

# **Securing Private Property: Formal versus Informal Institutions**

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## **Abstract**

Property rights is one of the most fundamental and highly robust institutions supporting economic performance. However, the channels through which property rights are achieved are not adequately identified. This paper is a first step towards unbundling the black box of property rights into a formal and informal component. We empirically determine the significance of both informal and formal rules in securing property rights. We find that when both components are included in the analysis, the impact of formal constraints are greatly diminished, while informal constraints are highly significant in explaining the security of property. These results are robust to a variety of model specifications, multiple instrumental variables and a range of control variables.

Keywords: Property Rights, Informal Institutions, Formal Institutions, Culture  
JEL Classification: F55, O17

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## 1. Introduction

What makes property rights secure? Although there is little consensus on the answer to this question, recent studies illustrate how secure property rights institutions lead to economic development (Scully 1988; Boettke 1994; Leblang 1996; de Soto 2000; Acemoglu, Johnson, and Robinson 2001, 2002; Landau 2003; Kerekes and Williamson 2008). Given this link between well-defined and secure property and economic performance, understanding how to secure private property is of critical importance to a significant number of countries since the majority of the developing world fails to maintain secure property rights institutions. We attempt to identify the specific channels through which property rights are achieved by undertaking a study analyzing two potential mechanisms to promote property rights: informal institutions and formal institutions. We define formal institutions as political constraints on government behavior and informal institutions as private constraints, such as norms or customs.<sup>1</sup>

This paper is a first step towards opening the black box of property rights institutions and understanding the relative importance of which mechanisms are more productive in securing property rights. We argue that both a formal and informal component needs to be included in an analysis attempting to understand what underpins property rights institutions. Our analysis seeks to separate out the direct causal effects of both types of constraints and empirically determine the significance of each. We do so by controlling for measures of both formal and informal institutions in regressions where the dependent variable is a measure of overall security of property. We find that any impact from formal constraints disappears once we control for informal institutions, while the informal constraints significantly lead to more secure property. We view this finding as

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<sup>1</sup> We define and discuss our measurement of each of these in detail in the next section.

suggesting that the role of formal institutions in securing property is currently overstated while informal rules and constraints are underemphasized.

Before turning to our conceptual explanation or to more sophisticated empirical techniques, an examination of the raw data provides insight into the relationships between formal and informal institutions and the security of property (we provide detailed description and justification for all variables and their measurement below).

[Insert Figure 1 About Here]

Figure 1 shows the relationship between our measure of informal institutions, culture, and the average protection against risk of expropriation, our measure of overall protection of private property. As the level or quality of informal institutions increases, so does the security of property rights. There is a visible upward trend highlighting an important role for informal institutions in securing property rights. This indicates that as culture increases, risk of expropriation decreases. This is suggestive that the importance of informal institutions is underestimated.

[Insert Figures 2 About Here]

Figure 2 shows the relationship between our four measures of formal institutions, judicial independence, proportional representation, constitutional review, and plurality, and the protection of private property. A similar relationship emerges between each measure of formal political constraints and the protection of private property. Figure 2(a) indicates that judicial independence does not impact the security of property. For any level of judicial independence, there exists a wide range of protection against expropriation. Figure 2(b) indicates that proportional representation also appears not to impact the level of secure property rights. Achieving the highest score for proportional

representation will not improve the level of security of property. Figures 2(c) and 2(d) plot constitutional review and plurality, respectively. These figures support the previous result that formal institutions do not play a significant role in protecting property rights. This suggests that formal constraints on government are not necessarily driving the protection of property. The raw data shows a clear relationship between informal and formal institutions and the level of secure property rights: the informal institutions have a clear impact on securing property while formal institutions do not. However, to substantiate these results, more sophisticated techniques, including controlling for both institutions simultaneously and isolating exogenous impacts, are executed below.

The findings suggest that informal institutions are significant in explaining the security of property rights, while formal constraints are insignificant. From these findings, we argue that codification of informal institutions may not be necessary to promote economic development. This paper challenges conventional beliefs that formal institutions are the driving force behind establishing property rights institutions. Instead, we contend that the informal mechanisms are crucially important but are often underestimated, as are the costs of government codification, while the benefits of codifying are typically overstated. In addition, we argue that criticisms regarding the empirical link between property rights institutions and economic development (for example, Sachs 2001, 2003; Glaeser, La Porta, Lopez-de-Silanes, and Shleifer 2004) stem from incorrect measurement of institutions. Our paper seeks to rectify these criticisms and contribute to the new institutional literature by empirically identifying institutions more specifically into a formal and informal component. From this specification, we are able to examine the underlying determinants of secure property

rights institutions contributing to economic development. To our knowledge, no other study has undertaken this investigation to determine the relative importance of formal and informal institutions in securing property rights.

The remainder of the paper is organized as follows. Section 2 presents theoretical explanations between formal and informal institutions and secure property rights. Section 3 outlines the empirical methodology and presents the data. Section 4 provides benchmark specifications and results. Section 5 examines the relative importance of formal and informal property rights institutions by employing multiple instrumental variable regressions to minimize reverse causality and endogeneity. Also provided in this section are several robustness checks that support the main findings and strengthen the validity of our instruments. Section 6 concludes.

## **2. Theoretical Background**

Property rights are one of the more fundamental and highly robust institutions; however, the institution itself is a ‘black box.’ In order to understand the determinants of secure property rights, we must distinguish between different types of predation and different enforcement and protection mechanisms. In other words, we must identify sources of insecurity. Two different types of predation exist that undermine security of property. The first type is public predation or expropriation from the government. This implies direct confiscation of property, such as land or capital, by government officials, in some form or another. The second type is private predation where other citizens expropriate, or attempt to seize, another individual’s property. This can also take a variety of forms such as not honoring a contract or seizing someone’s land or physical capital. In order to

establish overall secure property rights institutions, both types of predation must be prevented (North 1981).

Not only do we have to differentiate between types of predation, we must also sparse out the various forms of protecting or enforcing someone's right to their property. In theory, government is capable of protecting individuals against both types of predation, expropriation from government and expropriation from other citizens.<sup>2</sup> Protection against the state typically involves rules that establish constraints on government behavior such as constitutional constraints (see, for instance, Hayek 1960 and La Porta, Lopez-de-Silanes, Pop-Eleches, and Shleifer 2004). To protect against other citizens, government can establish rules to govern individual behavior that is enforceable in a court system, such as contract and debt enforcement (for example, see Djankov, La Porta, Lopez-de-Silanes, and Shleifer 2003; Djankov, Hart, McLiesh, and Shleifer 2006; La Porta, Lopez-de-Silanes, and Shleifer 2006). A more specific example of government protection against private predation is government land titling (de Soto 2000; Binswanger, Deninger, and Feder 1995; Baharoglu 2002).<sup>3</sup>

Another possibility is to rely on private mechanisms. These private mechanisms can range from attitudes, beliefs, customs, norms and traditions that guide everyday individual behavior to privately established and enforced court systems. For instance, the Medieval Law Merchant is an example of how private mechanisms can spontaneously emerge based on custom to establish and enforce informal rules (Benson 1989b). The

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<sup>2</sup> Contract theory recognizes formal institutions as a means of protecting against private and public predation (Buchanan and Tullock 1962).

<sup>3</sup> The effect of land titling is mixed. For studies that find positive effects associated with government land titling, see Feder, Onchan, Chalamwong, and Hongladarom (1988), Banerjee, Gertler, and Ghatak (2002), Do and Iyer (2003) and Field (2005). However, other scholars do not find any benefit from government land titling (Atwood 1990; Kimuyu 1994; Place and Migot-Adholla 1998; Firmin-Sellers and Sellers 1999; Brasselle, Gaspart, Platteau 2001; Place and Otsuka 2001; Kerekes and Williamson 2009).

existing literature on self-enforcing cooperation and exchange argues that public production of law and formal legal systems are not necessary to establish and enforce property rights (Benson 1989a,b; Greif 1993; Greif, Milgrom, and Weingast 1994; Nenova and Hartford 2004; Leeson 2005, 2007a,b,c). Benson (1989a) shows that customary law successfully defined and enforced property rights in primitive societies. This enforcement mechanism arose through voluntary cooperation as individuals realized the value of respecting one another's property. The threat of boycott or ostracism was sufficient to promote cooperation within primitive societies and to protect property.<sup>4</sup>

Until recently, most papers empirically analyzing institutions and economic development did not distinguish between different types of predation or enforcement mechanisms. Acemoglu and Johnson (2005) provide a first step towards 'unbundling institutions' by investigating government's role in protecting against both public and private predation. They find that property rights institutions, defined as rules constraining government behavior, have a positive and significant long run effect on investment, financial development, and economic growth, whereas government's provision of protection against private predation (contracting institutions) only weakly affects financial development. We view this finding as suggesting that government's primary role in establishing secure property rights institutions is to create rules that limit public predation, or government expropriation.

Therefore, the first component in our analysis centers on this link between property rights and formal rules constraining government behavior, what we define as formal institutions. The second component in our analysis is to focus on the private

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<sup>4</sup> Other articles demonstrating that private enforcement mechanisms, such as bilateral and multilateral punishment, can successfully define and protect property rights are Anderson and Hill (1979) and McChesney (1990). Also, Leeson (2008, 2009) illustrates how 17<sup>th</sup> century pirates relied on private means to promote social cooperation and secure their assets.

mechanisms available to protect against predation (either public or private), a link that is not previously explored in the applied institutional literature. We call these private mechanisms, such as attitudes and norms, informal institutions. The key difference between informal and formal institutions is that the informal rules emerge spontaneously and are not part of a government mandated and enforced legal system, whereas the formal institutions capture those rules to constrain government that are created and enforced by government. Informal institutions remain in the private sphere. Formal constraints are centrally designed and enforced. Overall, our analysis separates property rights institutions into two components: a formal component that captures political constraints on government behavior to protect against public predation, and an informal component capturing private mechanisms that may secure property rights.

### **3. Data and Empirical Methodology**

The empirical strategy is to isolate the channels through which both formal and informal institutions affect property rights. The basic economic relationship that we are attempting to capture can be expressed as:

$$Y_i = \mu + \beta C_i + \alpha F + Z_i \delta + \varepsilon_i$$

where  $Y$  is the property rights institution,  $C$  is the informal institutions,  $F$  captures the formal institutions, and  $Z$  is a vector of other control variables. Due to limited data availability (for example, our measure of formal institutions is only available at one point in time), we are only capable of performing cross-sectional analyses. However, this is common in the institutional literature (for example, see Acemoglu et al. 2001, 2002 and La Porta et al. 2004). The following sub-sections describe exactly why these proxies of

the different types of institutions are appropriate and how they are measured and analyzed.

### *3.1 Property Rights Institutions*

In order to unbundle the institution of private property, we must first identify an appropriate measure of property rights institutions. Current literature employs the International Country Risk Guide's (ICRG) average protection against risk of expropriation as the best measure of *formal* property rights institutions (Acemoglu, Johnson, and Robinson 2001, 2002; Glaeser et al. 2004; Acemoglu and Johnson 2005; Tabellini 2009). However, Glaeser et al. (2004) show that this measure is actually an outcome measure of institutions and policy choices. This measurement does not reflect permanent political constraints, as it rises with per capita income and is highly volatile. For example, if a dictator of a country happens to not expropriate its citizens' property, this gets reflected in the index with a higher score. However, this does not reflect government constraints that serve to protect property rights.

We argue that ICRG's measure of property rights does not pass a series of rigorous tests to qualify as formal political institutions.<sup>5</sup> What it does capture is the overall security of property that is the outcome of the country's institutional environment, policies, and culture. Therefore, the ICRG index is an outcome, *de facto* measure reflecting *both* the informal and formal components protecting one's property, not just the political environment. We view this variable as capturing both the formal and informal aspects of property rights institutions, as defined above.

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<sup>5</sup> The article shows that not only the ICRG index, but also Polity IV's Constraint on Executives and a government effectiveness index collected by Kaufmann, Kraay, and Mastruzzi (2003) is also susceptible to these concerns.

Given the nature of the variable, it is appropriate in the analysis to employ this index as a general snapshot capturing actual protection of property rights. Instead of following conventional analysis, we move this index from the right hand side to the left hand side. In other words, we do not use this measure as an explanatory variable. As an alternative, it is utilized as the dependent variable in order to decipher what channels secure property rights - formal rules on government or informal constraints on individual behavior. Our empirical strategy tests for the significance of both the formal and informal institutions. Average protection against risk of expropriation is only available for the years 1982 to 1997. We take the average over this time period for the analysis.

### 3.2 *Formal Institutions*

Continuing to follow the argument in Glaeser et al. (2004) for defining and measuring institutions, we argue that in order for a political constraint to be classified as a formal institution, the rule must show depth and durability. For example, constitutions or electoral rules satisfy this criterion, but policies chosen by a dictator do not. In order to qualify, the institution must be reasonably permanent and act as a focal point. Following this argument, most of the current literature neglects to correctly define a political or formal institution. The proxies used to measure institutions are survey indicators of institutional quality (for example, the International Country Risk Guide) and reflect a mix of institutions and policies. These de facto, outcome variables are not appropriate measures of formal institutions. This mis-measurement of formal political institutions may partially explain some of the recent criticisms of the institutional literature.

In order to correctly measure formal institutions, we rely on four constitutional constraints identified in Glaeser et al. (2004) that serve to constrain government predation. These constraints are plurality, proportional representation, judicial independence, and constitutional review and can be classified as either electoral rules or judicial constraints. Electoral rules, measured by plurality and proportional representation, are constraints on executive power. Judicial constraints, measured by judicial independence and constitutional review, capture the constraint on the executive issued by the judiciary. Plurality represents the election of a legislator by a winner take all strategy. Proportional representation captures whether a candidate in the upper and lower houses of parliament is elected based on the percentage of votes received by their party (Beck, Clarke, Groff, Keefer, and Walsh 2001).<sup>6</sup> Both measures are dummy variables (0, 1) averaged over the time period 1975-2000 in order to expand the number of countries.

Judicial independence measures the term length of the Supreme Court judges. Constitutional review captures both the extent of judicial review and the rigidity of the constitution. Judicial review is measured by whether judges have the power to review the constitutionality of laws. The rigidity of the constitution quantifies how hard it is to change the constitution by counting the number of steps necessary to do so (La Porta et al. 2004). Both judicial independence and constitutional review are available in 1995 and are normalized to range between zero and one. All four formal constraints are defined as objective constitutional measures of political rules constraining government. Therefore, higher scores for each measure necessarily implies stronger formal institutions. Although

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<sup>6</sup> Countries are not restricted to one system or the other. It is possible for a country to have both types of systems in place (for example, Australia and Brazil).

these measures do not capture all possible existing constraints on government, we believe they serve as appropriate proxies to capture constitutional restrictions on expropriation.

### 3.3 *Informal Institutions*

Informal institutions are those rules that shape human behavior but are outside of government and are not part of a written legal framework. These private mechanisms that guide everyday interactions and shape a way of life within a given region include social norms, customs, attitudes, beliefs about right and wrong, and rules of enforcement (North 1990). Defined in this manner, informal institutions include the private mechanisms that exist to secure property.

Recall, that in order to qualify as an institution constraints need to be persistent over time and show depth and durability. Therefore, we rely on a previously established measure of culture (for example, Tabellini, 2008; Coyne and Williamson 2009; Tabellini 2009; Williamson 2009) to proxy for informal institutions as it is persistent and does not change quickly.<sup>7</sup> Our measure of culture is constructed by identifying several key traits that are relevant for economic interaction and exchange, i.e. ‘economic culture.’ Porter (2000) defines economic culture as “the beliefs, attitudes, and values that bear on economic activities of individuals, organizations, and other institutions” (p. 14). We follow Porter’s terminology in order to narrow the concept of culture so that we can focus our analysis on how economic cultural traits may support property rights institutions.

Our economic culture variable is constructed by identifying four distinct categories of culture that should constrain behavior related to social and economic

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<sup>7</sup> For studies empirically investigating the direct association between culture and economic development and growth, see Guiso, Sapienza, and Zingales (2006), Licht, Chanan, and Schwartz (2007), Tabellini (2008, 2009) and Williamson and Mathers (2009).

interaction and, thus, property rights protection. These four components are trust, respect, individual self-determination (called control), and obedience. These components serve as rules governing interaction between individuals. In general, trust, respect, and individual self-determination are thought to promote secure property rights, whereas obedience may lead to higher rates of expropriation, as explained below in detail. We follow Tabellini's (2009) methodology in measuring culture and its components. In order to maximize sample size, we utilize two different waves of the World Values Surveys and the European Values Surveys, 1995-1997 and 1999-2000, consisting of over 119,000 individual responses. These surveys capture individual beliefs and values, reflecting local norms and customs, i.e. culture. Each section of culture has a corresponding question from the survey and a different aggregation process that is discussed below in more detail.

Trust is argued to reduce transactions costs, to lead more quickly to efficient outcomes, and to further market exchange (Fukuyama 1996; La Porta, Lopez-de-Silanes, Shleifer, and Vishny 1997; Woolcock 1998; Zak and Knack 2001; Dixit 2004; Francois and Zabojnik 2005). Therefore, it is argued that higher trust societies will experience higher levels of economic development and growth (Knack and Keefer 1997). We argue that this same logic holds between trust and property rights institutions. The more you trust your neighbor, the less likely you are to expropriate their property and vice versa. Trust reduces the cost of monitoring and lowers transactions costs, thus promoting mutual trust in individuals leads to less private predation. A lack of trust between individuals raises the cost of monitoring and increases transactions costs, resulting in individuals trading among small networks rather than expanding into anonymous market

participation. By not engaging in wider trading networks, individuals may view expropriation as an appropriate means of obtaining what they want.

The following question from the survey is used to measure the trust component of culture: “Generally speaking, would you say that most people can be trusted or that you can’t be too careful in dealing with people?” The level of trust is captured in each country by summing the number of respondents that answered “Most people can be trusted,” as opposed to “Can’t be too careful” and “Don’t know.”

The second component of culture captures how determined individuals are in their efforts to succeed. Individual motivation depends on the level of self control individuals believe they have over their choices. This is influenced by whether the individuals reap the benefits or consequences of their actions. The more likely it is that economic success will be determined by one’s own will, the more likely individuals will work harder, invest in the future, and engage in entrepreneurial activities (Banfield 1958). An extension of this argument is that individual choice depends on how much control you feel you have over your life. When individuals think that they have control over their life, they will be more likely to find ways that improve their economic welfare, including finding solutions to problems surrounding property rights. As individuals feel more of their choices determine their success, they will be more likely to respect others’ property and not engage in plunder, resulting in higher levels of secure private property. However, if individuals view the likelihood of succeeding as a product of luck or political connections, they will tend not to engage in productive activities, such as investing in securing property rights.

To identify and capture this cultural component (which we call control), we use the following survey question: “Some people feel they have completely free choice and control over their lives, while other people feel that what we do has no real effect on what happens to them. Please use this scale (from 1 to 10) where 1 means “none at all” and 10 means “a great deal” to indicate how much freedom of choice and control in life you have over the way your life turns out”. We determine an aggregate control component by averaging all the individual responses and multiplying by ten.

The third cultural trait is defined as respect. In some societies engaging in highly opportunistic behavior outside of your small group or network is accepted, while other societies promote social interactions beyond small groups (Platteau 2000). This can be defined as the amount of respect present in different societies. The differing attitudes about respect have economic consequences or benefits that range from the provision of public goods in a local community and the monitoring of political representatives (Putnam 1993; Banfield 1958). We argue that respect of property rights is another economic consequence or benefit that can emerge from these different mentalities. For example, the lower the respect among individuals in general, the more likely that property will not be respected and will lead to more property expropriation.

The following survey question is analyzed to determine the importance of respect in a society: “Here is a list of qualities that children can be encouraged to learn at home. Which, if any, do you consider to be especially important? Please choose up to five”. Respect is defined as the percentage of respondents in each country that mentioned the quality “tolerance and respect for other people,” as being important.

The fourth and final cultural trait captures the importance of obedience in a society. Tabellini (2009) argues that some societies teach that individualism can be destructive. It is the role of the state to suppress these instincts through coercion to achieve good outcomes. Therefore, a strong emphasis is placed on the role of the state as a coercive unit. Likewise, this translates into the parental unit also suppressing individual instincts in their children. This type of attitude stifles economic development by discouraging innovation, entrepreneurship, and cooperation among other members of society. Higher obedience may lead to lower rates of innovation and entrepreneurship as individuals have less incentive to be entrepreneurial. As a result, individuals may not invest resources to invent ways to define and enforce property rights, resulting in more property expropriation. In addition, more obedience may also lead to less widespread cooperation across groups as individuals do only what they are told versus cooperating with one another in productive endeavors and to solve problems. This also potentially leads to higher rates of property expropriation. Our measure for obedience comes from the above question that asks individuals to rank which qualities are important to teach children. We define this cultural trait by the percentage of respondents that identified obedience as an important quality.

Combining all four traits, one comprehensive measure for culture for each country is achieved by summing trust, control, and respect, and subtracting the obedience score. We then convert this comprehensive measure to be measured on a relative scale ranging from 0 to 10, with 10 representing the country with the strongest culture conducive to securing property and 0 representing the country with the lowest amount of culture conducive for property rights institutions. Appendix 1 describes the culture data

including each country's index score and relative rank. Detailed data descriptions and sources for all variables used in the empirical analysis are provided in Appendix 2.

#### 4. Benchmark Specifications and Results

Summary statistics for all of the variables used in the analysis are provided in Table 1.

[Insert Table 1]

Recall that average protection against risk of expropriation, culture, and all four measures of formal institutions are measured where a higher score implies more secure property rights. Due to the nature and construction of our variables of interest we do not place much weight on the interpretation of the coefficients; instead we are mainly interested in the sign and significance of the variable, although we do attempt to provide some economic interpretation of the main variables.

We show the basic relationship between formal and informal institutions and property rights by employing univariate and bivariate ordinary least squares (OLS) regressions. The univariate regression is identified as:

$$Y_i = \mu + \beta I_i + \varepsilon_i$$

where  $Y$  equals average protection against risk of expropriation, and  $I$  is either the informal institution or the formal institution. The bivariate regression is identified as:

$$Y_i = \mu + \beta C_i + \alpha F + \varepsilon_i$$

where  $Y$  again equals average protection against risk of expropriation,  $C$  equals the informal institution measured by culture, and  $F$  represents the formal measures. Next, we build off of these initial results and include additional control variables. This regression is identified as:

$$Y_i = \mu + \beta C_i + \alpha F + Z_i \delta + \varepsilon_i$$

where  $Z$  represents the vector of additional control variables. The control variables include GDP growth (percentage), educational attainment in 1960 (log form), urban population (percentage), and government consumption (percentage). GDP growth is averaged for the period 1982 to 1997. Educational attainment refers to the amount of schooling received by 1960. Urban population and government consumption are measured as percentages averaged for the years 1982 to 1997. We follow previous literature in determining which control variables to include (Acemoglu et al. 2001, 2002; Glaeser et al. 2004; Acemoglu and Johnson 2005; Tabellini 2009). All control variables are taken from World Development Indicators (2006). Detailed data descriptions and summary statistics are presented in Appendix 2 and Table 1, respectively.

The benchmark OLS univariate and bivariate regression results are presented in Table 2. Columns (1) through (5) show the univariate results. Column (1) shows the effect of culture, the informal measure, on average protection against risk of expropriation, the dependent variable. Culture has a positive effect on the protection of property and is significant at the 99 percent level. A one unit increase in the culture index increases property protection by 0.5 units. An increase by one standard deviation in the culture score increases property protection by one unit. This also suggests that a country that moves from the lowest rank (Uganda) on the culture scale to the highest (Sweden) will increase property protection by five units on a ten point scale, a rather dramatic increase. Also, the adjusted R-squared (0.45) suggests that culture is explaining almost half of the variation in the dependent variable.

[Insert Table 2 Here]

Columns (2) through (5) show the effects of the formal measures on the security of property. Judicial independence and proportional representation have a positive effect on property rights and are significant at the 95 percent level. This result suggests that a country moving from lack of to full judicial independence will increase property protection by 1.75, less than half of the increase in protection from the culture index. A one standard deviation increase in proportional representation increases property protection by 0.40 units, again, less than half of a one standard deviation increase from culture. Plurality displays a negative effect on property rights suggesting that a one-unit increase in plurality will reduce protection by 0.66 units. Constitutional review has a positive effect on property rights but is insignificant. These results also suggest that the formal institutions, even when significant, are not explaining much variation in the security of property according to the low adjusted R-squares.

Columns (6) through (9) of Table 1 show the bivariate results. Each column represents a regression in which culture enters with one of the four formal measures. Column (6) shows the effect of culture and judicial independence on the protection of property rights. Culture is positive and remains significant at the 99 percent level, while judicial independence is positive but now insignificant. For the remaining regressions, culture continues to have a positive effect on property rights and its coefficient is similar to the univariate result above (ranges from 0.47 to 0.51). Proportional representation and constitutional review are positive and insignificant, while plurality is negative and insignificant. The R-squared for each of these regressions is 0.45 or greater.

Comparing the univariate and bivariate regressions, the formal measures lose all significance with the inclusion of culture. Also, the value of the adjusted R-squared is

almost identical in the bivariate regressions as in the univariate regression with only culture. This suggests that the inclusion of any of the formal measures does not explain any additional variation in the dependent variable. These preliminary results indicate that informal institutions play a significant role in protecting property rights, while formal constraints may not be as important.

[Insert Table 3 About Here]

Table 3 presents OLS regressions with the inclusion of additional control variables: GDP growth, educational attainment in 1960, urban population, and government consumption. In each regression, culture has a positive effect on the protection of property rights and is significant at the 95 percent level. The coefficient is much smaller than before ranging from 0.17 to 0.20. The formal measures are insignificant in three out of four regressions with judicial independence actually switching to a negative sign (this could be due to endogeneity among the regressors). Educational attainment in 1960 enters into all four regressions with a positive sign and is significant at the 99 percent level, as could be expected. Government consumption is positive and significant in the regression including proportional representation. The R-squared in all four regressions is 0.70 or greater, suggesting that the inclusion of our controls explains additional variation in property protection.

## **5. Formal versus Informal Property Rights Institutions**

In this section, we present our main model specification where we employ multiple instrumental variable analysis to control for reverse causality, endogeneity and measurement error. In addition, we present several robustness checks including a semi-

reduced form of the main model, and we re-estimate our results with alternative formal and informal indices.

### *5.1 Instrumental Variables*

We want to establish causal relationships, not just correlations, between formal and informal institutions and the security of private property. There is the possibility of many relationships that run in various directions that impact the development of institutional environments; thus, the interaction between formal and informal institutions is not necessarily clear and we must isolate the effect of each institution. For example, formal constraints may exhibit codification of the informal mechanisms. Hence, the formal measure would capture both formal and informal institutions. If this is the case, the OLS regressions may not capture the causal relationship between the types of institutions and the protection of property.

Multiple instrumental variables are relied on to isolate the channels through which both informal and formal institutions affect property rights. In order to use instrumental variables, each instrument must be correlated with the specified type of institution but not with the other type. In other words, the instrument for informal institutions must have a strong effect on culture today, but cannot be correlated with current formal constraints. Also, the instrument for political constraints can only work through these formal measures, not through the informal, cultural environment. In addition, property rights institutions cannot be determining either one of the instruments.

The major challenge is to find appropriate instruments for both formal and informal institutions. Fortunately, the development literature provides valid proxies for

each. For formal institutions, we rely on legal origin as an appropriate instrument. Informal institutions are instrumented with latitude, a geography variable. A deeper explanation and analysis of the validity of these instruments is provided in the subsections presented below.<sup>8</sup>

In the complete model specification we employ two-stage least squares analysis (2SLS) and follow the same format as in the previous section. First, we run univariate and bivariate regressions. We then include additional control variables in the final specification. The two first stages in the 2SLS model specification are identified as:

$$C_i = \alpha G_i + v_i \quad (1)$$

$$F_i = \beta L_i + u_i \quad (2)$$

where  $C_i$  is culture,  $G_i$  is the instrument for culture,  $F_i$  is the formal measure, and  $L_i$  is the instrument for formal institutions. The primary second stage regression is expressed as:

$$Y_i = \mu + \beta I_i + \alpha S + Z_i \delta + \varepsilon_i$$

where  $Y$  again equals average protection against risk of expropriation,  $I$  is the instrumented culture variable,  $S$  is the instrumented formal measure, and  $Z$  represents the vector of additional control variables. We use the same control variables as in the previous model.

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<sup>8</sup> Several historical measures are identified as valid instruments for current institutions. Settler mortality and population density in 1500 is argued by Acemoglu, Johnson, and Robinson (2001, 2002) as affecting settlement patterns that determined past institutions. These institutions shaped current ones that now influence economic performance. Acemoglu and Johnson (2005) “unbundle institutions” into property rights institutions and contracting institutions. They argue that settler mortality and population density in 1500 largely impacted property rights institutions, but not contracting institutions. In contrast, they identify the effects of legal origin on contracting institutions, noting that legal origin has a minor effect on property rights institutions. However, Glaeser et al. (2004) argue that Acemoglu et al. (2001, 2002) incorrectly assert that colonizers impact current institutions. Instead, Glaeser et al. show that the Europeans brought their human capital, not their institutions, impacting current economic performance. They show that settler mortality is more correlated with human capital today than with institutional measures, suggesting that colonizers brought their knowledge instead of their political constraints. Therefore, these variables are not valid instruments for formal institutions. Tabellini (2009) uses historical political institutions and educational attainment in 1880 as instruments for culture. However, it is possible to argue that these two instruments are choice variables and not completely exogenous. Therefore, they are not valid instruments for informal institutions.

### *A. Legal Origin*

We rely on legal origin as an exogenous variable to explain the variation across formal institutions. The idea that many countries have a distinct legal origin is identified by La Porta et al. (1997) and La Porta, Lopez-de-Silanes, and Shleifer (1998). Legal origin is shown to shape financial, legal, and economic institutions and outcomes (Djankov et al. 2003). Different legal traditions, imposed during colonization, affect current legal systems. These legal traditions are classified as common law and civil law systems. Common law, imposed during British colonization, is referred to as English legal origin. The French, Scandinavian, and German colonizers imposed civil law systems. Acemoglu and Johnson (2005) show that legal origin has an exogenous impact on current political institutions and argue for its validity as an instrument. Also, as legal origin is a historical variable, today's property rights institutions do not determine a country's legal origin. Therefore, we use a country's legal origin, measured as English common law, as the instrument for formal institutions.

English legal origin is strongly correlated with judicial independence and proportional representation; therefore, we rely on these measures for the remainder of the analysis. The correlations between English legal origin and judicial independence and proportional representation are 0.55 and -0.41, respectively, and it is not strongly associated with current culture (-0.13). This suggests that legal origin may perform as a valid instrument. The first stage results, presented in Table 4, also indicate that legal

origin is a valid instrument for both measures of formal institutions, as shown by the high R-squared and F-statistic.<sup>9</sup>

[Insert Table 4 About Here]

### *B. Latitude*

Geography is used to isolate the impact of informal institutions on property rights. Specifically, latitude, measured as distance from the equator, is implemented to identify the channel through which culture affects property rights. As latitude is completely exogenous, it may be an appropriate instrument because today's security of property cannot influence a country's latitude. Diamond (1997), Gallup, Sachs, and Mellinger (1999), and Sachs (2001, 2003) argue that geography has a direct impact on economic development due to climate, the disease environment, endowment of resources, and transactions costs. However, Engerman and Sokoloff (1994), Sala-i-Martin and Subramanian (2003), Easterly and Levine (2003), and Rodrik, Subramanian, and Trebbi (2004) show that geography only exhibits an indirect effect on development by impacting the quality of current institutions. The argument is that certain factor endowments permit extreme inequalities and the dominance of a small group of elites. These differences in endowments have stunted institutional development. Hall and Jones (1999) invoke a similar argument and use latitude as an instrument for ICRG's measure of property rights protection.

Sowell (1998, 2008) offers a slightly different theoretical explanation on how geography influences, shapes, and determines a specific institution, culture. He argues

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<sup>9</sup> By implementing legal origin as an instrument, we are claiming that legal origin only exhibits a secondary impact on the security of property by explaining the impact from formal institutions.

that cultural progress of any society depends largely on the ability to interact and learn of advances made by others. Geography can impede or facilitate these interactions between groups. Hence, geography plays a critical role in determining, at any given time, cross cultural exchange. Groups that live in isolation due to geographic conditions do not advance as much culturally relative to other societies where the costs of interacting are much lower.<sup>10</sup>

We build from these arguments in order to utilize geography as an instrument for informal institutions. In our sample of countries, latitude has a strong effect on culture, and little effect on the formal institutions. This is demonstrated by the correlation between latitude and culture (0.54), suggesting that latitude may perform as a valid instrument. Latitude is explaining current informal institutions, but not current formal institutions (correlations are 0.13 for judicial independence and 0.18 for proportional representation). Table 4 (above) shows that the first stage results confirm latitude as a valid instrument, as show by the high R-squared and F-statistic.<sup>11</sup>

## 5.2 *Main Results*

Table 5 shows multiple IV regression results. Columns (1) through (3) present univariate results. Culture positively affects the protection of property and is significant at the 99 percent level. After controlling for endogeneity, both formal measures lose significance. Columns (4) and (5) show the bivariate results. Once again, culture is positive and significant at the 99 percent level in regressions (4) and (5). Judicial independence and

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<sup>10</sup> See Coyne and Williamson (2009) for an empirical investigation on how trade influences culture.

<sup>11</sup> By using geography, measured by latitude, as an instrument, we are also claiming that geography only has a secondary effect on development through its influence on informal institutions. Thus, geography is not directly determining security of property and therefore economic performance. Other proxies for geography are available; however, we use latitude as the measure of geography in order to maximize the sample size.

proportional representation maintain their respective signs and are again insignificant. After controlling for potential reverse causality, informal institutions have an even stronger effect on the protection of property than do formal measures. In fact, the coefficient for culture actually increases in magnitude ranging from 0.70 to 0.81, suggesting that a one standard deviation increase in culture will increase property protection by an average of 1.51 units. This implies that moving from 0 to 10 on the culture index leads to an average increase in property protection of 7.55 units.

[Insert Table 5 About Here]

Table 6 presents the IV regression results with the inclusion of control variables. The basic relationship between informal and formal institutions and the security of property rights still holds. Informal institutions positively affect property rights, while formal institutions do not. In both regressions all of the control variables (GDP growth, educational attainment in 1960, urban population, and government consumption) lose significance after controlling for endogeneity. These results suggest that not only is there a role for informal institutions in protecting property, they may in fact serve as a primary mechanism securing property rights.<sup>12</sup>

[Insert Table 6 About Here]

### 5.3 *Semi-Reduced Form*

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<sup>12</sup> Due to the importance of controlling for a country's current level of development, we attempt to re-estimate the regressions by using sub-samples based on varying income groups. Due to the fact that most countries within the same income group exhibit the same type of characteristics, such as institutions, the results were that all variables were insignificant. Also, due to the possibility that GDP growth is endogenous, we re-estimate the original regressions without GDP growth and find the same results. Again, due to high correlations between GDP and institutions (both formal and informal) any measure capturing levels of development can bias results and should not directly enter into the regressions.

One potential concern is the possibility that English legal origin affects the security of property rights through other channels besides its impact on formal constraints (for example, see La Porta et al. 2008). In order to address this concern, a semi-reduced specification of the model is implemented where informal institutions are still instrumented with latitude, but English legal origin now enters directly into the second stage.<sup>13</sup> Table 7 reports the results of the semi-reduced specification.

[Insert Table 7 About Here]

The positive and significant relationship between informal institutions, culture, and secure property rights remains. English legal origin is insignificant. The main results presented above are supported from this analysis. Not only does this result support the importance of informal institutions, but it also supports English legal origin as an appropriate instrument. There is no evidence of English legal origin impacting property rights institutions through channels other than its positive impact on formal property institutions.

#### 5.4 *Alternate Formal and Informal Indices*

Another possible critique of this analysis is the concern of measurement error with the institutional variables. To combat this, we utilize principle component analysis (PCA) to create a new culture index and an overall formal index variable. Then we re-estimate the main results.

Principle component analysis can be implemented in order to reduce several independent variables into a more coherent index while still capturing most of the

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<sup>13</sup> English legal origin obviously enters into the first stage as well. Therefore, the first stage results are basically the same as before and are not reported in order to save space.

information from the original variables. The PCA technique is especially applicable when there are theoretical ambiguities regarding construction of an index or when multicollinearity is a concern (see Dunteman 1989). For both the informal and formal index, PCA extracts the common variation between all four factors, creating an overall net measure of either informal institutions or formal institutions.

To create the new culture index, instead of summing trust, respect, and individual self-determination and subtracting obedience, we extract the first principle components and normalize the index to range between 0 and 10, with 10 representing the country with the strongest informal institutions.<sup>14</sup> A high score on the PCA culture index indicates that private mechanisms exist that should promote the security of property. In order to construct one comprehensive measure of formal institutions, we extract the first principle components from the original four measures of formal constraints (judicial independence, constitutional review, proportional representation, and plurality) to create an overall formal institutional index. The index is normalized to range between 0 and 10, with a score of 10 representing a country that exhibits high formality and score of 0 representing low formality. A high score on the formal index indicates that governments in these countries should be more constrained via formal rules than those countries with low scores.

[Insert Table 8 About Here]

The results for the re-estimation of the main results using IV estimation are presented in Table 8 above.<sup>15</sup> After creating new formal and informal indices based on

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<sup>14</sup> Tabellini (2009) employs the same two methods to construct two different culture indices and finds no significant difference in his results.

<sup>15</sup> The same instruments remain valid for both the formal and informal index based on principle component analysis. Latitude is correlated with the new culture index (0.50) and not correlated with the formal index (-0.18), while English legal origin is correlated with the formal index (0.41) and not correlated with the new culture index (-0.08). The results are basically the same in the first stage as previously presented and

principal component analysis, the results support the previous findings and suggest that the main results are not sensitive to institutional measurement error. The positive and significant impact from culture on securing property persists, while the insignificance of formal institutions remains.

## **6. Conclusion**

The beginning of the paper poses the question, “What makes property rights secure?” Our empirical analysis suggests that informal institutions are the underlying channels establishing secure, well-defined property rights. Even after controlling for reverse causality, the empirical results show that culture, our measure of informal institutions, has a positive and highly significant effect on property rights. However, formal institutions have no significant effect on securing property. These results are robust to the inclusion of control variables, different model specifications, and sensitivity analysis. Our results imply that the current trend toward formalization overstates the importance of formal institutions. In fact, these formal mechanisms may not be sufficient to achieve property rights institutions, due to potentially high costs that are often understated or completely ignored. These results have especially important implications for developing countries with highly predatory governments. In order to achieve secure property rights, the role of informal institutions inherent in a particular society may be more imperative than previously believed. These results support the literature that institutions matter for economic development and highlight the need for more research on understanding the role of both informal and formal institutions in the development process.

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are therefore omitted to save space.

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### Appendix 1: Culture Index and Country Rank

Country	Culture Index	Rank	Country	Culture Index	Rank
Albania	4.16	36	Latvia	3.86	42
Algeria	1.45	74	Lithuania	4.02	39
Armenia	3.29	54	Luxembourg	4.39	30
Australia	7.04	9	Macedonia	5.49	18
Austria	6.64	10	Malta	2.73	66
Azerbaijan	3.43	51	Mexico	2.87	63
Bangladesh	4.90	25	Moldova	3.37	53
Belarus	5.80	15	Montenegro	3.58	47
Belgium	3.89	41	Morocco	2.39	67
Bosnia and Herzegovina	3.55	48	Netherlands	9.24	2
Brazil	1.15	76	New Zealand	7.51	6
Bulgaria	5.16	21	Nigeria	1.25	75
Canada	6.34	12	North		
Chile	3.42	52	Ireland	4.53	29
China	7.37	7	Norway	6.39	11
Colombia	2.94	61	Pakistan	1.89	72
Croatia	2.16	71	Peru	1.11	77
Czech Rep	5.00	23	Philippines	2.19	70
Denmark	9.19	3	Poland	4.26	32
Dominican	2.88	62	Portugal	3.01	59
Egypt	3.05	58	Puerto Rico	2.26	69
El Salvador	0.97	78	Romania	2.87	64
Estonia	4.92	24	Russia	3.97	40
Finland	7.91	4	Serbia	3.29	55
France	5.32	19	Singapore	2.79	65
Georgia	3.75	43	Slovakia	3.72	45
Germany	5.86	14	Slovenia	4.19	34
Great Britain	3.47	50	South Africa	2.31	68
Greece	4.05	38	Spain	3.73	44
Hungary	4.09	37	Sweden	10.00	1
Iceland	7.30	8	Switzerland	6.14	13
India	3.09	57	Taiwan	4.34	31
Indonesia	3.69	46	Tanzania	0.65	79
Iran	4.64	28	Turkey	2.98	60
Ireland	4.74	27	Uganda	0.00	80
Israel	5.62	17	Ukraine	4.25	33
Italy	4.80	26	United States	5.66	16
Japan	7.70	5	Uruguay	5.23	20
Jordan	3.48	49	Venezuela	4.18	35
Korea	5.01	22	Vietnam	3.15	56
			Zimbabwe	1.61	73

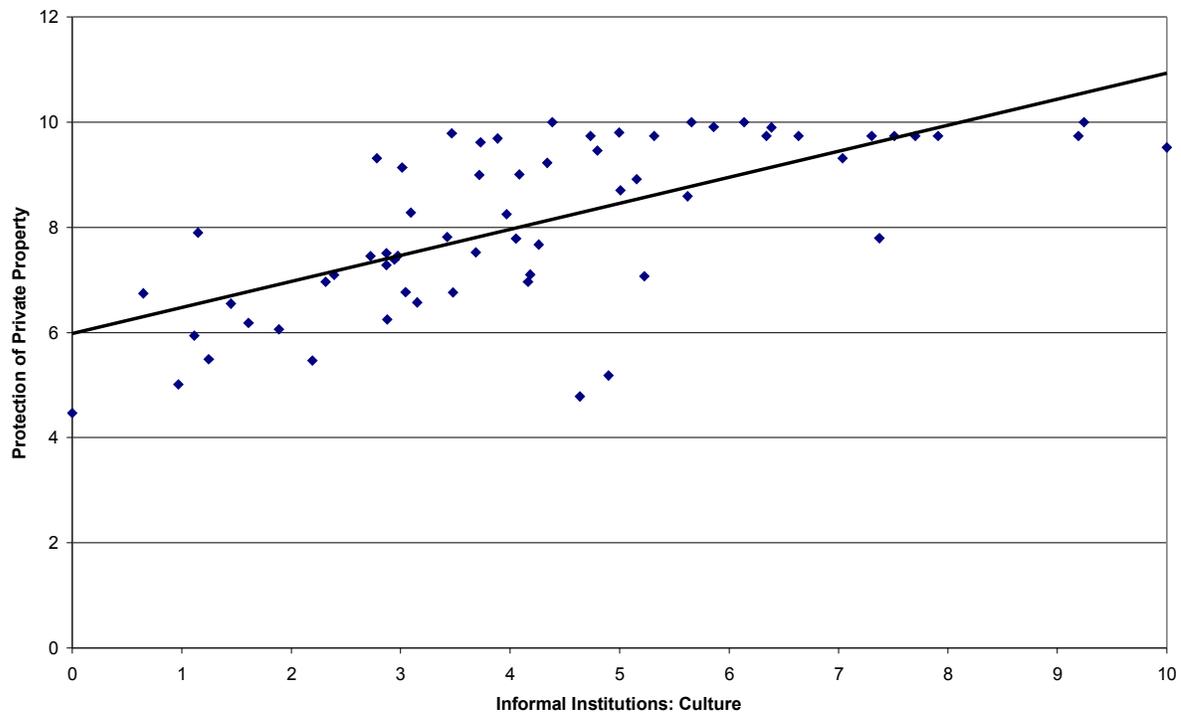
## Appendix 2: Data Description and Sources

Variable	Data Description	Data Source
Average Protection Against Risk of Expropriation	Measures protection from "outright confiscation and forced nationalization" of property. The index ranges from 0 to 10, where higher values are equal to a lower probability of government expropriation; averaged for the years from 1982-1997.	International Country Risk Guide, Political Risk Services
Culture	The sum of three positive beliefs (control, respect, trust) minus the negative belief (obedience), scaled between 0 and 1, with one representing strong culture conducive to development. Trust is measured as the percentage of respondents who answered that "Most people can be trusted," respect is measured as the percentage of respondents that mentioned the quality "tolerance and respect for other people" as being important, control is measured as the unconditional average response (multiplied by 10) to the question asking to indicate how much freedom of choice and control in your life you have over the way your life turns out (scaled from 1 to 10), and obedience is the percentage of respondents that mentioned obedience as being important.	World Values Surveys, 1995-1997 and 1999-2000
Judicial Independence	Judicial Independence is computed as the sum of three variables. The first measures the tenure of Supreme Court judges (highest court in any country), the second measures the tenure of highest ranked judges ruling on administrative cases, and the third measures the existence of a case law. The variable is normalized from 0 to 1, where higher values equal a higher degree of judicial independence. This variable is measured as of 1995.	La Porta et al. 2004
Proportional Representation	This variable equals one for each year in which candidates were elected using a proportional representation system; equals zero otherwise; averaged for the years from 1975-2000.	Beck et al. 2001
Constitutional Review	Constitutional review is computed as the sum of two variables. The first measures the extent to which judges have the power to review the constitutionality of laws in a given country. The second measures how hard it is to change the constitution in a given country. This variable is normalized from zero to one where higher values equal a higher degree of constitutional review by the courts; measured as of 1995.	La Porta et al. 2004

Plurality	This variable equals one for each year in which legislators were elected using a winner-take-all rule; it equals zero otherwise; average for the years from 1975-2000.	Beck et al. 2001
GDP Growth	Growth of GDP per capita, PPP basis, constant 2000 international dollars; averaged for the years from 1982-1997.	World Development Indicators 2006
Educational Attainment in 1960	Measured as the number of years of schooling of the total population over age 25 by 1960.	Glaeser et al. 2004
Urban Population	Percent of population living in an urban area; average for the years from 1982-1997.	World Development Indicators 2006
Government Consumption	Real government consumption expenditure, measured as a percentage of GDP; averaged for the years from 1982-1997.	World Development Indicators 2006
Latitude	Measured as the absolute value of the latitude of the country, scaled to values between 0 and 1 (0 is the equator).	La Porta, Lopez-de-Silanes, Shleifer, and Vishny 1999
English Legal Origin	Dummy variable coded 0 or 1: 1 indicates that a country was colonized by Britain and English legal code was transferred.	La Porta, Lopez-de-Silanes, Shleifer, and Vishny 1999

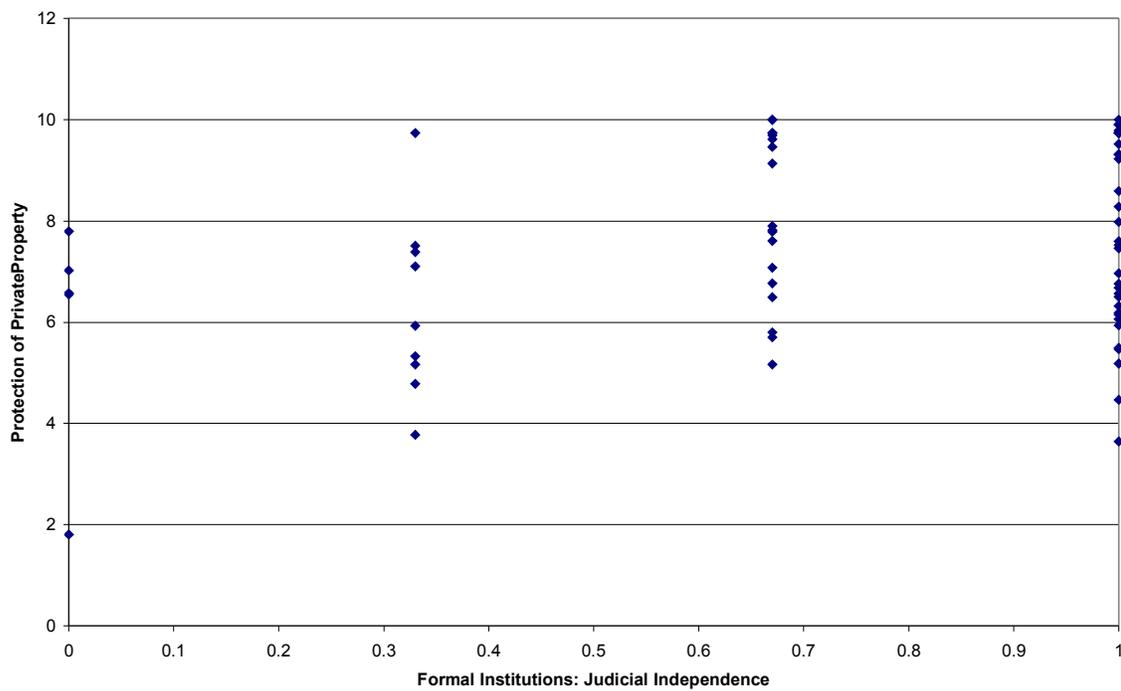
Figure 1:

Property Protection and Informal Institutions



**Figure 2(a):**

**Property Protection and Formal Institutions**



**Figure 2(b):**

**Property Protection and Formal Institutions**

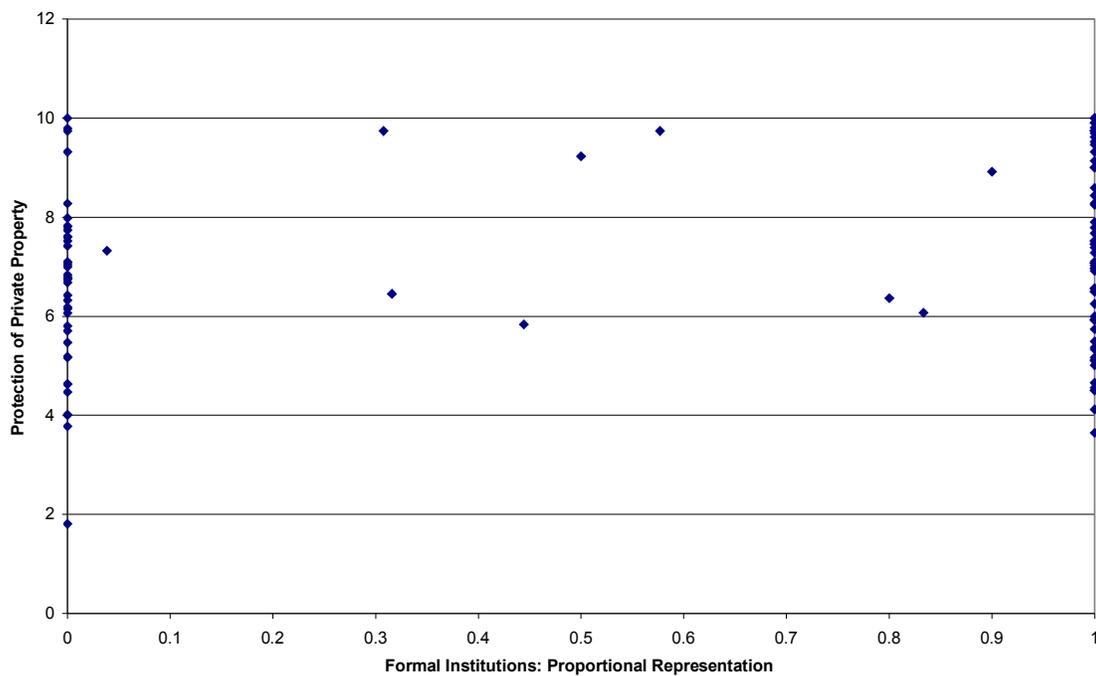


Figure 2(c):

## Property Protection and Formal Institutions

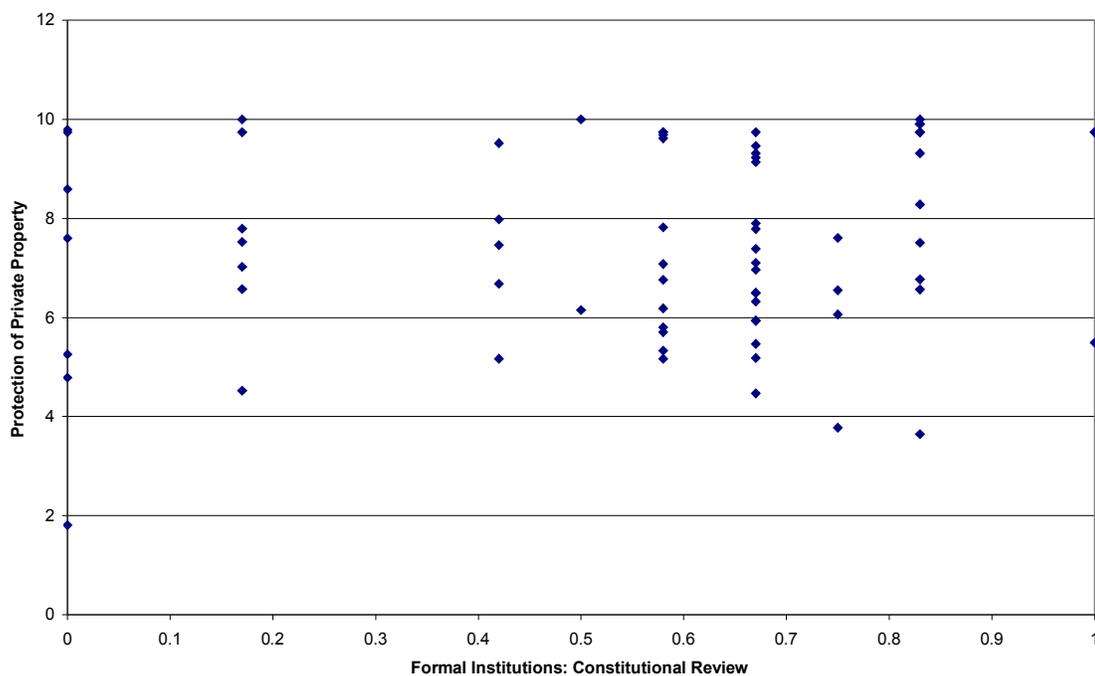
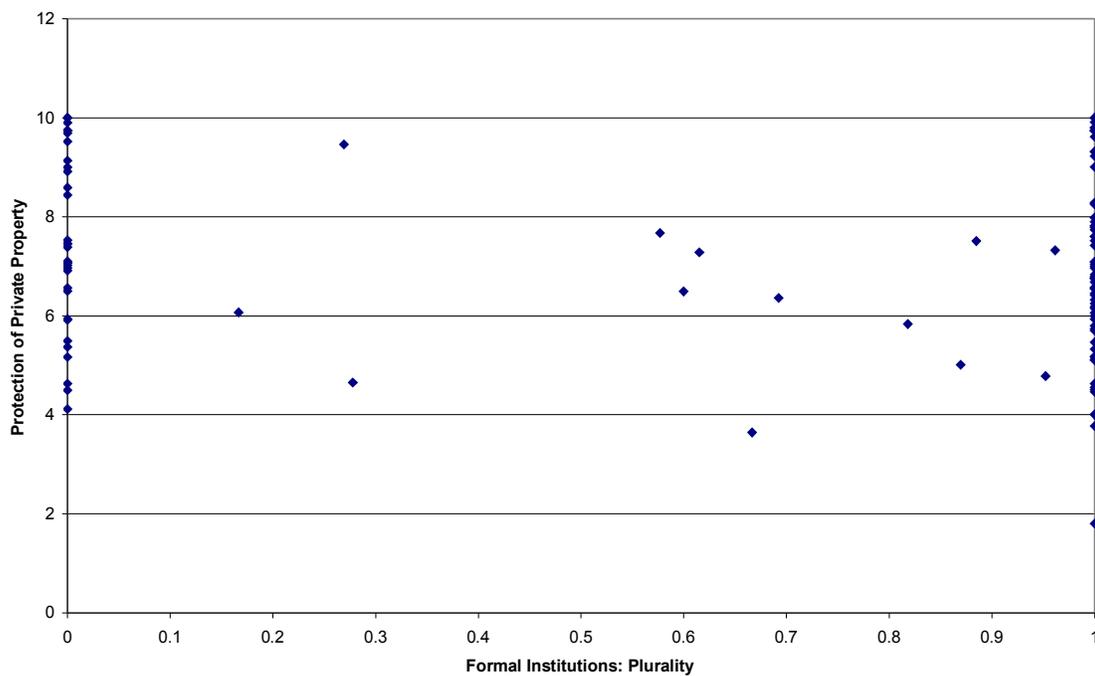


Figure 2(d):

## Property Protection and Formal Institutions



**Table 1: Summary Statistics**

<b>Variable</b>	<b># of Observations</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min.</b>	<b>Max.</b>
Avg. Protection Against Risk of Expropriation	133	7.08	1.84	1.81	10
Culture	79	4.18	2.01	0	10
Judicial Independence	69	0.75	0.32	0	1
Proportional Representation	153	0.56	0.49	0	1
Constitutional Review	71	0.56	0.27	0	1
Plurality	160	0.7	0.44	0	1
GDP Growth	189	2.83	4.71	-10.11	48.05
Log Educational Attainment in 1960	74	0.93	1.01	-2.6	2.26
Urban Population	202	51.16	24.62	5.47	100
Government Consumption	180	17.62	7.56	4.41	58.31
Latitude	199	0.28	0.19	0.01	0.8
English Legal Origin	199	0.34	0.48	0	1

Table 2: Benchmark OLS Regressions

Formal v. Informal Protection of Private Property									
Dependent Variable: Average Protection Against Risk of Expropriation									
	Univariate Results					Bivariate Results			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Culture	0.500*** (0.068)	--	--	--	--	0.474*** (0.078)	0.500*** (0.067)	0.492*** (0.079)	0.510*** (0.072)
Judicial Independence	--	1.745** (0.718)	--	--	--	0.569 (0.605)	--	--	--
Proportional Representation	--	--	0.797** (0.359)	--	--	--	0.331 (0.345)	--	--
Constitutional Review	--	--	--	0.843 (0.862)	--	--	--	0.665 (0.676)	--
Plurality	--	--	--	--	-0.658* (0.368)	--	--	--	-0.095 (0.331)
Constant	5.982*** (0.328)	6.207*** (0.582)	6.667*** (0.359)	6.965*** (0.535)	7.559*** (0.294)	5.611*** (0.597)	5.822*** (0.356)	5.585*** (0.601)	6.001*** (0.430)
Adjusted R-Squared	0.45	0.07	0.03	-0.001	0.01	0.45	0.52	0.45	0.47
Number of Observations	63	67	112	69	116	47	59	47	61

Note: Standard errors are in parentheses. Significance level: \*\*\* at 1%, \*\* at 5%, \* at 10%.

**Table 3: OLS Regressions with Controls**

<b>Formal v. Informal Protection of Private Property</b>				
<b>Dependent Variable: Average Protection Against Risk of Expropriation</b>				
	(1)	(2)	(3)	(4)
Culture	0.174** (0.082)	0.201** (0.088)	0.183** (0.085)	0.187** (0.087)
Judicial Independence	-1.169* (0.667)	-- --	-- --	-- --
Proportional Representation	-- --	0.584 (0.357)	-- --	-- --
Constitutional Review	-- --	-- --	0.414 (0.584)	-- --
Plurality	-- --	-- --	-- --	-0.026 (0.327)
GDP Growth	0.212 (0.135)	0.191 (0.128)	0.132 (0.130)	0.152 (0.131)
Schooling in 1960 (log)	1.580*** (0.349)	1.141*** (0.374)	1.280*** (0.329)	1.350*** (0.334)
Urban Population	-0.007 (0.012)	-0.0005 (0.011)	0.002 (0.011)	-0.003 (0.011)
Gov. Consumption	0.044 (0.033)	0.053* (0.031)	0.035 (0.034)	0.048 (0.033)
Constant	5.476*** (0.887)	3.965*** (0.848)	4.424*** (0.997)	4.524*** (0.914)
Adjusted R-Squared	0.71	0.7	0.69	0.69
Number of Observations	40	42	40	43

Note: Standard errors are in parentheses. Significance level: \*\*\* at 1%, \*\* at 5%, \* at 10%.

**Table 4: First Stage Results**

<b>Formal v. Informal Protection of Private Property</b>											
	<b>Dep. Var: Culture</b>					<b>Dep. Var: Judicial Independence</b>			<b>Dep. Var: Proportional Representation</b>		
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(4)	(1)	(3)	(5)
Latitude	6.707*** (1.192)	7.181*** (1.421)	6.700*** (1.260)	3.310* (1.873)	2.907 (1.797)	--	0.383* (0.191)	0.268 (0.229)	--	0.288 (0.256)	-0.241 (0.411)
English Legal Origin	--	-0.503 (0.608)	-0.051 (0.555)	-1.035 (0.698)	-0.973 (0.656)	0.363*** (0.071)	0.355*** (0.082)	0.194** (0.085)	-0.398*** (0.091)	-0.445*** (0.114)	-0.496*** (0.161)
F-Statistic	31.66	13.93	15.1	6.58	8.54	26.33	10.42	4.43	19.17	9.7	2.57
Adj. R-squared	0.33	0.37	0.33	0.46	0.52	0.28	0.3	0.35	0.14	0.23	0.19
# Observations	62	46	58	40	42	66	46	40	110	58	42

Note: Standard errors are in parentheses. Significance levels: \*\*\* at 1%, \*\* at 5%, \* at 10%. Columns (1) are the univariate regressions; Columns (2) are the bivariate regressions using judicial independence as the formal measure; Columns (3) are the bivariate regressions using proportional representation as the formal measure; Columns (4) are the regressions using judicial independence as the formal measure with the inclusion of control variables; Columns (5) are the regressions using proportional representation as the formal measure with the inclusion of control variables. All exogenous control variables also enter into the first stage but are omitted to save space.

**Table 5: 2 Stage Least Squares Regressions with IV Estimation**

<b>Formal v. Informal Protection of Private Property</b>					
<b>Dependent Variable: Average Protection Against Risk of Expropriation</b>					
	<b>Univariate Results</b>			<b>Bivariate Results</b>	
	<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>	<b>(5)</b>
Culture	0.792*** (0.134)	-- --	-- --	0.707*** (0.139)	0.807*** (0.147)
Judicial Independence	-- --	0.038 (1.395)	-- --	0.875 (1.193)	-- --
Proportional Representation	-- --	-- --	-0.07 (0.953)	-- --	-0.365 (0.887)
Constant	4.698*** (0.595)	7.456 (1.064)	7.180*** (0.602)	4.305*** (1.051)	5.027*** (0.669)
Adjusted R-Squared	0.29	-0.012	0.00	0.33	0.33
Number of Observations	62	66	110	46	58

Note: Standard errors are in parentheses. Significance level: \*\*\* at 1%, \*\* at 5%, \* at 10%.

**Table 6: Main Results - 2SLS Regressions with IV Estimation and Controls**

<b>Formal v. Informal Protection of Private Property</b>		
<b>Dependant Variable: Avg. Protection Against Risk of Expropriation</b>		
	(1)	(2)
Culture	0.692** (0.342)	0.928* (0.518)
Judicial Independence	0.707 (2.684)	-- --
Proportional Representation	-- --	-0.777 (1.542)
GDP Growth	0.020 (0.292)	0.022 (0.263)
Schooling in 1960 (log)	0.349 (0.999)	-0.429 (1.255)
Urban Population	0.010 (0.026)	0.017 (0.023)
Gov. Consumption	-0.042 (0.074)	-0.037 (0.082)
Constant	4.088** (2.014)	4.620** (1.780)
Adjusted R-Squared	0.46	0.18
Number of Observations	40	42

Note: Standard errors are in parentheses. Significance level: \*\*\* at 1%, \*\* at 5%, \* at 10%.

**Table 7: Semi-Reduced Form of Main Results**

<b>Formal v. Informal Protection of Private Property</b>	
<b>Dependent Variable: Average Protection Against Risk of Expropriation</b>	
Culture	0.757* (0.428)
English Legal Origin	0.213 (0.716)
GDP Growth	0.066 (0.226)
Schooling in 1960 (log)	0.374 (0.933)
Urban Population	0.003 (0.019)
Gov. Consumption	-0.027 (0.077)
Constant	4.239*** (1.265)
Adjusted R-Squared	0.31
Number of Observations	43

Note: Standard errors are in parentheses. Significance level: \*\*\* at 1%, \*\* at 5%, \* at 10%.

**Table 8: Alternate Formal and Informal Indices with IV Estimation**

<b>Formal v. Informal Protection of Private Property</b>	
<b>Dependent Variable: Average Protection Against Risk of Expropriation</b>	
Culture Index	0.934* (0.534)
Formal Index	0.065 (0.176)
GDP Growth	-0.032 (0.248)
Schooling in 1960 (log)	-0.451 (1.246)
Urban Population	0.020 (0.023)
Gov. Consumption	-0.064 (0.083)
Constant	4.365** (1.766)
Adjusted R-Squared	0.05
Number of Observations	39

Note: Standard errors are in parentheses. Significance level: \*\*\* at 1%, \*\* at 5%, \* at 10%.