



# **Do the Models of Institutional Quality Differ According to the Income Level of the Countries? The Case of the Low-Income Countries\***

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## **Summary**

This paper contributes to the debate about which factors determine the institutional quality of countries. It uses explanatory economic, socio-political and cultural variables for three sub-samples of countries with different income level. The results validate the hypothesis that establishes there is not an only valid model of institutional quality for all countries. Moreover, the limited explanatory capacity of the model for the low-income level sub-sample of countries has motivated the incorporation of other variables related to colonial origins, geographical location or life expectancy. The results validate the theoretical arguments that propose the use of these variables.

*Keywords:* Institutional quality, Aggregate Governance Indicators.

*JEL classification:* O10, O17, O50.

## **1. Introduction and theoretical framework**

The literature on economic growth has incorporated neo-institutionalist theories because the more traditional arguments, based on factor accumulation, are unsatisfactory for explaining the divergences in the per capita income of countries over time. The neo-institutional approach, led by Olson (1982, 1996) and North (1990), has been integrated into economic growth models. In this case, the parameter of efficiency or technological progress is no longer constant across countries but is dependent, among other things, on the specific institutional differences of each country.

For that reason, one of the most promising research lines in the last decade is that which analyzes the determinants of the institutional quality of countries, because this quality has

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been found to be a fundamental element for economic growth. The consensus achieved in the existing research (Alesina and Perotti, 1996; Barro, 1999; Straub, 2000; Kaufmann and Kraay, 2002; Islam and Montenegro, 2002; Borner *et al.*, 2004; Serra, 2004; Acemoglu *et al.*, 2008; Aixalá and Fabro, 2008; Álvarez and Caballero, 2008; Busse and Gröning, 2009; Hansson, 2009; Alonso and Garcimartín, 2011, 2013) is still weak. This fact leads us to propose the following hypothesis: the factors that determine institutional quality may not be the same in all countries; they may vary according to their income levels.

To test this hypothesis, this paper estimates a model that jointly introduces the explanatory variables most frequently proposed in the different theories that explain institutional quality. We use an aggregate indicator of institutional quality and an estimation method that corrects the problems of endogeneity. The model is tested for a broad sample of 156 countries and, later, for various sub-samples (high-, medium- and low-income countries). The results validate the starting hypothesis as well as showing the necessity of incorporating new variables in the case of the poor countries, because of the low explanatory power of the initial model when it is applied to this sample of countries, probably because differences in the effect of some explanatory variables appears as countries get richer. Thus, the determinants of institutional quality have differential effects based on the countries level of income.

With respect to the theories that explain institutional performance (La Porta *et al.*, 1999), they can be grouped into economic, cultural and sociopolitical. The first propose *per capita* income as the fundamental determinant of institutional quality; the cultural theories emphasise religion while the sociopolitical theories highlight the degree of ethno-linguistic heterogeneity and the legal origin of the countries. As well as these variables, trade openness has received a great deal of attention in recent years (Frankel and Romer, 1999; Leite and Weidmann, 2002).

To test the starting hypothesis about the impossibility of offering an explanation of the determinants of institutional quality that is valid for all countries, as well as the validity of the above-mentioned theories, the paper is structured as follows. Section 2 presents the empirical model and the data used. Section 3 contains the results for the whole sample of countries and by levels of income. Section 4 presents a model of institutional quality for poor countries that introduces additional variables in order to obtain greater explanatory power. Finally, Section 5 presents the most relevant conclusions.

## 2. Empirical model and data used

The model to be estimated, in accordance with what was outlined in the previous section, is the following:

$$\begin{aligned}
 IQ = & \alpha + \beta_1 * ethnoling. + \beta_2 * socialist + \beta_3 * common\ law + \beta_4 * german + \\
 & + \beta_5 * escandinav. + \beta_6 * protestants + \beta_7 * muslim + \beta_8 * other\ religions + \\
 & + \beta_9 * inc_{pc} + \beta_{10} * openness + \mu
 \end{aligned}
 \tag{1}$$

where  $IQ$  is the institutional quality; *ethnoling.* is the index of ethno-linguistic fractionalization; *socialist*, *common law*, *german* and *escandinav.* are dummies that indicate the legal origin of the countries (the omitted dummy has been *french*); *protestants* and *muslim* indicate the percentage of the population that belong to the Protestant and Muslim religions (the omitted variable has been *catholics*) and other *religions* is the percentage of the population than belong to any other religion<sup>1</sup>;  $inc_{pc}$  is the *per capita* GDP; finally *openness* is the average of imports and exports as a percentage of GDP.

In our paper, following Easterly and Levine (2003) and the IMF (2003), we define a global institutional quality index equal to the average of the six “Aggregate Governance Indicators” of the Worldwide Governance Indicators project of the World Bank<sup>2</sup>: “Voice and Accountability”, “Political Stability and Absence of Violence”, “Government Effectiveness”, “Regulatory Burden”, “Rule of Law” and “Control of Corruption”, and we use the average for the years 1996-2011.

As for the independent variables, for ethno-linguistic fractionalization, legal origin and religion, we have used the data of La Porta *et al.* (1999), completed in some cases with those of the *CIA World Factbook* (2012). For the variables *per capita* GDP in terms of PPP, and trade as a percentage of the GDP, we have used the database *World Development Indicators* (2012).

### 3. Estimation of the model

In this section we present the results obtained from estimating the model described above (Table 1), both for the whole sample and for the three sub-samples of countries in function of the income levels<sup>3</sup>. These results show that, in the case of the whole sample of countries, the following variables are significant, with the expected signs and robust to the method of estimation (OLS and TSLS): German and Scandinavian legal origin, Muslim religion, *per capita* income and trade openness. Thus, *common law* and *socialist* show no significant differential effect with respect to French legal origin, while German and Scandinavian legal origins are superior. Furthermore, the countries with a high percentage of Muslims show worse institutional frameworks than those that are predominantly Catholic, while *other religions* do not show any significant differential effect. Lastly, economic growth and trade openness would be accompanied by institutional improvements. The high explanatory power of the model ( $R^2=0,77$ ) should be highlighted<sup>4</sup>.

With respect to the sub-samples, the following variables appear as significant for institutional quality, with the expected signs and robust to the estimation method: for the high-income countries, *common law* and German legal origin, Muslim and other religions, and the *per capita* income; for the medium-income countries, Muslim religion and income. Finally, for the low-income countries, *socialist* legal origin, *other religions* and trade openness.

**Table 1**  
**TOTAL SAMPLES AND SUB-SAMPLES OF COUNTRIES<sup>a</sup> (GENERAL MODEL)**

Independent variable: IQ	Total sample		High-income countries		Medium-income countries		Low-income countries	
	(1) OLS	(1) TSLS	(2) OLS	(2) TSLS	(3) OLS ar(1)	(3) TSLS ar(1)	(4) OLS	(4) TSLS
<b>c</b>	-4.7906*** (-12.43)	-4.5372*** (-11.57)	-3.5809* (-2.04)	-3.5195* (-1.92)	-6.9357*** (-6.11)	-5.5582*** (-4.91)	-1.9535** (-2.31)	-1.4545 (-1.56)
<b>ethnoling.</b>	-0.1354 (-0.99)	-0.1701 (-1.24)	0.4056 (0.87)	0.4144 (0.86)	-0.1012 (-0.47)	-0.1224 (-0.55)	-0.1850 (-0.99)	-0.2233 (-1.12)
<b>socialist</b>	-0.1581 (-1.46)	-0.1402 (-1.25)	-	-	-0.0557 (-0.31)	-0.0041 (-0.019)	-0.3199* (-1.78)	-0.3698* (-1.80)
<b>common law</b>	0.1536 (0.10)	0.1954 (1.87)	0.2675** (2.18)	0.2694** (2.21)	0.036 (0.18)	0.05423 (0.24)	0.1618 (1.18)	0.2394* (1.87)
<b>german</b>	0.4513** (2.56)	0.5029*** (2.03)	0.1475* (1.79)	0.2634* (1.76)	-	-	-	-
<b>escandinav.</b>	0.761692*** (3.78)	0.8404*** (4.10)	0.2066 (0.54)	0.2111 (0.55)	-	-	-	-
<b>protestants</b>	0.0011 (0.55)	0.0006 (0.75)	0.0042 (1.07)	0.0041 (1.05)	0.0017 (0.64)	0.0010 (0.37)	0.0033 (0.59)	0.0012 (0.24)
<b>muslim</b>	-0.0031** (-2.44)	-0.0031** (-2.46)	-0.0125*** (-5.13)	-0.0126*** (-4.99)	-0.0034** (-2.19)	-0.0040** (-2.36)	0.0031 (1.19)	0.0036 (1.34)
<b>other religions</b>	0.0008 (0.65)	0.0005 (0.41)	-0.0040*** (-2.95)	-0.0040*** (-3.03)	-0.0003 (-0.88)	-0.0006 (-0.25)	0.0079** (2.45)	0.0079** (2.34)
<b>inc.<sub>pc</sub></b>	1.2726*** (12.47)	1.2094*** (11.42)	1.0757** (2.55)	1.0630** (2.41)	1.7931*** (6.00)	1.4411*** (4.63)	0.2086 (0.76)	0.0098 (0.03)
<b>openness</b>	0.0015* (1.97)	0.0015* (1.70)	0.0008 (0.97)	0.0007 (0.88)	0.0031* (1.96)	0.0024 (1.10)	0.0030* (1.87)	0.0051** (2.11)
<b>R<sup>2</sup> [N]</b>	0.77 [156]	0.77 [156]	0.77 [32]	0.77 [32]	0.52 [65]	0.50 [65]	0.22 [52]	0.22 [52]

Note: The dependent variable is institutional quality in the period 1996-2011 (IQ). The independent variables are: the index of ethno-linguistic fractionalization (ethnoling.); socialist (socialist), English (common law), German (german) and Scandinavian (escandinav.) legal origins; the percentage of the population that belongs to the Protestant religion (protestants), Muslim religion (muslim) and religions other than the Protestant, Muslim and Catholic religions (other religions); the logarithm of the average *per capita* GDP in the period 1996-2011 (inc.<sub>pc</sub>); and average imports and exports as a percentage of the GDP in the period 1996-2011 (openness).

To capture the differential effect, the dummy French legal origin and Catholic religion variables have been omitted. Lagged values of the variables inc.<sub>pc</sub> and openness have been used as instruments for the TSLS estimation. The validity of the instruments used has been tested and they have been shown to be significant, in all cases, when regressed on the variable to be instrumented. Likewise, the non-significance of these instruments has been tested by running the residuals from regression 2SLS on all the variables of the model and the instruments (Hausman test).

Student *t* in brackets (*White Heteroskedasticity-Consistent Standard Errors & Covariance*).

\*\*\* Level of significance: 1%; \*\* Level of significance: 5%; \* Level of significance: 10%.

In all the regressions carried out, the explanatory variables are jointly significant (*F-statistic*).

<sup>a</sup> In the sub-sample of high-income countries socialist legal origin has not been included because it is not found there. The same is true of the legal origins German and Scandinavian in the case of the low- and medium-income countries.

All this corroborates our starting hypothesis about the non-existence of only one model of institutional quality valid for all countries. It should be pointed out that the socialist legal origin is especially negative in low-income countries, while the positive effect of *common law* is only significant in high-income countries. As for religion, Muslim is relevant for high and medium-income countries, with a negative differential effect with respect to Catholic religion; *other religions* appears with a highly significant differential effect in high- and low-income countries (negative in the former and positive in the latter). Lastly, trade openness only guarantees institutional improvements in the low-income countries, while economic growth guarantees them in all the countries except the poor. According Kaufmann and Kraay (2002), in low-income countries, phenomena such as “State capture”, in some cases, compensate for the demand for institutional improvements that accompany income growth.

It can also be observed that the explanatory power of the model for the low-income countries is very inferior to that of the other sub-samples and that of the whole sample. This drives us to seek other variables that can better explain the differences observed in the institutional quality of poor countries.

## **4. A model of institutional quality for the poor countries**

### **4.1. Theoretical arguments**

The literature on institutions has contributed theoretical arguments that identify potentially determinant factors of institutional quality in poor countries. Among them, we can highlight colonial experience and life expectancy, because its low value in these countries conditions investment decisions on human capital, a key factor for the institutional quality.

When analysing the effect of the countries’ colonial experience upon institutional quality, we may find two approaches: one which focuses on the coloniser’s identity – i.e. its legal and cultural origins – and another one which focuses on the colonies’ conditions – i.e. their geographical conditions, natural resources and indigenous population density.

As regards the first approach, La Porta *et al.* (1998, 1999) lay emphasis on the legal and colonial origins whereby countries from former British colonies under common law have greater property rights protection, more developed financial markets and better regulation quality than countries endowed with French civil law. Countries with continental European influence (French or Spanish), which coincide with tropical areas in Africa and Central and South America, came up with less flexible and less adjustable regulations and institutions within the economic and legal scopes. Conversely, in countries under British influence, which coincide with warm areas such as North America (Canada and the USA), Australia, New Zealand and South Africa, institutions were more adaptable and had more property rights protection, corruption control and rule of law.

Djankov *et al.* (2002, 2003) point out that procedural formalism is more complex, conflicts take longer to be solved and corruption is higher in countries with French civil law than in countries with common law. In turn, regulation is lesser in these latter countries than in countries of French and socialist legal origin. For instance, the countries in Latin America adopted the Napoleonic code in the 19<sup>th</sup> century because it was more compatible with their Spanish legal inheritance. This supreme–authority–based civil law has led to more autocratic institutions than British common law, which is based on a legal corpus formulated by judges and has therefore given birth to more democratic institutions. Greif (1994) points out that different cultures generate different beliefs on how people should behave and this may have an impact on institutions. Likewise, Landes (1998) state that former British colonies thrived beyond the French, Spanish and Portuguese colonies due to the good economic and political institutions and to the ethics and culture they had inherited from Great Britain. The same way, North *et al.* (2000) use this same argument to differentiate the creation of institutions in North and South America, without leaving out other factors such as the abundance of natural resources.

The arguments that emphasise colonial heritage claim that domination by the British and, to a lesser extent, by the French favored the creation of a stronger local ruling class, with beneficial consequences for post–independence political stability (Svedberg, 1981). Many empirical analyses find a positive and significant relationship between British colonialism and indicators of economic and institutional development (North *et al.*, 2000; Grier, 1999; Brown, 2000). Bertocchi and Canova (2002) show that British and French colonies display higher levels of investment–output ratio and human capital, less corruption, better governmental policies, greater political stability and fewer ethnic conflicts than other colonies. Nevertheless, Portuguese, Belgian and Spanish colonization are believed to have been particularly detrimental, exerting a high degree of power monopoly from the metropolis, employing extreme forms of exploitation, and not paying attention to the establishment of good institutions.

As regards the second approach, among the authors who state that the colonies' conditions are the determining factor upon the quality of their institutions, we may highlight Acemoglu *et al.* (2001, 2002, 2005). They point out that the local features rather than the colonisers' identities were determinant in their institutional development. Their arguments stem from the idea that the British legal system led to better institutions, which implied for instance lesser expropriation risks. However, once the legal origin is taken into account, the local circumstances still have a fundamental role within institutions. Thus, European colonisers were “extractive” when the conditions to settle were unfavourable and therefore they could not settle safely. Conversely, they settled and reproduced their institutions when the conditions were appropriate<sup>5</sup>.

Thus, Acemoglu *et al.* (2001, 2002, 2005) use the colonisers' death rate as an indicator of the level of difficulty to settle and they observe that this rate is negatively correlated with measures of institutional quality such as the expropriation risk index. Therefore, the fact that some countries in Africa (Mali, Nigeria, Gambia, Ivory Coast, Ghana, Togo, Guinea, Niger, Congo), Latin America (Haiti, Nicaragua, Panama, Colombia, Bolivia, Brazil, Peru, Paraguay) and Asia

(Indonesia, Vietnam, Sri Lanka, India, Pakistan) located next to the Ecuador had tropical weather with its typical germs and infections against which Europeans were not immunized, brought about higher death rates in the colonisers, thus discouraging settlement.

When such conditions were combined with abundant natural resources and high indigenous population density which could be exploited – the existence of a relative small colonising minority against a great number of indigenous population also made it difficult for Europeans to settle – led to the birth of “extractive” institutions, which aimed at transferring the natural resources to the metropolis, not granting property rights to indigenous population. Such extractive institutions include the granting of land rights to elite groups to guarantee their support for the metropolis, as well as monopoly systems, trade regulations, taxes or even slave trade, together with authoritarian and absolutist States.

For Acemoglu *et al.* (2005) this argument would explain why British colonisers set up different economic institutions in very different parts of the world: in the Caribbean they set up societies based on slavery, supported by highly oppressive economic institutions. Likewise, the British used the worst practices of colonial rule and, when they arrived in African countries such as Sierra Leona, Ghana, Kenia and Zambia, they established “extractive” institutions. In contrast, the economic institutions developed in areas where the British settled and where there was not a great number of indigenous population to exploit (therefore, slavery was not a viable system) such as the USA, Canada, Australia and New Zealand, the political and economic institutions emerged with the aim of protecting them in the future and encouraging investment and development, with strong emphasis on private property, checks against government power, better distribution of property and economic power and wider participation in economic and political activities.

Acemoglu and Robinson (2012) mention Spanish colonization in Latin America as an example of how extractive institutions were set up – e.g. land expropriation, forced labour, low salaries and high taxes – which were aimed at sacking gold and silver mines by means of exploiting indigenous people. Despite the fact that these institutions generated great wealth for the Spanish crown, they turned Latin America into one of the most unequal continents in the world, with deficient institutions. English colonisers, however, settled in North America because the areas with high indigenous population and abundant gold and silver had already been colonised. Population density in the USA was low in comparison with other countries such Mexico and Peru. As North America developed, English elites tried to set up institutions that restricted economic and political rights for the colony’s inhabitants except for a privileged minority, as the Spanish had done. However, the model failed once and again and a system endowed with more economic freedom and more political rights was established. In fact, the lack of population or native resources made colonialism in Australia and the USA very different, although their citizens had to fight to achieve inclusive institutions and political rights. Likewise, Acemoglu and Robinson point out that in Latin America countries such as Argentina and Chile have better institutions because scant indigenous people and mineral riches made the Spanish pay less attention to them and therefore did not impose their extractive institutions so severely, which they did apply to the rest of the countries within the same area, such as Bolivia and Peru.



In the case of Africa, slave trade in European hands corrupted the institutions created in these countries, since many of them became more absolutist with the sole aim of selling slaves to the Europeans. These political institutions endured in countries such as Nigeria, Sudan, Senegal, Niger, Mali or Sierra Leone. In short, colonialism favoured more appropriate economic institutions when colonisers settled and less appropriate ones when extractive colonialism took place.

Along the same lines, institutionalists lay emphasis on natural resources supply and inequality in order to explain the institutional differences (Engerman and Sokoloff, 1997, 2002; Sokoloff and Engerman, 2000). These authors back the hypothesis that abundant raw materials (mining development and large-scale plantations) and high indigenous or slave population existing in some countries (Central and South America), contributed to creating unequal societies in terms of income distribution, human capital and political power, hindering institutional development.

Legal and political extractive institutions were created in order to protect landowning and mining elites whereas they limited political rights and schooling access to the majority of the peasantry. Nevertheless, in other countries with less abundant resources (North America) the weather favoured limited scale economies and did not lead to profitable slave labour. This circumstance, together with the fact that there were few native inhabitants, contributed to the development of exploitations in the hands of European descendants, so land distribution and farms size led to relatively egalitarian wealth distribution, important racial homogeneity and wider property rights protection. The result was the birth of a bigger medium class with well-distributed political power structures and a more favourable institutional performance. Thus, resource supply was more important than colonisers. In densely populated areas settling was less attractive and creating institutions to extract resources based on both economic and political inequality proved more interesting. In sparsely populated regions, a great number of European colonisers settled, thus creating institutions that protected property rights and distributed political power. Collier (2007), referring to “the curse of natural resources”, points out that the income derived from these resources prevents democracy from working appropriately, encouraging patronage system and weakening control systems over political activity.

In most of the aforementioned cases, whether their institutional origin stems from local conditions or colonial heritage, institutional models tend to endure after independence. Acemoglu *et al.* (2001) point to Latin America as an example of the endurance of extractive institutions during the independence era, since the monopolies and regulations framework devised by Spain remained intact after the independence throughout a great part of the 19<sup>th</sup> century. Forced labour policies endured and were intensified as well as reintroduced with the expansion of exportation agriculture in the last part of the 19<sup>th</sup> century in countries such as Brazil, Mexico, Guatemala and El Salvador. Likewise, forced labour was reintroduced in many independent African countries, such as Zaire.

According to Acemoglu *et al.* (2002), this institutional persistence stems from the fact that bad institutions tend to perpetuate power relationships which exclude reformers. Thus,



the consequences of the above mentioned geographical factors has been present until today, but have been far from a deterministic relationship. In particular, Acemoglu and Robinson (2012) mention Botswana, which quickly developed inclusive political and economic institutions after independence, establishing a democracy with regular and competitive elections.

In short, if these two approaches (colonisers' identity and colonies conditions) are considered complementary and not exclusive, a model trying to capture the effect of colonial experience upon institutional quality in poor countries should incorporate some variables which identify the colonising country and also geographical variables.

With respect to life expectancy, as a determining factor upon human capital and institutional quality, the low levels present in poor countries discourage investment in any productive activity (Alsan *et al.*, 2006), including investment in institutional improvements. Furthermore, the little investment in human capital derived from the low life expectancy (Chakraborty, 2004) reduces interpersonal trust, membership of associations and access to social networks, hindering the formation of social capital, an important dimension of institutional quality (Glaeser *et al.*, 2000), specially in this kind of countries, in which substitute or complement their weak formal institutions.

In the same way, this low investment in human capital also has direct negative effects on institutional quality. In fact, recent studies have shown it to be a core factor to explain such quality. Alonso and Garcimartín (2013) point out that the more educated the population is, the more transparency and dynamic institutions it demands, thus contributing to its own design and development<sup>6</sup>. Some previous research – e.g. Alesina and Perotti (1996) – already confirmed the positive impact of education on institutional quality and particularly on corruption control (Evans and Rauch, 2000 and Glaeser and Sacks, 2006).

#### 4.2. Empirical model for the low-income countries

As a consequence of the theoretical arguments expounded, and given the low explanatory power of the model estimated in the previous section for the sample of poor countries, we have incorporated the variables colonial origin, latitude and life expectancy, for these countries, with the aim of improving its explanatory power. Moreover, we have eliminated *per capita* income because the tests of redundant variables (*F-statistic and Log likelihood ratio*) advise its exclusion for this sample. The data sources have been: for life expectancy, *World Bank* (2012); for latitude, La Porta *et al.* (1999) and for colonial origin, *CIA World Factbook* (2012). The model to be estimated is the following:

$$\begin{aligned}
 IQ = & \alpha + \beta_1 * ethnoling. + \beta_2 * socialist + \beta_3 * common\ law + \\
 & + \beta_4 * german + \beta_5 * escandinav. + \beta_6 * protestants + \beta_7 * muslim + \\
 & + \beta_8 * other\ religions + \beta_9 * openness + \beta_{10} * latitude + \beta_{11} * life\ expectancy + \\
 & + \beta_{12} * UK + \beta_{13} * Portugal + \beta_{14} * other\ colonizers + \mu
 \end{aligned} \tag{2}$$

where *latitude* is the absolute value of the latitude of the country, *life expectancy* is the logarithm of the life expectancy in 1980, *UK*, *Portugal* and *other colonizers* are dummies that indicate the colonial origin (the omitted dummy has been *France*).

The model of institutional quality for the poor countries has been estimated using OLS and TSLS methods. This allows to correct endogeneity and to test the robustness of the results. The results obtained from applying this model are the following (Table 2). By incorporating latitude, this variable emerges as significant and with the expected sign. These results are consistent with the theoretical arguments exposed in the epigraph 4.1. Moreover, authors such as Goel and Nelson (2010) point out the importance of geographical factors to explain the institutional quality of the countries and the level of corruption. This variable presents the expected sign and is significant at 10%. The following step was to incorporate the variable life expectancy, with which a further improvement in the  $R^2$  was obtained. It is shown to be superior to the variable latitude, which now lose their significance because of their high correlation with the variable life expectancy (see Table 3). In countries close to the Equator, climatic and environmental conditions have a negative effect on life expectancy (Ram, 1997).

Lastly, when we incorporate colonial origin into the model, we observe an important increase in the  $R^2$ , from 0.22 in the general model to 0.40 in the specific model. French colonial origin (omitted dummy) appears superior to Portuguese and *other colonizers* (although only significant for *other colonizers*), while British origin is positive but does not show any significant differential effect. These results corroborate the theoretical arguments previously expounded by showing that countries with greater life expectancy, located further from the Equator and colonized by Great Britain or France have better institutional frameworks.

## 5. Conclusions

In this paper we have estimated a model that uses an aggregate index of institutional quality as the endogenous variable and the economic, socio-political and cultural factors considered by the literature to be the main determinants of institutional quality as explanatory variables. We have used a sample of 156 countries and three sub-samples grouped according to income level, with the aim of testing the hypothesis that there is not only one model of institutional quality that is valid for all countries.

The results obtained confirm this hypothesis. For the whole sample, the variables that are significant and robust to the method of estimation are the legal origins German and Scandinavian (both with positive signs), Muslim religion (with a negative sign), *per capita* income and trade openness (with a positive sign). For the sub-samples the results differ: The legal origin socialist only maintains its significance in low-income countries; the positive effects of *common law* appear as significant for high-income countries, while Muslim religion presents a significant and negative differential in high and medium-income countries. Lastly, economic growth guarantees institutional improvements in rich and medium-income countries and trade openness only guarantees them in low-income countries.

**Table 2**  
**LOW-INCOME COUNTRIES (GENERAL MODEL AND SPECIFIC MODEL)**

Independent variable: IQ	General model		Specific Model					
	(4) OLS	(4) TSLS	(5) OLS	(5) TSLS	(6) OLS	(6) TSLS	(7) OLS	(7) TSLS
<b>c</b>	-1.9535** (-2.31)	-1.4545 (-1.56)	-1.3039*** (-5.28)	-1.3974*** (-6.28)	-3.1927** (-2.10)	-4.9005*** (-3.31)	-5.1901*** (-3.20)	-5.3394** (-3.35)
<b>etnoling.</b>	-0.1850 (-0.99)	-0.2233 (-1.12)	-0.0900 (-0.51)	-0.1393 (0.72)	-0.2756 (-1.56)	-0.1989 (-1.04)	-0.2072 (-1.20)	-0.2265 (-1.23)
<b>socialist</b>	-0.3199* (-1.78)	-0.3698* (-1.80)	-0.4009* (-1.79)	-0.4370* (-1.84)	-0.7082*** (-3.55)	-0.5861** (-2.35)	-0.5187** (-2.48)	-0.5656** (-2.51)
<b>common law</b>	0.1618 (1.18)	0.2394* (1.87)	0.0959 (0.67)	0.1692 (1.26)	-0.0218 (-0.15)	0.1584 (1.23)	-0.0583 (-0.20)	0.1834 (0.53)
<b>protestants</b>	0.0033 (0.59)	0.0012 (0.24)	0.0015 (0.24)	0.0002 (0.05)	0.0089 (1.32)	0.0006 (0.13)	0.0040 (0.63)	0.0010 (0.19)
<b>muslim</b>	0.0031 (1.19)	0.0036 (1.34)	0.0016 (0.57)	0.0023 (0.85)	-0.0048 (-1.56)	0.0038 (1.52)	0.0035 (1.52)	0.004* (1.86)
<b>other religions</b>	0.0079** (2.45)	0.0079** (2.34)	0.0061* (1.81)	0.0064* (1.90)	0.0106*** (2.93)	0.0086** (2.56)	0.0089*** (2.79)	0.0090*** (2.77)
<b>inc<sub>pc</sub></b>	0.2086 (0.76)	0.0098 (0.03)	-	-	-	-	-	-
<b>openness</b>	0.0030* (1.87)	0.0051** (2.11)	0.0024 (1.25)	0.0044* (0.059)	0.0025 (1.39)	0.0046** (2.03)	0.0023 (1.37)	0.0052** (2.34)
<b>latitude</b>	-	-	0.8074* (1.71)	0.5832* (1.74)	0.2600 (0.50)	0.01613 (0.28)	0.4362 (0.77)	0.1720 (0.29)
<b>life expectancy</b>	-	-	-	-	2.012** (2.24)	2.0732** (2.40)	2.3385** (2.52)	2.3528**** (2.55)
<b>UK</b>	-	-	-	-	-	-	0.1019 (0.32)	0.1123 (0.30)
<b>Portugal</b>	-	-	-	-	-	-	-0.0964 (-0.41)	0.1351 (-0.46)
<b>Other colonizers</b>	-	-	-	-	-	-	-0.3200** (-2.66)	-0.3209** (-2.49)
<b>R<sup>2</sup> [N]</b>	0.22 [52]	0.22 [52]	0.23 [53]	0.23 [53]	0.26 [53]	0.26 [53]	0.40 [53]	0.39 [53]

Note: The variable latitude is the absolute value of the latitude of the country, scaled to take values between 0 and 1 and the variable life expectancy is the logarithm of the life expectancy in 1980. UK, Portugal and other colonizers are dummies that indicate the colonial origin, having omitted France to capture the differential effect.

Lagged values of the variables inc<sub>pc</sub> and openness have been used as instruments for the TSLS estimation. The validity of the instruments used has been tested and they have been shown to be significant, in all cases, when regressed on the variable to be instrumented. Likewise, the non-significance of these instruments has been tested by running the residuals from regression 2SLS on all the variables of the model and the instruments (Hausman test). Student *t* in brackets (*White Heteroskedasticity-Consistent Standard Errors & Covariance*).

\*\*\* Level of significance: 1%; \*\* Level of significance: 5%; \* Level of significance: 10%.

In all the regressions carried out, the explanatory variables are jointly significant (*F-statistic*).

The *F-statistic* and *Log likelihood ratio* tests determine that the variable inc<sub>pc</sub> is redundant in this sample and, therefore, can be eliminated from the model (*F-statistic*: 0.5058, probability: 0.4008; *Log likelihood ratio*: 0.6081, probability: 0.4355).

Table 3  
CORRELATION MATRIX OF THE VARIABLES  
(LOW-INCOME COUNTRIES)

	IQ	ethnoling.	socialist	common law	protestants	muslim	other religions	inc. pc	openness	life expectancy	latitude	UK	Portugal	other colonizers
IQ	1.000000													
ethnoling.	-0.021230	1.000000												
socialist	0.020314	-0.379544	1.000000											
common law	0.207532	0.241315	-0.325300	1.000000										
protestants	-0.023777	0.217709	-0.328432	0.286983	1.000000									
muslim	-0.123824	0.055998	0.006932	-0.046358	-0.479912	1.000000								
other religions	0.303360	-0.071758	0.435566	-0.035344	-0.253745	-0.516026	1.000000							
inc. pc	0.070774	-0.041148	0.010105	0.312328	-0.091252	0.025707	0.121135	1.000000						
openness	0.124508	-0.158532	0.449674	-0.158561	0.241423	-0.210789	0.115330	-0.139976	1.000000					
life expectancy	0.225201	-0.221311	0.537200	-0.141910	-0.100547	0.077556	0.014044	0.262421	0.271019	1.000000				
latitude	0.186485	-0.371320	0.707748	-0.129221	-0.348080	0.249664	0.206594	0.004364	0.326948	0.590986	1.000000			
UK	0.283785	0.239082	-0.281718	0.866025	0.206647	-0.014409	-0.063372	0.298062	-0.149922	-0.134184	-0.134537	1.000000		
Portugal	-0.084280	0.210388	-0.120736	-0.164957	-0.003897	-0.121498	0.001356	-0.084619	0.128883	-0.197332	-0.050214	-0.142857	1.000000	
other colonizers	-0.272556	-0.271908	0.388078	-0.198147	-0.134808	0.058283	0.125487	0.025973	0.083953	0.361825	0.376006	-0.402374	-0.172446	1.000000

The low explanatory power of the general model for the sample of poor countries led us to propose a different model for these countries. This model eliminates the variable income and includes latitude, life expectancy and colonial origin. The results improve the  $R^2$  of the estimation and show that the countries with longer life expectancy, located further from the Equator and colonized by Great Britain and France present better institutional frameworks.

## Notes

1. Given that the omitted variables have been *french* and *catholic*, the coefficients of the other variables contain the differential effect with respect to these categories used as reference.
2. This project reports aggregate and individual governance indicators for 215 economies over the period 1996–2011. For a description of the methodology see Kaufmann *et al.* (2010).
3. The division is carried out following the criterion used by the World Bank, according to which low income countries are those whose GDP is equal to or lower than \$745 *per capita* in 2001; medium income countries are those with a GDP above \$745 and below \$9.206 *per capita*, and high income countries are those with a GDP equal to or higher than \$9.206 *per capita*.
4. To have an additional test to contrast that the determinants of institutional quality differ across countries based on income level, we have estimated the following difference-in-difference model:

$$IQ = \alpha + \beta_1 * ethnoling. + \beta_2 * socialist + \beta_3 * common\ law + \beta_4 * german + \beta_5 * escandinav. + \beta_6 * protestants + \beta_7 * muslim + \beta_8 * otherreligions + \beta_9 * inc_{pc} + \beta_{10} * openness + \beta_{11} * (ethnoling. * inc_{pc}) + \beta_{12} * (socialist * inc_{pc}) + \beta_{13} * (german * inc_{pc}) + \dots + \beta_{(k-1)} * (muslim * inc_{pc}) + \beta_k * (otherreligions * inc_{pc}) + \mu$$

The results obtained show whether the institutional quality of the countries improves to a higher or lower extent when their *per capita* income increases, depending on the different factors included in the model. These results are at disposal of who are interested in them.

5. Certain that geographical and historical factors are relevant to explain the countries' institutional quality, authors such as Hall and Jones (1999), in their studies on economic growth, use several instruments on institutional quality, i.e. latitude, the percentage of population whose mother tongue is English and the percentage of population whose native language is one of the five main European languages.
6. Moreover, Molina, Amate and Guarnido (2013) point out a positive relationship between institutional quality and education spending.

## References

- Acemoglu, D.; Johnson, S. and Robinson, J. A. (2001), "The Colonial Origins of Comparative Development: An Empirical Investigation", *American Economic Review*, 91 (5): 1.369-1.401.
- Acemoglu, D.; Johnson, S. and Robinson, J. A. (2002), "Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution", *Quarterly Journal of Economics*, 118: 1.231-1.294.
- Acemoglu, D.; Johnson, S. and Robinson, J. A. (2005), "Institutions as a Fundamental Cause of Long-Run Growth", in P. Aghion, S. N. Durlauf (ed.), *Handbook of Economic Growth*, 1 (1): 385-472.
- Acemoglu, D.; Johnson, S.; Robinson, J. A. and Yared, P. (2008), "Income and Democracy", *American Economic Review*, 98 (3): 808-842.

- Acemoglu, D. and Robinson, J. A. (2012), *Why Nations Fail*, New York: Crown Publishers.
- Aixalá, J. and Fabro, G. (2008): “Determinantes de la calidad institucional de los países”, *Revista de Economía Aplicada*, vol. XVI, nº 46: 119-144.
- Alesina, A. and Perotti, R. (1996), “Income Distribution, Political Instability, and Investment”, *European Economic Review*, 40 (6): 1.203-1.228.
- Alsan, M.; Blomm, D. E. and Canning, D. (2006), “The Effect of Population Health on Foreign Direct Investment Inflows to Low- and Middle-Income Countries”, *World Development*, 34 (4): 613-630.
- Alonso, J. A. and Garcimartín, C. (2011): “Criterios y factores de calidad institucional: un estudio empírico”, *Revista de Economía Aplicada*, vol. XIX, nº 55: 5-32.
- Alonso, J. A. and Garcimartín, C. (2013), “The determinants of institutional quality. More on the debate”, *Journal of International Development*, 25 (2): 206-226.
- Álvarez Díaz, M. and Caballero, G. (2008): “The quality of institutions: a genetic programming approach”, *Economic Modelling*, 25 (1): 161-169.
- Barro, R. J. (1999): “Determinants of Democracy”, *Journal of Political Economy*, 107 (6): 158-183.
- Bertocchi, G. and Canova, F. (2002), “Did colonization matter for growth? An empirical exploration into the historical causes of Africa’s underdevelopment”, *European Economic Review*, 46: 1.851-1.871.
- Borner, S.; Bodemer, F. and Kobler, M. (2004): *Institutional efficiency and its determinants: The role of political factors in economic growth*, Paris and Washington, D. C.: Development Centre Studies, Organisation for Economic Cooperation and Development.
- Brown, D. (2000), “Democracy, colonization, and human capital in sub-Saharan Africa Studies”, *Comparative International Development*, 35 (1): 20-40.
- Busse, M. and Gröning, S. (2009), “Does foreign aid improve governance?” *Economic Letters*, 104: 76-78.
- Chakraborty, S. (2004), “Endogenous lifetime and economic growth”, *Journal of Economic Theory*, 116: 119-137.
- Collier, P. (2007), *The Bottom Billion. Why the Poorest Countries Are Failing and What Can Be Done About It*, Oxford University Press.
- C.I.A. (2012), *The World Factbook*, Washington DC: Central Intelligence Agency.
- Djankov, S.; La Porta, R.; López de Silanes, F. and Shleifer, A. (2002), “The Regulation of Entry”, *Quarterly Journal of Economics*, 117 (1): 1-37.
- Djankov, S.; La Porta, R.; López de Silanes, F. and Shleifer, A. (2003), “Courts”, *Quarterly Journal of Economics*, 118 (2): 453-517.
- Easterly, W. and Levine, R. (2003), “Tropics, Germs, and Crops: How Endowments Influence Economic Development”, *Journal of Monetary Economics*, 50 (1): 3-39.
- Engerman, S. L. and Sokoloff, K. L. (1997), “Factor Endowments, Institutions, and Differential Growth Paths among New World Economies”, in S. Haber (ed.), *How Latin America Fell Behind*, Stanford University Press.

- Engerman, S. L. and Sokoloff, K. L. (2002), "Factor Endowments, Inequality, and Paths of Development among New World Economies", *Economia*, 3 (1): 41-109.
- Evans, P. and Rauch, P. (2000), "Bureaucratic Structure and Bureaucratic Performance in Less Developed Countries", *Journal of Public Economics*, 75: 49-71.
- Frankel, J. and Romer, D. (1999), "Does Trade Cause Growth?" *American Economic Review*, 89 (3): 379-399.
- Glaeser, E. L.; Laibson, D.; Scheinkman, J. A. and Soutter, C. L. (2000), "What is Social Capital? The Determinants of Trust and Trustworthiness", *Quarterly Journal of Economics*, 65: 811-846.
- Glaeser, E. L. and Sacks, R. E. (2006), "Corruption in America", *Journal of Public Economics*, 90: 1.053-1.072.
- Goel, R. K. and Nelson, M. A. (2010), "Causes of corruption: History, geography and government", *Journal of Policy Modelling*, 32: 433-447.
- Greif, A. (1994), "Cultural Beliefs and the Organization of Society: A Historical and Theoretical Reflection on Collectivist and Individualist Societies", *Journal of Political Economy*, 102: 912-950.
- Grier, R. M. (1999), "Colonial legacies and economic growth", *Public Choice*, 98: 317-335.
- Hall, R. E. and Jones, C. I. (1999), "Why Do Some Countries Produce So Much More Output Per Worker than Others", *Quarterly Journal of Economics*, 114 (1): 83-116.
- Hansson, G. (2009), "What Determines Rule of Law? An Empirical Investigation of Rival Models", *Kiklos*, 62 (3): 371-393.
- International Monetary Fund (2003), *World Economic Outlook: Growth and Institutions*, Washington: International Monetary Fund.
- Islam, R. and Montenegro, C. E. (2002), "What Determines the Quality of Institutions?" Background Paper for the *World Development Report 2002: Building Institutions for Markets*.
- Kaufmann, D. and Kraay, A (2002), "Growth without Governance", *Economia*, 3 (1): 169-229.
- Kaufmann, D.; Kraay, A. and Mastruzzi, M. (2010), "The Worldwide Governance Indicators: Methodology and Analytical Issues", *World Bank Policy Research Working Paper*, nº 5430.
- La Porta, R.; López-de-Silanes, I. F.; Sheifer, A. and Vishny, R. (1998), "Law and finance", *Journal of Political Economy*, 106: 1.113-1.155.
- La Porta, R.; López-de-Silanes, I. F.; Sheifer, A. and Vishny, R. (1999), "The Quality of Government", *Journal of Law Economics and Organization*, 15 (1): 222-279.
- Landes, D. (1998), *The Wealth and Poverty of Nations*, New York: W. W. Norton.
- Leite, C. and Weidmann, J. (2002), "Does Mother Nature Corrupt? Natural Resources, Corruption, and Economic Growth", in G. T., Abed and S. Gupta (ed.), *Governance, Corruption, & Economic performance*, International Monetary Fund.
- Molina, A.; Amate, I. and Guarnido, A. (2013), "Institutions and Public Expenditure on Education in OECD Countries", *Hacienda Pública Española/Review of Public Economics*, 204: 67-84.



- North, D. C.; Summerhill, W. and Weingast, B. R. (2000), “Order, Disorder and Economic Change: Latin America versus North America”, in B. B.de Mesquita, and H. L., Root (ed.), *Governing for Prosperity*, Yale University Press.
- North, D.C. (1990), *Institutions, Institutional Change, and Economic Performance*, New York: Cambridge University Press.
- Olson, M. (1982), *The Rise and Decline of Nations*, Yale University Press.
- Olson, M. (1996), “Big bills left on the sidewalk: why some nations are rich, and others are poor”, *Journal of Economic Perspectives*, 10 (1): 3-24.
- Ram, R. (1997), “Tropics and Economic Development: An Empirical Investigation”, *World Development*, 25 (9): 1.443-1.452.
- Serra, D. (2004), “Empirical determinants of corruption. A sensitivity analysis”, *Public Choice*, 126: 225-256.
- Sokoloff, K. L. and Engerman, S. L. (2000), “Institutions, Factor Endowments, and Paths of Development in the New World”, *Journal of Economic Perspectives*, 14 (3): 217-232.
- Straub, S. (2000), “Empirical Determinants of Good Institutions: Do We Know Anything?”, *Inter-American Development Bank Working Paper*, n°. 423.
- Svedberg, P. (1981), “Colonial enforcement of foreign direct investment”, *The Manchester School*, 49: 21-38.
- World Bank (2012), *World Economic Indicators*, Washington DC: The World Bank.

## Resumen

Este trabajo contribuye al debate generado acerca de cuáles son los factores determinantes de la calidad institucional de los países. Se emplean variables económicas, socio—políticas y culturales para tres submuestras de países con diferentes niveles de renta. Los resultados validan la hipótesis de que no existe un único modelo de calidad institucional para todos los países. Además, la limitada capacidad explicativa del modelo para la submuestra de países de renta baja ha motivado la incorporación de otras variables relacionadas con los orígenes coloniales, la localización geográfica o la esperanza de vida. Los resultados validan los argumentos teóricos que proponen el uso de estas variables.

*Palabras clave:* Calidad Institucional, Indicadores agregados de gobernabilidad.

*Clasificación JEL:* O10, O17, O50.