GROWTH DETERMINANTS FOR COLOMBIA: NATIONAL AND REGIONAL PANEL DATA EVIDENCE 1964-2002

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ABSTRACT

The purpose of this paper is to empirically test the growth factors for the Latin American country of Colombia over the last half century. Fixed effects panel data estimation for all thirty-three Colombian states indicate a significantly positive relationship between labor growth and international trade on income growth. However, crimes against private property rights and capital significantly reduce income growth over the time-series, indicating that protection of property rights are an important determinant of economic growth and prosperity as discussed by North and Thomas (1973) and De Soto (1990, 2000). The results also show that institutional instability reduces economic growth.

INTRODUCTION

Nobel Laurete 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. 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 and human capital formation 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 unsecure and/or unclear in developing countries.

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 test state specific economic growth determinants for Colombia. The paper also tests the validity of De Soto's property rights hypothesis. By applying fixed effects panel data methodology to annual data from 1964-2002 for all thirty-three Colombian states, the property rights hypothesis is tested and confirmed; high security of property rights is positively associated with higher real economic growth rates. Other significant growth determinants are also found, such as labor force and international trade.

The remainder of this paper proceeds as follows: section II reports a brief history of Colomibia's property rights struggles, section III presents the regression model to be tested, section IV reports the empirical findings, and section V concludes with implications from the findings.

A BRIEF HISTORY OF PROPERTY RIGHTS IN COLOMBIA

The establishment of the Spanish Empire and its government in South America resulted in the conquest of what is now Colombia. Spain used its military supremacy to generate economic rent to the crown and in part to impose Catholicism on the natives. The Spanish also generated a new concept, private property. In his seminal book, *Manual de Historia Colombiana*, Fernando Ayala (2005) states, "Europeans transferred to America its race, its language and its religion…Equally, they transmitted…sciences, technology, civil freedom and critical solutions to face problems distinctive to the Conquest and the Colony. …the colonial society then organized lordly land concentration over time..." (Ayala, 2005, p. 20).

Towards the end of 1858, Colombia's name was changed to "Cofederación Granadina" (1858 -1863). Officially, the stately confederation followed a general free market policy called "librecambio." During this period land owned and administrated by the church was reassign to laity, although ownership was not. Essentially, natives could farm the land reassigned to them, but they could not own it. Colombia's name again changed to "Estados Unidos de Colombia" from 1863-1885. With a new constitution and economic system based on capitalism, several new freedoms where granted, including private property laws, see Kalmanovitz (2001) for details.

In 1886, with the creation of a new Constitution, the country took its actual name of "República de Colombia". Over the next 120 years the initial property laws of the librecambio have been weakened by several laws and executive orders. For example, when the conservative party took over power (i.e. 1886 -1930), they denied democratic guarantees including some ownership liberties. They also refused to pass additional private property reforms. Rincón (1973) argues that laws in Colombia are made without any specific principle except to protect vested interests that cause much of the corruption and inefficiencies with the State. Montenegro and Posada (2001) cite different analysts that observed higher violence in distant regions where economic growth is based on exploitation of cocaine, petroleum, emeralds and gold. They also show that the increase in violence and illegal activity within the country are associated with the justice system collapse and otherwise weakness within institutions, namely property rights.

Today, Colombian private property rights remain fairly weak relative to most developed countries. When examining Gwartney and Lawson's (2004) property right index, Colombia ranks near the bottom one-forth in securing property rights for its citizens in a scale where ten in the most secure. Moreover as with many Latin American countries, its ten-year average has been declining.

PER CAPITA INCOME GROWTH REGRESSION

The regression equation in this article is an extension of Mankiw, Romer and Weil's (1992) augmented Solow equation that allows for conditional convergence. Specifically, the equation of interest is in per capita terms, shown below as:

$$(1)\quad GPCY_{it} = a_0 + a_1(PCY60_{it}) + a_2(GLABOR_{it}) + a_3(HUMAN_{it}) + a_4(GTRADE_{it}) + a_5(PROPCRIME_{it}) + a_6(POLITICAL_{it}) + u_{it}$$

where $GPCY_{it}$ is the growth of real gross state product per capita for state i in time t, $PCY60_{,it}$, the conditional convergence term, is the log of state i's real income in 1960, $GLABOR_{it}$ is the growth of state i's labor force for time t, $HUMAN_{it}$, a proxy for human capital, is the level of secondary attainment for state i, $GTRADE_{it}$ is the sum of the growth of real exports plus real imports for state i at time t, $PROPCRIME_{it}$ is the is the level of criminal acts against property, capital, and general property rights for state i during time t, POLITICAL is a dummy variable representing political instability, and u_{it} is the error term.

Annual data for all thirty-three of Colombia's states were collected from 1964-2002 to test which of the growth determinants were significant to its overall development process. The data was tempered by the fact that several cities/villages within each state did not report official data over the last half-century.

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 the variable that is being estimated D is one, but equals zero all other times. Formally written as:

$$(2)\quad \begin{cases} D_{jt} = 1 & \text{if } i = j \\ 0 & \text{if } i \neq j \end{cases} \quad \text{for } j = 2,\ldots,33,$$

where i is the index of a cross-section unit. Equation (3) becomes the model of interest:

$$GPCY_{it} = a_0 + \sum_{j=2}^{33} \gamma_j D_{jt} + a_1(PCY60_{it}) + a_2(GLABOR_{it}) + a_3(HUMAN_{it}) + a_4(GTRADE_{it}) + a_5(PROPCRIME_{it}) + a_6(POLITICAL_{it}) + u_{it} \quad (3)$$

EMPIRICAL RESULTS AND ASSESSMENT

The national results from equation (3) are presented in Table 1 below. Notice that the results are as theoretically expected. Conditional convergence is found for the thirty-three states, meaning that low-income states (i.e. Amazonas and Guainía) experience faster income growth than high-income states (i.e. Valle del Cauca and Antioquia). Labor growth and the growth of trade are positive and significantly associated with income growth. Because the data for these two variables are in growth rates, the coefficients can be interpreted with constant elasticities. For example, the coefficient on the growth of real trade, GTRADE, is 0.011, suggesting that for every 10 percent increase in capital stock is associated with a 0.11 percent increase in income growth. Interestingly, human capital is not a significant growth variable, indicating that other institutional variables, including property rights, may be more important in the long run. As expected, however, the coefficient on crime against property rights and political instability are negative and significant at the 95 percent level for the national results.

Table 1: The Growth of Per Capita Income: National Results

TEST	a_0	PCY60	GLABOR	HUMAN	GTRADE	PROPCRIME	POLITICAL	BUSE R^2
Fixed Effects	2.883 (15.06)**	-0.918 (-57.42)**	0.324 (18.46)**	0.001 (0.40)	0.011 (7.23)**	-13.308 (-4.22)**	-0.028 (-2.83)**	0.944

Notes: There are 1254 data points per variable. 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: $g_2 = g_3 = \ldots = g_{33} = 0$, Fcalc = 431.01 > Fcrit = 1.88)

Next, states are grouped into their respective region: Atlantica, Central, Pacifica, Oriental, and Territorios. This paper uses the regional methodology of Colombia's Departamento Administrativo Nacional de Estadística when assigning regions. There are substantial regional differences in the rate of private property violations within region. These state differences do not necessarily correlate with

state income differences as some higher income states have high levels of property violations and some low income states have low property violations. The Pacifica region of Colombia, which includes Bogotá, has the highest per capita income of any region, but it also has the highest incidence of private property violations. Table 2 presents the regional results from equation (3). The coefficient for the PROPCRIME is significantly negative for all regions. One explanation of why property rights crimes are particularly significant in the Pacifica and Atlantica regions are that these two regions have seen the greatest changes (general upward trend) in property violations among the five geographic regions. The lack of variable fluctuation in Territorios Nacionales may have dampened the coefficient's significance. The political instability dummy, POLITICAL, is only significant for the Territorios region. This result can be partially explained by the fact that several departments within this region have experienced large scale guerilla and black market activity. In general, the regional findings serve to reinforce national estimates from Table 1.

Table 2: The Growth of Per Capita Income: Regional Results

REGION	a_0	PCY60	GLABOR	HUMAN	GTRADE	PROPCRIME	POLITICAL	BUSE R^2
Atlantica[1]	6.986 (14.25)**	-1.041 (-35.11)**	0.484 (14.46)**	0.0001 (1.55)	0.005 (2.16)**	-73.188 (-7.42)**	-0.006 (-0.40)	0.964
Central[2]	6.604 (8.50)**	-1.004 (-38.25)**	0.451 (10.67)**	0.0001 (0.90)	0.005 (2.02)**	-15.556 (-2.71)**	-0.009 (-0.54)	0.931
Pacifica[3]	6.594 (12.05)**	-1.051 (-35.72)**	0.452 (12.50)**	0.0001 (0.26)	0.003 (1.06)	-27.153 (-5.03)**	-0.004 (-0.24)	0.96
Oriental[4]	7.137 (13.36)**	-1.015 (-35.42)**	0.498 (14.20)**	-0.0001 (-1.18)	0.005 (2.39)**	-35.438 (-6.89)**	-0.002 (-0.07)	0.913
Territorios[5]	-1.183 (-2.22)**	-0.136 (-2.98)**	0.423 (8.43)**	-0.00002 (-0.36)	0.028 (3.85)**	-23.019 (-3.24)**	-0.065 (-1.71)*	0.894

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 all regions.
[1] Atlantica states include: Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena, and Sucre.
[2] Central states include: Antioquia, Caldas, Caquetá, Huila, Quindio, Risaralda, and Tolima.
[3] Pacifica states include: Cauca, Chocó, Nariño, Valle del Cauca, and Santa fe de Bogotá
[4] Oriental states include: Boyacá, Cundinamarca, Meta, Norte de Santander, and Santander.
[5] Territorios Nacionales states include: Amazonas, Arauca, Casanare, Guainía, Guaviare, Putumayo, San Andrés y Providencia, Vaupés, and Vichada.

CONCLUSION

The purpose of this paper is to test the growth determinants of Colombia on a state specific basis. Using fixed-effects panel data for Colombia's thirty-three states from 1964 to 2002, support for a negative and significant relationship between property rights crimes and economic growth is found. The results of this paper indicate that institutional conditions play a significant role in the continuance of the cycle of poverty. The combination of high levels of corruption are positively associated with weak property right protection and political instability in Colombia, see Ayala (2005).

Although the determinants of property rights, instability and corruption are complex and no single solution to this problem exists, the results of this paper indicate several areas for policy makers to focus on. However, further research is needed on this topic, especially around possible educational and democratic solutions.

DATA APPENDIX

The source for the growth of real per capita income (GPCY) is real Gross State Product, which comes from the Departmento Administrativo Nacional de Estadística, divided by state population, Las Estadisticas Sociales en Colombia. Colombia Estadística was the source for state specific labor force (GLABOR) and crimes against property and capital (PROPCRIME). (HUMAN) is calculated by the enrollment in public secondary schools by state, which comes from various years of the Colombia Estadística. Lastly, the state specific export and import data (GTRADE) comes from Anuario de Comercio Exterior.

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