

On the Near Optimality of Aboriginal Property Rights

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The link between economic institutions and economic performance generally focuses on two alternative questions. What economic institutions affect economic performance and what forces determine the configuration of property rights for divergent economic entities? Both questions have received considerable attention among scholars over the last few decades. An important niche in that literature deals with the evolution of economic institutions and the corresponding behavior among individuals living in people groups that exist in comparative isolation in largely non-industrialized societies, including hunter-gathers and agriculturalists in contemporary non-industrialized nations as well as non-industrialized societies in antiquity and the American frontiers.

Original contributions in this domain tended to build on Coase (1960) and focus on the most decentralized configuration of economic institutions. Preferred configurations of property rights seem to appear like manna or if they are absent, clever entrepreneurs or judges invent them. Examinations of the historical record or contemporary nonindustrialized contexts are thought to expand our understanding of the institutions/performance nexus.

More recent advances in the economics of institutions has moved away from the decentralized analysis and examined institutions from an aggregate perspective. Demsetz (2002) is an important case in point. His framework has moved from localized internalization of externalities in creating benefit enhancing institutions to explicit analysis of competing national ownership systems. Instead of focusing on property rights in decentralized exchange and production, Demsetz (2002) moves to the examination of comparative economic systems that do or do not permit private ownership.

In a related vein, Acemoglu and Johnson (2005) note that what was called “property rights” in earlier literature should more appropriately be labeled “contracting rights.” These are arrangements that deal with the largely horizontal links between parties to exchange or production relationships. The term “property rights” should be restricted to the deeply vertical relationships between ordinary citizens and the central government or elites closely related to the central government. Acemoglu and Johnson find that property rights institutions have a more profound effect on economic performance whereas contracting rights primarily affect the form organization or financing.

The purpose of the present paper is to examine the effects of both types of institutions on agricultural productivity in sub-Saharan Africa. The analysis builds on the economic effects of alternative types of economic institutions. The analysis examines the effects of property rights and does not explicitly examine the determinants or evolution of property rights. Indeed, the analysis assumes that property rights are exogenous. However, the empirical analysis does explicitly test the assumption in both the early and recent literature that private property rights dominate common property configurations. Moreover, the analysis has extreme relevance on its own right because that region is regrettably well known for endemic poverty (Collier 2007) and abysmal agricultural productivity (Bates 1981).

The remainder of this paper is organized as follows. Section 1 reviews some theoretical contributions. Section 2 identifies the model used in the empirical analysis. Section 3 reports the results. Section 4 contains the conclusions.

1. Theoretical Framework

A. Naive Theory

Classic works include Demsetz (1967) and Anderson and Hill (1975). The focus of these works is the creative response of individuals to changes in the value of resources. When technology or market values of goods change, individuals have an incentive to create the institution of private property to internalize externalities or to prevent dissipation of unowned resources. Eggertsson (1990) labels these approaches “naïve theories” of property rights because they attempt to model the development of property rights without addressing social and political institutions in which property rights are embedded. The development of property rights evolves largely by the costs and benefits of the entrepreneurial effort to define and enforce property rights. North and Thomas use a similar approach to account for the first economic revolution—the evolution from hunter gathering to agriculture. In addition to a costs and benefits approach, the naïve theory of property rights rests on a strong presumption that private property rights are generally superior to the next best alternative. Communal ownership or various partitioned rights are presumed to be dominated by exclusive private property rights.

B. Nuanced Theory

Two challenges immediately confront the naïve theory of property rights. First, there is considerable complexity in the specification of the cost and benefits. Free rider incentives are present in the efforts to specify property rights. For example, specifications of property rights in territorial animals are likely to differ substantially from property rights in migratory animals.

MacManus (1972) provides a contrast to Demsetz's account of the advent of the fur trade on property rights in Canada. MacManus notes that the beaver population was depleted after the advent of fur trade. To be sure there were property rights in the form of exclusive territories *a la* Demsetz, but that property right specification was limited to trapping for trade. Trapping for consumption was not subject to exclusive territories because there was a "Good Samaritan" constraint permitting trapping for sustenance. In short, the cost and benefits of the fur trade extended beyond a simple maximization of a resource value maximization.

Richard Posner (1980) reviews an extensive literature on property rights specification in a number of anthropological studies. Posner uses a cost and benefit framework but with a wider range of costs including information costs and problems of uncertainty and insurance in the absence of complete markets. Posner observes that ostensibly paradoxical institutions and behavior including limits on alienability, marriage, liability and communal as opposed to private property can be rationalized and often lead to arrangements that not consistent with a naïve theory of property rights.

Martin J. Bailey (1992) reviews more than 50 anthropological studies of aboriginal peoples. His sample includes peoples engaged in hunting, fishing, horticulture, and gathering. He notes that the anthropological studies exhibit great diversity in the specification of property rights. However, land rights tend to be different. Other resources vary the type of property but land rights vary by use as well. Private property existed in food but hunting rights often were communal while horticulture tends to be associated with various forms of private property.

Anderson and Swimmer (1997) move beyond Posner and Bailey by offering a more formal examination of endogenous property rights. They review the ethnographic study of 40 North American Indian groups. They examine ownership rights for a variety of assets from regular food, personal items, and weapons to the prey obtained from group hunting expeditions and undeveloped land. In a sense their analysis is consistent with the naive theory of property rights—the rights are the product of maximizing individuals, but they provide much greater specificity to the costs of defining and enforcing property rights. They correlate the ownership patterns with different types of assets as well as cost factors such as the presence of war (raises the cost of defining and enforcing private right) to harsh winters (lowers those same types of costs).

Anderson and Swimmer document a compelling case that private property rights are not always optimal. Like Posner and Bailey and with added breadth and specificity, they argue that common property is not necessarily optimal.

Smith (2000) provides yet another story regarding the range and variety of optimal property rights. He identifies a hybrid case of property rights, the “semicommons.” This property rights configuration entails a common resource—his particular discussion, agricultural land. More specifically, he examines the scattered land holdings of medieval Europe. These lands were held partially as open access common property for animal grazing and partially as small, scattered privately owned plots for grain growing by peasant owners. The arrangement permits the simultaneous achievement of optimal scale and incentives for two alternative resource uses. Smith asserts the arrangement is optimal because it deters the potentially dysfunctional effects

of strategic behavior that would occur with exclusive private land holdings with the peasant plots consolidated into single plots with the total combined area.

The upshot of this literature is that, a testable hypothesis emerges. Does private ownership dominate common ownership as the naive theory of property rights assumes or are there evolutionary optimal common property arrangements that dominate private ownership as the more nuanced theories hold.

C. Competing Ownership Systems

MacManus, Posner, and Bailey document the shortcomings of the naïve property rights view. More importantly, there has been some movement away from viewing property rights as claims on some localized resource to viewing property rights as alternative governance systems. Demsetz (2002) himself offers an expanded view of property rights. Demsetz notes that more than just incentives to create localized property rights, aggregations of individuals have incentives to compete on the basis of aggregate institutions with various degrees of ownership. Some nation states proscribe private property whatsoever whereas others permit and some cases devote considerable resources to maintaining the sanctity of property. Similarly, some communities proscribe private ownership of various resources as documented in the studies cited by Posner, Bailey, Anderson and Swimmer, and Smith.

D. Dichotomous Institutions

Acemoglu and Johnson (2005) move well beyond Demsetz (2002) by noting that much of institutional economics muddies the distinction between various types of economic

institutions—including both localized/horizontal institutions and more vertical relations between national elites and everyday citizens.

Contracting Institutions. Acemoglu and Johnson identify a set of institutions that affect the relationships between everyday citizens in enforcing contracts. These can affect being because weak contracting institutions can have deleterious effects on economic activity. However, if contracting institutions are weak, individuals can plausibly remedy those weaknesses by adaptation or extra-contractual arrangements.

Property Rights Institutions. This term refers to the set of institutions that protects individuals from the potentially coercive power of the state. Protecting property from expropriation or pursuing other actions that retard investment and economizing. Most importantly, according to Acemoglu and Johnson, these relationships are not nearly as amenable to contractual or extra-contractual solutions if the institutions are weak or perverse. Moreover, property rights institutions appear to be profoundly linked to economic performance in terms of long term economic growth and investment.

Aboriginal Property Rights as Contracting Rights

A central working hypothesis in this study is that the type of case studies delineated by MacManus, Posner, Bailey, Anderson and Swimmer, and Smith are largely in the contracting rights domain. They deal with relative small group interaction of comparatively horizontal relations. That judgment holds even if there is some hierarchy as in a chief, adjudicator, or tribal council of elders that resolves disputes.

Accordingly, though such arrangements may be optimal just as contracting arrangements are optimal, they are not as central to performance measures as the largely vertical governance structures that may (or may not) protect private property. By virtue of the fact that property rights in the meaning of the term used by Acemoglu and Johnson are features of the nation-state, rights of component groups are nearly *prima facie* contractual rights.

2. The Model

A. Performance and Institutions

The analytic relation examined below is straightforward and represented by the following equation.

$$Y_i = f(\text{Institutions}, \dots) \quad (1),$$

where Y represents a desired (good) outcome. Institution can be varieties of economic institutions. The open-ended component of the equation reflects the fact that other forces could also affect performance.

Given the non-industrialized nature of Africa, equation (1) uses a measure of agricultural output for the performance measure. The essential questions are what institutions affect agricultural performance and what other factors—e.g. control variables merit inclusion in equation (1).

B. Importance of Land Tenure

Jeffrey Herbst (2000) stresses the importance of land tenure in the political economy of Africa. Herbst notes that land tenure arrangements across Africa and that security of

ownership rights are central to economic efficiency. The net result is that some of the institutions represented in equation (1) should reflect land tenure arrangements.

Herbst also notes that land tenure arrangements across African exhibit considerable variety. Moreover, the preservation of pre-colonial customs for land tenure is an enduring source of conflict between national elites largely in capital cities and the local citizenry. Herbst asserts that land tenure arrangements in much of rural Africa antedate colonial Africa. Thus, it seems more than plausible to presume that Africa contains substantial aboriginal institutions.

C. Institutions and Agricultural Output

Equation (1) can be made more specific in equation (2),

$$Y_i = \beta_0 + \beta_1 \text{Property Rights}_i + \beta_2 \text{Contracting Rights}_i + \beta_3 \text{Control Variables}_i + \tilde{\varepsilon}_i \quad (2),$$

where Y is a performance measure of interest—in the present case a dollar denominated measure of agricultural output per worker. The data are from the World Bank, *World Development Indicators*. The measures are the standard agricultural productivity measure, but the numbers are inclusive of commercial hunting and timber as well as crop production.

The variables used in the present analysis are described below:

Property Rights Variables.

1. *Expropriation Risk*. This is a measure of the likelihood that people's property is subject to arbitrary expropriation. Positive values mean less likelihood of expropriation of property. The measures are the cumulative assessment of independent experts on the

politics of nation-states. Data are from the PRS group. Acemoglu and Johnson (2005) find this measure to a powerful determinant of economic performance.

2. *Constraints on executive.* This is a measure of restrictions on chief executives of nation states and by extension other elites. The measure is a component of the POLITY IV Data Set. Increasing values of this measure are associated with increased constraints on national executives and thus measures the extent to which chief executives can arbitrarily exercise power over their citizens and hence abrogate their citizens' property rights—in this case their rights to use and alienate their agricultural land.

3. *Legal and Property rights.* This is a ranking of the law and property rights components of the Fraser Institutes Economic Freedom of the world. It is a measure of the protection of private property and the adherence to due process of the law. It reflects systematic rankings of the countries of the world by a host of localized experts. Increased values reflect greater protection of property and greater due process.

4. *Private ownership.* This is Jeffrey Herbst's assessment of land ownership rights in Africa based on surveys of independent land tenure studies. Herbst identifies three categories of land ownership—non existent land ownership or sufficiently ambiguous property rights, existing private property rights and significant land ownership. The variable used here is a dummy variable equal to one for those cases where land ownership rights exist or are significant and zero otherwise.¹

Contracting Rights Variables.

1. *Contract enforcement.* This is a measure of the number of procedures to enforce a contract between parties to a contract. More procedures are presumed to entail greater contracting costs and hence greater restrictions on production and exchange.

2. Customary land tenure. This is Jeffrey Herbst's categorization for African countries that explicitly recognize customary land tenure arrangements. Because such relations are the product of custom and entail face-to-face, they are appropriately viewed as contractual rights—they deal with horizontal relations between members of the community, not between national leaders and ordinary citizens. While there is certainly likely to be some hierarchy in aboriginal governance relations, the relationship has to be more horizontal than the links between national elites and rules and local citizens that Acemoglu and Johnson so persuasively argue will attenuate property rights unless constrained. More to the point, if the Posner, Bailey, Anderson and Swimmer, and Smith stories are valid, then Y might well be higher with the existence of customer tenure arrangements.

Control Variables.

In addition to the primary variables of interest, we include measures that other researches have asserted or shown to be relevant in determining productive economic activity.

1. *Tropical areas*. Sachs and Warner (1997) claim that economic activity is enhanced in some regions and retarded in others due to geographic or climatic forces. Tropics are thought to be a force that retards economic growth. The measure used here is the proportion of a country's area that is categorized as tropical.

2. *Landlocked*. This measure is a dummy variable equal to one if a country is landlocked and equal to zero otherwise. The variable reflects the Collier's argument that being landlocked imposes substantial economic burdens to countries.

3. *Urbanization*. This measure is the proportion of country that is categorized as urbanized. It is included as a control variable based on Lucas's contention that urbanization raises externalities in human capital and as well as the possibility that from a strictly econometric view, urbanization may be correlated with various institutional variables and hence warrants inclusion.

Descriptive statistics of dependent and independent variables are shown in table 1. The data show considerable dispersion in agricultural productivity and institutional variables as well as control variables. Thus, there is a solid reason to explore why agricultural output per worker ranges from a low of about \$77 (Burundi) to a high of about over \$1,805 (Gabon).

D. Hypotheses

A reading of Demsetz (2002) and Acemoglu and Johnson (2005) suggests that the property rights measures should be positively related to agricultural output. Strengthened property rights means should encourage investment and in-turn economic growth. Goldstein and Udry (2008) document such results in the narrow context of agriculture in Ghana. Accordingly, there is reason to believe that all the property rights measures enhance agricultural output.

An additional hypothesis is that the two contracting variables—should affect agricultural productivity. The number of procedures to enforce a contract should be

Table 1

Descriptive Statistics

Variable	Mean	Standard Deviation	Minimum	Maximum
Agricultural Value Per Worker (2000 US \$)	40.63 (N=32)	372.38	76.67	1,805.30
Expropriation Risk	5.80 (N=30)	1.31	3.00	8.38
Constraints on Executive	4.49 (N=36)	2.15	1	7
Legal and Property Rights	4.38 (N=25)	1.39	1.98	8.15
Contract Enforcement	37.00 (N=30)	11.73	19	58
Private Ownership	0.67 (N=36)	0.478	0	1
Customary Land Tenure	0.389 (N=36)	0.494	0	1
Tropical Area	0.945 (N=36)	0.181	0	1
Landlocked	0.361 (N=36)	0.487	0	1.00
Urbanization	0.319	0.133	0.057	0.600

Private ownership, customary land tenure, and landlocked are dichotomous 0-1 variables.

negatively related to agricultural productivity because more procedures should be linked with weaker contracting rights. With the opposite predicted sign, but similar logic, customer land tenure should increase productivity if such arrangements entail stronger property rights in the sense that localized decision makers allocate uses and ownership claims in a way that maximizes community value. However, both predictions are less compelling than the property rights measures for two reasons. First, Acemoglu and Johnson note that contracting rights are more closely linked with the form of economic activity than economic performance. Second, to the extent that customary land tenure is linked with “good Samaritan” constraints as in MacManus (1972) or with social insurance to prevent hunger and starvation as in Posner (1980) or Bailey (1992) we might expect negative coefficients for the customary land tenure estimates. The same might be expected from the evidence put forth by Anderson and Swimmer and by the argument posited by Smith.

3. Results

Table 2 shows the results of estimates of the regression of agricultural productivity on property rights and contracting rights variables in separate regression estimates and with all variables included. Two property rights variables are statistically significant—the risk of expropriation of property from the PRS group and legal/property rights variable from the Economic Freedom of the World project. The contractual variables are not significant in any of the single estimates. When all variables are included, the private land ownership

Table 2

Regression Estimates - Agricultural Output per Worker and Institutional Variables

Variable	Estimates/(t statistics)						
Intercept	4.00 (5.38)	6.09 (15.89)	4.72 (8.68)	5.90 (10.50)	5.51 (31.62)	5.78 (33.58)	3.73 (3.52)
Expropriation Risk	0.330 (2.47)						0.135 (0.96)
Constraints on Executive		-0.020 (-0.28)					0.128 (1.68)
Legal and Property Rights			0.311 (2.73)				0.112 (0.62)
Contract Enforcement				0.001 (0.07)			0.004 (0.29)
Private Ownership					0.395 (1.63)		0.521 (2.06)
Customary Land Tenure						-0.043 (-0.17)	-0.738 (-2.17)
Adj. R ²	0.108	-0.020	0.164	-0.029	0.035	-0.030	0.046
S.E.R.	0.927	0.928	0.959	0.947	0.725	0.740	0.639
N	32	32	32	36	33	34	18

variable and the customary land tenure variables are both significant. The former is positive as predicted and the latter is negative, perhaps reflecting suboptimal rights with communal ownership or the presence of Good Samaritan principles or communal insurance markets that lower the market value of production. In all cases the coefficient of determination is low indicating that other multiple regressions or additional variables should be included in the analysis.

Table 3 shows the results of estimates. The Herbst private ownership and communal land tenure variables—the only ones that are significant in the last column of table 2 are included in all reported estimates and groups. The property rights measure show a mixed record. The legal/property rights coefficient is significant once but only when the Herbst measures are the only other variables included. Expropriation risk and constraints on the chief executive are generally not significant except when included together. On the other hand, the Herbst measures are usually significant with private land ownership enhancing agricultural output per worker and customary land tenure arrangements decreasing it. The low adjusted R-squared value again suggests that more variables might be warranted.

Table 4 shows the same estimates with the control variables included. The coefficients of determination are notably higher suggesting that inclusion of the control variables makes sense. Tropics and urbanization are occasionally significant. Landlocked is always significant and often robust—consistent with Collier's conjecture.

The institutional variables are similar to table 3. The cross-national variables, expropriation risk, constraints on executives, and legal/property rights rankings are

Table 3

Regression Estimates for Combinations of Institutions

Variable	Coefficient/(t statistics)						
Intercept	4.85 (7.81)	5.41 (0.40)	5.04 (10.55)	5.72 (9.32)	3.71 (7.80)	4.43 (6.65)	3.76 (5.70)
Expropriation Risk	0.111 (1.08)				0.196 (2.43)	0.174 (1.03)	
Constraints on Executive		0.023 (0.40)			0.130 (2.17)		0.092 (1.35)
Legal and Property Rights			0.184 (2.02)			0.105 (0.59)	0.086 (0.52)
Contract Enforcement				-0.005 (-0.36)			
Private Ownership	0.708 (2.31)	0.547 (1.84)	0.365 (1.03)	0.393 (1.48)	0.843 (3.41)	0.525 (1.59)	0.638 (2.34)
Customary Land Tenure	-0.559 (-1.76)	-0.298 (-0.98)	-0.630 (-2.01)	-0.261 (-0.90)	-0.726 (-2.57)	-0.835 (-2.16)	-0.917 (-2.91)
Adj. R ²	0.144	0.055	0.096	0.073	0.231	0.222	0.229
S.E.R.	0.663	0.736	0.714	0.675	0.629	0.641	0.641
N	26	33	24	29	26	20	20

Table 4

Regression Estimates for Geographic Variables and Combinations of Institutions

Variable	Coefficient/(t statistics)						
Intercept	6.26 (2.96)	5.93 (14.69)	4.54 (1.73)	7.16 (8.04)	4.47 (2.25)	4.35 (1.52)	4.37 (1.51)
Expropriation Risk	0.034 (0.27)				0.135 (1.40)	0.093 (0.73)	
Constraints on Executive		0.062 (1.13)			0.176 (4.34)		0.380 (0.56)
Legal and Property Rights			0.137 (1.06)			0.157 (1.13)	0.119 (0.84)
Contract Enforcement				-0.015 (-1.15)			
Private Ownership	0.717 (2.41)	0.645 (2.42)	0.707 (2.12)	0.531 (2.31)	0.913 (4.28)	0.690 (1.83)	0.786 (2.34)
Customary Land Tenure	-0.407 (-1.58)	-0.407 (-0.97)	-0.238 (-0.98)	-0.141 (-0.68)	-0.593 (-2.64)	-0.467 (-2.01)	-0.268 (-0.98)
Tropical Area	-1.480 (-0.85)	-1.301 (-3.46)	-0.018 (-0.01)	-1.473 (-3.78)	-1.330 (-1.21)	-0.226 (-0.11)	-0.560 (-0.29)
Landlocked	-0.380 (-1.77)	-0.439 (-2.65)	-0.746 (-3.69)	-0.551 (-2.76)	-0.418 (-2.27)	-0.732 (-3.27)	-0.711 (-3.51)
Urbanization	1.726 (1.36)	1.819 (1.98)	1.823 (1.83)	1.298 (1.70)	2.240 (2.23)	1.429 (0.96)	1.992 (1.59)
Adj. R ²	0.351	0.391	0.454	0.396	0.574	0.433	0.431
S.E.R.	0.578	0.555	0.555	0.516	0.468	0.550	0.567
N	26	32	24	29	26	20	24

usually not significant. The exception is column five where expropriation risk and executive constraints are estimated in the same equation.

The most salient results are for the Herbst variables. These results for customer land tenure are still uniformly negative but significant in few estimates. The logical inference is that customer land tenure is linked with the control variables. Closer examination of specification issues is clearly warranted.

The strongest results in table 4 are for the private ownership variable. The results show that private land ownership is uniformly positive and significant. The magnitudes are palpable. The coefficients range from .531 to .913. At the overall sample mean that would entail an increase of about \$215 per worker to as high as \$459 per worker in 2003.

One problem with the results reported in tables 2-4 is that they may not be closely linked with the nature of aboriginal peoples despite Herbst's assertion that the institutions in the vast domains of rural Africa are essentially pre-colonial and therefore are likely to resemble aboriginal institutions. However, the data seem to be quite different from the aboriginal peoples described in the ethnographic studies examined Bailey or Anderson and Swimmer. For example, a random resident in various African countries could maintain a strong tribal identity and language and at the same time be a college graduate, drive a BMW, and use a satellite phone to contact a bank in Zurich. The presence of non-aboriginals could confound the results and inferences.

To more closely approximate the theme of this paper, a closer focus on aboriginal peoples is warranted. To that end the sample is segmented by the extent to which (proportion) "ethnoreligious" adherents are present in a country. The measure is obtained

from Barrett, Kurian, and Johnson (2001). The measure is the proportion of people belonging to what the literature earlier referred to as “tribal” religions and the authors indicate the peoples usually are “... animists, polytheists, and shamanists.” The sample median is 12 percent. The data range from a low of .5 percent in Mauritania to a high of 52.5 percent in Benin. Presumably, the political economy of Benin contains a higher percentage of people adhering to aboriginal belief systems than is the case in Mauritania. Equation (2) is estimated for a sample of countries that have percentages of ethnoreligious adherents greater than the median value of 12 percent.

Table 5 contains the estimates for the more intensively aboriginal countries. Despite the small sample size, the results remain robust. Indeed, the adjusted R-squared is higher for the more intensively aboriginal sample. That measure is .6 for three of the seven estimates reported. Private ownership remains uniformly positive although it is not uniformly statistically significant. On the other hand, the other aggregate property rights measure—constraints on the executive—is significant more often. Customary land rights are uniformly negative but not so frequently are they statistically significant.

The straightforward interpretation is private property ownership and limits on the chief executive that protect ownership rights from takings increases agricultural productivity in environments with a relatively high incidence of aboriginal peoples. In contrast, explicit recognition of customary rights does not enhance agricultural productivity in those same countries. Customary land tenure patterns do not appear to be optimal in this domain. The presumption of dominance of private property institutions is not refuted in the African case and in the case of relatively intensive aboriginal countries.

Table 5

Regression Estimates for Geographic Variables and Combinations of Institutions: High Aboriginal Sample

Variable	Coefficient/(t statistics)						
Intercept	0.89 (0.36)	2.79 (2.66)	3.37 (1.19)	1.85 (0.92)	2.69 (1.25)	2.64 (1.18)	2.94 (1.18)
Expropriation Risk	0.096 (0.45)				0.110 (0.66)	0.138 (0.73)	
Constraints on Executive		0.117 (2.60)			0.130 (2.20)		0.620 (1.37)
Legal and Property Rights			-0.012 (-0.07)			-0.102 (-0.38)	0.003 (0.02)
Contract Enforcement				-0.003 (-0.17)			
Private Ownership	0.608 (1.67)	0.661 (3.95)	0.382 (1.31)	0.532 (1.84)	0.719 (3.00)	0.420 (1.59)	0.578 (2.93)
Customary Land Tenure	-0.377 (-1.48)	-0.499 (-2.42)	-0.455 (-2.39)	-0.356 (-1.45)	-0.456 (-1.80)	-0.552 (-1.71)	-0.495 (-2.49)
Tropical Area	3.049 (1.66)	1.152 (1.19)	1.377 (0.786)	2.681 (1.55)	0.763 (0.47)	1.750 (1.17)	1.268 (0.81)
Landlocked	-0.104 (-0.35)	-0.295 (-2.14)	-0.517 (-3.82)	-0.255 (-1.24)	-0.216 (-0.82)	-0.289 (-0.79)	-0.493 (-4.64)
Urbanization	3.265 (1.30)	3.579 (4.18)	3.923 (4.91)	3.789 (2.42)	2.440 (1.60)	3.620 (2.26)	4.010 (8.75)
Adj. R ²	0.330	0.652	0.620	0.386	0.548	0.486	0.625
S.E.R.	0.463	0.328	0.313	0.444	0.381	0.384	0.311
N	14	16	13	15	14	11	13

4. Concluding Thoughts

The link between institutions and economic performance is at the forefront of contemporary economics. Examining institutions in nonindustrialized contexts is worthwhile because it expands the range of observable behavior and pushes the robustness tests of the institutions/economic performance nexus.

Notwithstanding the preliminary nature of this examination, especially with respect to specification issues, the data show that simple land ownership opportunities generate substantial benefits to citizens. Agricultural output per worker is notably higher when private land ownership exists and has legal protection. Other economic institutions may play a role but are not nearly as robust as the land ownership measure. Customary land tenure relations may have a negative effect on agricultural output, but they may simply reflect other factors. In short, the presumption that private property arrangements dominate communal property arrangements—a foundation of the early naïve view of property rights seems consistent with the data while more nuanced theories are somewhat ambiguous.

Table A1

Correlation Matrix

	Expro. Risk	Const. on Executive	Legal and Property Rights	Contract Enforcement	Private Ownership	Customary Land Tenure	Tropical Area	Landlocked	Urban
Expropriation Risk	1.000								
Constraints on Executive	-0.078	1.000							
Legal and Property Rights	0.401	0.123	1.000						
Contract Enforcement	-0.222	0.014	-0.408	1.000					
Private Ownership	0.223	-0.277	0.283	-0.030	1.000				
Customary Land Tenure	0.269	0.004	0.486	-0.221	-0.471	1.000			
Tropical Area	-0.182	0.028	-0.709	0.128	-0.266	-0.331	1.000		
Landlocked	0.034	0.022	0.342	-0.276	0.322	0.570	-0.083	1.000	
Urbanization	0.024	-0.164	-0.103	0.353	-0.414	-0.241	-0.333	-0.308	1.000

Table A2
Data Sources

Variable	Definition	Source
1. Agriculture value added per worker	Value from crops, forestry, fishing, hunting, and livestock. Minus the value of intermediate inputs. Data are in \$US 2000.	World Bank, <u>World Development Indicators</u>
2. Expropriation risk	Ranking on scale of 0-10 of the risk that the government will expropriate property. Data are 1985-1997.	<u>International Country Risk Guide</u> , The PRS Group
3. Constraints on the executive	Ranking from 3-7 of the extent of institutionalized constraints on the decision making powers of chief executives. Data are from 1990-2000.	Polity IV Data Base
4. Legal and security property rights	Ranking of the quality of the legal structure and the security of property rights. Data are from 2000.	Economic Freedom Project. Gwartney and Lawson (2008)
5. Contract enforcement	The number of independent actions mandated by law or courts that demand interaction between the parties of a contract or between them and the judge or court officer. Data are for 2003.	World Bank, <u>World Development Indicators</u>
6. Private Ownership	Private land ownership exists or is significant equals 1; equals 0 if private ownership does not exist.	Herbst (2000)
7. Customary Tenure	Government explicitly recognizes customary land tenure equals 1; equals 0 otherwise.	Herbst (2000)
8. Tropical Area	Percent of land area in geographic tropics.	Gallup, Sachs, and Mellinger (2000)
9. Landlocked	Equal to 1 if landlock, equal 0 otherwise	Gallup, Sachs, and Mellinger (2000)
10. Urbanization	Percent of population living in urban areas. Data are for 1995.	Gallup, Sachs, and Mellinger (2000)

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¹ These are combined into one category because there are only eight countries with "significant" land ownership.