

PROPERTY RIGHTS AND ECONOMIC GROWTH: PANEL DATA EVIDENCE

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ABSTRACT

This paper offers empirical and theoretical evidence supporting the role of property rights in the development process. In many countries today, significant barriers to obtain legal and formal property rights continue to exist. What effect if any does this have on a country's ability to achieve economic development? Using neo-classical growth theory and applying property rights data from 1990-2002, the property rights hypothesis is tested for a group of 101 countries. Fixed effects panel data results are supportive of the hypothesis; countries whose citizens have secure and legal property rights tend to grow faster than countries with weaker property rights.

INTRODUCTION

Nobel Laureate Douglas North and Robert Thomas (1973) were one of the initial researchers to argue that institutions are prerequisites for economic growth. Institutions are considered social norms, educational and political systems, religion(s) of a country, and openness to trade and outside ideas among other things. Proper institutions enable individuals, groups, and firms to engage in the specialization and exchange that is required in the growth process. According to North (1987, 1990), the fundamental causes of economic growth are the institutions that lower transaction costs and enhance productivity through the specialization and exchange process. Scully (1988), Levin and Renelt (1992), Sala-i-Martin (1997), Nee (1998), De Soto (2000), and more recently Barro and McCleary (2003) and Claessens and Laeven (2003) find additional support to the institutional-economic growth nexus.

De Soto (1990, 2000) argues that property rights are a particularly important economic institution because of their role as an engine of economic growth. Property rights include: ownership of resources, including titles and deeds, intellectual property rights, including patents, copyrights, and trademarks and independent and impartial legal systems. Proper institutions and secure property rights give individuals incentives to innovate and produce something of value rather than trying to enrich themselves by some other inefficient method (i.e. rent-seeking activity, theft, arbitrary confiscation and/or taxation). Continuous economic growth through innovation, human capital formation, and lower transaction costs is conditional on the existence of enforceable property rights.

De Soto (1990, 2000) observes great disparity in formal private property protection between developed and developing countries, and believes this to be the main determinant of divergence over the last 100 years. That is, property rights are secure in successful countries and insecure and/or unclear in developing countries.

What has come to be known as the “De Soto hypothesis” suggests that economic growth is significantly related to the security of property rights in a country. For example, he argues that in developing countries most property is unproductive and “dead” because ownership rights are not adequately recorded or trusted. He states, “Because the rights to these possessions are not adequately documented, these assets cannot readily be turned into capital, can not be traded outside of narrow circles where people know and trust each other, can not be used as collateral for a loan, and cannot be used as a share against investment” (De Soto, 2000, p. 6). But developed countries have been able through agreed upon legal frameworks to secure private property so that it can be productive and provide a source of funding to entrepreneurs and other business activities. He argues, “In the West, by contrast, every parcel of land, every building, every piece of equipment, or store of inventories is represented in a property document that is the visible sign of a vast hidden process that connects all these assets to the rest of the economy. Thanks to this representational process, assets can lead an invisible, parallel life alongside their material existence. They can be used as collateral for credit. The single most important source of funds for new businesses in the United States is a mortgage on the entrepreneur’s house...By this process the West injects life into assets and makes them generate capital” (De Soto, 2000, p. 6). Essentially, what De Soto is saying is that property is more productive in developed countries because it serves as collateral to capital, investment, and other business activities. This secure and dual serving property is the primary reason why some countries have grown quickly, and the lack of secure property is one primary reason why some countries have lagged behind.

The purpose of this paper is to determine the quantifiable relationship between property rights and economic growth. Using fixed effects panel data methodology and annual data from 1990-2002 from 101 countries, the property rights hypothesis is tested and confirmed; high security of property rights is positively associated with higher real economic growth rates. The paper also finds that less developed economies (LDCs) benefit more from enhancements in property rights than developed economies.

This paper proceeds as follows: section II develops a theory on how property rights and innovation are related using entrepreneurial activities, section III presents the regression model to be tested, section IV reports the empirical findings, and section V concludes with implications from the findings.

THE THEORETICAL CASE FOR PROPERTY RIGHTS: INCREASED INNOVATION

Secure property rights impact an economy through many channels. This paper will focus on one of the many theoretical channels through which property rights impacts economic growth, that is, increases in entrepreneurial activity and technology.

Important elements of entrepreneurial activity are guiding institutions such as the legal systems, the tax laws, the rules and regulations, and the other conditions under which the entrepreneur must operate. Changes in institutions can greatly alter the amount of entrepreneurial activity. Greater freedom of action will increase the supply of entrepreneurs, repression of freedom will reduce innovation. Schumpeter (1934) specifically mentions increases in taxes as an impediment to entrepreneurship,

as well as financial policies that increase the cost of doing business. In developing countries, the cost of borrowing is substantially higher because most property, mainly mortgages, can not be used as collateral.

The entrepreneurs' quest for profit leads them to seek advantages over their competitors by developing superior products. This is accomplished through new techniques and more efficient methods of production. New ideas are "created" because it is profitable to innovate. When deciding on whether to devote resources to the research and development of a new product or method, entrepreneurs must calculate whether it is profitable. Specifically, they must consider if the short-run monopoly profit of research and development, the present discounted value of all future profits, is greater than the current costs of innovation. A simple form of Schumpeter's endogenous technological progress model can be defined as:

$$A = f(L, P, B, r, f, t), \tag{1}$$

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where A is the growth of total factor productivity, L is the labor force, P is profit, B is the amount of resources needed to create a new innovation, r is the interest rate, f is a bank's cost of investigating prospective borrowers, and t is explicit taxes and costs imposed on financial intermediation by government.

The theoretical influence of each variable is located under each variable in equation (1). For example, the greater the labor force (L) to work at developing new technology, the more rapid new ideas occur. The greater the profit payout (P) of a new idea, the faster the growth of TFP. The more resources that are needed to create one new idea (B), the slower the growth of technology. The higher the interest rate (r), the greater the present discounting factor of future profits and the slower the growth of new ideas. The higher the cost of investigating prospective borrowers (f), the lower the TFP growth. Lastly, the greater the taxes and explicit costs of financial intermediation (t), the slower the growth of technology.

De Soto suggests that countries with unsecure property rights have lower than optimal technology growth because they face higher interest rates (r) because they have no collateral and are high risk, they face higher costs of borrowing (f), and they face greater costs of financial intermediation (t).

SPECIFYING THE REGRESSION MODEL

Many linear econometric studies have analyzed the "sources of growth," see for example Barro (1991), Levin and Renelt (1992), Keefer and Knack (1997), Sala-i-Martin (1997), and Hall and Jones (1999). Most have drawn their regression foundation from the neoclassical Cobb-Douglas function, $Y = AK^\alpha L^{1-\alpha}$. Taking the natural log of the level values gives us $\ln(Y) = \ln(A) + \alpha \ln(K) + (1-\alpha)\ln(L)$, and differentiating with respect to time, T , $\frac{\partial \ln(Y)}{\partial T}$ yields:

$$GY = GA + \alpha GK + (1-\alpha)GL, \tag{2}$$

where GY, GA, GK, and GL are the growth rate of output, total factor productivity, capital and labor, respectively, and α and $(1-\alpha)$ are the relative shares of income going to capital and labor, respectively. Most researchers also add other institutional

variables that are believed to explain economic growth to equation (2), such as an international trade and/or an educational variable. Technically, adding a variable to the equation helps to explain part of the constant, which in this case is the Solow residual (i.e. total factor productivity). To test the role of property rights in the growth process, the Frasier Institutue’s property rights index is added to equation (2). A common form of the testable regression equation with property right is:

$$GRGDP_{it} = a_0 + a_1GLABOR_{it} + a_2GCAPITAL_{it} + a_3GTRADE_{it} + a_4HUMAN_{it} + a_5PROPERTY_{it} + u_{it} \quad (3)$$

where $GRGDP_{it}$ is the growth of real Gross Domestic Product for country i at time t , $GLABOR_{it}$ is the growth of the labor force for country i at time t , $GCAPITAL_{it}$ is the growth of real capital for country i at time t , $GTRADE_{it}$ is the growth of real international trade (i.e. the sum of imports and exports) for country i at time t , $HUMAN_{it}$, a proxy for human capital, is the fraction of country i ’s population aged 25 or above with secondary educational attainment, $PROPERTY_{it}$ is Gwartney and Lawson’s (2004) property rights index, and u_{it} is the error term. The property rights index has a value range from 1 to 10, where the value 1 is given to countries with severe restrictions on the freedom of its citizens and other economic agents to obtain secure property rights and independent legal systems. An index value of 10 is reserved for those countries with secure property rights and trusted legal systems. See Table 1 below for descriptive statistics on the property rights index.

**TABLE 1
DESCRIPTIVE STATISTICS FOR THE PROPERTY
RIGHTS INDEX, 1990-2002**

	All Countries	OECD Countries	LDC Countries
Average Index Value	5.652	7.853	4.967
Median Index Value	5.468	8.306	4.926
Maximum Index Value	9.538	9.538	8.633
Minimum Index Value	1.599	3.635	1.599
Average Standard Error	0.049	0.074	0.042
Average 95% Confidence Interval	±0.098	±0.148	±0.084
Average Kurtosis Value ¹	-0.686	0.350	-0.173
Average Skewness Value ²	0.324	-1.054	0.167
Number of Observations	1313	312	1001

¹ Kurtosis measures the relative peakedness or flatness of a distribution compared with the normal distribution. Positive kurtosis indicates a relatively peaked distribution, while a negative kurtosis designates a relatively flat distribution.

² Skewness is a measure of asymmetry of distribution. A positive skewness indicates a distribution with an asymmetric tail extending toward more positive values, and vice versa.

Equation (3) is compatible with endogenous growth theory, which suggests that productivity growth is assumed to be a result of specific policy choices, in this case policies that increase trade, education, and property rights. Equation (3) is thus in accordance with theoretical arguments suggesting that, *ceteris paribus*, an open, highly educated, property rights enforcing economy achieves more rapid productivity growth than a closed, low educated, weakly enforced property rights economy.

ESTIMATION AND RESULTS

Annual data for 101 countries were collected from 1990-2002 to test the above hypothesis. Panel data methodology in this paper follows the pooling technique described by Kmenta (1986). Estimation procedures allow for heteroskedasticity over cross-sections (i.e. allows for the error terms for each cross section to differ as one might expect from very large to smaller states) and timewise autocorrelation over time within cross-sections. This approach allows for country-specific differences through dummy variables (D), as it is implicitly assumed that the coefficient estimates for the included variables are identical across all countries. The following rules are applied to the dummies. When the cross-sectional unit is a part of a the variable that is being estimated D is one, but equals zero all other times. Formally written as:

$$D_{jt} = \begin{cases} 1 & \text{if } i = j \\ 0 & \text{if } i \neq j \text{ for } j = 2, \dots, 101, \end{cases} \quad (4)$$

where i is the index of a cross-section unit. The model of interest becomes:

$$GRGD_{it} = a_0 + \sum_j^{101} \gamma_j D_{jt} + a_1 GLABOR_{it} + a_2 GCAPITAL_{it} + a_3 GTRAD_{it} + a_4 HUMANA_{it} + a_5 PROPERTY_{it} + u_{it} \quad (5)$$

The global results from equation (5) are presented in Table 2 below. Notice that the results are as theoretically expected. The traditional factors of production, labor and capital, are positive and significantly associated with economic growth at the 95 percent level. Because the data are in growth rates, the coefficients can be interpreted with constant elasticities. For example, the coefficient on the growth of real capital, GCAPITAL, is 0.214, suggesting that for every 10 percent increase in capital stock is associated with a 2.14 percent increase in growth rates.

TABLE 2
ECONOMIC GROWTH DETERMINANTS: GLOBAL RESULTS

TEST	α_0	GLABOR	GCAPITAL	GTRADE	HUMAN	PROPERTY	BUSE R ²
Fixed Effects	10.099 (18.72)**	0.242 (6.96)**	0.214 (20.39)**	0.328 (30.10)**	0.016 (15.53)**	0.020 (7.02)**	0.996

Notes: Figures in parentheses are *t*-statistics. **Significant at the 95% level.

*Significant at 90% level. The joint hypothesis of the cross-section units having a common intercept is rejected (Ho: $\alpha_2 = \alpha_3 = \dots = \alpha_{11} = 0$, $F_{\text{calc}} = 27.06 > F_{\text{crit}} = 1.30$).

The significantly positive coefficient on the growth of international trade reaffirms what many past studies have found; open economies grow faster, see Feder (1982), Rivera-Batiz and Romer (1991), Dollar (1992), Sachs and Warner (1995), Frankel and Romer (1999), Parente and Prescott (2000), and Wacziarg (2001). Improvements to secondary educational attainments provide positive influences to economic growth for the sample of 101 countries. This is in accordance with many past studies, see Barro and Lee (1993), Barro (1997), Doppelhofer *et al.* (2000), and Lewer (2002).

As expected, the coefficient on property rights is positive and significant at the 95 percent level for the global sample. Besides the increase of technology, property rights influence on economic growth is also likely to operate through the other explanatory variables on the right-hand side of the sources of growth equation (5). North and Thomas (1973), De Soto (1990, 2000) and Powell (2002) showed that property rights influence growth through investment (factor accumulation). De Soto (1990, 2000) and Langelett and Schug (2003) specifically found property rights to influence growth through human capital accumulation.

To determine how changes in property rights impact developing economies relative to developed economies, regression equation (5) is rerun by splitting the 101 country sample into OECD and less developed countries (LDC) sub-samples, respectfully. The results are reported in Table 3 below:

TABLE 3
ECONOMIC GROWTH DETERMINANTS: OECD AND LDC RESULTS

TEST	α_0	GLABOR	GCAPITAL	GTRADE	HUMAN	PROPERTY	BUSE R ²
OECD ¹	0.916	0.662	0.237	0.101	0.165	0.008	0.998
Fixed Effects	(0.74)	(8.17)**	(14.57)**	(5.73)**	(11.59)**	(1.96)**	
LDC ²	3.699	0.956	0.161	0.136	0.024	0.019	0.998
Fixed Effects	(7.74)**	(29.58)**	(19.65)**	(13.46)**	(3.09)**	(8.31)**	

Notes: Figures in parentheses are *t*-statistics. **Significant at the 95% level.

*Significant at 90% level. The joint hypothesis of the cross-section units having a common intercept is rejected for the OECD and LDC sub-samples countries.

¹ OECD countries include: Australia, Austria, Belgium, Canada, Czech Republic, Denmark, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Mexico, New Zealand, Norway, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States.

² LDC countries include: Algeria, Argentina, Bahrain, Bangladesh, Barbados, Belize, Benin, Bolivia, Botswana, Brazil, Burundi, Cameroon, Chile, China, Colombia, Rep. of Congo, Costa Rica, Cote D Ivoire, Croatia, Cyprus, Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Fiji, Gabon, Ghana, Guatemala, Guyana, Haiti, Honduras, Hong Kong, India, Indonesia, Iran, Israel, Jamaica, Jordan, Kenya, Latvia, Lithuania, Malawi, Malaysia, Mali, Malta, Mauritius, Myanmar, Namibia, Nepal, Nicaragua, Niger, Nigeria, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Romania, Russia, Rwanda, Senegal, Sierra Leone, Singapore, Slovenia, South Africa, Sri Lanka, Thailand, Togo, Trinidad & Tobago, Tunisia, Uganda, Uruguay, Venezuela, Zambia, Zimbabwe.

The regression results for both OECD and LDCs are similar to the global results in Table 2. Perhaps the most significant finding is that the property rights coefficient for the LDCs, 0.019, is over twice as large as in OECD countries, 0.008. This is consistent with De Soto's hypothesis and the theory presented in section II. Moreover, as Table 1 indicates the developing countries property rights index is on average 58 percent lower than the developed economies, suggesting that a similar change to both indexes would have a larger absolute effect in developing countries than in developed economies.

CONCLUSION

The purpose of this paper is to test the property rights-growth hypothesis first suggested by North and Thomas (1973) and more specifically addressed by De Soto (1990, 2000). Using fixed-effects panel data for 101 countries from 1990-2002, support for a positive and significant relationship between property rights and economic growth is found.

The findings of this paper offer several economic insights. First, as economic theory suggests, countries with secure property rights are able to grow faster partially because of more rapid technology growth and entrepreneurial activity. The empirical evidence also supports the idea that developing countries gain more from positive changes to their legal structures and property rights than do developed economies. Lastly, property rights and the lack thereof may be a significant convergence variable. Further research is needed on this topic, especially around the specific channels through which property rights impact growth.

DATA SOURCES

The International Monetary Fund's *International Financial Statistics* (IFS), CD-ROM version, January, 2004, was the source for GRGDP (Gross Domestic Product, series 99b.c), GCAPTIAL (Gross Fixed Capital Formation, series 93ee.), GLABOR (Labor Force, series 67.d), GTRADE (Imports, series 98c.c plus Exports, series 90c.c), and GDP Deflator (series 99bi.) as the deflator. Barro and Lee's (2002)

educational data set was the source for HUMAN (percentage of people aged 25 or above reaching a secondary educational attainment), and Gwartney and Lawson's (2004) property rights index was the source for PROPERTY.

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REFERENCES

- Barro, Robert J. (1991) "Economic Growth in a Cross Section of Countries," *Quarterly Journal of Economics*, 106(2), 407-444.
- Barro, Robert J. (1997) *Determinants of Economic Growth*, Cambridge, MA: MIT Press.
- Barro, Robert J. and Jong-Wha Lee (1993) "International Comparisons of Educational Attainment," *Journal of Monetary Economics*, Vol. 32(3), 363-394.
- Barro, Robert J. and Jong-Wha Lee (2002) "International Data on Educational Attainment: Updates and Implications," *CID Working Paper No. 42*.
- Barro, Robert J. and Rachel M. McCleary (2003) "Religion and Economic Growth across Countries," *American Sociological Review*, 68(3), 760-781.
- Claessens, Stijn and Luc Laeven (2003) "Financial Development, Property Rights, and Growth," *The Journal of Finance*, 58(6), 2401-2436.
- De Soto, Hernando (1990) *The Other Path: The Invisible Revolution in the Third World*, New York, NY: Basic Books.
- De Soto, Hernando (2000) *The Mystery of Capital: Why Capitalism Triumphs in the West and Fails Everywhere Else*, New York, NY: Basic Books.
- Dollar, David (1992) "Outward-Oriented Developing Economies Really Do Grow More Rapidly: Evidence From 95 LDCs, 1976-1985," *Economic Development and Cultural Change*, 40(3), 523-544.
- Doppelhofer, Gernot, Miller, Ronald I. and Xavier Sala-i-Martin (2000) "Determinants of Long-Run Growth: A Bayesian Averaging of Classical Estimates (BACE) Approach," *NBER Working Paper*, No. 7750, June.
- Feder, Gershon (1982) "On Exports and Economic Growth," *Journal of Development Economics*, 12(1), 59-72.
- Frankel, Jeffrey A. and David Romer (1999) "Does Trade Cause Growth?" *American Economic Review*, 89(3), 379-399.
- Gwartney, James and Robert Lawson (2004) *Economic Freedom of the World 2004 Annual Report*, Vancouver: Fraser Institute.
- Hall, Robert E. and Charles I. Jones (1999) "Why Do Some Countries Produce So Much More Output Per Worker Than Others?" *Quarterly Journal of Economics*, 114(1), 83-116.

- Langelett, George and Mark Schug (2003) "Private Property and Economic Growth," Presented at the International Conference of the Association of Private Enterprise Education, Las Vegas, NV, April 6th.
- Lewer, Joshua J. (2002) "The Cycle of Poverty: New Insights to an Old Problem," *Southwestern Economic Review*, 30(1), 51-58.
- Levine, Ross and David Renelt (1992) "A Sensitivity Analysis of Cross-Country Growth," *American Economic Review*, 82(4), 942-63.
- Keefer, Philip and Stephen Knack (1997) "Why Don't Poor Countries Catch-Up? A Cross National Test of Institutional Explanations," *Economic Inquiry*, 35(3), 590-602.
- Kmenta, Jan (1986) *Elements of Econometrics*, Second Edition, New York, NY: Macmillan.
- Nee, Victor (1998) "Norms and Networks in Economic and Organizational Performance," *American Economic Review*, 88(3), 85-89.
- North, Douglass C. (1987) "Institutions, Transaction Costs and Economic Growth," *Economic Inquiry*, 25(3), 419-428.
- North, Douglass C. (1990) *Institutions, Institutional Change and Economic Performance*, Cambridge, MA: Cambridge University Press.
- North, Douglass C. and Robert P. Thomas (1973) *The Rise of the Western World: A New Economic History*, Cambridge, MA: Cambridge University Press.
- Parente, Stephen L. and Edward C. Prescott (2000) *Barriers to Riches*, Cambridge, MA: MIT Press.
- Powell, Benhamin (2002) "Private Property Rights, Economic Freedom, and Well Being," *Global Prosperity Initiative Working Paper 27*.
- Rivera-Batiz, Luis A. and Paul M. Romer (1991) "Economic Integration and Endogenous Growth," *Quarterly Journal of Economics*, 106(2), 531-555.
- Sachs, Jeffrey D. and Andrew Warner (1995) "Economic Reforms and the Process of Global Integration," *Brookings Papers on Economic Activity*, 1, 1-118.
- Sala-i-Martin, Xavier (1997) "I Just Ran Two Million Regressions," *American Economic Review* 87(2), 178-83.
- Schumpeter, Joseph (1934) *The Theory of Economic Development*, Cambridge, MA: Cambridge University Press.
- Scully, George W. (1988) "The Institutional Framework and Economic Development," *Journal of Political Economy*, 96(3), 652-662.
- Wacziarg, Romain (2001) "Measuring the Dynamic Gains from Trade," *World Bank Economic Review* 15(3), 393-429.

