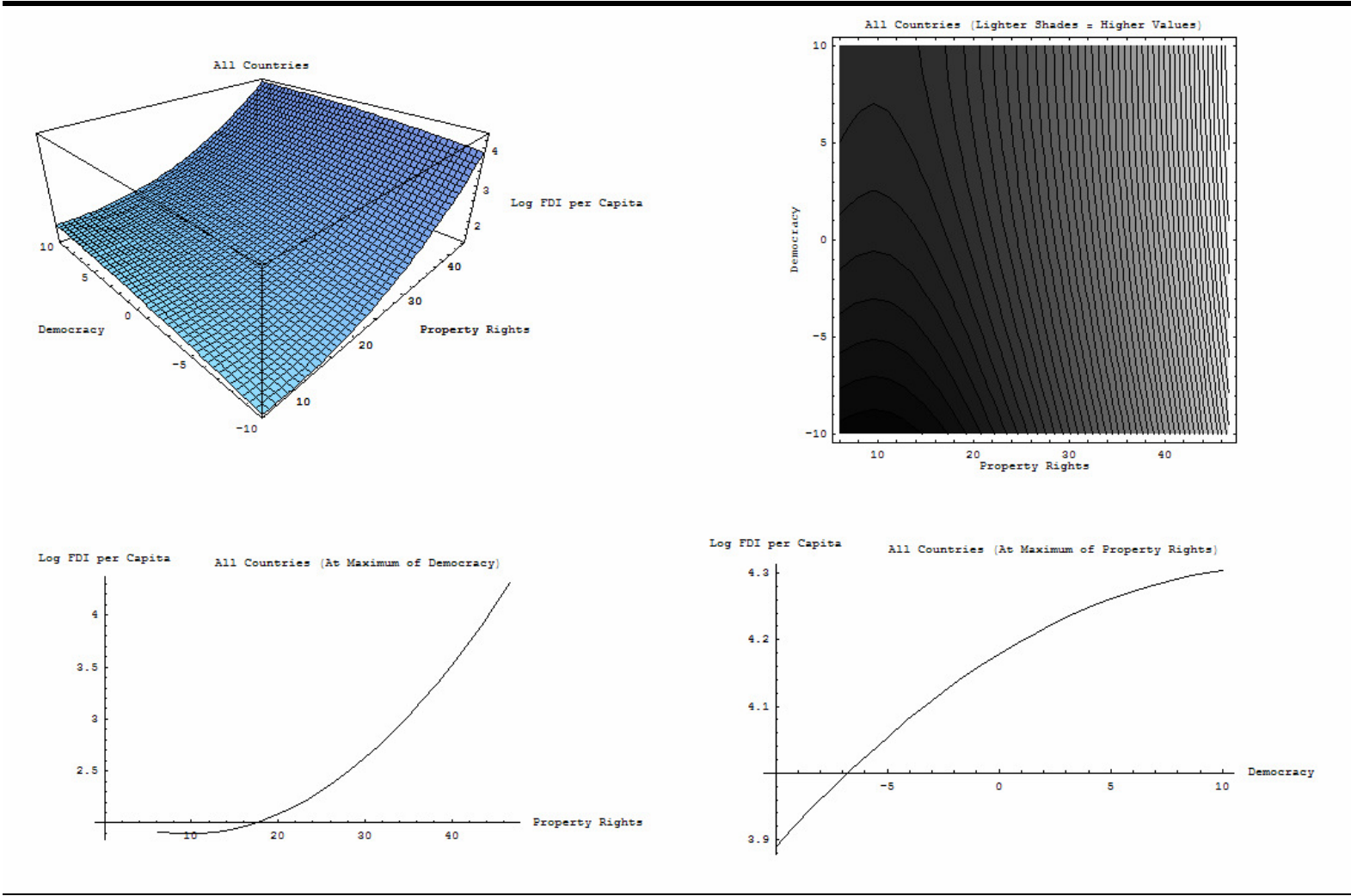


Figure 2. Estimated Relationship between Democracy, Property Rights, and Per Capita FDI Inflows: Asia

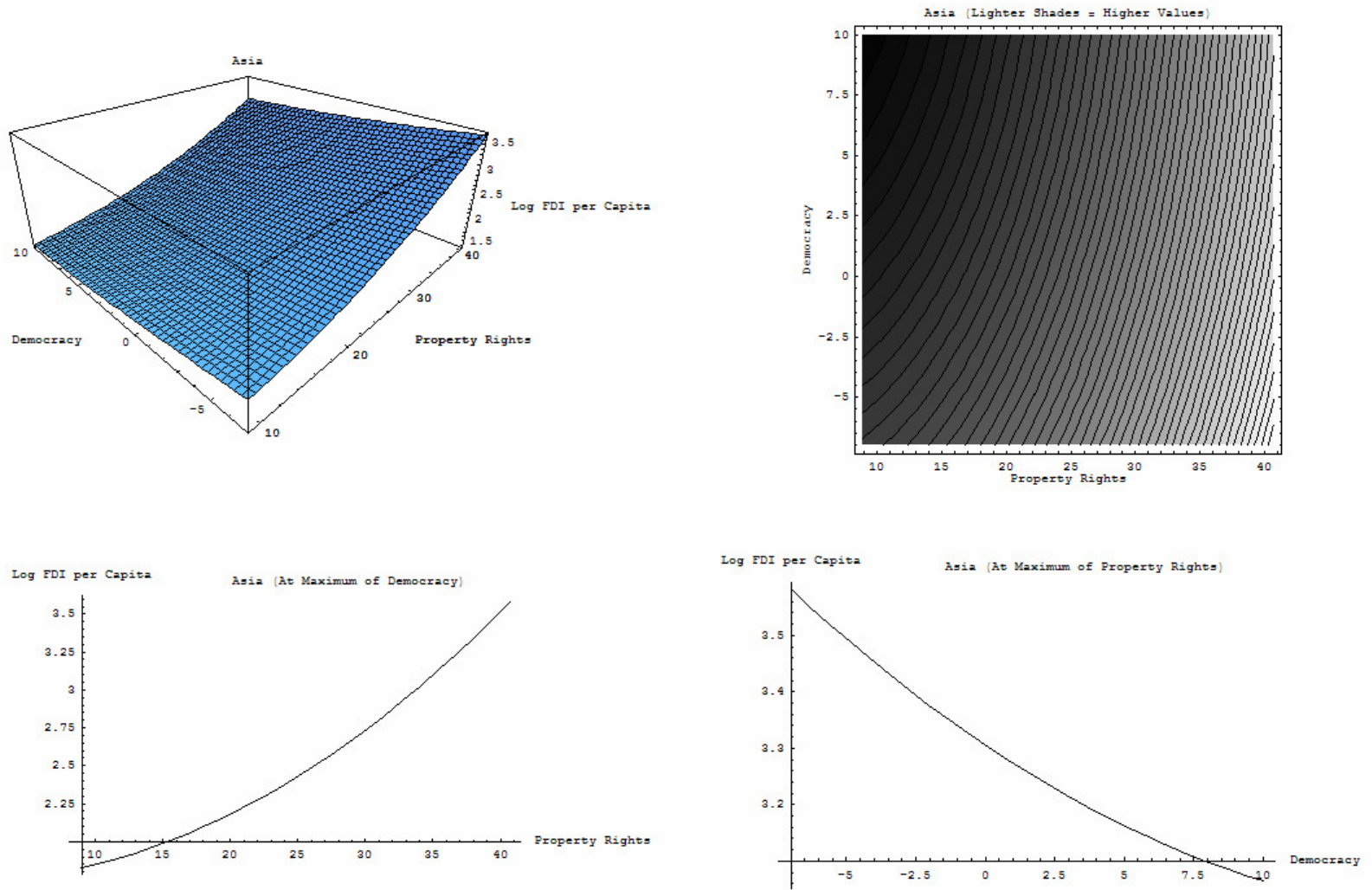


Figure 3. Estimated Relationship between Democracy, Property Rights, and Per Capita FDI Inflows: Eastern Europe

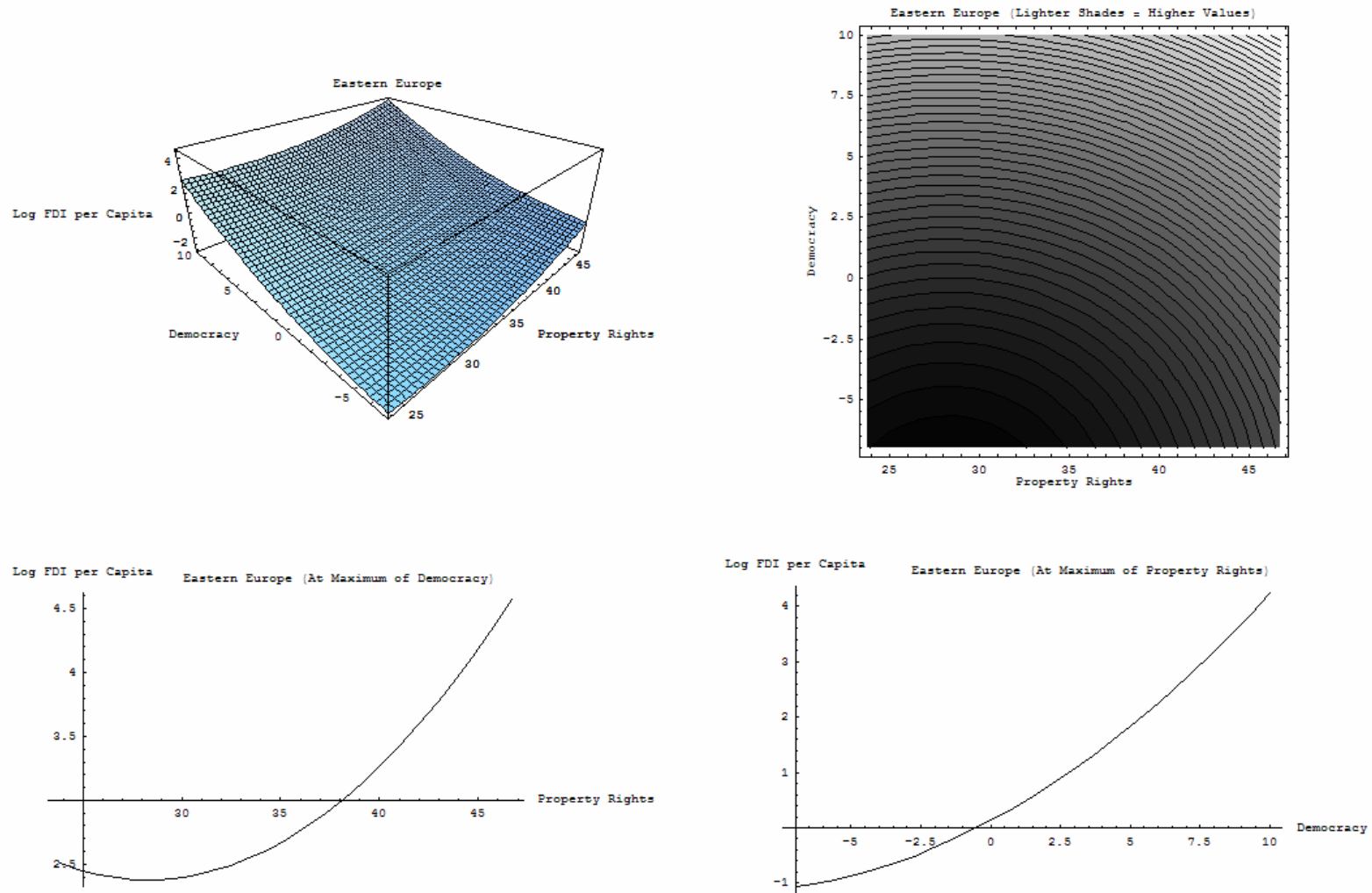


Figure 4. Estimated Relationship between Democracy, Property Rights, and Per Capita FDI Inflows: Latin America

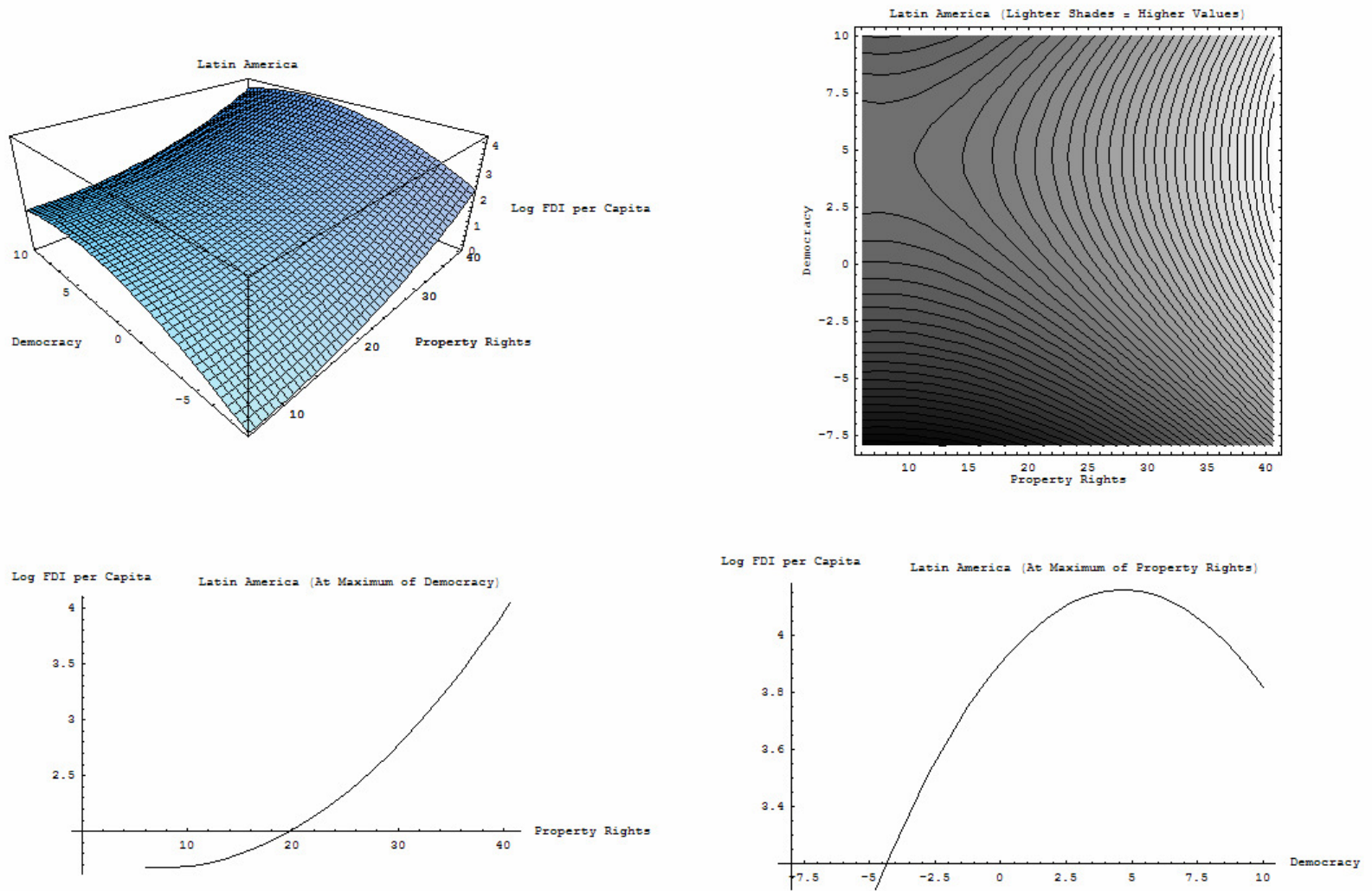


Figure 5. Estimated Relationship between Democracy, Property Rights, and Per Capita FDI Inflows: Middle East / North Africa

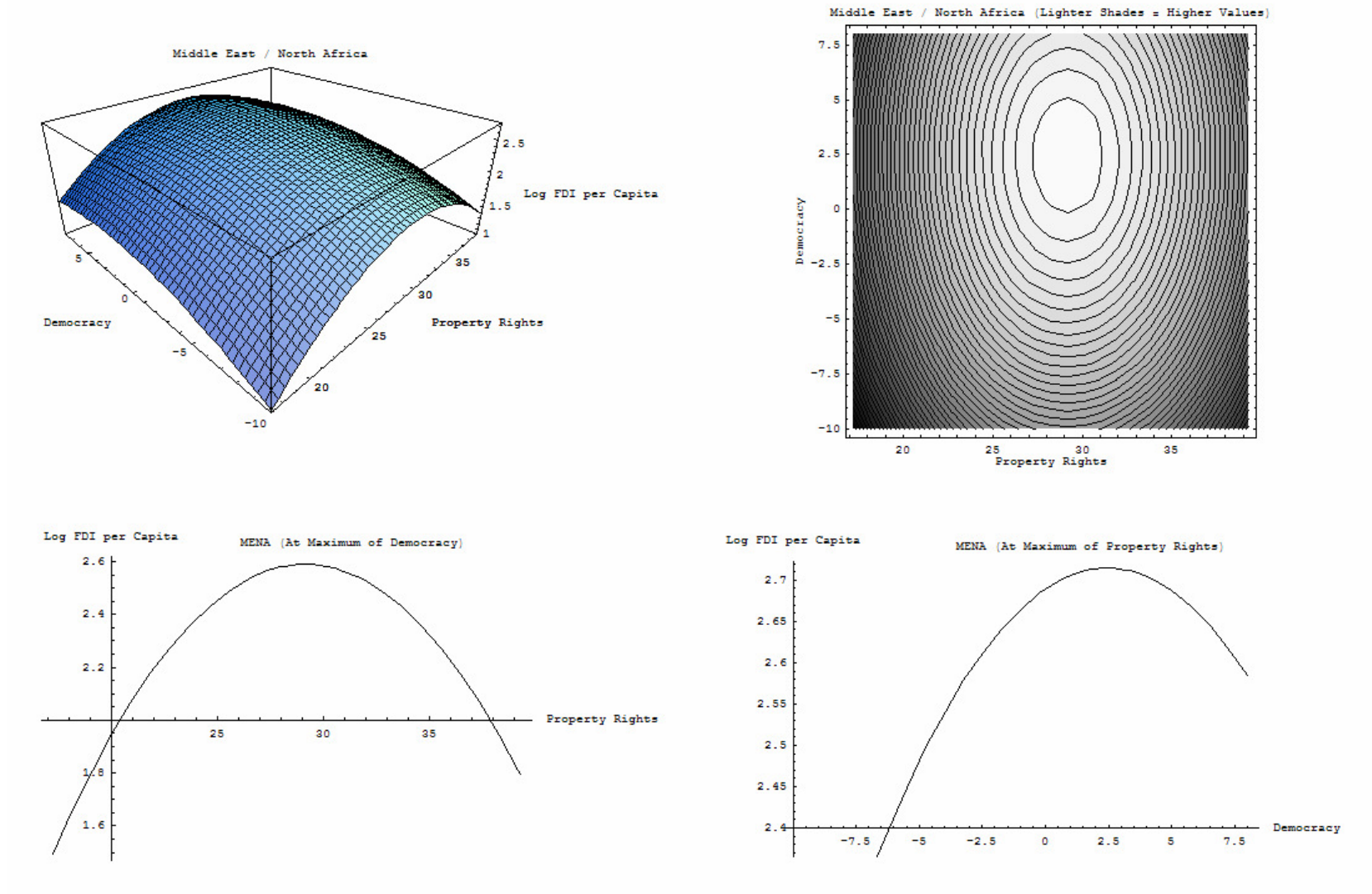
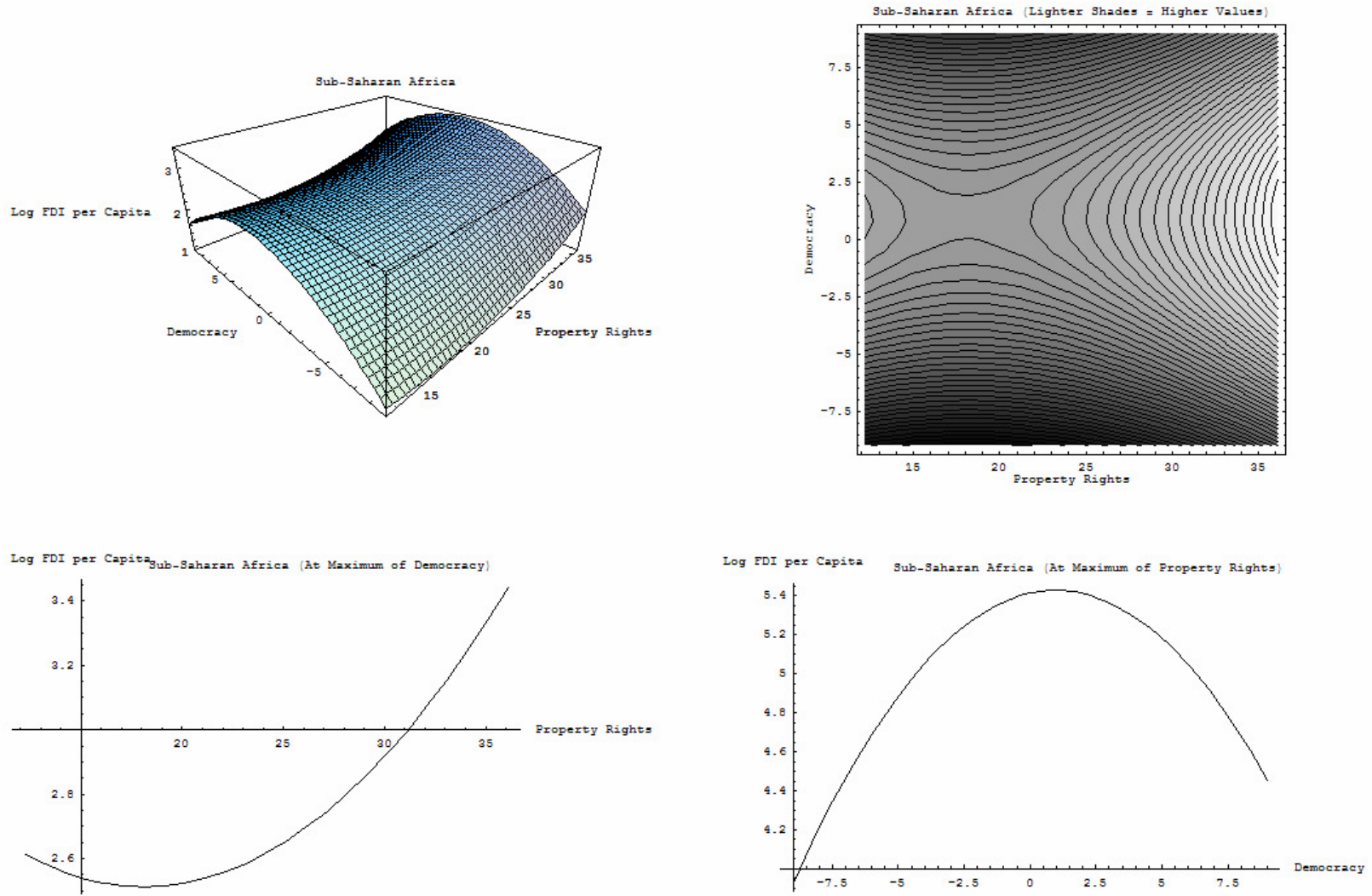


Figure 6. Estimated Relationship between Democracy, Property Rights, and Per Capita FDI Inflows: Sub-Saharan Africa



## Appendix 5: Regression Output, Residual Plots by Country, Hausman Tests

### Regression 1

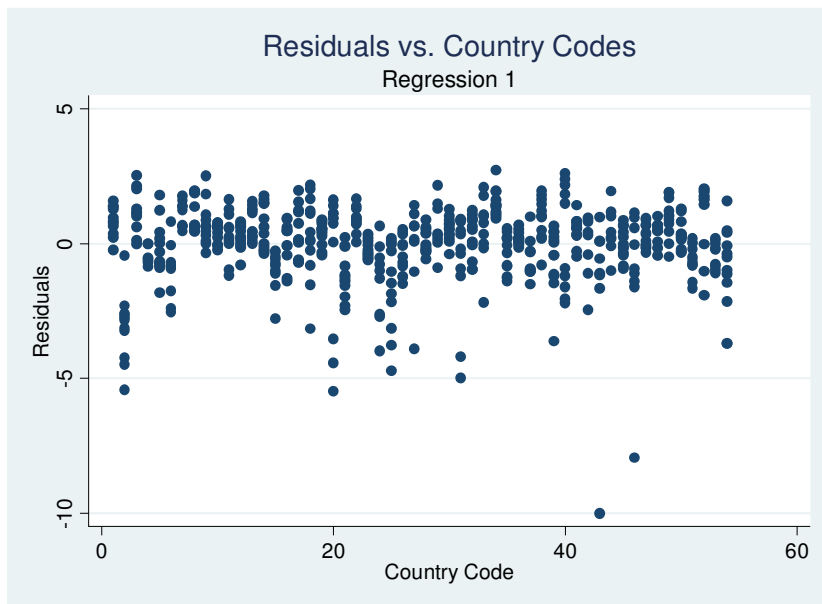
```
. xtreg lfdicap lgdp lgdpcap trade reserveimp civilwarthreat polity proprights, be

Between regression (regression on group means)   Number of obs   =       583
Group variable (i): code                         Number of groups =        54

R-sq:  within = 0.2554                          Obs per group:  min =         8
        between = 0.7615                          avg =       10.8
        overall = 0.5868                          max =        12

sd(u_i + avg(e_i.))= .9230472                    F(7,46)         =       20.98
                                                Prob > F        =       0.0000
```

	lfdicap	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
	lgdp	.001517	.1046118	0.01	0.988	-.2090556 .2120895
	lgdpcap	.996066	.1768606	5.63	0.000	.640064 1.352068
	trade	1.573644	.5178024	3.04	0.004	.5313616 2.615926
	reserveimp	.259621	.4560118	0.57	0.572	-.6582832 1.177525
	civilwarth~t	.0033631	.0099342	0.34	0.737	-.0166335 .0233596
	polity	.022521	.024495	0.92	0.363	-.0267848 .0718268
	proprights	.0246437	.0331961	0.74	0.462	-.0421765 .0914639
	_cons	-6.931991	2.017686	-3.44	0.001	-10.99338 -2.870599



## Regression 2

```
. xtreg lfdicap lgdp lgdpcap trade reserveimp civilwarthreat polity proprights, fe
```

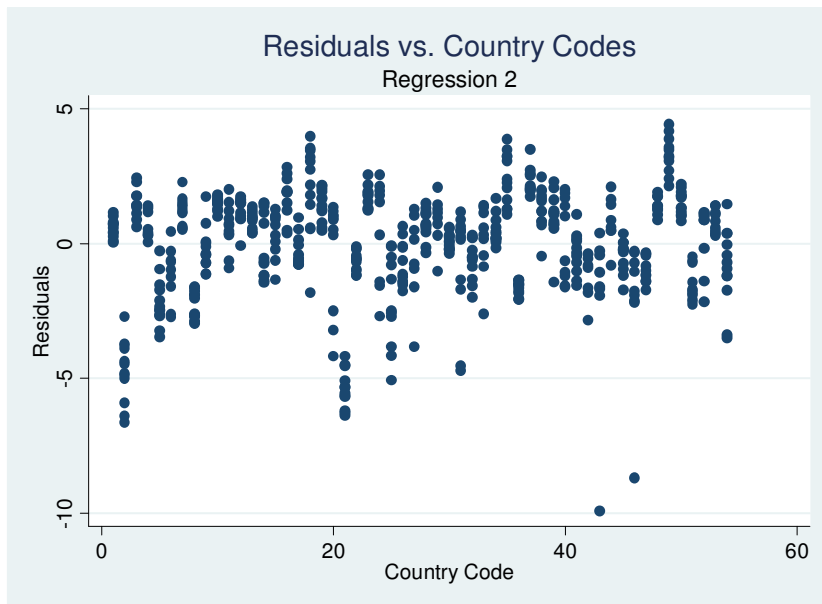
```
Fixed-effects (within) regression      Number of obs   =      583
Group variable (i): code              Number of groups =      54

R-sq:  within = 0.2962                Obs per group:  min =      8
      between = 0.2642                  avg   =     10.8
      overall  = 0.2438                  max   =     12

corr(u_i, Xb) = -0.3546                F(7,522)        =     31.38
                                          Prob > F        =     0.0000
```

lfdicap	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
lgdp	.6881356	.803271	0.86	0.392	-.8899055 2.266177
lgdpcap	-.2233906	.97101	-0.23	0.818	-2.130958 1.684177
trade	.8214712	.4806997	1.71	0.088	-.1228724 1.765815
reserveimp	.6304706	.3345492	1.88	0.060	-.0267576 1.287699
civilwarth~t	-.001989	.0039359	-0.51	0.614	-.0097212 .0057433
polity	.0630994	.0154031	4.10	0.000	.0328397 .0933592
proprights	.0920594	.0152921	6.02	0.000	.0620177 .122101
_cons	-15.85088	13.34901	-1.19	0.236	-42.07527 10.37351
sigma_u	1.6289602				
sigma_e	1.0685022				
rho	.6991741	(fraction of variance due to u_i)			

```
F test that all u_i=0:      F(53, 522) =      7.55      Prob > F = 0.0000
```





### Regression 3

```
. xtreg lfdicap lgdp lgdpcap trade reserveimp civilwarthreat polity proprights, re theta
```

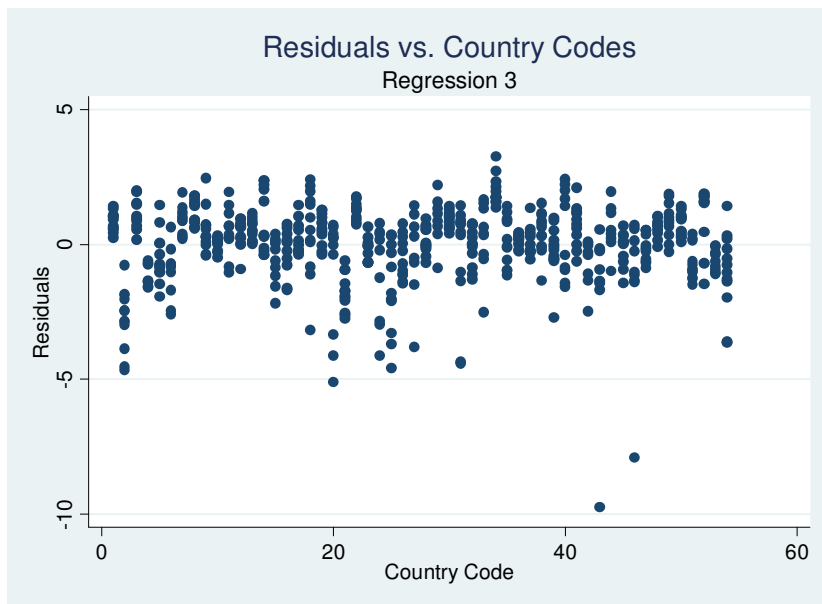
```
Random-effects GLS regression           Number of obs   =       583
Group variable (i): code                Number of groups =        54

R-sq:  within = 0.2921                  Obs per group:  min =         8
      between = 0.7316                    avg =       10.8
      overall = 0.5891                    max =        12

Random effects u_i ~ Gaussian           Wald chi2(7)     =    355.86
corr(u_i, X) = 0 (assumed)             Prob > chi2     =     0.0000
```

```
-----+----- theta -----+-----
min      5%      median      95%      max
0.5988   0.5988   0.6567   0.6633   0.6633
```

lfdicap	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
lgdp	-.0511247	.0906029	-0.56	0.573	-.2287032 .1264538
lgdpcap	.8129441	.1393501	5.83	0.000	.5398229 1.086065
trade	1.285131	.3391079	3.79	0.000	.6204921 1.949771
reserveimp	.4741082	.2695898	1.76	0.079	-.054278 1.002494
civilwarth~t	.0005803	.0035553	0.16	0.870	-.006388 .0075487
polity	.0546416	.0123159	4.44	0.000	.0305028 .0787803
proprights	.0835937	.012767	6.55	0.000	.0585708 .1086166
_cons	-5.829538	1.786135	-3.26	0.001	-9.330298 -2.328778
sigma_u	.86254328				
sigma_e	1.0685022				
rho	.39454295	(fraction of variance due to u_i)			



## Regression 4

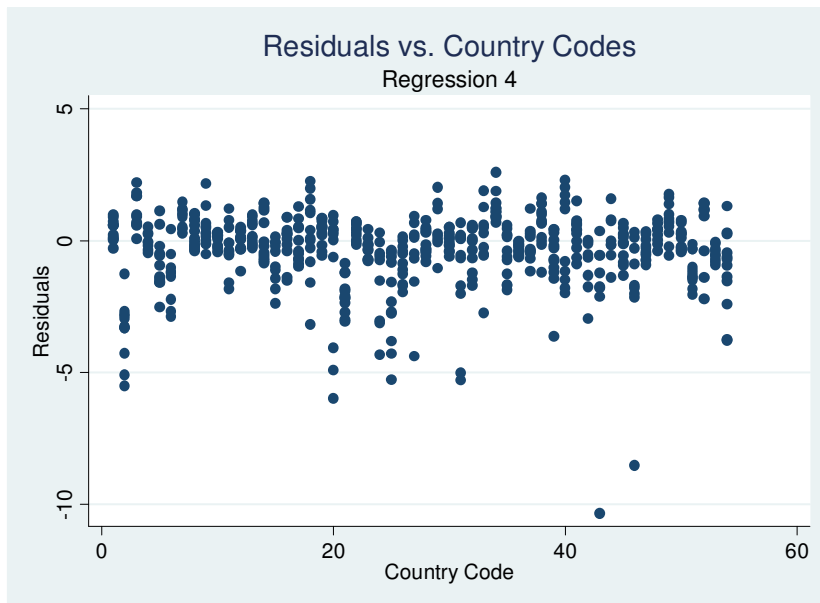
```
. xtgls lfdicap lgdp lgdpcap trade reserveimp civilwarthreat polity proprights, igls p(h)
```

Cross-sectional time-series FGLS regression

Coefficients: generalized least squares  
Panels: heteroskedastic  
Correlation: no autocorrelation

Estimated covariances	=	54	Number of obs	=	583
Estimated autocorrelations	=	0	Number of groups	=	54
Estimated coefficients	=	8	Obs per group: min	=	8
			avg	=	10.7963
			max	=	12
Log likelihood	=	-788.2569	Wald chi2(7)	=	2488.12
			Prob > chi2	=	0.0000

lfdicap	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
lgdp	.0508611	.0217968	2.33	0.020	.0081403 .093582
lgdpcap	.8656996	.0378323	22.88	0.000	.7915496 .9398496
trade	1.132471	.0981602	11.54	0.000	.9400809 1.324862
reserveimp	-.1146567	.0624083	-1.84	0.066	-.2369747 .0076613
civilwarth~t	.00546	.0016792	3.25	0.001	.0021689 .0087511
polity	.0181741	.0051719	3.51	0.000	.0080374 .0283107
proprights	.059368	.005667	10.48	0.000	.0482609 .070475
_cons	-7.535045	.4558347	-16.53	0.000	-8.428465 -6.641626



## Hausman Test between Regressions 2 & 3

```
. hausman fe re
```

	---- Coefficients ----			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	fe	re	Difference	S.E.
lgdp	.6881356	-.0511247	.7392603	.798145
lgdpcap	-.2233906	.8129441	-1.036335	.9609589
trade	.8214712	1.285131	-.4636601	.3407023
reserveimp	.6304706	.4741082	.1563624	.1981023
civilwarth~t	-.001989	.0005803	-.0025693	.0016885
polity	.0630994	.0546416	.0084579	.0092506
proprirights	.0920594	.0835937	.0084657	.0084174

b = consistent under Ho and Ha; obtained from xtreg  
 B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(7) = (b-B)'[(V\_b-V\_B)^(-1)](b-B)  
 = 9.46  
 Prob>chi2 = 0.2213

## Regression 5

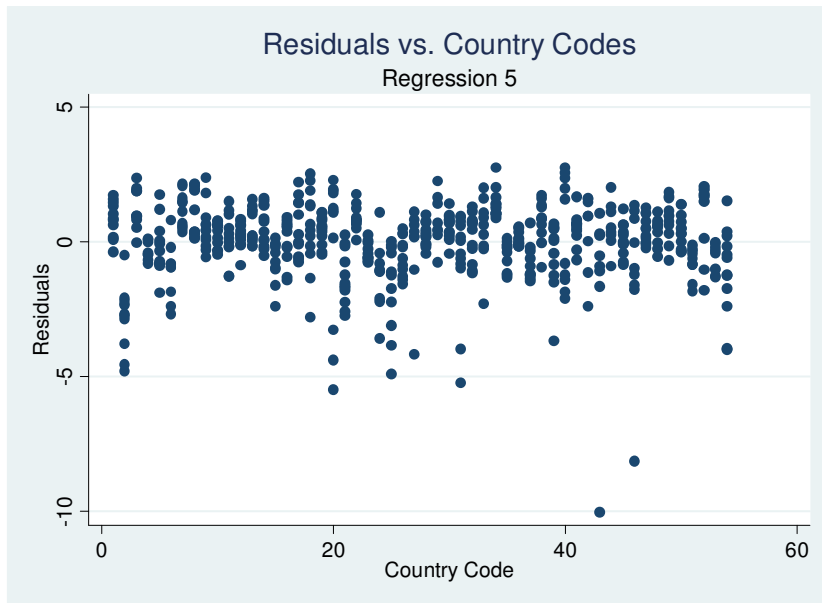
```
. xtreg lfdicap lgdp lgdpcap trade reserveimp civilwarthreat polity politysq proprights
proprightssq, be
```

```
Between regression (regression on group means)   Number of obs   =   583
Group variable (i): code                         Number of groups =   54

R-sq:  within = 0.1901                           Obs per group:  min =    8
         between = 0.7686                          avg =   10.8
         overall = 0.5774                          max =   12

sd(u_i + avg(e_i.))= .9295739                    F(9,44)         =   16.24
                                                Prob > F        =   0.0000
```

	lfdicap	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
	lgdp	.0406387	.1120827	0.36	0.719	-.1852492 .2665266
	lgdpcap	.9758416	.1814438	5.38	0.000	.6101657 1.341518
	trade	1.669842	.5332539	3.13	0.003	.595139 2.744544
	reserveimp	.2684499	.4593521	0.58	0.562	-.6573133 1.194213
	civilwarth~t	.0026502	.0100255	0.26	0.793	-.0175549 .0228553
	polity	.0168154	.0269762	0.62	0.536	-.0375516 .0711824
	politysq	.0047565	.006947	0.68	0.497	-.0092443 .0187573
	proprights	.1626171	.152815	1.06	0.293	-.1453613 .4705954
	proprightssq	-.0026963	.0028082	-0.96	0.342	-.0083559 .0029633
	_cons	-9.559419	3.112293	-3.07	0.004	-15.83183 -3.287004



## Regression 6

```
. xtreg lfdicap lgdp lgdpcap trade reserveimp civilwarthreat polity politysq proprights
proprightssq, fe
```

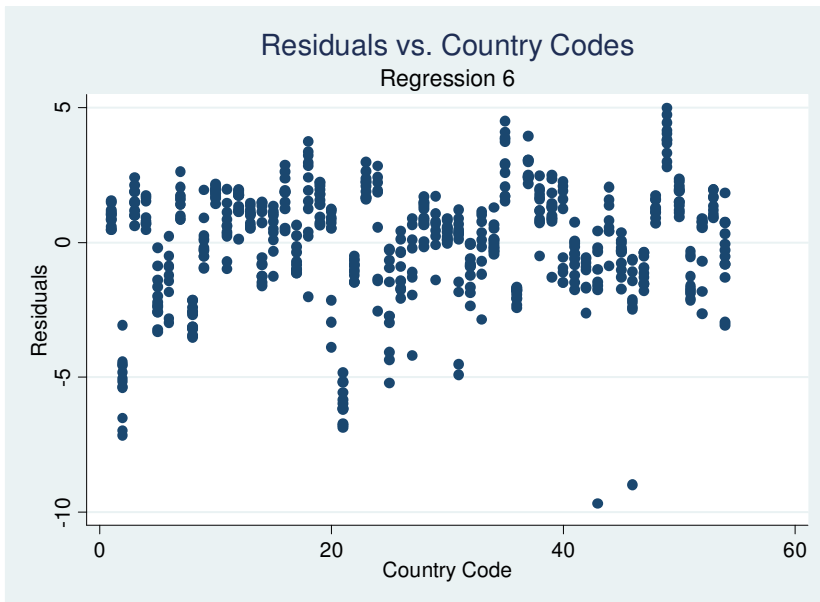
```
Fixed-effects (within) regression      Number of obs   =       583
Group variable (i): code              Number of groups =        54

R-sq:  within = 0.2995                 Obs per group:  min =         8
      between = 0.1375                 avg             =       10.8
      overall  = 0.1490                 max             =        12

corr(u_i, Xb) = -0.4214                F(9,520)        =       24.70
                                          Prob > F         =       0.0000
```

	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
lfdicap					
lgdp	.7720657	.8646696	0.89	0.372	-.9266094 2.470741
lgdpcap	-.5359654	1.087389	-0.49	0.622	-2.672181 1.60025
trade	.8497659	.4808852	1.77	0.078	-.0949507 1.794482
reserveimp	.5987885	.3350149	1.79	0.074	-.0593604 1.256938
civilwarth~t	-.0012005	.0039666	-0.30	0.762	-.008993 .0065921
polity	.060662	.0161752	3.75	0.000	.0288852 .0924388
politysq	.0009073	.003445	0.26	0.792	-.0058604 .0076751
proprights	.0193364	.0501136	0.39	0.700	-.0791135 .1177864
proprightssq	.0013753	.0009027	1.52	0.128	-.0003981 .0031486
_cons	-14.87912	14.13724	-1.05	0.293	-42.65226 12.89401
sigma_u	1.8251181				
sigma_e	1.0680358				
rho	.7449098	(fraction of variance due to u_i)			

```
F test that all u_i=0:      F(53, 520) =      7.59      Prob > F = 0.0000
```



## Regression 7

```
. xtreg lfdicap lgdp lgdpcap trade reserveimp civilwarthreat polity politysq proprights
proprightssq, re theta
```

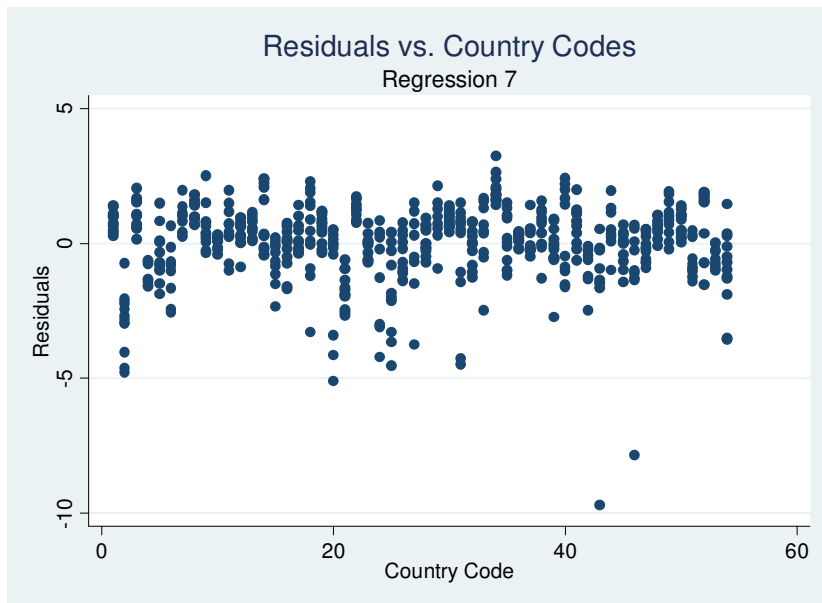
```
Random-effects GLS regression                Number of obs   =       583
Group variable (i): code                    Number of groups =        54

R-sq:  within = 0.2949                      Obs per group:  min =         8
        between = 0.7278                    avg           =       10.8
        overall = 0.5872                    max           =        12

Random effects u_i ~ Gaussian                Wald chi2(9)    =    355.17
corr(u_i, X) = 0 (assumed)                  Prob > chi2     =     0.0000
```

```
-----+----- theta -----+-----
min      5%      median      95%      max
0.6017  0.6017  0.6593    0.6658  0.6658
```

```
-----+-----
lfdicap |          Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-----+-----
      lgdp |   -.0613093    .0923258   -0.66   0.507   - .2422646   .119646
      lgdpcap |   .8167862    .144081   5.67   0.000   .5343925   1.09918
      trade |   1.268297    .3421583   3.71   0.000   .5976792   1.938915
  reserveimp |   .4630709    .2704683   1.71   0.087   -.0670371   .993179
civilwarth~t |   .0008682    .0035741   0.24   0.808   -.0061368   .0078733
      polity |   .0553666    .0126469   4.38   0.000   .0305791   .0801541
  politysq |  -.0010077    .0028299  -0.36   0.722   -.0065542   .0045388
  proprights |   .0325619    .0470291   0.69   0.489   -.0596135   .1247372
  proprightssq |   .0009539    .0008451   1.13   0.259   -.0007025   .0026103
      _cons |  -4.94353    1.954255  -2.53   0.011   -8.7738   -1.113259
-----+-----
sigma_u |   .86957849
sigma_e |   1.0680358
rho     |   .3986398   (fraction of variance due to u_i)
-----+-----
```



## Regression 8

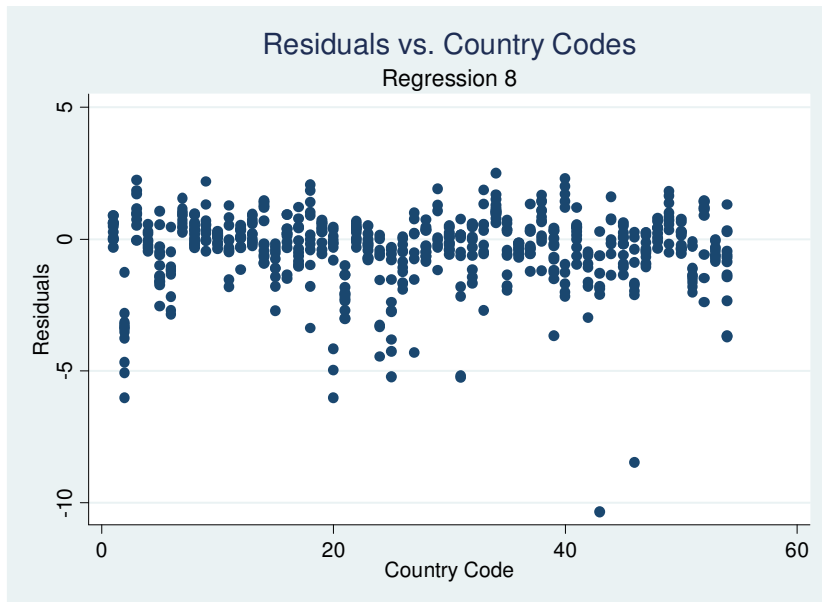
```
. xtgls lfdicap lgdp lgdpcap trade reserveimp civilwarthreat polity politysq proprights
proprightssq, igls p(h)
```

Cross-sectional time-series FGLS regression

Coefficients: generalized least squares  
Panels: heteroskedastic  
Correlation: no autocorrelation

Estimated covariances	=	54	Number of obs	=	583
Estimated autocorrelations	=	0	Number of groups	=	54
Estimated coefficients	=	10	Obs per group: min	=	8
			avg	=	10.7963
			max	=	12
			Wald chi2(9)	=	2624.17
Log likelihood	=	-785.5369	Prob > chi2	=	0.0000

lfdicap	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
lgdp	.0465472	.0228873	2.03	0.042	.0016889 .0914055
lgdpcap	.8620634	.0375996	22.93	0.000	.7883696 .9357573
trade	1.077655	.1042234	10.34	0.000	.8733805 1.281929
reserveimp	-.143006	.0623291	-2.29	0.022	-.2651689 -.0208432
civilwarth~t	.0054915	.0017049	3.22	0.001	.0021499 .008833
polity	.0207445	.0057375	3.62	0.000	.0094992 .0319897
politysq	-.0008271	.00109	-0.76	0.448	-.0029635 .0013093
proprights	-.033548	.0309626	-1.08	0.279	-.0942336 .0271376
proprightssq	.0017514	.0005615	3.12	0.002	.0006508 .0028519
_cons	-6.149941	.6886263	-8.93	0.000	-7.499624 -4.800258



## Hausman Test between Regressions 6 & 7

```
. hausman fe re
```

Note: the rank of the differenced variance matrix (8) does not equal the number of coefficients being tested (9); be sure this is what you expect, or there may be problems computing the test.

Examine the output of your estimators for anything unexpected and possibly consider scaling your variables so that the coefficients are on a similar scale.

	---- Coefficients ----		(b-B)	sqrt(diag(V_b-V_B))
	(b)	(B)	Difference	S.E.
	fe	re		
lgdp	.7720657	-.0613093	.8333749	.8597264
lgdpcap	-.5359654	.8167862	-1.352752	1.077801
trade	.8497659	1.268297	-.4185313	.3379028
reserveimp	.5987885	.4630709	.1357176	.1976914
civilwarth~t	-.0012005	.0008682	-.0020687	.0017204
polity	.060662	.0553666	.0052954	.0100843
politysq	.0009073	-.0010077	.0019151	.0019646
proprights	.0193364	.0325619	-.0132254	.0173099
proprightsq	.0013753	.0009539	.0004213	.0003172

b = consistent under Ho and Ha; obtained from xtreg  
 B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(8) = (b-B)' [(V\_b-V\_B)^(-1)] (b-B)  
 = 7.05  
 Prob>chi2 = 0.5316



## Regression 9

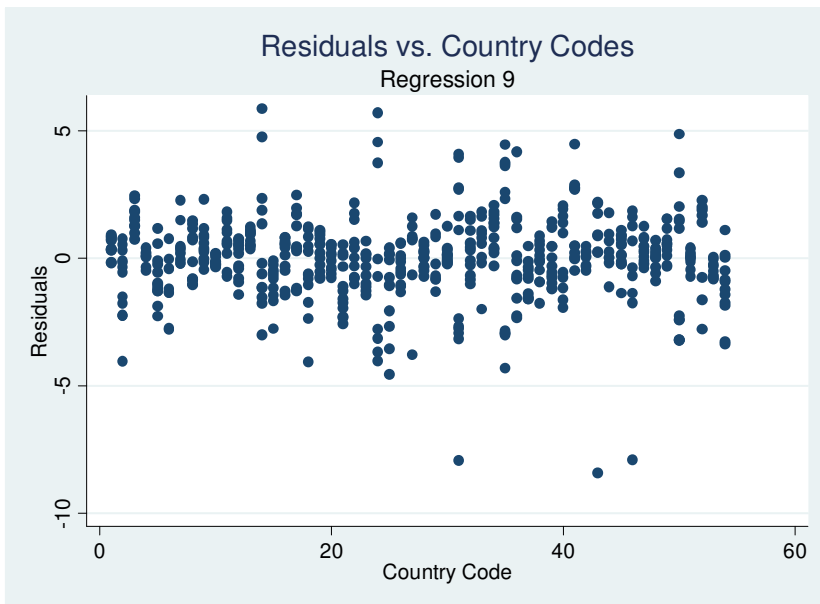
```
. xtreg lfdicap lgdp lgdpcap trade reserveimp civilwarthreat pol1 pol2 pol3 pol4 pol5
polsq1 polsq2 polsq3 polsq4 polsq5 proprights1 proprights2 proprights3 proprights4
proprights5 proprights1 polsq1 polsq2 polsq3 polsq4 polsq5 i1 i2
i3 i4, be
```

```
Between regression (regression on group means) Number of obs = 583
Group variable (i): code Number of groups = 54

R-sq: within = 0.1233 Obs per group: min = 8
      between = 0.8757 avg = 10.8
      overall = 0.5288 max = 12

sd(u_i + avg(e_i.))= .9037637 F(28,25) = 6.29
Prob > F = 0.0000
```

lfdicap	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
lgdp	-.011367	.1690915	-0.07	0.947	-.3596174 .3368834
lgdpcap	1.056667	.4031103	2.62	0.015	.2264459 1.886888
trade	2.048059	.7878086	2.60	0.015	.4255369 3.670581
reserveimp	.2591099	.7350535	0.35	0.727	-1.254761 1.772981
civilwarth~t	-.0055029	.0128843	-0.43	0.673	-.0320387 .0210328
pol1	-.0941076	.0616916	-1.53	0.140	-.2211637 .0329486
pol2	.3027089	.4319164	0.70	0.490	-.5868395 1.192257
pol3	.1411231	.2162471	0.65	0.520	-.3042463 .5864924
pol4	-.0722742	.3277089	-0.22	0.827	-.7472033 .6026549
pol5	.0252146	.0851626	0.30	0.770	-.150181 .2006102
polsq1	.0192283	.0166605	1.15	0.259	-.0150846 .0535412
polsq2	.0088631	.0364443	0.24	0.810	-.0661952 .0839215
polsq3	-.0175876	.0246211	-0.71	0.482	-.0682957 .0331204
polsq4	-.0058878	.0249663	-0.24	0.815	-.0573068 .0455312
polsq5	-.0027688	.0161698	-0.17	0.865	-.0360712 .0305336
proprights1	.699547	.6197111	1.13	0.270	-.5767719 1.975866
proprights2	-.3902908	.3509123	-1.11	0.277	-1.113008 .3324265
proprights3	.0186899	.4547494	0.04	0.968	-.917884 .9552638
proprights4	2.679199	4.273514	0.63	0.536	-6.122268 11.48067
proprights5	-.1260525	.4618146	-0.27	0.787	-1.077177 .8250724
propright~q1	-.0110713	.0124535	-0.89	0.382	-.0367199 .0145772
propright~q2	.0067201	.0057306	1.17	0.252	-.0050824 .0185225
propright~q3	.0018987	.0090017	0.21	0.835	-.0166405 .020438
propright~q4	-.0526099	.0665009	-0.79	0.436	-.189571 .0843513
propright~q5	.0016118	.0097178	0.17	0.870	-.0184024 .0216261
i1	-12.94889	8.340296	-1.55	0.133	-30.12605 4.228275
i2	(dropped)				
i3	-3.84885	7.682016	-0.50	0.621	-19.67026 11.97256
i4	-33.45367	63.44758	-0.53	0.603	-164.1264 97.21907
_cons	-3.810625	6.363374	-0.60	0.555	-16.91624 9.294989



## Regression 10

```
. xtreg lfdicap lgdp lgdpcap trade reserveimp civilwarthreat pol1 pol2 pol3 pol4 pol5
polsq1 polsq2 polsq3 polsq4 polsq5 proprights1 proprights2 proprights3 proprights4
proprights5 proprights1 proprights2 proprights3 proprights4 proprights5 i1 i2
i3 i4, fe
```

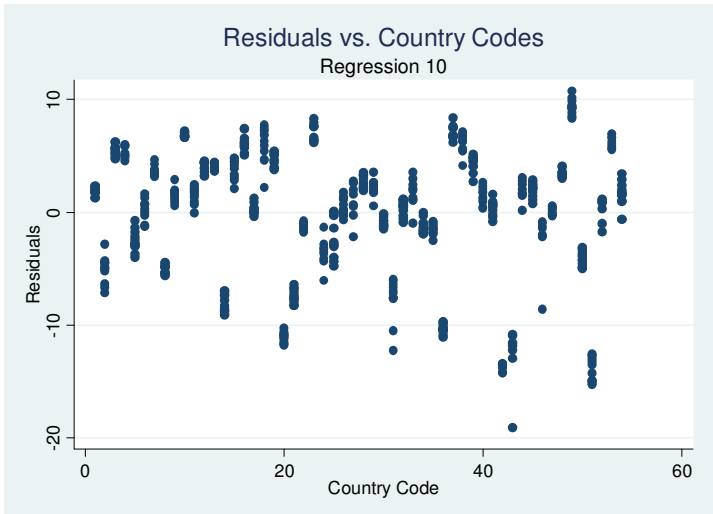
```
Fixed-effects (within) regression      Number of obs   =      583
Group variable (i): code              Number of groups =       54

R-sq:  within = 0.4556                Obs per group:  min =       8
      between = 0.0027                  avg   =      10.8
      overall  = 0.0082                  max   =       12

corr(u_i, Xb) = -0.9368                F(25,504)       =      16.87
                                          Prob > F        =      0.0000
```

lfdicap	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
lgdp	1.95191	.8276209	2.36	0.019	.3258978 3.577922
lgdpcap	-1.529933	1.06933	-1.43	0.153	-3.630827 .5709603
trade	1.023824	.4579271	2.24	0.026	.1241426 1.923505
reserveimp	.5425049	.3070848	1.77	0.078	-.0608191 1.145829
civilwarth~t	.0039445	.0037012	1.07	0.287	-.0033271 .0112162
pol1	.0619316	.0733371	0.84	0.399	-.0821525 .2060156
pol2	.2737482	.0703083	3.89	0.000	.1356147 .4118817
pol3	.0557714	.0329817	1.69	0.091	-.0090271 .12057
pol4	.0112468	.0570654	0.20	0.844	-.1008685 .1233621
pol5	.0199486	.0185562	1.08	0.283	-.0165083 .0564056
polsq1	-.0104229	.0115258	-0.90	0.366	-.0330674 .0122216
polsq2	.0174825	.0127557	1.37	0.171	-.0075783 .0425433
polsq3	-.0233727	.0064297	-3.64	0.000	-.036005 -.0107404
polsq4	.0061244	.0085881	0.71	0.476	-.0107484 .0229972
polsq5	-.010665	.0056632	-1.88	0.060	-.0217913 .0004613
proprights1	-.0582693	.0995924	-0.59	0.559	-.2539368 .1373981
proprights2	.5151821	.2643907	1.95	0.052	-.0042616 1.034626
proprights3	-.0000357	.0761599	-0.00	1.000	-.1496658 .1495944
proprights4	.6371626	.2402195	2.65	0.008	.1652077 1.109117
proprights5	.0692123	.1558948	0.44	0.657	-.2370713 .375496
propright~q1	.0023136	.0019165	1.21	0.228	-.0014516 .0060789
propright~q2	-.0052717	.003976	-1.33	0.185	-.0130832 .0025398
propright~q3	.0018147	.0015162	1.20	0.232	-.0011642 .0047937
propright~q4	-.0114517	.0041429	-2.76	0.006	-.0195912 -.0033123
propright~q5	.0000199	.0031173	0.01	0.995	-.0061046 .0061445
i1	(dropped)				
i2	(dropped)				
i3	(dropped)				
i4	(dropped)				
_cons	-36.856	13.62826	-2.70	0.007	-63.63119 -10.08081
sigma_u	5.5822359				
sigma_e	.95638013				
rho	.97148453	(fraction of variance due to u_i)			

```
F test that all u_i=0:      F(53, 504) =      6.38      Prob > F = 0.0000
```



## Regression 11

```
. xtreg lfdicap lgdp lgdpcap trade reserveimp civilwarthreat pol1 pol2 pol3 pol4 pol5
polsq1 polsq2 polsq3 polsq4 polsq5 proprights1 proprights2 proprights3 proprights4
proprights5 proprightssql proprightssql2 proprightssql3 proprightssql4 proprightssql5 i1 i2
i3 i4, re theta
```

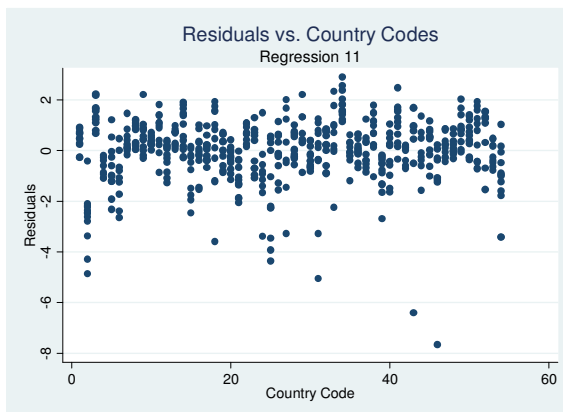
```
Random-effects GLS regression              Number of obs   =       583
Group variable (i): code                  Number of groups =        54

R-sq:  within = 0.4443                    Obs per group:  min =         8
       between = 0.8010                   avg =       10.8
       overall = 0.6827                   max =        12

Random effects u_i ~ Gaussian             Wald chi2(29)    =    570.66
corr(u_i, X) = 0 (assumed)               Prob > chi2     =     0.0000
```

```
-----+----- theta -----+-----
min      5%      median      95%      max
0.6321   0.6321   0.6864   0.6926   0.6926
```

	lfdicap	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
lgdp		-.0833595	.1127924	-0.74	0.460	-.3044285 .1377094
lgdpcap		.832344	.2351467	3.54	0.000	.3714649 1.293223
trade		1.525403	.3543059	4.31	0.000	.830976 2.21983
reserveimp		.5351597	.2629315	2.04	0.042	.0198234 1.050496
civilwarth~t		.0045529	.0034179	1.33	0.183	-.0021461 .0112518
pol1		-.0221321	.0448571	-0.49	0.622	-.1100503 .0657861
pol2		.2908041	.0655559	4.44	0.000	.1623168 .4192914
pol3		.0567032	.0320906	1.77	0.077	-.0061933 .1195997
pol4		.0377494	.0454767	0.83	0.406	-.0513832 .126882
pol5		.0336747	.0166855	2.02	0.044	.0009717 .0663777
polsq1		.0033561	.0080804	0.42	0.678	-.0124811 .0191933
polsq2		.0168606	.0119618	1.41	0.159	-.006584 .0403053
polsq3		-.0197686	.0055989	-3.53	0.000	-.0307423 -.008795
polsq4		.0028728	.0075802	0.38	0.705	-.0119842 .0177297
polsq5		-.0166323	.004923	-3.38	0.001	-.0262813 -.0069833
proprights1		.0671548	.0830176	0.81	0.419	-.0955568 .2298663
proprights2		.5867176	.2620413	2.24	0.025	.0731261 1.100309
proprights3		.0145382	.0739449	0.20	0.844	-.1303912 .1594676
proprights4		.6265729	.2384697	2.63	0.009	.159181 1.093965
proprights5		-.0047865	.1432508	-0.03	0.973	-.2855529 .27598
propright~q1		.0001223	.0015767	0.08	0.938	-.002968 .0032125
propright~q2		-.0064591	.0039177	-1.65	0.099	-.0141375 .0012194
propright~q3		.0018376	.0014614	1.26	0.209	-.0010266 .0047019
propright~q4		-.0110617	.0041089	-2.69	0.007	-.0191149 -.0030085
propright~q5		.0011579	.0028787	0.40	0.688	-.0044843 .0068
i1		-1.692374	2.170007	-0.78	0.435	-5.945509 2.560761
i2		-15.26391	4.892031	-3.12	0.002	-24.85212 -5.675709
i3		-.2411357	2.075339	-0.12	0.908	-4.308725 3.826454
i4		-8.141102	3.763529	-2.16	0.031	-15.51748 -.7647201
_cons		-3.588453	2.780402	-1.29	0.197	-9.037941 1.861035
sigma_u		.85453911				
sigma_e		.95638013				
rho		.4439401	(fraction of variance due to u_i)			



## Regression 12

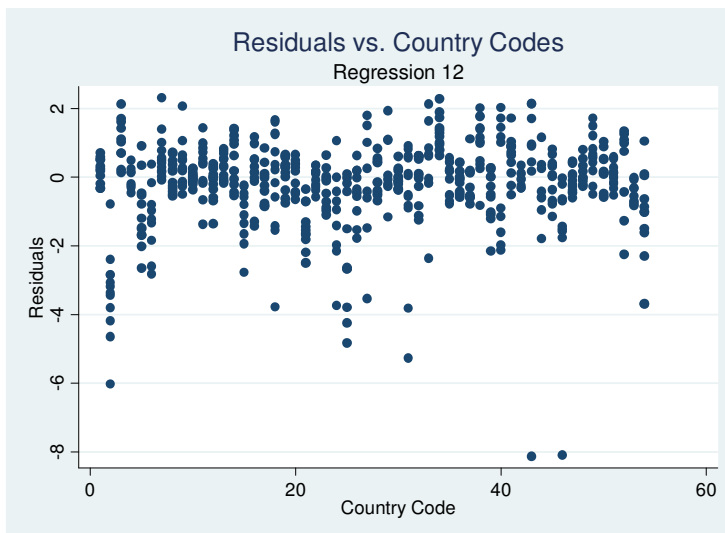
```
. xtgls lfdicap lgdp lgdpcap trade reserveimp civilwarthreat pol1 pol2 pol3 pol4 pol5
polsq1 polsq2 polsq3 polsq4 polsq5 proprights1 proprights2 proprights3 proprights4
proprights5 proprights1 polsq1 proprights2 polsq2 proprights3 polsq3 proprights4 polsq4
i3 i4, igls p(h)
```

Cross-sectional time-series FGLS regression

Coefficients: generalized least squares  
Panels: heteroskedastic  
Correlation: no autocorrelation

Estimated covariances	=	54	Number of obs	=	583
Estimated autocorrelations	=	0	Number of groups	=	54
Estimated coefficients	=	30	Obs per group: min	=	8
			avg	=	10.7963
			max	=	12
Log likelihood	=	-684.9135	Wald chi2(29)	=	4543.23
			Prob > chi2	=	0.0000

lfdicap	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
lgdp	.0173349	.0387718	0.45	0.655	-.0586563 .0933262
lgdpcap	.8891059	.0718229	12.38	0.000	.7483356 1.029876
trade	1.270232	.1224306	10.38	0.000	1.030272 1.510191
reserveimp	.0357251	.1139972	0.31	0.754	-.1877053 .2591555
civilwarth~t	.0041684	.0018327	2.27	0.023	.0005764 .0077605
pol1	-.033138	.0097961	-3.38	0.001	-.052338 -.0139381
pol2	.2697757	.0235206	11.47	0.000	.2236762 .3158753
pol3	.110053	.0192595	5.71	0.000	.0723052 .1478009
pol4	.0206409	.012875	1.60	0.109	-.0045936 .0458754
pol5	.0296574	.0122419	2.42	0.015	.0056638 .053651
polsq1	.0008975	.0024066	0.37	0.709	-.0038193 .0056143
polsq2	.0141067	.0040785	3.46	0.001	.006113 .0221005
polsq3	-.0118336	.0022719	-5.21	0.000	-.0162865 -.0073807
polsq4	-.0042133	.0027096	-1.55	0.120	-.009524 .0010973
polsq5	-.015109	.0028493	-5.30	0.000	-.0206935 -.0095244
proprights1	-.0010884	.0450788	-0.02	0.981	-.0894412 .0872644
proprights2	-.364558	.0990975	-3.68	0.000	-.5587855 -.1703306
proprights3	-.0317429	.0481826	-0.66	0.510	-.126179 .0626933
proprights4	.4493084	.110879	4.05	0.000	.2319896 .6666273
proprights5	-.1040271	.1022192	-1.02	0.309	-.3043731 .0963189
propright~q1	.0011313	.0008482	1.33	0.182	-.0005311 .0027936
propright~q2	.0064499	.0014346	4.50	0.000	.0036382 .0092617
propright~q3	.0021495	.0008493	2.53	0.011	.0004848 .0038141
propright~q4	-.0077105	.001945	-3.96	0.000	-.0115226 -.0038983
propright~q5	.0028695	.0020004	1.43	0.151	-.0010513 .0067903
i1	-1.967018	1.443305	-1.36	0.173	-4.795844 .8618077
i2	-.0220786	2.191658	-0.01	0.992	-4.317649 4.273492
i3	-1.784838	1.467905	-1.22	0.224	-4.66188 1.092204
i4	-7.292749	2.007741	-3.63	0.000	-11.22785 -3.35765
_cons	-4.230921	1.437207	-2.94	0.003	-7.047795 -1.414048



## Hausman Test between Regression 10 & 11

```
. hausman fe re
```

Note: the rank of the differenced variance matrix (20) does not equal the number of coefficients being tested (25); be sure this is what you expect, or there may be problems computing the test.

Examine the output of your estimators for anything unexpected and possibly consider scaling your variables so that the coefficients are on a similar scale.

	---- Coefficients ----			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	fe	re	Difference	S.E.
lgdp	1.95191	-.0833595	2.035269	.819899
lgdpcap	-1.529933	.832344	-2.362277	1.043155
trade	1.023824	1.525403	-.5015791	.2901113
reserveimp	.5425049	.5351597	.0073452	.1586446
civilwarth~t	.0039445	.0045529	-.0006083	.0014202
poll	.0619316	-.0221321	.0840636	.0580187
pol2	.2737482	.2908041	-.0170559	.0254102
pol3	.0557714	.0567032	-.0009317	.0076146
pol4	.0112468	.0377494	-.0265026	.0344722
pol5	.0199486	.0336747	-.013726	.0081195
polsq1	-.0104229	.0033561	-.013779	.008219
polsq2	.0174825	.0168606	.0006219	.0044297
polsq3	-.0233727	-.0197686	-.0036041	.0031612
polsq4	.0061244	.0028728	.0032516	.0040367
polsq5	-.010665	-.0166323	.0059673	.0027991
proprights1	-.0582693	.0671548	-.1254241	.0550157
proprights2	.5151821	.5867176	-.0715355	.0351685
proprights3	-.0000357	.0145382	-.0145739	.0182341
proprights4	.6371626	.6265729	.0105897	.0289415
proprights5	.0692123	-.0047865	.0739988	.0615011
propright~q1	.0023136	.0001223	.0021914	.0010894
propright~q2	-.0052717	-.0064591	.0011874	.0006784
propright~q3	.0018147	.0018376	-.0000229	.0004042
propright~q4	-.0114517	-.0110617	-.00039	.00053
propright~q5	.0000199	.0011579	-.0011379	.0011962

b = consistent under Ho and Ha; obtained from xtreg  
 B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(20) = (b-B)'[(V\_b-V\_B)^(-1)](b-B)  
 = 22.69  
 Prob>chi2 = 0.3042  
 (V\_b-V\_B is not positive definite)