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Institutions and Poverty

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ABSTRACT *This study utilises eight alternative measures of institutions and the instrumental variable method to examine the impacts of institutions on poverty. The estimates show that an economy with a robust system to control corruption, an effective government, and a stable political system will create the conditions to promote economic growth, minimise income distribution conflicts, and reduce poverty. Corruption, ineffective governments, and political instability will not only hurt income levels through market inefficiencies, but also escalate poverty incidence via increased income inequality. The results also imply that the quality of the regulatory system, rule of law, voice and accountability, and expropriation risk are inversely related to poverty but their effect on poverty is via average income rather than income distribution.*

I. Introduction

Differences in technology, human capital, physical capital, and natural resources have traditionally occupied a central role in explaining poverty and economic development. Lately, institutions and their impact on the economy have become focal points in the economic growth literature and several studies have shown that the quality of institutions impact economic growth, which is a necessary condition for poverty reduction (Knack and Keefer, 1995; Beck et al., 2000; Chong and Calderón, 2000a; Henisz, 2000; Kakwani and Pernia, 2000; Acemoglu et al., 2001; Dollar and Kraay, 2002; Easterly and Ross, 2003; Enders and Hoover, 2003; Ravallion and Chen, 2003; Durham, 2004; Glaeser et al., 2004; Rodrik et al., 2004; Klasen, 2008; Tebaldi and Elmslie, 2008a, b). Institutions also affect the distribution of economic growth benefits across various social and political groups in a society, such that despite similar economic performance poverty reduction differs substantially among nations (Lopez, 2004).

This article discusses the theoretical links between institutions and poverty and estimates the impacts of institutions on poverty. This research contributes to the literature on the subject in two respects. First, this paper uses several alternative measures of institutions and a principal component-weighted measure of institutions

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to examine the links between poverty and institutions. Second, we introduce a new instrument (early human capital accumulation) that helps to circumvent the endogeneity problem that plagues the poverty and institutions empirical researches.

The rest of the article is organised as follows: Section II discusses the intrinsic challenges in conducting empirical evaluations on institutions and reviews the theory and conceptual framework linking poverty to institutions. Section III outlines the empirical strategy and presents the data sources. Section IV discusses the empirical results, and Section V summarises the paper's findings.

II. Background

A major difficulty in conducting empirical work with institutions is the inherent imprecision and limitations in the definition and measurement of institutions (Tebaldi and Elmslie, 2008b). For instance, Engerman and Sokoloff argue that institutions should be 'interpreted broadly to encompass not only formal political and legal structures but culture as well' (Engerman and Sokoloff, 1997: 261). North (1990) proposes examining institutions in terms of formal and informal rules and enforcement of procedures.[1] The New Institutional Economic school considers institutions as the 'application and extension of concepts such as transaction costs, property rights, public choice, and ideology' (Furubotn and Richter, 2005: 37).[2] Nevertheless, these general definitions provide little aid in building a workable framework for the measurement and modelling of institutions. Sala-i-Martin (2002) suggests a pragmatic conceptualisation of institutions in terms of a set of attributes related to the ways that a society and its economy works in modern capitalism. He argues that measures of (*the quality of*) *institution* should account for the enforcement of contracts, protection of property rights, perceptions that the judiciary system is predictable and effective, transparency of the public administration, control of corruption, and pro-market regulations. In this study, we closely follow Chong and Calderón (2000b), La Porta et al. (1999 and 2008), Sala-i-Martin (2002), and Hasan et al. (2007) as we utilise subjective measures of institution such as control of corruption, rule of law, political stability, and expropriation risk. Section III provides the sources and definitions for all measures of institution utilised in this study.

From a theoretical standpoint, one can treat institutions as an aggregate index that broadly measures the *attributes* discussed above without accounting for every single nuance related to the concept of *institution*. A large theoretical literature examining poverty and institutions follows this approach. Overall, the literature suggests that institutions (broadly defined) influence poverty via market inefficiencies and misallocation of resources. Rodrik (2000) argues that laws might be created not to serve the interest of social optimum, but rather the private optimum. When authorities use their legal but discretionary power for awarding legitimate or illegitimate rewards to their cronies, this might lead to economic inefficiency (North, 1993). Inequality in the allotment of political power to the educated might create inequity in income distribution, resulting in the uneducated being trapped in poverty (Chong and Calderón, 2000b). Bastiaensen et al. (2005) points out that poverty depends on how well people are represented in the political processes that establish, guarantee, and contest people's entitlements.

Sindzingre (2005) demonstrates that institutions have a vital role in affecting poverty because institutions mediate the impacts of economic transformations (globalisation) and the distribution of economic outcomes. Sen (1981, 1999) argues that the effectiveness of institutions depends primarily upon the capabilities and entitlements of social actors as institutions will determine how efficient and equitably resources are allocated to the poor and how well the needy social actors are able to access their resource's share. Failure of either one of the above could lead to poverty incidence. Grindle (2004) shows that good governance is a pre-requisite for poverty alleviation. The study argues that to achieve good governance it is crucial to have: (i) institutions that establish sets of laws between political and economic agents; (ii) establishments that administer public services; (iii) human capital that staff government bureaucracies; and, (iv) transparency and interface of authorities and the public.

Chong and Gradstein (2007) developed a model and show empirically that institutions and income inequality reinforce each other, so that poor institutions lead to high income inequality. The theoretical explanation for this relationship is that weak institutions let the poor in a disadvantaged situation from not obtaining protection from the judicial system. On the other hand, the rich have a much stronger political influence, which allows them to subvert the institutions in their favour.

Tebaldi and Mohan (2008) develop an institution-augmented Solow model and show that poor institutions decrease the efficacy of technology and reduce both labour and capital productivity. Their model suggests that poor institutions may create poverty traps and the only way to escape is through improvements in institutions. This prediction is consistent with North (1990), who questioned the inability of societies to eradicate an eventual inferior institutional framework that prevents countries to converge as predicted by neoclassical theory. Bowles (2006) also shows that poverty persists because of institutions; however, poverty itself reinforces the institutions that cause and reproduce poverty, leading to poverty traps. More precisely, poor economies face endogenous forces that make it hard to promote and coordinate 'the types of collective action necessary to "tip" a population from an unequal to a more equal set of institutions' (Bowles, 2006: 136). Overall, institution-caused market inefficiency occupies a central role in explaining the links between poor institutions and poverty incidence.[3]

From an empirical standpoint, researchers are constrained by data availability and most of the empirical analyses on institutions use *subjective*[4] measures of institutions including risk of expropriation, corruption, democracy, and constraints on the executive.[5] Furthermore, many of these proxies for institutions are highly correlated (see La Porta et al., 1999; Glaeser et al., 2004) and the choice of the institutional measure for conducting empirical work is, in general, *ad hoc*. The availability of quantitative measures of institutions contributed to the rise of a new front of empirical research with a focal point on the impacts of institutions on average income (see Acemoglu et al., 2001) and economic growth (Mauro, 1995; Oliva and Rivera-Batiz, 2002; Tebaldi and Elmslie, 2008b). However, empirical studies examining the links between poverty and institutions are still very limited.

Chong and Calderón (2000b) offer an empirical analysis of the links between institutions and poverty. Specifically, they estimate a cross-country regression in

which poverty rate is a linear function of institutions,[6] income, income inequality, ethnolinguistic fragmentation, and government spending. The study finds that good institutions reduce the level, rigor and prevalence of poverty. However, the Chong and Calderón (2000b) study is plagued by unaddressed endogeneity issues. In particular, they use the share of government spending on defence and the origin of the legal system as instruments for institutions. The use of the share of government spending on defence as an instrument likely violates the orthogonality conditions as this variable might be directly correlated with poverty itself because (as the authors recognise), 'increases in defence spending are taken as diversion of resources' (Chong and Calderón, 2000b: 132). Besides, other *lagged* variables included in the regression such as income inequality and fertility rate are auto-correlated (and persistent) and likely correlated with the error term, which would bias the estimates.

Hasan et al. (2007) re-examines the links between poverty rates and institutions and tests if governance, political freedom, and easiness of doing business, among other proxies for institutions, impact cross-country poverty rates. A major finding from this study is that, accounting for initial income levels, all measures of *governance* are not correlated with poverty rates. They also find that the measures of 'ease of doing business' are inversely related to poverty rates. The study, however, is also plagued with unaddressed endogeneity. In particular, the authors ignore the inherent endogeneity and use simple OLS to estimate their regressions. In addition, the authors include several measures of institutions into their regressions simultaneously, which may cause severe multicolinearity and inflate the covariance estimates, likely leading to type-I error.

III. An Empirical Model Linking Poverty to Institutions

This study departs from Chong and Calderón (2000b) and Hasan et al. (2007) as it follows the empirical strategy proposed by Hall and Jones (1999) and Acemoglu et al. (2001) to model the relationship between poverty and institutions. More precisely, rather than including several *proximal* covariates[7] into the poverty regression, we start by considering the following model:

$$P_{i,t} = \beta_0 + \beta_1 \hat{T}_{i,t} + v_{i,t} \tag{1}$$

where t represents time, i indexes countries, P denotes poverty rate, $\hat{T}$ measures institutions, and v is a random disturbance.

This specification greatly differs from Chong and Calderón (2000b) and Hasan et al. (2007) as we examine the impact of a *deep* factor – *institution* – on poverty, as well as attempt to avoid the *endogeneity trap* that is inherent when adding several covariates to the model. This specification is consistent with a growing branch of the empirical literature on institutions as it recognises that institution is the *deep* factor impacting poverty and/or economic performance (see Hall and Jones, 1999; Acemoglu et al., 2001), rather than *proximal* causal factors such as educational attainment, investments, and government spending, among other variables typically found in growth-poverty regressions.

Equation 1 is plagued with endogeneity because $\hat{T}$ and P are measured contemporaneously. To circumvent this problem, an instrument for institutions that is correlated with current institutions but uncorrelated with v (hence uncorrelated with

poverty) should be used. The empirical literature on institutions suggests that much of the variation in current institutions can be explained by geography-related variables and historical factors such as colonial status and the origin of the legal system (Hall and Jones, 1999; La Porta et al., 1999; Acemoglu et al., 2001; McArthur and Sachs, 2001; Acemoglu et al., 2005). Figure 1 graphically summarises these ideas and shows the link between colonisation, geography and human capital with current institutions, and the forward-link between current institutions and poverty incidence.

Figure 1 suggests that early institutions were influenced by geography because the colonisation process endogenously acted in response to certain environmental surroundings, thus creating institutions accustomed to the colony's geography (Acemoglu et al., 2001). Denoon (1983) and Acemoglu et al., (2001) argue that geographically disadvantaged settlement colonies were subject to the heavy burden of infectious diseases. This discouraged the creation of institutions aimed at protecting private property. However, colonies with better geographical conditions were able to engage in processes that replicated European-type settlements and social adaptation. This ultimately helped to develop better institutions and paved the way for initiating systems that protected private property rights. Denoon (1983) further contended that many settler colonies' early institutions form the basis of the current modern institutions. In addition, Engerman and Sokoloff (2003) strongly believe that unfavourable geography destructively impacts growth-promoting institutional development. La Porta et al. (1999 and 2008) suggest that a country's current institutions have historical ties with the predetermined origin of its legal system.[8] The rational here is that the origin of legal systems based on colonial legacy distinguishes the role of the current institutions in establishing regulatory systems, defending property rights, and fostering political freedom.

Cervellati et al. (2008) shows that natural resources become less important in determining institutional change and that human capital is the 'main force behind the end of social conflicts and . . . the actual driving force behind institutional change' (Cervellati et al. 2008: 1358, 1379). Furthermore, Bernard Mandeville (early 1700) argues that the development of institutions is an evolutionary process depending on generations of accumulated knowledge, that is, institutions 'are the products, not of inspiration (either human or divine) but of the collective experience of the human race' (Rosenberg, 1963: 187). This implies that current institutions depend on *early* human capital. Hayek argues that education also plays a fundamental role in the evolution of institutions as the development of civilization was determined by the 'capacity to imitate and pass on what [humans] had learned' (Hayek, 1979: 157). In

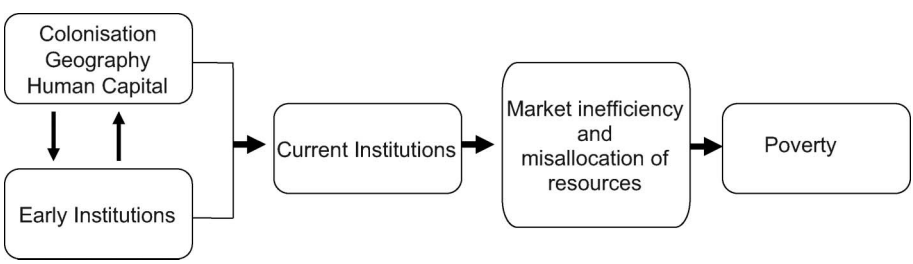

Figure 1. Institutions and poverty.

this line, Glaeser et al. shows that human capital impacts current institutions 'even over a relatively short horizon of 5 years' (Glaeser et al., 2004: 296). Therefore, current institutions are expected to have been influenced by *early* human capital. Consequently, an economy with a relatively large number of educated people would allow it to create the conditions for developing the social arrangements necessary to induce the creation of good institutions.

From an empirical standpoint, the conceptual ideas discussed above suggest that current institutions could be modelled as follows:

$$\hat{T}_i = \delta_1 + \delta_2 H_{0,i} + \delta_3 G_i + \delta_3 R_i + \eta_i \tag{2}$$

where $\hat{T}$ denotes institutions, H_0 denotes the *early* human capital, G is a vector of geographical variables (e.g. mean temperature and coastal area), R is a vector of 'other' exogenous determinants of institutions (colonial status or legal origin), and η is a random disturbance.

Equation 2 is very similar to the empirical specification for institutions found in La Porta et al. (1999), McArthur and Sachs (2001) and Acemoglu et al. (2001). However, this study contributes to the literature by adding early accumulated human capital to the set of variables determining current institutions. This equation states that initial human capital is an important factor in the shaping of early institutions, which ultimately determines current institutions.

The specification above assumes that geography affects poverty only via institutions. However, geography-related variables may also have a direct effect on poverty. We consider this case by re-specifying Equation 1 as follows:

$$P_{i,t} = \beta_0 + \beta_1 \hat{T}_i + \beta_2 G_i + v_{i,t} \tag{3}$$

The concerns discussed above regarding the identification of the model constitute an empirical issue that can be evaluated by testing if the instruments (included in Equation 2) are correlated with the error term of Equation 3. This study follows Alcala and Ciccone (2004) and Acemoglu et al. (2005) as it utilises the Hansen's J statistic (Hansen, 1982) to test whether the variables listed above satisfy the requirements for valid instruments. Additionally, because the model includes several instruments for institutions, our estimates are subject to the *weak instruments* problem. Thus we examine the reliability of our estimates under the assumption of weak instruments by applying the Anderson-Rubin (AR) test, as suggested by Stock et al. (2002).

Data

This study uses poverty data from the World Development Indicators (WDI), which is compiled by the World Bank. We utilise a poverty measure that considers the percentage of the population living on less than PPP $2 a day as the dependent variable. To circumvent missing data, we utilise the average poverty rates from 2000–2004. Table 1 lists the countries included in our analysis. It is also important to notice that the WDI dataset does not report poverty rates (at the PPP $2 threshold) for developed countries, limiting the analysis to developing countries.

The measures of institution are taken from McArthur and Sachs (2001) and Kauffman et al. (2007). Expropriation Risk, a measure of risk of confiscation and

Table 1. Selected variables

Country	Code	Pov	VA	PS	GE	RL	RQ	CC
Argentina	ARG	18.2	0.37	−0.14	0.01	−0.34	−0.13	−0.43
Benin	BEN	73.7	0.38	0.32	−0.32	−0.43	−0.35	−0.55
Burkina Faso	BFA	71.8	−0.36	−0.23	−0.55	−0.59	−0.29	−0.2
Bangladesh	BGD	84	−0.48	−0.94	−0.65	−0.8	−0.73	−0.9
Bulgaria	BGR	9.5	0.46	0.19	−0.23	−0.15	0.42	−0.26
Bolivia	BOL	43.2	0.1	−0.5	−0.45	−0.6	0.21	−0.76
Brazil	BRA	22.1	0.37	−0.16	−0.08	−0.3	0.19	−0.07
Chile	CHL	7.6	0.88	0.71	1.26	1.2	1.36	1.36
China	CHN	42	−1.54	−0.13	0.09	−0.41	−0.25	−0.4
Ivory Coast	CIV	48.8	−1.14	−1.45	−0.79	−1.07	−0.48	−0.72
Cameroon	CMR	50.6	−1.11	−0.7	−0.74	−1.08	−0.61	−1.09
Colombia	COL	20.2	−0.39	−1.87	−0.13	−0.73	0.11	−0.45
Costa Rica	CRI	9.2	1.16	0.87	0.44	0.65	0.71	0.73
Dominican Republic	DOM	14.1	0.18	−0.05	−0.45	−0.46	−0.03	−0.48
Egypt	EGY	43.9	−0.97	−0.61	−0.19	0.05	−0.28	−0.26
Ethiopia	ETH	77.8	−0.98	−1.18	−0.66	−0.52	−0.93	−0.58
Guatemala	GTM	31.1	−0.44	−0.9	−0.61	−0.91	0.1	−0.81
Honduras	HND	39.8	−0.08	−0.38	−0.65	−0.83	−0.18	−0.79
Haiti	HTI	78	−1.06	−1.29	−1.46	−1.53	−1.15	−1.32
Hungary	HUN	2	1.09	0.81	0.72	0.73	1	0.64
Indonesia	IDN	53.9	−0.69	−1.54	−0.41	−0.86	−0.35	−0.94
Jamaica	JAM	15.1	0.56	−0.11	−0.18	−0.42	0.33	−0.43
Jordan	JOR	7	−0.49	−0.19	0.27	0.37	0.27	0.17
Cambodia	KHM	89.8	−0.76	−0.75	−0.77	−0.98	−0.41	−1.01
Laos	LAO	74.1	−1.53	−0.12	−0.69	−1.14	−1.26	−0.96
Morocco	MAR	14	−0.6	−0.3	−0	0.09	−0	0.02
Madagascar	MDG	88	0.1	0.05	−0.5	−0.5	−0.2	−0.2
Mexico	MEX	19	0.1	−0.3	0.1	−0.4	0.48	−0.3
Mali	MLI	72	0.31	0.06	−0.5	−0.5	−0.2	−0.4
Mozambique	MOZ	74	−0.2	−0.1	−0.5	−0.8	−0.5	−0.7
Mauritania	MRT	63	−0.9	−0	−0.1	−0.5	−0.3	−0.2
Malawi	MWI	63	−0.4	−0.1	−0.7	−0.4	−0.3	−0.8
Nigeria	NGA	92	−0.9	−1.6	−1.1	−1.4	−1	−1.2
Nicaragua	NIC	80	−0	−0.3	−0.7	−0.8	−0.1	−0.6
Pakistan	PAK	70	−1.2	−1.4	−0.6	−0.7	−0.7	−0.9
Panama	PAN	18	0.51	0.18	−0.1	−0.1	0.56	−0.3
Peru	PER	34	−0.2	−0.9	−0.3	−0.6	0.34	−0.3
Philippines	PHL	45	0.16	−0.8	0	−0.5	0.16	−0.5
Poland	POL	2	1.05	0.47	0.62	0.46	0.64	0.35
Paraguay	PRY	31	−0.4	−0.8	−1.1	−1	−0.4	−1.1
Romania	ROM	17	0.3	0.12	−0.4	−0.3	−0.1	−0.3
Rwanda	RWA	88	−1.4	−1.5	−0.8	−0.9	−0.8	−0.4
El Salvador	SLV	40	0.14	−0.1	−0.3	−0.5	0.5	−0.4
Thailand	THA	30	0.14	−0.1	0.3	0.19	0.34	−0.3
Tunisia	TUN	6.6	−0.9	0.21	0.64	0.21	0.14	0.27
Turkey	TUR	15	−0.4	−1	−0	−0	0.26	−0.2
Tanzania	TZA	90	−0.4	−0.3	−0.6	−0.5	−0.3	−0.9
Uruguay	URY	4.8	0.89	0.64	0.56	0.46	0.59	0.64
Venezuela	VEN	34	−0.3	−1	−0.9	−1	−0.7	−0.9

(*continued*)

Table 1. (*Continued*)

Country	Code	Pov	VA	PS	GE	RL	RQ	CC
South Africa	ZAF	34	0.79	−0.5	0.56	0.17	0.38	0.47
Senegal	SEN	56.2	−0.04	−0.54	−0.12	−0.26	−0.28	−0.38
Sri Lanka	LKA	41.6	−0.24	−1.43	−0.27	0.01	0.22	−0.23
Zambia	ZMB	91	−0.3	−0.3	−0.8	−0.6	−0.3	−0.8

Notes: Poverty percentage of the population living on less than PPP $2 a day (Pov); Voice and accountability (VA); Political stability (PS); Government effectiveness (GE); Rule of law (RL); Regulatory quality (RQ); and Control of corruption (CC).
Source: World Development Indicators; Kauffman et al. (2007).

forced nationalisation, is used to conform to other studies in the growth and institutions literature. It is calculated as the average value for each country over the period 1985–1995 and ranges between 0–10. Higher scores represent better institutions, thus lowering risk of confiscation or forced nationalisation. This variable is originally obtained from Political Risk Services, and taken as reported in McArthur and Sachs (2001). Kauffman et al. (2007) provides six other measures of institutions: Control of Corruption, Regulatory Quality, Rule of Law, Government Effectiveness, Voice and Accountability, Political Stability and Absence of Violence.[9] These variables range from −2.5 to 2.5, with higher scores indicating better institutions. This study utilises an average index through the time periods of 1996, 1998, 2000, 2002, 2004 and 2005.

The geographic variables are taken from McArthur and Sachs (2001) and La Porta et al. (1999). We use *coastal land*, which quantifies the proportion of land area within 100 km of the coast, and *latitude*, which measures the absolute value of the latitude and is scaled to take values between 0 and 1. The colonial legacy is taken from La Porta et al. (1999) and measured by a set of dummy variables that identify the origin of a country's legal system. These dummy variables identify if the origin of the legal system is English, French, German, Scandinavian or Socialist. We also take Ethnolinguistic fragmentation from La Porta et al. (1999).

The idea that the development of institutions is an evolutionary process depending on previously accumulated knowledge is accounted for in the empirical model by including a variable that measures human capital accumulation in the early twentieth century. Data on students enrolled in primary and secondary schools in early twentieth century are from Mitchell (2003a, b, c). This variable is calculated as the number of students in school per square kilometre in 1920.[10] The country area is from the United Nations and based upon the current geopolitical arrangement.

IV. Empirical Results

Figure 2 shows that poverty rates are negatively correlated with institutions as countries with better institutions have lower poverty rates. However, the simple correlations shown in these figures do not allow one to infer whether better institutions actually reduce poverty rates. It could be the case that poverty creates economic and social conditions that prevent the development of good institutions,

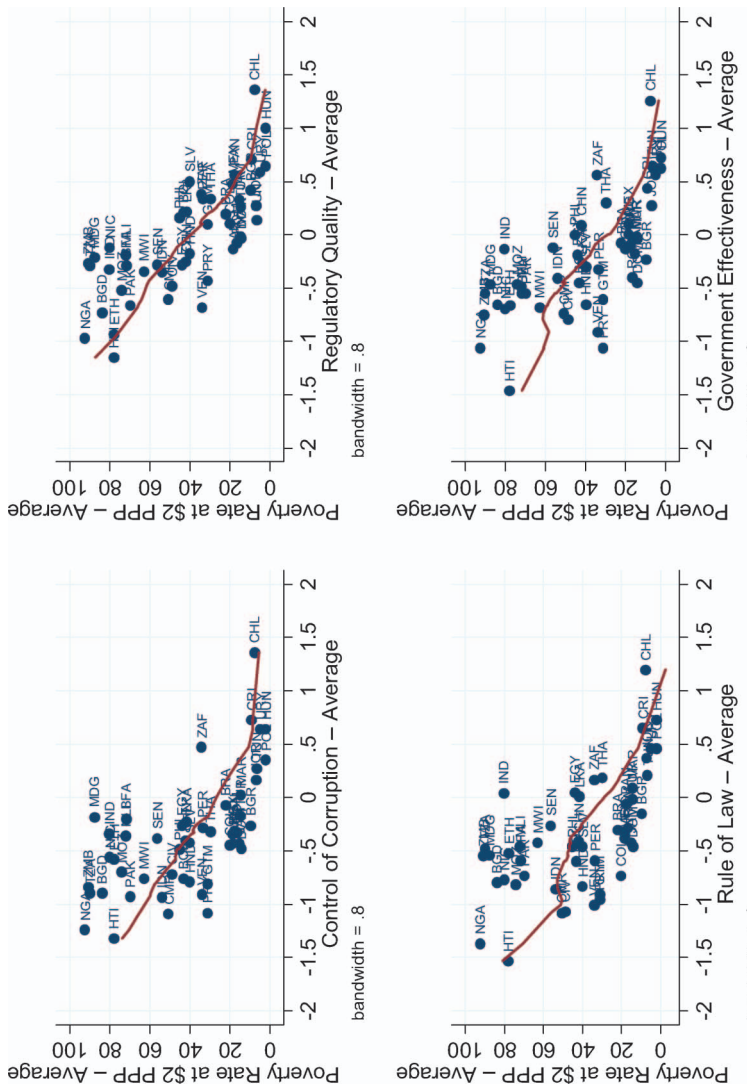

Figure 2. Poverty and quality of institutions. *Source:* Authors' compilation.

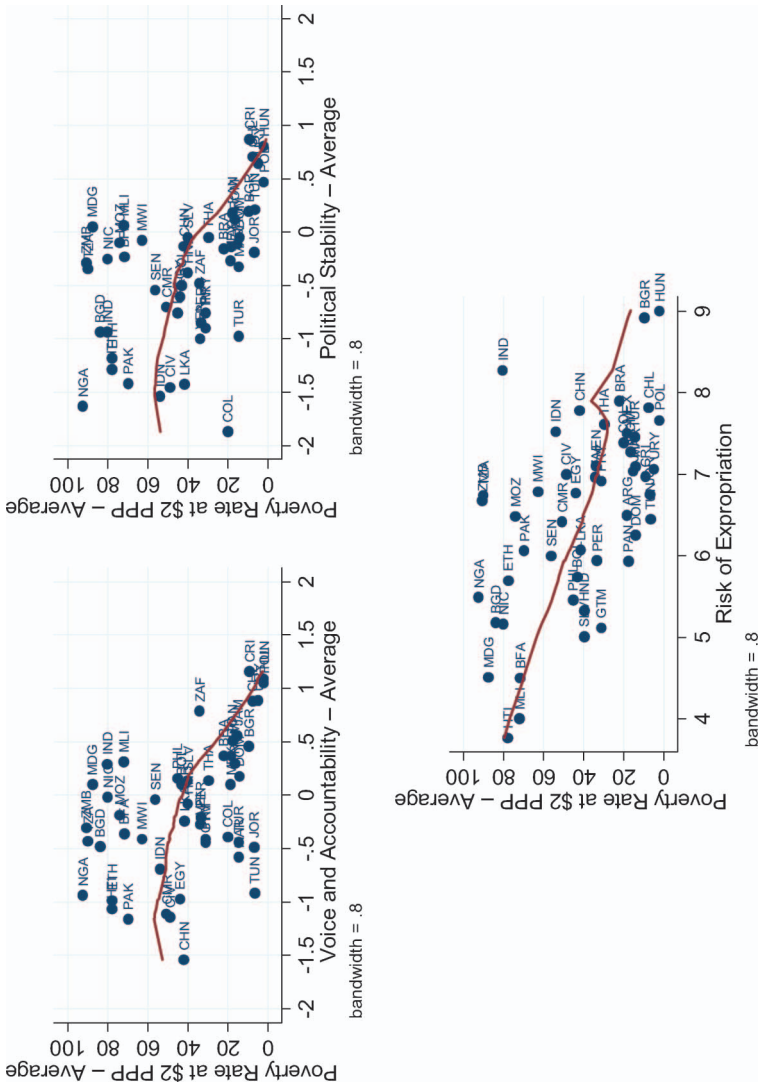

Figure 2. (*Continued*).

rather than the other way around. We address the eventual endogeneity issue by estimating a set of regressions that utilises the instrumental variable method (IV) with robust standard errors. Table 2 reports the first-stage regression (Equation 2), and Table 3 shows the second-stage estimates of Equation 3.

The results reported in Table 2 indicate that historical levels of human capital, geography, and the origin of the legal system are important determinants of current institutions and explain approximately 60 per cent of the variation in the alternative measures of institutions. Specifically, in all regressions, controlling for geographically-related variables and legal origin, human capital density in the early twentieth century have a positive and statistically significant influence on all measures of institutions (except Political Stability). This indicates that countries that accumulated relatively more human capital in the early twentieth century turned out to have better *current* institutions. In addition, as expected, socialist legal origin is associated with relatively poor institutions. The regressions also suggest that the Scandinavian legal origin over performs the common legal system (British). Overall, the French, German and British legal systems perform comparably in terms of affects on current institutions. As pointed out earlier in Section III, La Porta et al. (1999), however, found that countries with French or socialist laws show signs of inferior institutional structure. Further, controlling for other covariates, we find that the coefficient on ethnolinguistic fragmentation is not significant, which suggests that this variable does not impact current institutions. This result contradicts La Porta et al. (1999), where they found that ethnolinguistically heterogeneous countries show signs of mediocre institutional performance.

Table 3 reports the second-stage regressions of institutions on poverty and allows for examination of the impacts of institutions on poverty rates. Columns 1–7 of Table 3 show that accounting for endogeneity and controlling for geography, institutions are negatively related to poverty rates. More precisely, developing countries with better institutions – measured by control of corruption, regulatory quality, rule of law, government effectiveness, voice and accountability and political stability – have lower poverty rates. These results are consistent with Chong and Calderón (2000b) who find that institutions reduce the level, severity, and prevalence of poverty. The results are also consistent with the theoretical literature discussed in section II. However, our results contradict Hasan et al. (2007).

Does geography have a direct effect on poverty? Table 3 shows mixed results. Columns 1–4 of Table 3 show that geography (absolute latitude and coastal area) has no direct effect on poverty rates. This result suggests that all of the impacts of geography on poverty are passed on through the effects of geography on institutions. However, column 5 of Table 3 suggests that geography might still play a role when we control for voice and accountability.

Columns 6 and 7 of Table 3 show that the coefficient on political stability is not significant while the coefficient on expropriation risk is only marginally significant. Two possible explanations may support these results. First, political stability may be obtained through political systems that do not promote the set of conditions needed to generate economic growth and/or distribute the benefits of economic growth to all groups in society. In particular, some stable political systems are designed to protect the elites or their political cronies in detriment to the needy population who might be deprived of basic needs. With respect to the coefficient on expropriation risk, one

Table 2. The determinants of current institutions

Explanatory Variables	Dependent Variable						
	Control of corruption	Regulatory quality	Rule of law	Government effectiveness	Voice and accountability	Political stability	Expropriation risk
Coefficients							
Legal origin – socialist[a]	−0.898***	−0.492	−0.785***	−0.709**	−0.613*	0.254	−0.463
	(0.26)	(0.30)	(0.25)	(0.29)	(0.32)	(0.27)	(0.53)
Legal origin – French[a]	−0.284	−0.0766	−0.276	−0.284	−0.0130	0.0615	−0.286
	(0.20)	(0.20)	(0.19)	(0.20)	(0.16)	(0.20)	(0.36)
Legal origin – German[a]	0.404	0.224	0.489*	0.381	0.299	0.679**	0.769**
	(0.36)	(0.25)	(0.27)	(0.30)	(0.21)	(0.28)	(0.39)
Legal origin – Scandinavian[a]	0.741**	0.422	0.452*	0.430	0.496*	0.621**	0.622
	(0.31)	(0.30)	(0.26)	(0.28)	(0.28)	(0.28)	(0.44)
Human capital density in the early 20th century	0.0798**	0.124***	0.0969***	0.0912**	0.142***	0.0446	0.282***
	(0.037)	(0.043)	(0.035)	(0.040)	(0.034)	(0.035)	(0.071)
Ethnolinguistic fragmentation	−0.167	0.0123	−0.000847	0.0435	0.269	0.0653	0.495
	(0.28)	(0.32)	(0.29)	(0.30)	(0.29)	(0.34)	(0.73)
Absolute latitude	2.794***	1.598***	2.762***	2.794***	1.948***	2.225***	3.908***
	(0.62)	(0.61)	(0.52)	(0.61)	(0.56)	(0.51)	(0.99)
Prop. land within 100 km of the sea coast	0.276	0.354	0.303	0.378	0.273	0.568**	−0.293
	(0.26)	(0.25)	(0.24)	(0.25)	(0.24)	(0.26)	(0.52)
Constant	−0.519	−0.298	−0.611**	−0.565*	−0.564*	−1.180***	6.359***
	(0.33)	(0.35)	(0.31)	(0.33)	(0.32)	(0.33)	(0.74)
Observations	107	107	107	107	107	107	97
R-squared	0.65	0.54	0.67	0.63	0.58	0.48	0.56

Notes: ***, **, and * denotes significance at the 1 per cent, 5 per cent, and 10 per cent, respectively. Standard errors are given in parentheses.
[a]Common (British) Law is the omitted category.

Table 3. IV regressions of poverty rates (PPP $2) on institutions and geography

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Control of corruption	−54.48**						
	[−2.50]						
Regulatory quality		−74.70**					
		[−2.15]					
Rule of law			−45.17**				
			[−2.02]				
Government effectiveness				−76.15*			
				[−1.70]			
Voice and accountability					−23.34**		
					[−2.21]		
Political stability						3.394	
						[0.19]	
Expropriation risk							−8.001
							[−1.28]
Prop. land within 100 km of the sea coast	−10.49	15.49	−12.49	−4.888	−11.51	−28.04***	−26.98***
	[−0.88]	[0.76]	[−1.15]	[−0.29]	[−1.09]	[−2.76]	[−3.36]
Absolute latitude	−14.47	7.454	−21.01	36.73	−81.35***	−131.4***	−86.92***
	[−0.28]	[0.13]	[−0.39]	[0.36]	[−2.69]	[−2.71]	[−2.66]
Constant	29.12	31.29	34.52	16.89	61.00***	83.66***	121.9***
	[1.23]	[1.49]	[1.41]	[0.43]	[5.08]	[4.37]	[3.47]
Observations	53	53	53	53	53	53	48
Uncentered R-squared	0.78	0.77	0.83	0.72	0.83	0.81	0.85
Hansen J-statistic overidentification test	2.954	2.500	6.351	4.579	7.610	8.200	9.723
Hansen J – p-value	0.399	0.475	0.0957	0.205	0.0548	0.0421	0.0211
Anderson-Rubin (AR) test	5.792	3.121	3.314	2.224	4.872	5.699	7.512
p-value AR test	0.215	0.538	0.507	0.695	0.301	0.223	0.111

Notes: ***, **, and * denotes significance at the 1 per cent, 5 per cent, and 10 per cent, respectively. t-ratios are given in parentheses. The dependent variable is the average poverty rates between 1999–2004; all regressions were run with standard errors robust to arbitrary heteroskedasticity. All first-stage regressions are estimated including the following set of variables: ln human capital density in the early twentieth century, dummies for the origin of the legal system, absolute latitude, proportion of land within 100 km of the seacoast, and ethnolinguistic fragmentation

could argue that protecting property rights only is not sufficient to put in place the forces and conditions needed to eliminate the deep-rooted conditions that create and replicate poverty in developing countries. In addition, regardless of political stability and protection of property rights, it might be the case that geographical (coastal land and latitude are significant in models 6 and 7) conditions of a society determine the yield and productivity of the agricultural sector, which a majority of poor rely on. Overall, these findings might actually help to identify which set of institutions is more conducive to reducing poverty rates because it suggests that control of corruption, regulatory quality, rule of law, government effectiveness, and voice and accountability do impact and reduce poverty rates. Conversely, political stability and expropriation risk do not seem to affect poverty in developing countries. A comparison of the coefficients reported in Table 3 also suggests that control of corruption, regulatory quality, rule of law, and government effectiveness have much stronger effects on poverty rates than voice and accountability.

A second possible explanation for the results discussed above is that the regressions on risk of expropriation and political stability might violate some of the statistical conditions needed to estimate the model. For instance, if the model is not properly identified, then the estimates will be biased and inconsistent. To examine the robustness of the estimates and alleviate concerns on the validity of the instruments, this study follows Acemoglu et al. (2005) and Alcala and Ciccone (2004) and utilises the Hansen's J statistic (Hansen, 1982) to evaluate the overidentifying restrictions in the IV regressions. The overidentification tests suggest that the correlation between the instruments and the error term in models 1–5 of Table 3 is not significant. However, the overidentification test does cast some doubt that the model for voice and accountability, expropriation risk, and political stability (columns 5–7 of Table 3) are correctly identified; so those results should be interpreted with extra caution. In addition, as suggested by Stock et al. (2002), we apply

Table 4. IV regressions of poverty rates using principal component-weighted institutions

Variables	Coefficients
Weighted institutions	−46.30* [−1.88]
Prop. land within 100 km of the sea coast	18.38 [0.70]
Absolute latitude	109.3 [0.88]
Constant	−19.48 [−0.37]
Observations	53
Uncentred R-squared	0.44
Hansen J-statistic overidentification test	0.772
Hansen J – p-value	0.856
Anderson-Rubin (AR) test	2.307
p-value AR test	0.679

Notes: ***p < 0.01, **p < 0.05, *p < 0.1; t-ratios are given in parentheses. The dependent variable is the average poverty rates between 1999–2004; all regressions were run with standard errors robust to arbitrary heteroskedasticity. All first-stage regressions are estimated including the following set of variables: ln human capital density in the early twentieth century, dummies for the origin of the legal system, absolute latitude, proportion of land within 100 km of the coast, and ethnolinguistic fragmentation.

Table 5. IV regressions of poverty rates (PPP $2) on institutions and initial GDP per capita

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Log of average income	−21.92***	−27.56***	−25.50***	−22.88***	−31.79***	−27.22***	−30.28***	−21.56***
	[−5.67]	[−3.75]	[−7.20]	[−5.84]	[−7.13]	[−13.5]	[−9.44]	[−4.52]
Control of corruption	−23.04**							
	[−2.32]							
Regulatory quality		−5.595						
		[−0.33]						
Rule of law			−12.22					
			[−1.34]					
Government effectiveness				−18.18*				
				[−1.69]				
Voice and accountability					4.298			
					[0.51]			
Political stability						−11.50**		
						[−2.19]		
Expropriation risk							0.458	
							[0.15]	
Weighted institutions								−9.356*
								[−1.83]
Constant	212.1***	266.4***	245.2***	224.0***	301.9***	259.3***	285.7***	211.5***
	[6.11]	[4.34]	[7.55]	[6.46]	[7.89]	[14.6]	[16.9]	[5.02]
Observations	53	53	53	53	53	53	48	53
Uncentered R-squared	0.78	0.82	0.83	0.81	0.78	0.81	0.77	0.81
Hansen J-statistic	2.216	7.541	4.050	3.323	6.242	3.120	6.618	3.978
p-value	0.819	0.183	0.542	0.650	0.283	0.682	0.251	0.553
Anderson-Rubin (AR) test	7.478	1.706	10.13	10.60	7.927	11.48	11.44	5.682
p-value AR test	0.279	0.945	0.119	0.102	0.244	0.0746	0.0757	0.460

Notes: ***, **, and * denotes significance at the 1 per cent, 5 per cent, and 10 per cent, respectively. t-ratios are given in parentheses. The dependent variable is the average poverty rates between 1999–2004; all regressions were run with standard errors robust to arbitrary heteroskedasticity. All first-stage regressions are estimated including the following set of variables: ln human capital density in the early twentieth century, dummies for the origin of the legal system, absolute latitude, proportion of land within 100 km of the coast, and ethnolinguistic fragmentation.

the Anderson-Rubin (AR) test to check reliability of the estimates when weak instruments are present. The AR test results are reported at the bottom of Table 3. The test suggests that the estimates are robust under the assumption of weak instruments. Overall, the results of the AR and J-statistics tests provide evidence that the regressions for control of corruption, regulatory quality, rule of law, and government effectiveness are reliable.[11]

The Principal Component Analysis (PCA) is also used to extract the first eigenvalue of Kaufman et al.'s (2007) six alternative measures of institutions.[12] PCA produces better weights compared to taking a simple average of these measures of institutions as it entails the calculation of the eigenvalue decomposition of a data covariance matrix after centring the data on average for each attribute of institutions. The analysis transforms multidimensional data to a new synchronized variable (weighted institutions), such that the greatest variance moves to a point on the first coordinate. The results using the first eigenvalue as a proxy for institution is presented in Table 4. The estimates indicate that the coefficients on weighted institutions are negative and statistically significant at the 1 per cent level, which substantiates previous results.

A major issue with the findings in Table 3 is that it does not distinguish whether institutions are influencing average income, which ultimately determines poverty, or the distribution of income. To address this issue, we estimate a set of regressions that includes average income as an explanatory variable into Equation 3. Table 5 reports the results and shows that not all types of institutions impact poverty in the same way. More precisely, controlling for average income, we find that the coefficients on regulatory quality, rule of law, voice and accountability, and risk of expropriation are not significant. These results combined with findings reported in Table 3 suggest that the affects of regulatory quality and rule of law on poverty are felt through average income rather than via income distribution. In other words, economies with a poor regulatory system or lack of law enforcement will experience low levels of income, which ultimately increase poverty incidence. However, these institutions do not increase poverty incidence via income distribution. On the other hand, models 1, 4, 6 and 8 of Table 5 show that controlling for average income, the coefficients on corruption, government effectiveness, political stability, and weighted institutions are statistically significant at the 5 per cent level. This finding implies that corruption, government effectiveness, and political stability also influence poverty incidence via income distribution. This result is consistent with a large theoretical literature that examines the effects of institutions on income distribution.

V. Conclusion

This study demonstrates that alternative measures of institutions are negatively related with poverty rates and explains a significant portion of the variation in poverty across developing countries. The results provide evidence that some institutions are more conducive in affecting poverty than others and that institutions impact poverty via different channels. An economy with a robust system to control corruption, an effective government, and with a stable political system will create the necessary conditions to promote economic growth, minimise income distribution conflicts, and reduce poverty in developing countries. However, corruption,

ineffective governments, and political instability will not only hurt income levels through market inefficiencies, but also escalate poverty incidence via increased income inequality. The results also suggest that the quality of the regulatory system, rule of law, and voice and accountability are inversely related to poverty, but their effects on poverty are via average income rather than income distribution.

This article suggests that a broad strategy that includes improvements in institutions is needed to fight poverty. In particular, transfer and/or aid programmes will have limited and short-term effects on poverty if the fundamental poverty-causing factors – institutions – were not addressed as part of the strategy to eradicate poverty. Hence, in terms of policy implications, this paper suggests that policies aimed at reducing poverty should first consider improving institutions in developing countries as a pre-requisite for economic development and poverty eradication.

Notes

1. See also North and Thomas (1973).
2. Furubotn and Richter (2005: 560) define *an institution* as 'a set of formal or informal rules, including their enforcement arrangements (the ''rules of the game''), whose objective is to steer individual behavior in a particular direction'.
3. Hasan et al. (2007) and Breton (2004) provide a more complete discussion on the links between *weak* institutions and poverty.
4. The subjective measures of institutions are mainly assembled by private companies such as the International Country Risk Guide (ICRG), Transparency International (TI), Business Environmental Risk Intelligence (BERI) and based on an assessment of perception. These companies conduct perception surveys of 'economic agents who make growth-relevant decisions' (Grogan and Moers, 2001: 326). Glaeser et al. (2004) criticise the use of subjective institutional measures in growth related empirical analysis, arguing that such variables 'measure outcomes, not some permanent characteristics' (Glaeser et al., 2004: 8) of a society's institutions. Conversely, it has been argued that these institutional measures provide relevant information about growth-promoting institutional arrangements, and that the mere existence of organisations such as the ICRG and BERI and the considerable price that entrepreneurs are willing to pay for this kind of data provide evidence on the accuracy of such institutional measures (Mauro, 1995; Grogan and Moers, 2001).
5. For discussion and definition of these variables see Knack and Keefer (1995), La Porta et al. (1999), and Acemoglu et al. (2001).
6. Chong and Calderón (2000b) use five alternative measures of institutions including Repudiation of contracts, expropriation risk, corruption, Law and Order Tradition, and bureaucratic quality.
7. The *proximal* covariates are variables considered important to explain poverty such as income inequality, education, fertility rates, and so forth. However, these variables are determined by some other *deep* institutional factors. For more details on the *deep* variable/parameter refer to Hall and Jones (1999) and Acemoglu et al. (2001).
8. The authors divide the legal systems into: British common law, French civil law, German civil law, Scandinavian civil law and socialist (Soviet Union) law.
9. Kauffman et al. (2007) state that:
   i) *Regulatory Quality* 'includes measures of the incidence of market-unfriendly policies such as price controls or inadequate bank supervision, as well as perceptions of the burdens imposed by excessive regulation in areas such as foreign trade and business development'.
   ii) *Rule of Law* includes 'several indicators which measure the extent to which agents have confidence in and abide by the rules of society. These include perceptions of the incidence of crime, the effectiveness and predictability of the judiciary and the enforceability of contracts. Together, these indicators measure the success of a society in developing an environment in which fair and predictable rules form the basis for economic and social interactions and importantly, the extent to which property rights are protected'.

iii) *Control of Corruption* 'measures perceptions of corruption, conventionally defined as the exercise of public power for private gain .... The presence of corruption is often a manifestation of a lack of respect of both the corrupter (typically a private citizen or firm) and the corrupted (typically a public official or politician) for the rules which govern their interactions and hence represents a failure of governance according to our definition'.

iv) *Voice and Accountability* measures 'the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.'

v) *Political Stability and Absence of Violence* measure 'perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including domestic violence and terrorism.'

vi) *Government Effectiveness* measures 'the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies'.

10. The measure of *early human capital* used in this paper is *ad hoc* and constructed based on data availability. In particular, Mitchell (2003a, b, c) provides data on students enrolled in primary and secondary schools back to the eighteenth century for just a few countries. A representative cross-country sample can be only collected around 1920. Mitchell reports the number of children enrolled in primary and secondary schools for 68 countries in 1920 and for 52 countries around the 1930s. Therefore, combining the actual 1920 data with estimates of the number of students enrolled in 1920 based upon the 1930/1940 numbers produce a sample comprised of 120 countries. We use the geometric growth rates in the estimations. For instance, if a country has data on enrolment between 1930–1940, the geometric growth rate between these periods is utilised to estimate enrolment back to 1920. Albeit imperfect, this variable fits the idea that historical human capital accumulation is important in the shaping of current institutions.
11. We also examine the reliability of the results above and the existence of an eventual sample bias by estimating regressions of poverty rates using the national poverty thresholds data from the CIA world factbook. The CIA poverty data combined with other data generate a sample comprised of 89 countries (compared to the PPP $2 a day measure of 53 countries in Table 3). The results corroborate the findings above, suggesting that an eventual sample bias, if it exists, is not significant. One interesting point to note is that expropriation risk and political stability turn out to be significant at the one and ten per cent levels, respectively. The overidentification test for expropriation risk and political stability becomes significant too, indicating that the models are correctly identified. However, the AR test casts some doubt on the reliability of the estimates due to the presence of weak instruments. The results using the CIA dataset is available upon request.
12. Aixalá and Fabro (2007) augmented the Solow model with country specific institutional quality (IQ) using an average measure of the same six Kaufman's Worldwide Governance Indicators.

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