

Property Rights and Growth: a Matter of Extremes  
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## **Abstract**

This text explores the impact of property rights on economic growth by analyzing pooled cross-section ratings of property rights in 120 countries across a 35 year period.

Empirical results are couched within a theoretical model that incorporates institutions into a general production function, adding property rights as an idiosyncratic shock. A generalized multivariate regression controlling for capital investment, population growth, trade openness and a benchmark level for GDP exhibits a positive impact of property rights on growth. Additional results indicate that the magnitude of property rights' impact varies across different stages of development with the most profound impact in the extremes, i.e. the most developed and least developed countries. The text concludes by investigating the impact of legal heritage on the effectiveness of property rights as a growth propellant.

## **Section I: Introduction**

Political institutions contribute to market outcomes by setting parameters for agents' actions in an economy. Institutions create rules for economic exchange, enforce contracts and inherently reflect organizational norms within a society. They extend from the local congressional office to the general judicial system of a country. The way people interact, the expectations we take to social, political or economic relationships, and the decisions we reach are all influenced by various formal and informal institutions in our communities. Thus, the relationship between institutions and socioeconomic activity is both fundamental and pervasive.

In macroeconomics, policy choices adopted by governments in response to market pressures are ultimately political in nature, subject to the realities and constraints defining the incentive structures for politicians. At the microeconomic level, private individuals and firms function similarly. For example, the Judicial system enforces constraints by sanction, affecting how lobbying is conducted, regulatory policy is executed and contracting is both determined and managed; the credibility and clarity of job-protection legislation influences a manager's decision to hire another worker; and the organization of the SEC and its regulation affects how an investor calculates risk. In essence, institutions will impact both the parties economic agents choose to contract with and the specifics of the contract.

Hence, this paper econometrically assesses institutional effects as reflected in property rights and legal precedent on economic growth. The intent is to statistically express the extent to which institutions codetermine a country's economic success.

Primarily, the study explores the impact of measures of property rights on economic performance. In order to appropriately assess property rights as a growth determinant, comprehensive regression models are estimated. To shed further light on the property rights issue, simple bivariate models and more complex interactive models are examined.

Results indicate that while property rights matter for all countries, the magnitude of their impact varies across different levels of development. Predictably, legal tradition also significantly impacts the effectiveness of property rights and, by extension, economic growth.

## **Section II: Background Literature**

The role of institutions as economic infrastructure may serve as a compliment to the transformation of resources and inputs into output, or as a deterrent, effectively stunting an entity's economic potential (Jordan, 2001). The ability of individuals and firms to convert inputs into outputs turns on reassurances by the state that their actions are viewed as legitimate and protected. Short-term policy reactions do not have the same impact on economic agents as long-term public institutions. It is the institutions that facilitate trust and affect expectations amongst actors in chains of production. Thus, if public institutions minimize transaction costs through protection of contracts and private property, then variation in the quality of such institutions over time and place should be equally expressed in variations of economic growth.

If better institutions are linked to better economic performance, then institutions must be flexible and dynamic in response to market pressure. Yet, while the rate of

institutional responsiveness depends on the regime type and structure of a government (i.e. the ease with which incumbents can be replaced), government institutions have been shown to be inherently responsive to changes in societal preferences and market pressures, albeit slowly (Garrett and Lange, 1996). Theoretically, this allows for institutions to be representations of sociological norms and indirect representations of market conditions that occur within the political economy of a country.

Additionally, institutional quality has been shown to be sensitive to the degree of “social cohesion” within a country; here social cohesion is defined as the building of shared values, communities and a sense of common enterprise. Thus, the nature of socioeconomic divisions within a society not only manifests in public policy, but in the institutions of a country (Easterly, 2004). The ability of a polity to respond to financial shocks, downturns or economic opportunities in a collective manner is significantly restrained when members of that polity do not identify with one another. Institutions function as a locus of synergy and symbiosis between players, coordinating activity in response to common problems such as human rights violations (Veseth, 1982).

By influencing the economic environment within a society, institutions allow individuals to convert social returns to wealth generating activity and private returns. Hall and Jones (1999, 2004) define this relationship as social infrastructure. They assess its impact on economic growth as proxied by worker’s capital/output ratio. They show that economic performance in output per worker is determined by investment rates in physical and human capital. However, cross-national variation in capital accumulation relies primarily on institutions and government policies that encourage investment. Thus,

comparative differences in output per worker across countries may be explained indirectly by differences in social infrastructure.

Nonetheless, definitions of public institutions themselves and their relationship with economic growth is a subject of contention. One method to gauge institutional effects on growth is to measure the viability of a government's capacity to convince long-term investors that they'll respect contracts; that is, that they are credible. With respect to economic interaction, government credibility may be trust that governments will guarantee individual property rights. Existing modeling efforts argue that credibility of a government's general policy commitments is communicated to investors by structural constraints on the ability of government officials to make rash decisions; this is statistically reflected in the relationship between structurally-derived measures of political constraints and cross-national variation of economic growth (see e.g. Henisz, 2000). The logic of this argument is that once governments make commitments, their ability to break those commitments rely on the ease at which powerful politicians can make decisions. Thus, Jensen (2003) points out that the ability to say an agreement is credible in the long run relies on the system of checks and balances within a government which prevents actors from arbitrarily expropriating property.

Property protection is especially applicable to calculation of risk in foreign direct investment (FDI) since *ex post* it is illiquid and subsequently sensitive to changes in government. Thus, the number of independent branches of government with veto power, as well as the distribution of preferences among those political branches, can be used as a measure of government credibility. This is consistent with other forms of regime type literature such as that by Li and Resnick (2003) which argue that democratic institutions

attract FDI through institutional resistance to predatory rent seeking behavior. While policy agendas are often fettered to the short term in democracies, the benefits of long term constitutional constraints over elected politicians outweigh the potential losses due to periodic swings in voting patterns. Similarly, institutional guarantees of contract enforcement significantly contribute to diminished risk, appropriate expectation formation and enhanced investment.

In fact, robust property rights and rule of law are consistently used as proxies for optimal market infrastructure in the institution-growth literature; the main disagreement, however, has been over exactly how to measure it. Not only does economic development affect the role and impact of property rights, but regime type may create additional interaction effects. Leblans (1996) shows that economic growth is more rapid in economies that protect property rights than those that do not and that democratic regimes have more incentives to protect property rights than dictatorships. Rodrik et al. (2004) presents evidence that cross national variations in income levels are affected by indicators reflecting the quality of institutions and rule of law. In fact, these variables statistically trump other measures of geography and international economic integration, and are linked to physical capital accumulation. Furthermore, in contrast to growth theory based primarily on economic integration and trade openness, Berg and Kruger (2003) show that the effect of strong legal structure and property rights are positive and stronger than freedom to exchange with foreigners, which might actually retard growth rates in societies sensitive to international economic shocks. Consequently, higher economic growth rates have occasionally been associated with state taxes on international trade (see e.g. Berggren and Jordahl, 2003). Hence, institutional quality regarding property rights is

fundamentally important because property rights are the basic mechanism that can set expectations and create the incentive to invest; without any institutional guarantee on property rights itself, investment would not exist because actors could never credibly enforce contracts (Acemoglu et. al, 2004).

As noted above, property rights set expectations that guide behavior, affecting the actions of economic actors. Jones (1983) points out that when considering transaction costs between employers and workers, the system of property rights sets the context within which the costs of negotiation, monitoring and enforcement of economic exchanges and contracts is determined. While property rights may function under the basic framework of allocating workers specific rights to the use of resources, the strategic impact of secured property rights is that expectations of individuals influence their willingness to engage with and commit to obligations with other parties. The level of performance reflects the exchange context in which an understanding is reached and hence is a function of property rights. The degree to which the firm must internalize the risk of the contract is inversely related to the strength of the country's property rights. High property rights may be selected at the micro-level when production patterns become specialized to the point where monitoring is expensive and employees require an incentive to invest in firm-specific skills.<sup>1</sup> In contrast, weak property rights might be the optimal choice when skills are nonspecific, contract negotiation is cheaper and monitoring of behavior is easier. Additionally technology transfer is also a function of property rights; increased regulation in the form of broader property rights and/or better

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<sup>1</sup> For a related theoretical model for how states deal with employee incentive problems concerning the limitations of firm-specific skill acquisition, see Margarita Estevez, Torben Iversen, and David Soskice, "Social Protection and the Formation of Skills: A Reinterpretation of the Welfare State." In Peter Hall and David Soskice, eds., *Varieties of Capitalism*. Oxford: Oxford University Press, 2001, p. 150

enforcement actually facilitates the transition of knowledge and skills from developed to developing countries. Branstetter et. al (2005) show that stronger intellectual property rights in host countries tend to increase technology transfer from US multinational enterprises to local domestic firms.

Other individual and firm-level approaches to property rights have produced considerable variety in market responses to differences in how property rights are conceived, defined and enforced. Johnson (2002) notes that the perceived security of property rights is directly related to reinvestment rates, where insecurity of property rights and high levels of corruption reduce firms' investment by over a third. Additionally, since security of property rights is directly related to the desire for external finance, the presence or lack of enforceable property rights can be a factor influencing the level of external finance. Moreover, Clessens and Laeven (2003) produce evidence that indicates that secure property rights are linked to higher micro-level profits since they lead to higher rates of return on assets via improved asset allocation. They also note a converse, yet more resonant point, that lower property right protection negatively impacts the allocation of investable assets and limits the growth of new firms.

Origins of the legal system itself have an impact on expectations, credibility of commitments, investment patterns and economic development. La Porta et. al (1998) notes that French civil laws give investors weaker legal rights than British common laws do. This is attributable to the fact that common law favors shareholders and creditors by ensuring stronger rights. This relationship increases in complexity when considering enforcement, which is the highest in German-civil law and Scandinavian countries, lowest in French-civil law systems with English common-law sitting in the middle. For a

legal structure to protect private property, coercion and corruption must be limited. Glaeser and Shleifer (2002) point out that this relationship between financial sector strength and legal origins is affected by the historical development of each legal system. This is attributable to the fact that historical development reflects the power dynamics and negotiated norms in a country.

The econometric models presented in La Porta et. al (1999) demonstrate that economies formed on common-law legal foundations have more robust financial markets and protections than those formed on a civil-law legal structure. However, as Glaeser et. al. (2004) shows, once modeling extends beyond binomial coding for legal origins, the strength of institutional vs. human capital explanations for growth is contestable. Moreover, La Porta et. al. (2004) note that since most studies that attempt to quantify institutional quality use datasets that are mean-reverting and subjective to temporary government policies, results supporting long-term institutional effects may instead be representing short-term political changes.

Keefer and Knack (1995, 1997) demonstrate that political risk exhibits inconsistent predictive power for economic growth in cross-country studies. They show that political risk, defined through probability of coup attempt, revolution and assassination loses statistical significance when econometric modeling controls for institutional quality. Such a finding is consistent with the notion that strong institutions mitigate uncertainty and risk. This finding supports the notion that economic development is more sensitive to long-term indicators of success, such as a property rights system, than short-term changes in governance.

Yet the question remains “do institutions cause economic growth, or does economic growth encourage good institutions”? Chong and Calderón (2000) use multiple measures for institutions in a cross-sectional study to establish linear feedback between economic performance and institutional quality. Although Chong and Calderón use contract enforceability, nationalization potential, infrastructure quality and bureaucratic delays of contracts as measures for institutions, infrastructure quality was the only variable in the institutional subset to efficiently predict growth. All measures of institutions aside from enforceability of contracts, however, significantly predict growth after excluding developed countries from the regression. Chong and Calderón also show that models demonstrating positive effects of economic performance on institutional quality are more robust than models demonstrating the positive effects of institutional quality on economic performance. If secure property rights first require a large enough volume of commerce to exist before appropriate institutional mechanisms develop, then incorporating economic feedback into institutional quality may be appropriate in econometric modeling (see e.g., Rosenberg and Birdzell, 1986).

### **Section III: Theoretical Model**

We start from a neoclassical model of economic growth, and then shift the fundamental assumptions to control for country specific institutional variation. Heitger (2004) points out that traditional growth theory from Solow (1956) emphasizes physical capital accumulation and endogenous growth theory a la Romer (1986) emphasizes human capital and technological progress. Institutional effects such as property rights

have usually been taken for granted. However, while capital accumulation, be it physical, human or technological, may bring improvements to an economy, they are not the only factors affecting growth. What is typically missing from theoretical growth models is a control for *incentive setting* institutions. If property rights assign costs and benefits and hence help set meaningful prices and expectations, mitigate transaction costs and promote more efficient use of resources, then they are indeed incentive setting institutions.

Building on the work of Heitger (2004) we present the specification of a neoclassical growth model below and outline a channel for variations in property rights to affect a country's economic growth. The production function is given by:

$$(1) \quad Y(t) = K(t)^\alpha H(t)^\beta (A(t)L(t))^{1-\alpha-\beta}$$

where  $Y$  = output

$K$  = physical capital

$H$  = human capital

$A$  = technology

$L$  = labor

$\alpha + \beta < 1$

Because the same production function applies to consumption and all forms of capital one unit of consumption can be costlessly transformed into one unit of physical or human capital. Both physical and human capital depreciate at the same rate  $\delta$ . Finally, labor grows at a rate of  $n$  and technology changes at a rate of  $g$ . Taking logs and reformulating equation (1) produces

$$(2) \quad n[Y(t)/L(t)] = A_0 + gt - [(\alpha + \beta) / (1 - \alpha - \beta)] * \ln(n + g + \delta) \\ + [(\alpha) / (1 - \alpha - \beta)] * \ln(s_k) + [(\beta) / (1 - \alpha - \beta)] * \ln(s_h)$$

where  $Y/L$  = output per worker on per capita income.

Equation (2) indicates that per capita income growth depends on the rate of growth of the labor force as well as the accumulation of physical and human capital.

For our purposes  $A_0$  is the most critical element of equation (2). Traditionally  $A_0$  has been interpreted as capturing such features as technology, climate, resource endowments and institutions. Consequently,

$$(3) \quad \ln A_0 = a + \varepsilon$$

where  $\alpha$  = constant

$\varepsilon$  = other country specific shocks

In this study we introduce an additional variable that is quite similar to  $A_0$  but which also reflects property rights differences among countries.

$$(4) \quad \ln \hat{A}_0 = a + PR + \varepsilon$$

where  $PR$  = property rights

Consequently, Equation (2) becomes

$$(2') \quad n[Y(t)/L(t)] = \hat{A}_0 + gt - [(\alpha + \beta) / (1 + \alpha + \beta)] * \ln(n + g + \delta) \\ + [(\alpha) / (1 - \alpha - \beta)] * \ln(s_k) + [(\beta) / (1 - \alpha + \beta)] * \ln(s_h)$$

This specification enables us to introduce property rights as an explicit explanatory variable in specifications of economic growth. Results from this exercise are reported in Section V.

#### **Section IV: Methodology**

This study uses The Fraser Institute's Free the World Economic Freedom Index to measure quality of property rights.<sup>2</sup> The index spans the period from 1970 to 2005.<sup>3</sup> It includes 120 countries. Since institutions are long-term entities that change slowly, the use of high frequency time-series analysis is not necessary. Thus, we take averages over five year periods to produce a cross sectional time series multivariate regression.

The use of five year averages serves several purposes. Primarily, it makes the survey longitudinally consistent, allowing us to make relatively accurate inferences given the data. Secondly, one of the goals of this study is to address the methodological issue raised by La Porta et. al (2004) concerning data sets that ascribe subjective ratings to long-term institutions. By using five year averages, we minimize the variance of each annual observation due to short term policy decisions within each five year period. Thus, if government policies in the short term are ephemeral, then they will not bias five year averages.

The index defines legal structure and security of property rights in five components: Judicial independence: the judiciary is independent and not subject to interference by the government or parties in disputes; impartial courts: a trusted legal

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<sup>2</sup> Dataset available at: <http://www.freetheworld.com/download.html>

<sup>3</sup> Data from 1970 to 2000 are expressed in 5 year averages. From 2001 till 2004, annual data is given.

framework exists for private businesses to challenge the legality of government actions or regulation; protection of intellectual property; military interference in rule of law and the political process; integrity of the legal system.<sup>4</sup> The data ranges from 1-10, where lower values indicate poorer legal structures.

Log real GDP is the dependent variable. It is regressed on our institutional measure for property rights, as well as other conditioning variables such as the capital stock, trade openness and population growth to assess the robustness of legal institutions as a predictor of economic growth. In some regressions the impact of legal origins is also assessed. Their influence is captured with a dummy variable equal to one if the country's legal system evolved in the French civil law tradition. All countries are classified as least developed (LDC), developing or developed countries. This structure allows us to create interaction variables to measure differences in how property rights affect economic growth across development stages.<sup>56</sup>

## **Section V: Results**

As with previous studies in the political economy of law (Keefer and Knack, 1995; Keefer and Knack, 1997; La Porta et. al, 1999), this study examines the relationship between the strength of a country's legal structure and its economic performance. Here, economic performance is given by the rate of GDP growth. The

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<sup>4</sup> Since 1970, countries receive a general score for legal structure and security of property rights. However, since 1995 the index started reporting scores for subunits such as judicial independence and protection of intellectual property.

<sup>5</sup> While dual causality tests between economic performance and institutional quality are suggested, this study does not focus on this relationship. Rather, it focuses on the non linear quality of property rights. Further research in this area is suggested.

<sup>6</sup> See Garrent and Lange (1985), p. 823-825 appendix for interaction variable methodology.

analysis focuses on ratings of property rights as a proxy for the strength of the overall legal system. We also inspect the role of precedent in law by accounting for common or civil law heritage. The sample of countries is analyzed collectively and in three separate subgroups based on their classification as developed, developing (middle income) and least developed countries (LDC). Specifically, in the analysis that follows, in the aggregate models developed countries with British common law heritage are the implicit benchmarks. La Porta et. al, (1998) suggests that these two factors should contribute to higher rates of growth. More parsimonious sub-period models shed further light on the analysis.

We start by exploring the structural relationship between GDP growth and legal institutions. As noted above, in the regression analysis development is treated as a dummy variable where the developed economies are the implicit benchmark, thus  $D_1$  represents middle income countries and  $D_2$  represents the LDCs.

[Table I]

The correlation matrix in Table I suggests that stronger legal structures are associated with higher rates of economic growth. Predictably, there is a strong negative association between high levels of property rights and lower levels of development. We also see that French Civil law structures are negatively correlated with property right values as well as with GDP growth rates. However, these findings are simply suggestive.

More theoretically based-regression analysis will further illuminate this issue. With more complex multivariate regressions, we will test the following hypotheses:

- i)* Higher property rights ratings contribute to higher rates of economic growth.
- ii)* The effects of property rights are non-linear given different levels of economic development.
- iii)* French Civil Law structures are associated with lower growth rates.

## **Section VI: Empirical Analysis**

Table II presents our first regression model estimated over the full sample of 120 countries. Gross capital formation is our proxy for capital stock, population growth proxies for labor force growth and  $[\text{imports} + \text{exports}] / \text{GDP}$  is our measure for trade openness. Also included is each country's level of GDP in 1975. This variable is employed as a control for assessing the impact of starting points on growth. As noted earlier, dummy variables for the LDC and Developing countries are also included to allow for variation in the intercept of the regression equation.

[Table II]

The full sample regression results displayed in Table II confirm that stronger property right regimes are associated with higher levels of growth. Moreover, property rights have by far the largest impact on growth rates. These findings suggest that by providing protection for ownership, legal structures are an important growth determinant through all stages of development. Consistent with simple growth models, Gross Capital

Investment also contributes significantly to growth, as does the level of GDP in 1975. Both findings simply confirm earlier research that indicates that capital and starting points matter. The dummy variables are also significant and positive. This is not unexpected; rather it vindicates the convergence theorem of exogenous growth models. As countries approach a steady state of growth, we may witness declining rates of growth due to the diminishing returns on the marginal product of capital inputs. Thus, poorer countries may grow faster than richer countries since they possess relatively less capital of all kinds. It follows that as poorer countries begin to amass capital and converge to higher levels of development, they will initially grow faster than richer economies. This interpretation is confirmed by the decreasing magnitude of the LDC and Developing dummies. Population growth is significantly negative at the 10% level. Consistent with current human capital theory (Becker, Murphey, Tamura, 1990), this finding indicates that high birth rates alone are an inhibitor to growth.

Trade Openness is the only insignificant variable. This result indicates that while export led growth might stimulate economic development in some countries it is not a panacea for all. Could it be that the benefits of trade openness depend on strong institutions and on different stages of a country's development? The regressions that follow shed light on this issue.

When we analyze the same general model across different sub-groups, a more complex picture emerges.<sup>7</sup> The results of this exercise are presented in Table II panels B, C and D respectively. For Developed economies, property rights impact on growth is even more pronounced than for the full sample or any other country group. This finding,

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<sup>7</sup> Classifications for Developed, Middle Income and LDC countries are taken from the World Bank's Global Development Index in Appleyard, Field, & Cobb (2007)

combined with a dramatically higher Adjusted  $R^2$ , suggests that property rights are critical for developed economy growth. Such a finding may be due to the importance of innovation and intellectual property as a growth engine.

The results regarding population growth buttress this argument. The population variable is marginally significant (85% level) and the coefficient is positive. This suggests that birth rates are being complimented by sufficient investments in education and training, allowing innovation and technology to assume a more powerful role in economic development. The market's ability to price human capital, especially good ideas, is predicated on the economy's ability to encourage and protect it through robust legal institutions. Thus, mature property rights facilitate more efficient allocations of resources to innovative activities by assigning costs and benefits to economic agents and reducing transaction costs.

Meanwhile, gross capital investments are not significant contributors to growth, suggesting innovation rather than accumulation of capital is an impetus for growth in developed economies. Additionally, since the coefficient value of gross capital investment level tends to shift when adding property rights to a general growth model, multicollinearity issues might remove the statistical significance of investment (Chong and Calderón, 2000). The finding that trade openness is identified as significant and negative is puzzling. Many of the most developed countries are small open economies, and the rest are large industrialized countries. Given that the trade volume is generally quite large for developed economies relative to all the other country classes, it is feasible that trade openness is less important for sustained growth. Additionally, as Berggren and

Jordahl (2003) point out trade openness may occasionally retard growth rates in small open economies sensitive to international economic shocks.

In the remaining two sub-groups, property rights and starting points are significantly important contributors to growth. However, the impact of property rights in the LDC's is about 50% larger than in the developing country group. The combination of results regarding property rights suggests that the effects of legal institutions are complex. Specifically, the results support the notion that the influence of property rights on economies is variable. In fact, the effectiveness of property rights are felt most at the extremes as defined by a country's stage of development. Gross capital investment is significant and positive in developing economies, while it is insignificant in the LDC's. In conjunction with different impacts of property rights, these findings suggest that while investments in physical capital positively contribute to growth in developing countries, the effective allocation and use of such capital require robust institutions. Similarly, Trade Openness appears significantly positive only in developing countries, indicating that export led growth is a phenomenon that needs to be complimented by stronger domestic institutions in order to be effective. Consistent with the results for high income countries, population growth is insignificant in the middle income country regression. However, it is significant, negative and large in magnitude for the poorest country group. As we saw above, the combination of results further supports the notion that it is human capital that matters. Low investment in both education coverage and quality, combined with high fertility rates produces underdeveloped steady states. Thus, improvements in education, health care and training must supplement population growth to positively impact both micro- and macro-economic development (Mincer, 1981). Simply

increasing the number of humans will not promote growth. Finally, the relatively low adjusted  $R^2$  values in LDC and Developing countries suggest that many different variables, such as non-formal social institutes are impacting growth in these sub-groups (Hall and Jones, 1999).

We further explore the suggested nonhomogeneity of the impact of property rights by looking at a simple bivariate model presented in Table III. The simplicity of the model, split again by a country's stage of development, is meant to directly explore the impact of law alone. Here again the results indicate that the quality of a country's legal institutions varies according to the country's stage of development, with the greatest impact occurring at either end of the development spectrum.

[Table III]

To further develop and test the notion that the impact of property rights may be non linear, we introduce an interaction term into the original full sample model. The specification and results are reported in Table IV. The interaction term is created by multiplying the property rights variable with the development dummies. Such a construction allows the slope of the regression equation to vary by country group. The results are generally consistent with our original model. However, while both dummies were significant in the original model (shifting the intercept), in this later specification only the LDC slope is significantly altered and in a positive way.

[Table IV]

Finally, we assess the statistical impact of legal heritage in Table V. To accomplish this we introduce a heritage-interaction term into the general model from Table II. This variable allows the effectiveness of legal structures to vary according to the legal heritage and traditions that the legal structure evolved from. Results indicate that civil law structures reduce the impact of property rights. This finding is consistent with the work of La Porta et. al (1998), among others. The relative lack of shareholder protection and rigorous law enforcement in civil law societies impact expectations and risk negatively.

[Table V]

## **Section VII: Conclusion**

How do we begin to account for cross-national variations in economic performance? While it is important to consider the effect of traditional economic inputs, it has become increasingly profitable to analyze and incorporate incentive setting institutions into general growth equations. As political economy literature increasingly addresses these issues, it will be important to start adjusting long held assumptions to reflect current thought. This study does so by incorporating legal structures and their heritage into traditional growth models and empirically testing their impact(s). The results suggest complex, non linear interaction effects on growth between property rights and the level of development. Across all stages of development, starting points affect

future growth rates. Legal strength and precedent are shown to significantly impact growth, even when controlling for other economic inputs. While population growth negatively impacts GDP growth in the general regression, the coefficient changes across different stages of development, suggesting the importance of human capital investment. Gross capital investment is more significant in developing economies rather than LDCs, implying that more robust legal structures positively impact the allocation of resources in these countries. Institutional variables consequently interact with non-institutional variables in shaping their magnitude and influence.

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**Table I**  
Correlation Matrix of Independent Variables

	Property Rights	Level of Development	Legal Structure	Real GDP Growth
Property Rights	1.0000			
Level of Development	-0.7251	1.0000		
Legal Structure	-0.0218	-0.2317	1.0000	
Real GDP Growth	0.1766	-0.0243	-0.0471	1.0000

**Table II**  
Full Sample Regression Model

$$\text{GDP Growth} = \text{Property Rights} + \text{Gross Capital Investment} + \text{Population Growth} + \text{Trade Openness} + \text{GDP Level} + \text{LDC-Dummy} + \text{Developing-Dummy}$$

	$\beta_n$	Standard Error	$t$	95% Conf. Interval	Adj R <sup>2</sup>	Number of Observations
<i>i. Aggregate</i>						
Constant	20.70711**	1.359203	15.23	18.03691 23.37731	0.1131	528
Property Rights	.6808619**	.1599114	4.26	.3667102 .9950136		
Gross Capital Investment	.0284296**	.0073457	3.87	.0139988 .0428604		
Population Growth	-.3746877*	.2068906	-1.81	-.7811318 .0317565		
Trade Openness	.003953	.0053457	0.74	-.0065489 .0144548		
GDP Level (1975)	5.74e-14**	1.29e-14	4.45	3.20e-14 8.28e-14		
Least Developed Economy	3.22468**	.8753983	3.68	1.504928 4.944432		
Developing Economy	1.491611**	.7209518	2.07	.075275 2.907947		

<i>ii. Developed Economies</i>						
Constant	19.51318**	.886041	22.02	17.75652 21.26984	0.6654	112
Property Rights	.9078379**	.109554	8.29	.6906364 1.125039		
Gross Capital Investment	-.0062329	.0138651	-0.45	-.0337219 .021256		
Population Growth	.1968786	.1299506	1.52	-.0607611 .4545184		
Trade Openness	-.0073054**	.0025409	-2.88	-.012343 -.0022677		
GDP Level (1975)	4.70e-14**	4.18e-15	11.24	3.87e-14 5.53e-14		
<i>iii. Developing Economies</i>						
Constant	21.40041**	1.516572	14.11	18.41475 24.38607	0.1574	279
Property Rights	.544874**	.2425238	2.25	.0674195 1.022329		
Gross Capital Investment	.0371993**	.0106027	3.51	.0163259 .0580728		
Population Growth	-.3618184	.3102951	-1.17	-.9726937 .2490568		
Trade Openness	.0178124*	.0091508	1.95	-.0002028 .0358275		
GDP Level (1975)	7.74e-13**	1.47e-13	5.25	4.84e-13 1.06e-12		
<i>iv. LDC</i>						
Constant	24.25698**	1.936736	12.52	20.42565 28.0883	0.1486	137
Property Rights	.8378103**	.3325971	2.52	.1798539 1.495767		
Gross Capital Investment	.0069881	.0111825	0.62	-.0151335 .0291097		
Population Growth	-1.077797**	.4799566	-2.25	-2.027265 -.1283278		
Trade Openness	.0116227	.0166399	0.70	-.0212951 .0445405		
GDP Level (1975)	4.80e-12**	1.59e-12	3.02	1.66e-12 7.95e-12		

\*\* $\alpha = .05$

\* $\alpha = .10$

**Table III**  
Bivariate Models of Property Rights

GDP Growth = Property Rights | Development

	$\beta_n$	Standard Error	$t$	95% Conf. Interval	Adj R <sup>2</sup>	Number of Observations
<i>Developed</i>						
Constant	19.70064**	.8947876	22.02	17.93758 21.46371	0.1603	231
Property Rights	.7992651**	.1192658	6.70	.5642665 1.034264		
<i>Developing</i>						
Constant	22.6351**	1.004857	22.53	20.66016 24.61287	0.0183	350
Property Rights	.5057912**	.1986821	2.55	.1150224 .8965599		
<i>LDC</i>						
Constant	21.98721**	1.193065	18.43	19.63114 24.34329	0.0803	163
Property Rights	1.080076**	.2881168	3.75	.5111004 1.649051		

\*\* $\alpha = .05$

\* $\alpha = .10$

**Table IV**  
Interaction Regression Result

$$\text{GDP Growth} = \text{Property Rights} + \text{Gross Capital Investment} + \text{Population Growth} + \text{Trade Openness} + \text{GDP Level} + \text{Property Right} * \text{LDC} + \text{Property Right} * \text{Developing}$$

	$\beta_n$	Standard Error	$t$	95% Conf. Interval	Adj R <sup>2</sup>	Number of Observations
Constant	22.54941**	.9957537	22.65	20.59321 24.5056	0.1138	528
Property Rights	.4508463**	.1296679	3.48	.1961089 .7055837		
Gross Capital Investment	.0285049**	.0073408	3.88	.0140837 .0429261		
Gross Capital Investment	.0285049**	.0073408	3.88	.0140837 .0429261		
Population Growth	-.3892729*	.2076482	-1.87	-.7972055 .0186596		
Trade Openness	.0038451	.0053468	0.72	-.006659 .0143491		
GDP Level (1975)	5.67e-14**	1.29e-14	4.40	3.14e-14 8.20e-14		
Pro Rights * LDC	.5881819**	.1505167	3.91	.2924864 .8838774		
Pro Rights * Developing	.156363	.1010605	1.55	-.042174 .3549		

\*\* $\alpha = .05$

\* $\alpha = .10$

**Table V**  
Legal Heritage Result

GDP Growth = Property Rights + Gross Capital Investment + Population Growth +  
Trade Openness + GDP Level + LDC-Dummy + Developing-Dummy + Property Rights  
\* Code Law

	$\beta_n$	Standard Error	$t$	95% Conf. Interval	R <sup>2</sup>	Number of Observations
Constant	23.28027**	2.095138	11.11	19.1546 27.40594	0.1294	268
Property Rights	.4728798*	.2515838	1.88	-.0225303 .9682899		
Gross Capital Investment	.0259259	.0200347	1.29	-.0135257 .0653775		
Population Growth	-1.230415**	.3793305	-3.24	-1.977379 -.4834502		
Trade Openness	.0147381**	.0072248	2.04	.0005113 .028965		
GDP Level (1975)	6.16e-14**	1.43e-14	4.30	3.34e-14 8.98e-14		
Least Developed Economy	3.951129**	1.489096	2.65	1.018852 6.883406		
Developing Economy	1.45976	1.077077	1.36	-.6611838 3.500703		
Property Rights * Code Law	-.1965345*	.1219078	-1.61	-.4365911 .0435221		

\*\* $\alpha = .05$

\* $\alpha = .10$