View metadata, citation and similar papers at core.ac.uk

brought to you by CORE

provided by Research Papers in Economics

ECONSTOR

WWW.ECONSTOR.EU

Der Open-Access-Publikationsserver der ZBW – Leibniz-Informationszentrum Wirtschaft
The Open Access Publication Server of the ZBW – Leibniz Information Centre for Economics

Dobler, Constanze

Working Paper

The impact of institutions, culture, and religion on per capita income

Schriftenreihe des Promotionsschwerpunkts Globalisierung und Beschäftigung // Evangelisches Studienwerk e.V., No. 28/2009

Provided in cooperation with:
Universität Hohenheim

Suggested citation: Dobler, Constanze (2009) : The impact of institutions, culture, and religion on per capita income, Schriftenreihe des Promotionsschwerpunkts Globalisierung und Beschäftigung // Evangelisches Studienwerk e.V., No. 28/2009, urn:nbn:de:bsz:100-opus-4443 , http://hdl.handle.net/10419/30368

Nutzungsbedingungen:
Die ZBW räumt Ihnen als Nutzerin/Nutzer das unentgeltliche, räumlich unbeschränkte und zeitlich auf die Dauer des Schutzrechts beschränkte einfache Recht ein, das ausgewählte Werk im Rahmen der unter
→ http://www.econstor.eu/dspace/Nutzungsbedingungen
nachzulesenden vollständigen Nutzungsbedingungen zu vervielfältigen, mit denen die Nutzerin/der Nutzer sich durch die erste Nutzung einverstanden erklärt.

Terms of use:
The ZBW grants you, the user, the non-exclusive right to use the selected work free of charge, territorially unrestricted and within the time limit of the term of the property rights according to the terms specified at
→ http://www.econstor.eu/dspace/Nutzungsbedingungen
By the first use of the selected work the user agrees and declares to comply with these terms of use.

ZBW Leibniz-Informationszentrum Wirtschaft
Leibniz Information Centre for Economics

Mitglied der Leibniz-Gemeinschaft

Evangelisches
Studienwerk e.V. Villigst

Schriftenreihe des Promotionsschwerpunkts
Globalisierung und Beschäftigung

Nr. 28/2009

The Impact of Institutions, Culture, and Religion on Per Capita Income

by

Constanze Dobler

Stuttgart-Hohenheim
ISSN 1618-5358

The Impact of Institutions, Culture, and Religion on Per Capita Income

Constanze Dobler
University of Hohenheim
Chair of Economic Theory
70593 Stuttgart
codobler@uni-hohenheim.de

Abstract

Despite many approaches of neoclassical and endogenous growth theory, economists still face problems in explaining the reasons for income differences between countries. Institutional economics and the deep determinants of growth literature try to depart from pure economic facts to examine economic development. Therefore, this article analyzes the impact of institutions, geography, and integration on per capita income. Concerning theoretical reasoning, emphasis is on the emergence of institutions and their effect on economic growth. However, institutions can appear in different shapes since political, legal, and economic restrictions are not the only constraints on human behaviour. Norms and values also limit possible actions. Therefore, a differentiation between formal and informal institutions is made. Informal institutions are defined as beliefs, attitudes, moral, conventions, and codes of conduct.

Property rights are assumed to be the basic formal institutional feature for economic success. Despite their direct impact on growth through individual utility maximization, property rights also make a statement concerning the political and legal environment of a country.

Regarding the regression analysis, different religious affiliations are used as instrumental variables for formal and informal institutions.

The regression results affirm a crucial role of informal and formal institutions concerning economic development. However, a high proportion of Protestant citizens encourage informal institutions that support economic growth, while a high Muslim proportion of the population is negatively correlated with growth-supporting formal institutions.

Keywords: culture, economic development, institutions, property rights, religion

JEL classification: A13, F55, H11, Z10, Z12, Z13

1. Introduction

Despite many approaches of neoclassical and endogenous growth theory, economists still face problems in explaining the reasons for income differences between countries. Economic growth cannot be solely determined by the conventional factors of production like physical and human capital accumulation and technological progress. However, breaking down the unknown process of productivity, growth theory has no other choice than to open up to deeper determinants of growth which might originate in other disciplines. This is what institutional economics does. Although the starting point of all actions remains familiar since human interactions are driven by scarcities, incentives and the desire to decrease uncertainty and transaction costs, further explanations shift away from pure economics and open up an interdisciplinary approach. Political, legal, and historical sciences, geography, trade and even culture and psychology are considered.[1] This approach makes sense as the process of economic development started with the emergence of mankind and since then has been a mixture of all factors influencing human actions. Hence, the deep determinants of growth, that is the factors that determine factor accumulation and technological process, must be considered (Rodrik, 2003, p.4ff.; Rodrik, Subramanian & Trebbi, 2004). However, in this article, the emergence of institutions and their impact on economic outcome are emphasized. Most of the work on institutions deals with political, judicial, and economic and thus, formal institutions. Often the protection of property rights is assumed to be the basic institutional feature for economic success. Therefore, the analysis reverts to a property rights measure concerning formal institutions. Additionally, culture is emphasized as a crucial determinant of economic growth. If culture is defined as the values, norms, conventions, codes of conduct, traditions, attitudes, and beliefs of a society, then culture can be equated with the term 'informal institutions'. Since informal institutions incorporate beliefs as well as the behaviour that implements these beliefs, religion is closely related to it. Hence, religion is the basis that delivers the beliefs which are then converted into behaviour and codes of conduct, and thus influences the economic activities of the individual. By this means, religious beliefs were transformed into cultural traits, which people nowadays may no longer connect to religion.

[1] Literature: Acemoglu & Johnson, 2005; Acemoglu, Johnson & Robinson, 2001; Acemoglu, Johnson & Robinson, 2002; Acemoglu, Johnson & Robinson, 2005; Akerlof & Kranton, 2000; Dollar & Kraay, 2002; Easterly & Levine, 2003; Fernández & Fogli, 2007; Frankel & Romer, 1999; Gallup, Sachs & Mellinger, 1998; Glaeser et al., 2004; Guiso, Sapienza & Zingales, 2006; Hall & Jones, 1999; Knowles & Weatherston, 2006; La Porta et al., 1999; La Porta et al., 2004; Persson & Tabellini, 2006; Persson & Tabellini, 2007; Persson & Tabellini, 2008a; Persson & Tabellini, 2008b; Porta & Scazzieri, 1997; Przeworski, 2004b; Rodrik, Subramanian & Trebbi, 2004; Rodrik, 2003; Sachs, 2003; Sachs & Warner, 1995; Tabellini, 2005; Tabellini, 2007; Tabellini, 2008.

However, if religion shapes cultural traits, its implementation in human attitudes and behaviour may also affect formal institutions. Political and legal structures may be the outcome of historical accidents, but aside from that they depend on particular beliefs and attitudes and the consequent worldviews and ideologies of the society. For this reason, a connection between formal institutions and religious traits is established.

Religion has been measured via religious affiliation indicators by La Porta et al. (1999). At any rate, because of data limitation, the analysis mainly concentrates on the impact of Protestantism and Islam.

Concerning informal institutions, an indicator based on the World Values Survey is used as a proxy variable.[2]

The theoretical argument demonstrates the transmission channels between institutions and per capita income and emphasizes the issues of endogeneity and reverse causality. Moreover, a regression analysis incorporating informal and formal institutions, geography, and trade is run. Because of the endogeneity issue, different religious affiliations are used as instrumental variables for institutions. The regression results affirm a crucial role of formal and informal institutions concerning economic development.

The remainder of the article proceeds as follows: in the second part, formal and informal institutions are determined and the interrelations between institutions and per capita income are explained according to several examples used in the empirical analysis. The third section emphasizes the issue of endogeneity and reverse causality. The ambiguous transmission channels between formal and informal institutions and per capita income are demonstrated and the method of instrumental variable estimation is presented as a possible solution concerning the econometric analysis. The fourth section exhibits the possibility of using religion as an instrumental variable for institutions. Both, the methodical and the intuitive arguments are exposed. The fifth section deals with the measurement of institutions and the relevant data. In this context a literature review on approaches using the World Values Survey data set is given. Moreover, measures of formal institutions and instrumental variable approaches are illustrated. The sixth part presents the data used in the empirical analysis, which incorporates geography and trade variables as well as the relevant instrumental

[2] World Values Surveys Four-wave Integrated Data File, 1981-2004.

variables. The regression approach is depicted in the seventh section. Accordingly, the eighth part demonstrates the regression results. Thus, informal and formal institutions play a crucial role in determining per capita income. The resultant conclusions are presented in the last section.

2. Formal and informal institutions

Institutions constitute the social, political, legal and economic system of a state. According to North (1990) "Institutions are the rules of the game in a society ... (they) are the humanly devised constraints that shape human interaction. …they structure incentives in human exchange, whether political, social or economic" (p. 1). Hence, institutions are the framework within which social life takes place. In a world without institutions a human's reaction to a particular incentive is unpredictable. No patterns exist which could help to forecast human behaviour. Furthermore, misconduct cannot be sanctioned since a difference between "good" and "bad" behaviour is not defined. This world is characterized by uncertainty and therefore high transaction costs. Either inhibit efficient economic activity. Therefore, people strive after a situation in which others' reactions are predictable and hence uncertainty and transaction costs can be reduced. To achieve their target, humans are prepared to impose constraints on themselves whereby codes of conduct emerge which afford reliable expectations and therefore reduce uncertainty. These restrictions are called institutions. They are created by human beings to impose binding rules on social interactions and to regulate a situation of anarchical conditions. Institutions specify how to behave in certain situations and hence, human actions become predictable. Violations are punished and offenses against the constraints imply particular costs. Thus, uncertainty as well as information, monitoring, and enforcement costs are reduced. Accordingly, we can think of institutions as a particular legal system, the constitution of a state or business regulations — that is, the market structure as well as the political system can be traced back to humans' desire to regulate their interaction. In general, rules that constitute the political, legal, economic, and social environment and are formally written down in a rule book, be it for example a legal text or a constitution, are called formal institutions. On the other hand, life is not constrained solely by formal institutions. Moral, norms, values, conventions, traditions, and codes of conduct also influence human behaviour. These cultural and societal factors are called informal institutions. They are not officially written down and a violation must not lead to state-run, but rather public or societal

punishment. Usually informal institutions underlie formal institutions since they determine a society's basic attitudes and beliefs. Sometimes individuals might feel constrained by informal institutions which relate to their conviction rather than by formal institutions. North (1990) reverts to a plausible example of rules in sports to describe the difference between formal and informal institutions. Thus, formal institutions can be compared to rules that are written down in a rule book, while informal institutions are "unwritten codes of conduct that underlie and supplement formal rules, such as not deliberately injuring a key player on the opposing team". (p.4).

At any rate, the decisive question is how institutions influence economic development. Much work has been done on the issue of formal institutions and their impact on economic growth. Clearly, a country's economic development is determined by its political, legal, and economic system. Less is known regarding informal institutions and their effect on economic outcome. If societies differ concerning their cultural characteristics, aggregated behaviour will vary and thus affect economic outcome differently. Therefore, the following section will examine the transmission channels between formal and informal institutions and economic growth.

Informal institutions are defined as morals, values, conventions, norms, traditions, codes of conduct, attitudes, and beliefs. Hence, the term informal institutions can be used as a substitute for culture or cultural factors. The corresponding transmission channel is the individual her- or himself as informal institutions affect economic development on an aggregated level through their influence on people's behaviour. An early example regarding informal institutions and their influence on economic development is Max Weber's popular thesis concerning the Protestant work ethic (Weber, 2002, originally published 1904-05). Weber argues that the emergence of capitalism was closely related to the belief, and hence the resulting behaviour, of the Protestant population. Following his argument, work was not just a means to an end but the purpose of life and God's will. People believed that God's chosen ones were pleased with a materially good and save life. Hence, everybody tried to achieve a high living standard in order to believe that she or he was a chosen one. In other societies, where material standards play no role regarding God's goodwill, people lack the accordant incentives to work hard and to invest. Therefore, according to Weber, countries with a high proportion of Protestant citizens were economically more successful than others. Consequently, beliefs, attitudes, and codes of conduct resulting from religious affiliation affect the development of economies. Weber's thesis comes close to our work, as religious

origins result in norms and values which people implement in everyday life. For now we will skip the religious dimension but we will refer to this point later. At any rate, the hypothesis states that particular attitudes, norms, values, and codes of conduct support factor accumulation and technological progress while others do not. The challenge is to measure informal institutions and to point out concrete features with which the impact on economic growth can be analyzed. Hence, we must consider which human properties can be depicted, and demonstrate a clear relationship to culture. That is, the accordant characteristics must depend on values, norms, convictions and so forth, and must differ according to that criteria.

Therefore, we emphasize three commonly used informal institutional factors which will also play a role in the empirical analysis to describe the impact of culture on economic growth. These factors are trust, control over one's own life, and the societal structure, hence limited vs. generalized morality (Platteau, 2000). The level of trust, self-determination and the societal structure all depend on prevalent cultural patterns.

The role of trust in an economy has been studied for some time, especially in game theoretical approaches. An individual's level of trust depends on his or her cultural and societal background, as well as on experiences, which again are shaped by society and culture. But why should a high level of trust support economic growth? As already described, transaction costs play a decisive role in the theory of institutions. The incentive to implement an institution has its origin in the desire to lower transaction costs. In high-trust societies information is replaced by trust. Hence, the corresponding expenses are not necessary and transaction costs are low. People in high-trust societies may not record every detail of an act of sale and spend less time and money on lawyers and the monitoring process. The business environment and, in general, economic transactions may be less regulated than in low-trust societies. However, these examples already indicate the ambiguous character of institutional relations since an adequate regulatory structure and legal system might also increase the level of trust. Thus, a clear causality between trust and the respective formal institutions does not exist. At any rate, it is obvious that a high level of trust decreases transaction costs while increasing the quantity of transactions.

Another informal institutional feature which depends on the cultural environment, and hence on prevalent norms, values, and attitudes, is an individual's conviction concerning control over one's own life. If people are persuaded of being able to influence destiny they will try to

improve their situation and be proactive. If, on the other hand, people believe in predestination, they are not in the position to better their situation through their own initiative. Hence, investment in physical and human capital will in general be lower than in a society in which everybody works hard and invests to improve her or his life. The attitude concerning control over one's own life can originate from religious beliefs and cultural background, but it can also be the result of the institutional environment. An authoritarian political system which domineers over its citizens combined with bad economic performance, and therefore low per capita income, probably does not entail self-confidence but resignation. Hence, again causality is ambiguous. At any rate, believing in predestination rather inhibits growth on an aggregated level.

The last example for informal institutional influence on individual behaviour and thus economic development is the prevalent societal structure, hence generalized or limited morality (Platteau, 2000). Of course, this feature is correlated with the former two. Limited morality characterizes hierarchical societies in which high levels of trust and cooperation are prevalent inside groups like the family, the clan, or the tribe. Within the respective group, transaction costs are low and business is done. However, beyond the group mistrust is dominant and people have less respect for members of other families, clans, or tribes. Cooperation between members of different groups depends on high monitoring and information costs and thus transactions beyond it are rare. Hence, a hierarchical society with distinct familial or tribal structures is less supportive for economic growth. Modern societies which emphasize the individual and in which respectful codes of behaviour are applied to everyone, independent of familial or tribal affiliation, practice what is called generalized morality. This permits an increase in the quantity of cooperation and transactions, while lowering costs, and hence, supports growth (Greif, 1994; Platteau, 2000; Tabellini, 2005). Moreover, in a society where generalized morality is prevalent, the free-rider issue on public goods may be less dominant. As people trust and respect each other, public goods may not be misused. The impact of the societal structure on economic development is studied by Greif (1994). The author explores the different development paths of Maghribis and Genoese traders in the late eleventh century. According to him, wealth differences can be traced back to differing societal patterns. In particular, it is decisive whether the society exhibits a collectivist or an individualist structure. Via a One-Sided Prisoner's Dilemma, Greif demonstrates that the economic success of the Genoese, compared to the Maghribis, can be

ascribed to their individualist societal order. Thus, differences in societal organization can be traced back to distinct cultural affiliations.

However, these examples show that different cultural features which incorporate norms, conventions, values, and codes of conduct influence peoples' attitudes regarding their lifestyle and behaviour. Trust, control over one's own life and the societal structure were chosen as examples since it is unquestioned that these characteristics do influence economic behaviour.

Regarding formal institutions, the protection of property rights is usually described as the decisive institutional feature concerning growth. The exclusiveness and the irreproachable allocation of ownership offer the crucial incentive to invest that emanates from property rights. According to De Soto (2000), property rights highlight the economic potential of an asset and, even more importantly, assets can be used as collateral. Hence, property can generate new capital and receive credit. However, property rights, coupled with an appropriate law to protect them are, according to De Soto, the lifeline of economic success in Western Economies.

Despite the direct channel on income, the dominance of secure property rights also makes a statement concerning the political and legal environment of a state. Property rights are usually not afforded in dictatorships or authoritarian states, where expropriation by the political power or even by private interest groups is possible since no appropriate law and no independent judiciary exist. Hence, unsecure property rights are accompanied by less political and economic freedom, fewer civil rights and a manipulable judiciary. At any rate, to maximize macroeconomic profits the opposite situation is necessary.

Therefore, economic success depends on secure property rights. But who decides on the protection of ownership, and thus, the structure of the legal and economic system? Acemoglu, Johnson and Robinson (2005) have developed a theoretical approach which ascribes the emergence of the political, legal, and economic institutional environment to resource endowment and therefore to property rights. In their model, political power is crucial regarding the formal institutional environment of a state — that is, the elites in power will arrange formal institutions in a way that best fits their interests. The essential theoretical feature is the differentiation between de jure and de facto political power. Hence, legitimate

governance can, but must not necessarily possess de facto political power. Instead, de facto political power depends on resource endowment. Thus, an interest group with an adequate endowment of capital and other resources might be able to determine formal institutional properties. The exercise of de facto political power can vary. One possibility is a military coup in which individuals equipped with arms, money, and eventually supported by further interest groups, use their resources to overthrow the current government. Then the de facto political power will implement formal institutions which fit its interests, that is, the retention of political power. Therefore, civil property rights and political participation will not be afforded, since this would endow individuals with resources that could be used to overthrow the rebels.

A less martial example is lobbying. Even in democratic states, particular industries or other interest groups use their power resulting from resource endowment to determine the institutional form in a way that best fits their interests, that is, the further accumulation of resources.

Besides property rights, Rodrik (2007) emphasizes political participation as a decisive institution for economic growth. Accordingly, a participatory political system guarantees less volatile growth rates, better adjustment regarding external shocks, and less distributive inequality.

The allocation of secure property rights is usually accompanied by political participation and postulates an independent judiciary. The legal system must be able to enforce property rights against governmental and private offences. Democracy ensures that formal institutions cannot be changed on behalf of a certain interest group which possesses the appropriate resources. Property rights in conjunction with civil liberties guarantee the efficient use of every asset in a state, and therefore maximal per capita income. Nevertheless property rights can also exist and be protected in other political systems, but since their application will probably be constrained in a non-democratic state, total economic efficiency will be adversely affected (Besley & Kudamatsu, 2008; Rodrik, 2007). Furthermore, to develop their full potential, ownership rights must be accompanied by a free-market system which allows every person to use his or her assets in a way that maximizes their individual utility. Then, the economy can realize its maximal growth potential on an aggregated level.

3. Endogeneity

Empirical analysis on institutions is particularly hampered by the fact that "… institutional quality is as endogenous to income levels as anything can possibly be" (Rodrik, 2007, p.185). Since the economically relevant question is whether and how institutions influence per capita income, the target is to model and to measure the effect of institutions on income and not vice versa. Even if we wanted to estimate the influence of per capita income on institutional development, we should be able to single out the unidirectional effect, since otherwise the according coefficient would measure the bilateral impact.

However, the transmission channel between informal institutions and economic development has already been described. Particular norms and values lead to behavioural patterns that do not necessarily support growth. Take for example the exclusion of women, and hence, a large part of the potential work force, from education and economic life in several societies. On the other hand, it is conceivable that income levels also influence cultural features. In general, institutions are characterized by their stickiness.[3] At any rate, as institutions are man-made entities, they can be changed, although institutional alteration takes time, especially if informal institutions are involved. As usually only marginal progress is made from one generation to the next, a change in norms, values, and conventions can take decades or centuries (Boettke, Coyne & Leeson, 2008; Roland, 2005).

Institutions emerge in order to reduce uncertainty and to ensure stability. However, informal institutions guarantee a kind of non-material or social stability, while formal institutions secure material stability. As the standard of living increases, perspectives are modified — that is, under the premise of material stability, the significance of non-material stability changes. Therefore, morals, norms, and values are altered when perspectives and priorities change. Higher material security also modifies the incentives for social affiliation, and hence, informal institutions adjust to new living circumstances. But, since humans are social beings, the non-material stability warranted through informal institutions cannot be replaced by material stability. Therefore, several norms and values are maintained, even if they seem useless from

[3] Boettke, Coyne and Leeson (2008) define institutional stickiness as "… the ability or inability of new institutional arrangements to take hold were they are transplanted …" (p.332). We use the term 'stickiness' to characterize the slow convertibility of institutions in general. However, institutions must not change slowly. Therefore, Roland (2005) differentiates between fast-moving and slow-moving institutions.

an economic point of view. Individuals need these norms and values for self-identification and self-orientation, although they might not make economic sense.

At any rate, altering informal institutions takes time and may even not be possible in respect to particular norms and values. Nevertheless, some informal institutions adjust to living circumstances. Higher material standards, for example, change the content and perspective of life. Social patterns that subconsciously exist for security reasons and for the reduction of transaction costs are no longer necessary when income increases. Therefore, the societal structure of generalized mortality can rather be observed in developed or rich societies.

Concerning control over one's own life, a higher living standard contributes to an attitude of self-determination and self-confidence. People endued with property would rather maintain that their wealth can be traced back to their own decisions and activities. These individuals will also believe that they can shape their future according to their own wishes. Of course, wealth can also be traced back to destiny, as, for example, in Weber's thesis on the Protestant work ethic. In this thesis, people thought God's chosen ones could be recognized by their material standards, and thus people worked hard and accumulated capital to show to themselves and others that they belonged to the chosen ones.

At any rate, a high living standard will be preferred to be traced back to one's own efforts, and hence will encourage further endeavour. Even in Weber's argument, people worked hard and invested to show that they are chosen ones, and hence their wealth could be traced back to their own efforts, while they believed it was God's will.

Regarding trust, the influence of income levels may not be that obvious. We are trustful when we do not expect other people to cheat on us, and thus, the expectations regarding other peoples' behaviour are decisive. Peoples' actions depend on their attitudes, codes of conduct, conventions, and so forth, and thus, on informal institutions. This is a crucial point since behaviour must not be related to logical or rational patterns if informal institutions are involved. An alteration in expectations concerning others' actions includes a change in expected transaction costs and in the general level of uncertainty. Higher income levels increase the living standard and material stability. Hence, even if an individual looses a part of its property, it still must not fear for its existence. Therefore, uncertainty and transaction costs are reduced. However, trust depends on common norms and values and if these will be

changed due to higher per capita incomes the level of trust will adjust. At any rate, the societal structure is crucial, since a change from limited to generalized morality will increase the average level of trust.

Again, these are only examples for the influence of per capita income on informal institutions. Of course, several other cultural features can be affected by a change in living standards. A higher income may also be correlated with higher education standards, and therefore with more open-minded and educated individuals. These people may have the ability to question and criticize the predominant institutions, both formal and informal, and alter them. Therefore, in general, some level of physical and human capital is necessary to be able to understand the importance of a growth-promoting institutional framework.

Figures 1 to *5*, which can be found in the appendix, demonstrate the correlations between our informal institutional measures and per capita income.[4] However, seemingly growth-supportive attitudes are correlated with high income levels, while growth-inhibiting features come along with low income levels. Hence, the graphs demonstrate a clear relationship between informal institutions and per capita income. Still no statement concerning causality can be made.

An increase in per capita income may alter not only informal, but also formal institutions. *Figure 6* in the appendix depicts the relationship between per capita income and a measure for formal institutions, *xconst*, which will be commented later. A high level of *xconst* characterizes growth-supporting formal institutions, while a low level refers to growth-inhibiting formal institutions. In general, low per capita incomes are accompanied by growth-inhibiting formal institutions and vice versa. However, some distracting observations with high per capita incomes and low institutional values can be observed. These countries are, for example, Bahrain, the United Arab Emirates, or Qatar, which exhibit relatively high per capita incomes, but underperform in respect to their levels of formal institutions. Indeed, these states are characterized by features that distinguish them from other countries with growth-

[4] The measures are taken form the World Values Survey and are called *trust*, *control*, *respect*, and *obedience*. *Trust* measures the level of trust within a society, *control* indicates how far people are persuaded of being in control over their lives, *respect* and *obedience* specify the hierarchical structure of the society, in which high levels of *trust*, *control*, and *respect* are supportive to growth, while a high level of *obedience* is growth-inhibiting. *Inform4* is a general measure of informal institutions and is created by adding up the values of *trust, control* and *respect* and by subtracting *obedience*. The subsequent chapter on the data used in the empirical analysis gives a detailed description of the informal institutional measures and the indicator *inform4*. In general, a high level of *inform4* indicates growth-supporting informal institutions, while low levels indicate growth-inhibiting informal institutions.

supporting formal institutions. The mentioned Gulf States, for example, can afford a relatively high living standard for their indigenous population due to their oil wealth, and therefore, they are able to afford "bad" institutions.[5] Thus, the positions of these outliers can be traced back to their resource wealth.

At any rate, aside from outliers with resource wealth, does a higher per capita income lead to formal institutions that support growth? We have already discussed this matter with reference to the model of Acemoglu, Johnson and Robinson (2005). Higher per capita incomes can shift the power allocation within a state. A group or person endued with appropriate resources is able to take over de facto political power, and therefore arrange institutions in a way that best fits their respective interests. If parts of the population gain de facto political power through economic growth and hence higher per capita incomes, they will try to enforce their interests. However, radical changes in political and economic institutions are difficult to explain without the introduction of informal institutions. An increase in per capita income alters informal institutions which then impact formal institutions. The basic settings of a society can jointly be responsible for the general concept of the state, the political system, and the structure of power. An autocratic government and a hierarchic system which represses parts of the population may enhance explicit cultural features like disrespect, mistrust, resignation, a collective social structure and hence, limited morality. In turn, these cultural characteristics again support the preservation of an authoritarian government and, in general, of the prevalent formal institutional structure. An increasing per capita income improves the level of informal institutions in the sense that people become more trustful and respectful, self-reliant, and confident. Apart from that, it could be correlated to higher educational standards, and therefore to more open-minded and educated individuals. Due to their higher per capita incomes, the individuals are able to enforce institutions that fit their interests. Hence, they will question the current system and further enforce property rights and political participation. A democratic state may support growth-supporting informal institutions. Independent citizens who can freely participate in political, economic, and social processes may realize a higher level of trust, self-determination, and self-confidence.

The endogeneity and causality issues in institutional analysis depict a particular challenge for empirical work. Typically, an OLS-regression cannot be run because of a possible omitted variable bias and reverse causality. Institutions as they are defined in this article can be

[5] The term "bad" institutions does not judge an institution on a qualitative level, it refers solely to institutions which are not supportive of economic growth.

influenced by several factors, but we are not able to detect every determinant that might have an effect on institutional quality. Hence, it is unavoidable that certain variables correlated with institutions are incorporated in the error term. That is, our coefficients are biased because of omitted variables. On the other hand, the aim of our work is to estimate the effect of institutions on per capita income. As stated above, this effect is not unidirectional. Formal and informal institutions influence each other and income, which again has an impact on both kinds of institutions. Hence, our institutional coefficient of an OLS-regression would not only estimate the unidirectional effect of, for example, informal institutions on income, but also the feedback reaction from income to informal institutions.

However the problem of endogeneity in growth empirics is commonly solved through instrumental variable estimation — that is, we must find an instrumental variable for each of our endogenous regressors. The detection of an adequate instrument can become quite tricky. An instrumental variable must possess two features: it has to be correlated with the appropriate endogenous variable, and it must be uncorrelated with the disturbance. While the former can be tested, the fulfilment of the second feature, and therefore the relevance and accuracy of the regression result, relies on the researchers' intuition. As causality is the main issue in our deep determinants analysis, we must determine a channel that transmits the effect of the particular endogenous variable in the right direction, and thus, from institutions to income and not vice versa. It must be ensured that the instrumental variable does not influence the dependent variable directly, but only through its effect on the endogenous variable. If this requirement is fulfilled, the causality issue is solved and the estimated coefficient measures the effect of institutions on income.

4. Religion as instrumental variable for institutions

According to the previous paragraph, we need instrumental variables for formal and informal institutions to run a regression analysis which examines the effect of institutions on income. Hence, we need variables that are correlated with institutions but have no direct effect on per capita income. Since institutions determine income, we must find out which factors determine institutions. Therefore, we must identify the origin of institutions and clarify whether it is correlated with income. If this is not the case, we can model the transmission channel from

institutional origin to institutions, and from there to income via a Two-Stage-Least-Squares estimation. [6]

Informal institutions are defined as values and norms. How do values and norms emerge? The origin of most of our values and norms can be traced back to religion, and therefore depends on which religion has been, and still is, dominant in a particular region. Why for example do we speak of the Christian West or the Islamic countries? Hence, why do we use religious terms to describe a group of countries or a region? The differences between these countries must exist in obvious areas like the social, cultural, or political life since it must affect us in some manner, otherwise we would not care about it. Moreover, the difference must be traced back to religion, since in other respects we would not use religious terms to describe the countries. Thus, religion seems to matter, and it matters so much that we classify countries according to their religious affiliations. In speaking of Christian or Islamic or Buddhist countries, for example, we explicitly want to highlight their religious affiliations. Hence, we associate the prevalent religion with obvious features that differ between the countries. This can constitute particular conventions, values, moral, attitudes, behaviour, or societal, political, legal, and economic differences. Thus, we are talking about different institutions.

Therefore, we assume that the religious environment affects institutions, which then influence per capita income. Religion cannot directly be correlated with income if we want to use it as an instrumental variable. However, just being religious does not affect economic outcome. Religion can not achieve anything as long as it is not implemented in peoples' attitudes and behaviour and at least in social, hierarchical and political structures. Only then is an indirect influence on income possible. Over decades and centuries, religious codes have become a part of the prevalent culture. Although individuals acting according to particular cultural norms and values may not connect these features to religion anymore, tracing the cultural properties back to their origin shows that religion is the starting point.

Again, incentives play a role. Humans implement religious guidelines because they act from conviction, they fear punishment, or both, and hence, their behaviour corresponds to religious morality. Of course, this incorporates their economic behaviour, and thus, being religious

[6] From a methodological point of view, the instrumental variable must provide a convenient source of exogenous variation and must not be intuitively correlated with institutions (Rodrik, 2007, p.185ff.). At any rate, the aim of this article is to find out whether institutional quality can be traced back to religious matters. Hence, in this case the potential correlation between institutions and Protestantism and institutions and Islam is of particular interest.

does not influence economic growth. Religious beliefs do not influence economic development until they become converted into norms, values, and codes of conduct. Thus, just being Protestant does not affect economic development, as Protestantism must operate through its effect on human behaviour, that is, through informal institutions.[7]

However, the fact that formal and informal institutions are closely related to each other has led to the consideration that both kinds of institutions can be traced back to the same instrumental variable approach. Certain religious beliefs may encourage property rights, and therefore constraints on the executive, while others may inhibit it. The relation between religion and formal institutions can best be seen regarding theocratic states where religion claims terrestrial and religious power. But even in countries where state and religious power are separated, a basic attitude arising out of the religious background is prevalent. Originally religious beliefs constituted worldviews and ideologies, that is, political ideologies, the general understanding of the state and the societal system per se. Even if this is not the case and no general political ideology is prevalent in the society, certain cultural traits originating in religion may support a particular political system through acquiescence and obedience.

Thus, using religious affiliation as an instrumental variable for formal institutions, we must assume that religion does not influence per capita income directly but only through institutions. As already elucidated, this is the case. Religion can not achieve anything as long as it is not implemented in peoples' attitudes and behaviour and at least in social, hierarchical and political structures.

Figure 7 in the appendix depicts the relationship between religious affiliation of the population and informal institutions. A high Protestant proportion of the population is accompanied by high levels of *inform4*, that is, growth-supporting informal institutions. On the other hand, countries with a high proportion of Muslim citizens realize a minor level of *inform4*, and hence have growth-inhibiting informal institutions. However, *figure 8*

[7] Guiso, Sapienza & Zingales (2003) also have examined the effect of religious affiliation on cultural traits. Via the World Values Survey data set, the authors have tried to determine the degree as well as the type of religiosity, and connect it to societal attitudes which are supposed to support economic growth. They at least have not directly connected the appropriate attitudes to per capita income. The authors have concluded that, in general, Christian religions are accompanied with growth-supportive attitudes, while Islam seems to be less conducive to societal properties that are beneficial for growth. Moreover, Barro and McCleary (2003) have studied the effect of church attendance and religious beliefs on economic outcome. However, they have found that religious beliefs in general support growth. Nevertheless, church attendance seems to be less conducive to the growth rate, although the authors point out that the net effect has to be considered since church attendance might foster beliefs which are supportive for growth. They justify their results on the consideration that certain religious beliefs encourage specific individual behaviour that supports growth.

demonstrates the relationship between religious affiliation and the Freedom House property rights index 2000, which is scaled from 0 to 100, with 0 indicating non-protected, and 100 completely protected, property rights. A high Protestant proportion of the population is attended by a strong protection of property rights, while a high Muslim proportion of the population shows fewer protected property rights.[8] However, we use Protestant and Muslim affiliation of the population as instrumental variables for informal and formal institution, respectively. This is the case because we are looking preferably for unequal instruments. Since our work is close to that of Max Weber on an argumentative level, Protestant affiliation is used to illustrate informal institutions, as Protestantism is said to alter norms and values in favour of economic growth. From a Western point of view, the differences in formal institutions that can be traced back to religion become particularly obvious in Islamic countries. Consider, for example, the political and legal systems, which often cannot be described as democratic or constitutional, compared to Western standards. Hence, to note these differences, the Muslim affiliation of the population is used to illustrate formal institutions. That is, Protestant affiliation is assumed to be supportive for economic growth, while Muslim affiliation is said to be growth-inhibiting (Guiso, Sapienza & Zingales, 2003; La Porta et al., 1999; Landes, 1998). More precisely, Protestantism and Islam are assumed to have different impacts on institutional development, and the particular institutions then influence the growth rate. These statements will be tested within the empirical analysis. Of course, other religions should be considered, too, and thus, regressions including the Catholic affiliation of the population were run, although the intuitional justification is less clear, as are the empirical results. At any rate, since several data sets had to be merged for the empirical analysis, not enough observations remained to run regressions with further religious affiliation variables. Therefore, our empirical analysis is restricted to proxies for Protestantism and Islam and, for the sake of completeness, Catholicism. Since it is expected that Protestantism and Islam, in particular, have different effects on institutions, and since both religions are widespread, this is not a disadvantage. However, arguing that religion has an influence on the development of institutions, we should be clear that we are talking about Protestantism and Islam, and not religion in general.

[8] In figures 7 and 8, countries with a Protestant, Catholic, and Muslim proportion of the population, respectively, greater 50 percent are used.

5. Measuring institutions

It is not enough just to form a theory about the influence of institutions on economic growth nowadays. In the past twenty years the revival of growth theory has been based upon a mixture of theoretical and empirical reasoning. The term "informal institutions" has been known since North's work in 1990. Despite that, empirical measures of institutions were predicted on factors describing formal institutions, because determinants like values, norms, morals, attitudes, and codes of conduct cannot be easily measured. However, since the incorporation of societal and cultural factors into economic theory has gained more acceptance, a few research projects dealing with the issue have emerged. The World Values Survey (WVS), for example, is an often used data source for indicating and measuring informal institutions (Inglehart & Welzel, 2007; Inglehart et al., 2004). It is based on surveys and is separated into different parts dealing with topics like "perceptions of life", "politics and society", "religion and moral", inter alia.

An influential work concerning culture and its influence on GDP per capita, that is based on the WVS data, is Tabellini (2005). The author identifies history as the decisive determinant of economic growth and argues that culture depicts the connection between history and current economic development. Hence, Tabellini has had to identify a variable which reflects culture, is shaped by history, and influences current economic growth. Therefore, he uses the WVS data set and creates a cultural indicator which has been used by several researchers since then. As will be seen, we also resort to Tabellini's cultural index in this article.

Knowles and Weatherston (2006) rely on the WVS data set to measure the effect of informal institutions on economic growth. They also refer to Tabellini (2005) and use his cultural indicator to examine whether institutions or geography are the predominant factor concerning its influence on the growth rate.

Williamson (2009) examines the relationship between different formal and informal institutional arrangements. Her aim is to detect whether institutions are transferrable, and therefore whether the institutional structure of economically successful countries can be imposed on underdeveloped economies. She also uses a modified indicator of Tabellini's cultural index, and hence the WVS data set to measure informal institutions (Williamson & Kerekes, 2009; Williamson, 2009).

Guiso, Sapienza and Zingales (2006) use the WVS data to measure the effect of culture on expectations and preferences and their impact on economic outcomes. They estimate, for example, how far trust influences the probability of becoming an entrepreneur and how cultural traits affect saving decisions and political preferences like redistribution.
In an earlier work, Guiso, Sapienza, and Zingales (2003) have analyzed the influence of religion on particular cultural traits which are measured via the WVS data.

Religious affiliation itself is a variable that has been applied as a proxy for informal institutions and culture. La Porta et al. (1999), for example, use Catholic and Muslim affiliation of the population to measure the effect of cultural institutions on government performance, as both religions are emphasized as inhibiting economic development (Landes, 1998).

Measures of formal institutions are manifold, and hence not all of them will be enumerated. A variable often used to measure the protection of property rights is Polity III's, or alternatively Polity IV's, "constraints on the executive" (Acemoglu & Johnson, 2005; Acemoglu, Johnson & Robinson, 2001; Glaeser et al., 2004; Knowles & Weatherston, 2006). Furthermore, "average protection against expropriation risk" and survey indicators of institutional quality from the International Country Risk Guide or Political Risk Services, respectively, are applied (Acemoglu, Johnson & Robinson, 2001; Glaser et al., 2004; Knowles & Weatherston, 2006). Rodrik et al. (2004) use "government effectiveness" from Kaufmann et al. 2002, while Glaeser et al. (2004) trace back to an institutional quality measure which includes elements that capture the protection of property rights and the strength of the rule of law from Kaufmann et al. (2003). The resultant current version is Kaufmann et al. (2008) which includes government indicators from 1996-2007. La Porta et al. (1999) use ethnic heterogeneity as a measure of redistributive tendencies and the legal system to quantify the relative power of the state versus property owners. Furthermore, La Porta et al. (2004) construct measures for judicial independence and constitutional review. Glaeser et al. (2004) give an overview on institutional measures in their respective data appendix. Moreover, Durlauf, Johnson and Temple (2005) arrange a table of relevant proxies and instrumental variables concerning institutions and further growth relevant determinants.

Since institutions are endogenous, several proposals for instrumental-variables estimation exist. A popular approach is the one by Acemoglu, Johnson and Robinson (2001), who use

records of the eighteenth and nineteenth century concerning mortality rates of soldiers, bishops and sailors in former European colonies to create a measure of settler mortality. Then 'settler mortality' is used as an instrumental variable for current institutions. Rodrik, Subramarian and Trebi (2004), for example, also resort to 'settler mortality' as an instrument for institutions, inter alia.

Other instrumental variables for institutions are, for example, the fraction of the population speaking English or a major European language, and the distance from the equator. Hall and Jones (1999) use these measures to instrument for social infrastructure which they define as the institutions and government policies that determine the economic environment within which individuals act (Hall & Jones, 1999, p.84). Hall and Jones justify their choice of instrumental variables by the fact that these variables measure the extent of Western European influence.

Tabellini (2005) uses literacy rates in 1880 and political institutions between the seventeenth and nineteenth century as instrumental variables for culture. His argument is that both instrumental variables do not influence current economic outcome directly, but only through their effect on culture. Hence, European regions that were poorly educated at the end of the nineteenth century differ from better educated regions regarding their cultural characteristics even today. The same is true concerning early political institutions, which affected cultural patterns, and thereby current income.

Knowles and Weatherston (2006) use the percentage of the population being Protestant as instrumental variable for informal institutions, and the proportion of the population speaking English and a major European language, respectively, as instruments for formal institutions.

Williamson and Kerekes (2009) rely on legal origin as instrumental variable for formal institutions and on latitude to instrument for informal institutions.

Guiso, Sapienza and Zingales (2006) use religion and ethnicity as instrumental variables for culture, since both measures are nearly time-invariant and hence the causality issue can be discounted. Changes in religion and ethnic background pass so slowly that the feedback from income on culture is not relevant.

At any rate, these examples show that concentrating on the so-called proximate determinants of growth, that is, factor accumulation and technology, can be misleading. Of course capital, labour, and productivity determine output. But which factors determine the levels of physical and human capital accumulation? As accumulation and productivity are themselves endogenous, they are influenced by deeper determinants, for example, informal and formal institutions.

However, institutions are not the only deep determinant of growth. Of course, *geography* is a further determinant that affects factor accumulation and productivity. It makes a difference whether a country has access to the seaside and is located in a temperate climate zone, or whether it is embedded in inaccessible terrain and has to cope with climatic extremes like droughts and heat or severe rainfall and cold. Moreover, the geographical position determines a country's resource endowment and is responsible for the disease environment. A further deep determinant is integration, or alternatively, trade or *openness*. As some countries are more accessible and easier to reach than others, integration is, of course, influenced by geography. Moreover, several connections between integration, institutions, and the proximate determinants exist, as all factors influence each other (Rodrik, 2003; Rodrik, Subramanian & Trebbi, 2004).

Hence, running a regression analysis with only institutions as independent variables will result in biased coefficients, as other deep determinants are omitted. Therefore, *geography* and *openness* will also be incorporated in the following empirical work. Apart from the issue of omitted variable biases, the consideration of geography and trade allows further insights concerning their influence on per capita income. Hence, the individual impacts of all deep determinants can be analyzed and compared to each other.

6. Data

In my analysis, I follow Tabellini (2005) and Knowles and Weatherston (2006) with respect to their informal institutions index. Using data from the WVS, Tabellini composed an index of four cultural features. According to Tabellini: "Three of them are expected to encourage a positive and productive attitude towards market exchange, entrepreneurial activities, or the production of public goods … The fourth indicator is symptomatic of a more hierarchical

society where individuals are less likely to take advantage of economic opportunities or to cooperate with each other …" (Tabellini, 2005, p.8f.). The measures are *trust*, *control*, *respect*, and *obedience*. As already illustrated, a high level of trust decreases transaction costs, while increasing the quantity of transactions and, accordingly, economic growth. In the WVS, *trust* is measured with the following question: "Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?". Possible answers are "Most people can be trusted", "Can't be too careful", and "Don't know". The level of trust in a country is measured by the percentage of respondents who answered that "Most people can be trusted".

The second measure that favours economic development is *control*. The corresponding question in the WVS is: "Some people feel that they have completely free choice and control over their lives, while other people feel that what they do has no real effect on what happens to them. Please use this scale (from 1 to 10) where 1 means 'none at all' and 10 means 'a great deal' to indicate how much freedom of choice and control in life you have over the way your life turns out". As already explained, being persuaded of having control over one's own life supports growth, and thus, a high number for *control* is positively correlated with per capita income. To measure *control* I follow Knowles and Weatherston (2006) who used the percentage of respondents in a country who gave a score of 7-10 concerning the former question.

The last growth supporting feature is *respect*. In the WVS, the corresponding question is: "Here is a list of qualities that children can be encouraged to learn at home. Which, if any, do you consider to be especially important? Please choose up to five." Respondents can decide between "good manners, independence, obedience, hard work, feeling of responsibility, imagination, thrift, saving money and things, determination and perseverance, religious faith, unselfishness, and tolerance and respect for other people". The variable *respect* is measured as the percentage of respondents in each country that has mentioned "tolerance and respect for other people".

The fourth element of Tabellini's cultural indicator is *obedience*. This factor is not supportive to growth as it increases. The appropriate question in the WVS is again the one asking for important qualities in children. Hence, *obedience* is measured by the percentage of respondents answering that obedience is an important quality for children to learn. According

to Tabellini, obedience without further reflection is a typical feature of hierarchical societies. Individualism is suppressed and obedience is more important than one's own opinion and personal responsibility. The suppression of individualism makes cooperation difficult and has negative effects on economic development (Tabellini, 2005, p.11). Therefore, *respect* and *obedience* are used as proxies for the societal structure, resulting in generalized vs. limited morality. Accordingly, a country with a high level of *respect* and a low level of *obedience* is expected to realize generalized morality and vice versa.

Tabellini creates two indicators using the four cultural traits. He obtains the first one by applying first principle component analysis and the second one by adding up the three positive measures minus *obedience*. Here it was decided to follow the second approach in creating an indicator of informal institutions. Therefore *trust*, *control*, and *respect* were added together, and *obedience* was subtracted. The resulting indicator is called *inform4*.

A proxy for formal institutions must reflect the interrelationship between formal institutions and growth. As already shown, property rights are usually assumed to be the main determinant for growth. Acemoglu and Johnson (2005), for example, emphasize the importance of property rights institutions. According to the authors "… property rights institutions are intimately linked to the distributions of political power in society because they regulate the relationship between ordinary private citizens and the politicians or elites with access to political power" (p.951). Hence, their preferred measure of property rights is Polity IV's "constraints on the executive", which measures the extent of institutionalized constraints on the executive. Its scale ranges from "unlimited authority" (1) to "executive parity or subordination" (7). Following Acemoglu and Johnson, this means of measurement has two advantages, "… first, it corresponds to the procedural rules constraining state action, and second, it highlights the close relationship between property rights institutions and political institutions" (p.951).

I follow Acemoglu's and Johnson's approach and use Polity IV's "constraints on the executive" as a proxy for formal institutions in my regression analysis.

To allow for ecological conditions and geography, I use a measure of malaria risk. The variable is called *malfal94* and was first introduced by Gallup, Sachs and Mellinger (1998). It emerged from a variable called MAL94P which depicts "… the proportion of each country's

population that live with risk of malaria transmission …" (Sachs, 2003, p.5). Malfal94 "… multiplies the MALP94 index by an estimate of the proportion of national malaria cases that involve the fatal species, Plasmodium falciparum, as opposed to three largely non-fatal species of the malaria pathogen (P. vivax, P. malariae, and P. ovale)" (Sachs, 2003, p.5). The measure was also used by Acemoglu, Johnson and Robinson (2001), Rodrik, Subramanian and Trebbi (2002), and Knowles and Weatherston (2006).

Openness is measured with data from the Penn World Tables 6.2. I use the variable *openk* which represents exports plus imports, divided by real GDP per capita in constant prices. The base year is 1996.

The data from the Penn World Tables 6.2 is also used to measure per capita income. The corresponding variable is called *rgdpl*, which represents real GDP per capita in constant prices. Again, the reference year is 1996.

7. Regression Approach

The equation to be estimated is:

$$(1) \qquad y = \alpha + \beta_1 I + \beta_2 F + \beta_3 GEO + \beta_4 OPEN,$$

where y indicates GDP per capita, I stands for informal and F for formal institutions, GEO denotes geography, and OPEN is openness.

Equation (2) corresponds to (1) with only the accordant proxies being inserted:

$$(2) \qquad \log(rgdpl) = \alpha + \beta_1 \inf orm4 + \beta_2 xconst + \beta_3 malfal94 + \beta_4 openk.$$

First of all the equation is estimated via OLS. However, as the causality between institutions and per capita income is mutual, endogeneity is definitely an issue in the regression, and therefore OLS may not be an accurate estimation method.

However, the 2SLS method is used to solve the problem of unclear causality between institutions and per capita income. Consequently the other regressors are assumed to be exogenous.

At any rate, after instrumenting for formal and informal institutions, endogeneity could still be an issue in respect to geography and integration. Definitely, a higher per capita income lowers malaria risk. Better health care is affordable at the state, as well as at the individual, level and vaccine is available for major parts of the population. Being aware of this issue, Sachs (2003) introduced an instrumental variable called Malaria Ecology (ME) which "is built upon climatological and vector conditions on a country-by-country basis, and is therefore exogenous to public health interventions and economic conditions, [therefore] ME provides an ideal instrumental variable for malaria risk" (Sachs, 2003, p.7). Hence, *ME* is used as instrument for malaria risk.

Concerning openness, it could be argued that richer countries are prone to open their economies as they are not protecting infant or other indigenous industries from competition on the world market. Hence, openness may lead to higher incomes, but higher incomes may also cause more openness. As in the former malaria case, it reverts to a well-established instrumental variable concerning openness, and therefore the natural logarithm of the Frankel-Romer actual trade share is used (Frankel & Romer, 1999).

8. Regression results

Since the empirical analysis consists of different data sets, the number of included countries varies between 72 and 54. No differentiation has been made between particular country groups like OECD countries, developing countries, or former colonies, since this would further decrease the sample size. Instead, all countries for which data are available are incorporated in each case. Tables 1-6 can be found in the appendix.

The first column of *Table 1* demonstrates the OLS regression results. A one percentage point increase in *inform4* leads to a 1.1 percentage point increase in per capita income. The result is significant at the 1 percent level. The coefficient on *xconst* is also significant at the 1 percent level. Accordingly, a one-score-increase leads to a rise in per capita income of 13 percent. Of

course, the coefficient on *malfal94* has a negative sign as an increase in malaria risk leads to a decline in income. *Openk* is significant at the 5 percent level and its coefficient is quite small, but at any rate a positive effect of openness on income becomes apparent.

As the size of the coefficients can be misleading concerning the variables' impact on income compared to each other, the first column of *Table 2* presents the beta-coefficients of the OLS regression. When measured in standard deviations, *inform4* has the largest effect on per capita income compared to all included variables. Therefore, informal institutions seem to play a decisive role in explaining per capita income patterns.

Columns two and three of *Table 1* show the first and second stage regression of a 2SLS estimation using *protestant* as an instrument for informal institutions. The coefficient on *protestant* in the first-stage regression demonstrates the variables' correlation with *inform4*, which is a precondition for its use as an instrumental variable. The second-stage regression confirms the OLS results. The coefficient on *inform4* is significant at the 1 percent level. A one percentage point increase in *inform4* leads to a 1.2 percentage point rise in per capita income. A one-score-increase of *xconst* on its scale from one to seven leads to a 12 percent higher per capita income.

Again, the beta-coefficients in column three of *Table 2* shed some light on the relation of the independent variables concerning their impact on per capita income. A one standard deviation increase in *inform4* leads to an increase of 0.48 standard deviations in per capita income. The other variables' beta-coefficients are smaller than that.

Table 3 demonstrates further 2SLS results. In regression (4) we use *protestant* and *muslim* as instruments for *inform4* and *xconst*, respectively. *Protestant* is highly significant in the first stage regression on *inform4*. As expected, *muslim* is negatively correlated with *xconst* and significant at the 1 percent level in the first-stage regression on *xconst*. Hence, a higher Protestant affiliation of the population enhances growth-supporting informal institutions, while a high Muslim affiliation decreases the level of growth-supporting formal institutions. In the second-stage regression, all variables are significant at least at the 5 percent level. A one percentage increase in *inform4* leads to a rise in per capita income of 1.1 percentage points. If *xconst* increases at one score, per capita income rises at 17.3 percent. A look at the

beta coefficients of *Table 4* again demonstrates the superiority of *inform4*, which, when rising at one standard deviation, leads to a 0.43 standard deviation increase in per capita income.

Regression (5) demonstrates the case where we use *catholic* in place of *muslim* as an instrumental variable. Again, *protestant* is significant at the 1 percent level concerning *inform4*. *Protestant* and *catholic* are both significant in the first-stage regression on *xconst*. In the second-stage regression, *inform4* becomes insignificant, while the coefficient on *xconst* increases.

Regressions (6)-(8) show the 2SLS results when we use instrumental variables for all independent variables. The first-stage regressions for *malfal94* and *openk* are not listed in the tables. At any rate, the instrumental variables *me* and *logfrankrom* are highly significant in each case. In regression (6) *muslim* is used as instrumental variable for *xconst*. Now, *protestant* is only significant on *inform4*, while *muslim* is significant and negatively correlated with *xconst*. All regressors of the second-stage regression are significant at least at the 10 percent level. A one percentage point increase in *inform4* leads to a 0.86 percentage point increase in per capita income. If *xconst* rises at one score, per capita income increases at 19.2 percent. Regarding the beta coefficients in Table 4, a one standard-deviation-increase in *inform4* leads to a rise in per capita income by 0.36 standard deviations, which is nearly the same amount as the beta coefficient on *xconst*.

In regression (7), again, *catholic* is used instead of *muslim* as an instrumental variable for *xconst*, while all independent variables are assumed to be endogenous. However, *inform4* is significant at the 10 percent level. The coefficient on *xconst* again increases compared to regressions (1) and (3) in which *muslim* is used as instrument, though the increase is not excessive. The most notable alteration occurs in the beta-coefficients-table, where the coefficient on *xconst* increases from 0.36 to 0.5 standard deviations. Hence, using *catholic* as an instrument for formal institutions, *xconst* gains more importance regarding its effect on per capita income and compared to the other regressors, while *inform4* becomes less significant.

Regression (8) is overidentified — that is, *protestant*, *muslim*, and *catholic* are used as instrumental variables. However, when *muslim* is incorporated, *catholic* is not significant in the first-stage regression on *xconst*. Instead, *muslim* is negatively correlated with *xconst* and significant at the 1 percent level. *Protestant* is also significant at the 1 percent level in the

first-stage regression on *inform4*. Except for *openk*, all regressors are significant in the second-stage regression. A one percentage point increase in *inform4* leads to a 0.8 percentage point increase in per capita income. If *xconst* increases at one score, income rises at 20.6 percent. Regarding the beta-coefficients, the coefficient on *xconst* decreases to 0.39 standard deviations, but is still higher than the coefficient on *inform4* and *malfal94*. However, using *protestant*, *muslim*, and *catholic* as instrumental variables, the disturbing effect of *catholic* decreases. The coefficients on *inform4* and *xconst* are comparable to the ones using only *protestant* and *muslim*, and thus, the overidentified regression can be used as a test of robustness. If *catholic* has a significant effect which disturbs the relationship, the result would not be robust in comparison to the ones using *protestant* and *muslim*. Thus, the correlation between *protestant*, *muslim*, *xconst* and *inform4* is stable. At any rate, *catholic* does not seem to fit into the intuitive argument. While Protestantism and Islam seem to have an impact on institutions, this must not hold for all religions.

To assure the results, some tests were conducted in order to shed light on a few issues concerning instrumental variable estimation. However, the small sample size demonstrates a problem regarding 2SLS estimation as well as testing. But, as we are working with country data and different data sets, there is nothing we can do about that issue. Therefore, the tests can best be seen as an additional coverage, but they are not fully reliable and have to be considered with caution. Most assumptions and conclusions must be considered by relying on intuition.

A perpetual issue in empirical work is that of heteroskedasticity. Although heteroskedasticity does not affect the consistency of the instrumental variable coefficient estimate, it does affect the estimates of the standard errors. Therefore, the Pagan-Hall test was applied on regressions 4, 5 and 6 to detect possible heteroskedasticity in the 2SLS estimations. The results suggest that heteroskedasticity is not existent in the accordant regressions. However, caution is advisable concerning this outcome as the Pagan-Hall test statistic might not be useful working with small sample sizes (Baum, Schaffer & Stillman, 2003, p.14). Therefore, additionally, the White-Koenker test statistic was used, even though this test is usually not applied in instrumental variable estimation. However, again, the result suggests that no heteroskedasticity is prevalent.

Concerning the validity of the instruments, the Sargan test statistic was implemented, again only for the case of overidentification, as the test is not valid otherwise. However, the null hypothesis is not rejected, and thus, the instrumental variables are not correlated with the disturbance. Again, we cannot fully rely on the test statistic since the Sargan test may not be valid when all instruments share the same rationale (Murray, 2006, p.117). As three religious affiliation variables are used as instrumental variables, this definitely is the case, and thus, the test only affirms our regression results but cannot be seen as evidence.

In the end, the Shea statistic to test for the issue of instrumental variable irrelevance was applied. Again, we achieved a positive result since at least the instruments for institutions are clearly relevant. To solve the problem of instrumental variable irrelevance, it is also useful to have a look at the first-stage regression results. The relevance is confirmed, since all instruments are highly significant in respect to the accordant endogenous regressors.

Table 5 demonstrates several tests of robustness. Yet again, regressions (6)-(8) were run including further independent variables, respectively. However, Panel A incorporates dummy variables for English and French legal origin as additional regressors. The original regression results are robust. Again, *inform4* becomes insignificant when *catholic* is used as sole instrumental variable for formal institutions. Moreover, the coefficient on *malfal94* further decreases. Interestingly, the coefficient on English legal origin is significant at the 5 percent level in all regressions.

Panel B includes a measure of population density (Sachs, 2003). Again, the original regression results are robust in respect to the inclusion of the additional regressors, while *pop100km* itself is insignificant.

In panels C, D, and E, the variables *coastline*, *temperature*, and *landlocked* from the Parker (1997) data set are added as exogenous regressors. All three factors are insignificant, while the results remain robust. The variables in panel C, D, and E depict geography measurements. Since they are not significant in contrast to *malfal94*, panel F examines what happens when *malfal94* is omitted, that is, when we do not control for geographical or ecological determinants at all. Still the results are robust. The main difference is depicted by *openk*, which is significant at the 5 percent level in all regressions, and thus, there does not seem to be a high correlation between *malfal94* and our institutional measures.

The empirical analysis demonstrates that at least Protestantism and Islam have a significant influence on the quality of institutions. Accordingly, a high proportion of Protestant population accompanies growth-supporting informal institutions, while a high proportion of Muslim population is negatively correlated with the constraints on the executive in the particular countries. Furthermore, our indicator of informal institutions is positively correlated with per capita income. Hence, informal institutions can be growth-supportive or growth-inhibiting. The higher the levels of *trust*, *control*, and *respect*, and the lower the level of *obedience*, so much the better for economic growth. Moreover, our measure of formal institutions and malaria risk are significant for per capita income, while openness at least becomes insignificant. It can be concluded that a one percentage point increase in *inform4* leads to an increase in per capita income between 0.8 and 1.1 percentage points. If *xconst* increases by one unit per capita, income rises about 20 percentage points.

9. Conclusion

The article tries to incorporate cultural traits in growth analysis and examines whether the emergence of institutions can be traced back to religious origins. The assumption is that not only formal but also informal institutions, and hence cultural factors, have an impact on economic growth. Theoretical and empirical analysis must consider the issues of endogeneity and reverse causality. Therefore, the transmission channels between informal and formal institutions and per capita income are examined. It is argued that religion, particularly Protestantism and Islam, influences the development of institutions. Therefore, the emergence of growth-supporting or growth-inhibiting formal and informal institutions depends on the prevalent religious, in our case Protestant and Islamic, morality. Concerning empirical analysis, the usual OLS approach is not practicable. Hence, we run several 2SLS regressions and use the proportion of the population being, respectively, Protestant or Muslim as instrumental variables. *Protestant* and *Muslim* are highly correlated with the accordant institutional indicators. Thus, a high Protestant proportion of the population is correlated with growth-supporting informal institutions, while a high percentage of Muslim citizens is correlated with growth-inhibiting formal institutions. Moreover, the second-stage regressions demonstrate that cultural factors have a crucial impact on per capita income.

The relevance of this result stems from the particular properties of informal institutions. In general, institutions are characterized by their stickiness, and thus, alterations take place slowly. Institutions which are responsible in particular for self-identification and non-material stability, that is informal institutions, are even more resistant to change (Boettke, Coyne & Leeson, 2008; Roland, 2005). At the same time these institutions are jointly responsible for economic development and are ambiguously correlated with formal institutions and income. Hence, an alteration of formal institutions which obviously hinder growth encounters several problems. First, formal and informal institutions are correlated, and many formal institutions even originate in informal institutions. Therefore, when changing formal institutions, the ambiguous transmission channels and the prevalent informal institutions must be considered. Otherwise the change can lead to unexpected results. At the least, the modification could worsen the situation or simply have no effect, as the prevalent culture might not match the formal transformations. Second, political or economic patterns, which in general are considered to be supportive for economic growth, do not do the job in certain countries with different societal and cultural origins, and thus, some institutions cannot be exogenously modified — that is, the transformation of institutions is constrained. And third, no true or right institutional structure exists, as the quality of institutions depends on their societal environment. Hence, institutions that might be judged as growth-inhibiting in one country can be quite effective somewhere else. This holds for formal as well as informal institutions.

Of course, this means that a general pattern of growth which can be applied to every country does not exist. Although this conclusion might be depressing because it limits the scope for development economics, it has important political implications in that the implementation of standard Western institutions might not be helpful in certain cases. Thus, in the majority of cases, externally imposed institutions that are not rooted in the historical and cultural environment will not be accepted.

References

Acemoglu, Daron & Johnson, Simon (2005) Unbundling Institutions. *Journal of Political Economy*, October, 113(5), 949-995.

Acemoglu, Daron, Johnson, Simon & Robinson, James A. (2001) The Colonial Origins of Comparative Development: An Empirical Investigation. *American Economic Review*, December, 91(5), 1369-1401.

Acemoglu, Daron, Johnson, Simon & Robinson, James A. (2002) Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution. *The Quarterly Journal of Economics*, November, 117(4), 1231-1294.

Acemoglu, Daron, Johnson, Simon & Robinson, James A. (2005) Institutions as Fundamental Causes of Long-Run Growth. In: Aghion, Philippe, & Durlauf, Steven N. (eds), *Handbook of Economic Growth, Volume 1A*. 2005 Elsevier B.V., 385-472.

Akerlof, George A. & Kranton, Rachel, E. (2000) Economics and Identity. *The Quarterly Journal of Economics*, August, 115(3), 715-753.

Barro, Robert J. & McCleary, Rachel M. (2003) Religion and Economic Growth Across Countries. *American Sociological Review*, October, 68(5), 760-781.

Baum, Christopher F., Schaffer, Mark E. & Stillman, Steven (2003) Instrumental Variables and GMM: Estimation and Testing. Boston College, Department of Economics, Working Paper No. 545, February 2003.

Besley, Timothy & Kudamatsu, Masayuki (2008) Making Autocracy Work. In: Helpman, Elhanan (ed), *Institutions and Economic Performance*. Harvard University Press, Cambridge, MA & London, 452-510.

Bockstette, Valerie, Chanda, Areendam & Putternam, Louis (2002) States and Markets: The Advantage of an Early Start. *Journal of Economic Growth*, December, 7(4), 347-369.

Boettke, Peter J., Coyne, Christopher J. & Leeson, Peter T. (2008) Institutional Stickiness and the New Development Economics. *American Journal of Economics and Sociology*, April, 67(2), 331-358.

De Soto, Hernando (2000) *The Mystery of Capital: Why Capitalism Triumphs in the West and Fails Everywhere Else*. Basic Books, New York.

Dollar, David & Kraay, Aart (2004) Trade, Growth, and Poverty, *The Economic Journal*, February, 114(493), F22-F49.

Durlauf, Steven N., Johnson, Paul A. & Temple, Jonathan R.W. (2005) Growth Econometrics. In: Aghion, Philippe, & Durlauf, Steven N. (eds), *Handbook of Economic Growth, Volume 1A*. 2005 Elsevier B.V., 555-677.

Easterly, William & Levine, Ross (2003) Tropics, Germs, and Crops: How Endowments Influence Economic Development. *Journal of Monetary Economics*, January, 50(1), 3-39.

Fernández, Raquel (2008) Culture and Economics. In: Durlauf, Steven N. & Blume, Lawrence E. (eds), *The New Palgrave Dictionary of Economics*, 2nd edition, Palgrave Macmillan. [Online] Available from: http://www.dictionaryofeconomics.com/article?id=pde2008_E000282. doi:10.1057/9780230226203.0346. [Accessed 9th February, 2009]

Fernández, Raquel & Fogli, Alessandra (2007) Culture: An Empirical Investigation of Beliefs, Work, and Fertility. NBER Working Paper No. 11268.

Frankel, Jeffrey A. & Romer, David (1999) Does Trade Cause Growth? *American Economic Review*, June, 89(3), 379-399.

Gallup, John Luke, Sachs, Jeffrey D. & Mellinger, Andrew D. (1998) Geography and Economic Development. In: Pleskovic, Boris & Stiglitz, Joseph E. (eds), *Annual World Bank Conference on Development Economics 1998*, April 1998, The World Bank: Washington, DC., 127-188.

Glaeser, Edward L., La Porta, Rafael, Lopez-De-Silanes, Florenico & Shleifer, Andrei (2004) Do Institutions Cause Growth? *Journal of Economic Growth*, September, 9(3), 271-303.

Greif, Avner (1994) Cultural Beliefs and the Organization of Society: A Historical and Theoretical Reflection on Collectivist and Individualist Societies. *Journal of Political Economy*, October, 102(5), 912-950.

Guiso, Luigi, Sapienza, Paola & Zingales, Luigi (2003) People's Opium? Religion and Economic Attitudes. *Journal of Monetary Economics*, January, 50(1), 225-282.

Guiso, Luigi, Sapienza, Paola & Zingales, Luigi (2006) Does Culture Affect Economic Outcomes? *Journal of Economic Perspectives*, Spring, 20(2), 23-48.

Gurr, Ted R., Jaggers, Keith & Moore, Will H. (1989) *The POLITY II Codebook*. University of Colorado at Boulder, Center for Comparative Politics. Polity II data. [Online] Available from: http://www.icpsr.umich.edu/. [Accessed 9th February, 2009]

Hall, Robert E. & Jones, Charles I. (1999) Why Do Some Countries Produce So Much More Output Per Worker Than Others? *The Quarterly Journal of Economics*, February, 114(1), 83-116.

Heston, Alan, Summers, Robert & Aten, Bettina (2006) Penn World Table Version 6.2, Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania, September 2006.

Inglehart, Ronald, Basanez, Miguel, Diez-Medrano, Jaime, Halman, Loek & Luijkx, Ruud (eds) (2004) *Human Beliefs and Values: A Cross-Cultural Sourcebook Based on the 1999-2002 Values Surveys*, Siglo Veintiuno Editores, México.

Inglehart, Ronald & Welzel, Christian (2007) *Modernization, Cultural Change, and Democracy: The Human Development Sequence*. First published 2005, 5th printing 2007. Cambridge University Press, Cambridge.

International Country Risk Guide, [Online] Available from: http://www.prsgroup.com/. [Accessed 2nd March, 2009]

Jaggers, Keith & Gurr, Ted Robert (1995) Tracking Democracy's Third Wave with the Polity III Data, *Journal of Peace Research*, 32:469-482. Polity III data. [Online] Available from: http://privatewww.essex.ac.uk/~ksg/polity.html. [Accessed 2nd March, 2009]

Jaggers, Keith & Marshall, Monty G. (2005) *Polity IV Project: Political Regime Characteristics and Transitions, 1800-2004, Dataset User's Manual*. Polity IV Project, Center for Global Policy, George Mason University. Polity IV data. [Online] Available from: http://www.systemicpeace.org/polity/polity4.htm. [Accessed 9th April, 2008]

Kaufmann, Daniel, Kraay, Aart & Mastruzzi, Massimo (2003) Governance Matters III: Updated Governance Indicators for 1996-2002. June 2003, Policy Research Working Paper No. 3106, The World Bank Department Research Group, Washington DC.

Kaufmann, Daniel, Kraay, Aart & Mastruzzi, Massimo (2008) Governance Matters VII: Governance Indicators for 1996-2007. June 2008, Policy Research Working Paper No. 4654, The World Bank Department Research Group, Washington DC.

Kaufmann, D., Kraay A. & Zoido-Lobatón, P. (2002) Governance Matters II: Updated Indicators for 2000-2001. February 2002, Policy Research Working Paper No. 2772, The World Bank Department Research Group, Washington DC.

Kerekes, Carrie B. & Williamson, Claudia R. (2008) Unveiling de Soto's Mystery: Property Rights, Capital Formation, and Development. *Journal of Institutional Economics*, December, 4(3), 299-325.

Knowles, Stephen & Weatherston, Clayton (2006) Informal Institutions and Cross-Country Income Differences. University of Nottingham, CREDIT Research Paper, No. 06/06.

La Porta, Rafael, Lopez-De-Silanes, Florenico, Pop-Eleches, Cristian & Shleifer, Andrei (2004) Judicial Checks and Balances. *Journal of Political Economy*, April, 112(2), 445-470.

La Porta, Rafael, Lopez-De-Silanes, Florenico, Shleifer, Andrei & Vishny, Robert (1999) The Quality of Government. *The Journal of Law, Economics, & Organization*, March, 15(1), 222-279.

Landes, David (1998) *The Wealth and Poverty of Nations*. W. W. Norton, New York.

Murray, Michael P. (2006) Avoiding Invalid Instruments and Coping With Weak Instruments. *Journal of Economic Perspectives*, Fall, 20(4), 111-132.

North, Douglass C. (1990) *Institutions, Institutional Change and Economic Performance*. Cambridge University Press, Cambridge.

Parker, Philip M. (1997) *National Cultures of the World: A Statistical Reference*. Greenwood Press, Westport.

Persson, Torsten & Tabellini, Guido (2006) Democracy and Development: The Devil in the Details. NBER Working Paper No. 11993.

Persson, Torsten & Tabellini, Guido (2008a) Democratic Capital: The Nexus of Political and Economic Change. Working Paper.

Persson, Torsten & Tabellini, Guido (2008b) The Growth Effect of Democracy: Is it Heterogeneous and How Can it be Estimated? Helpman, Elhanan (ed) *Institutions and Economic Performance.* Harvard University Press, Cambridge, MA, 544-585.

Platteau, Jean-Philippe (2000) *Institutions, Social Norms, and Economic Development*. Routledge, London.

Porta, Pier Luigi & Scazzieri, Roberto (1997) Towards an economic theory of international civil society: Trust, trade and open government. *Structural Change and Economic Dynamics*, March, 8(1), 5-28.

Przeworski, Adam (2004b) Geography vs. Institutions Revisited: Were Fortunes Reversed? New York University, mimeo.

Rodrik, Dani (2007) *One Economics Many Recipes: Globalization, Institutions, and Economic Growth*. Princeton University Press, Princeton.

Rodrik, Dani, ed (2003) *In Search of Prosperity*. Princeton University Press, Princeton.

Rodrik, Dani, Subramanian, Arvind & Trebbi, Francesco (2004) Institutions Rule: The Primacy of Institutions Over Geography and Integration in Economic Development. *Journal of Economic Growth*, June, 9(2), 131-165.

Roland, Gérard (2005) Understanding Institutional Change: Fast-Moving and Slow-Moving Institutions. Presented at the *Conference of Endogenous Institutional Change*. Social Science History Institute, Stanford University, also published in *Studies in Comparative International Development*, 2004, 38(4), 109-131.

Sachs, Jeffrey D. (2003) Institutions Don't Rule: Direct Effects of Geography on Per Capita Income. National Bureau of Economic Research (Cambridge, MA) Working Paper No. 9490, February 2003.

Sachs, Jeffrey D. & Warner, Andrew (1995) Economic Reform and the Process of Global Integration. *Brookings Papers on Economic Activity*, 26(1995-1), 1-118.

Tabellini, Guido (2005) Culture and Institutions: Economic Development in the Regions of Europe. CESifo Working Paper, No. 1492, July 2005.

Tabellini, Guido (2007) Institutions and Culture. IGIER Working Paper, Bocconi University.

Tabellini, Guido (2008) The Scope of Cooperation: Values and Incentives. *The Quarterly Journal of Economics*, August, 123(3), 905–950.

Weber, Max (2002) *The Protestant Ethic and the Spirit of Capitalism*. Routledge, New York & London (originally published as two separate essays, 1904-1905).

Williamson, Claudia R. (2009) Informal Institutions Rule: Institutional Arrangements and Economic Performance. *Public Choice*, forthcoming.

Williamson, Claudia R. & Kerekes, Carrie B. (2009) Securing Private Property: The Relative Importance of Formal versus Informal Institutions. Appalachian State University, unpublished Working Paper.

WORLD AND EUROPEAN VALUES SURVEYS FOUR WAVE INTEGRATED DATA FILE, 1981-2004, v.20060423, 2006. The World Values Survey Association. [Online] Available from: www.worldvaluessurvey.org, and European Values Study Foundation. [Online] Available from: (www.europeanvalues.nl). [Accessed 7th May, 2008]

Appendix

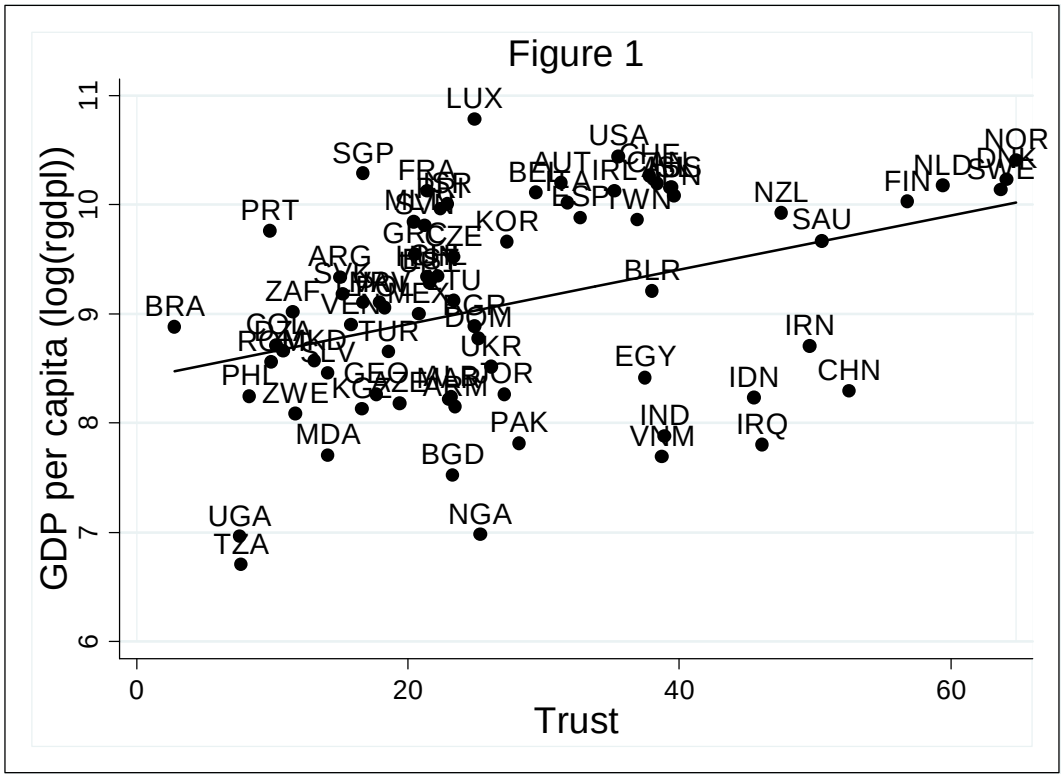
Figure 1
GDP per capita (log(rgdpl))
Trust
LUX
USA
SGP
NOR
NLD
FIN
SWE
NZL
SAU
PRT
KOR
ARG
BLR
ZAF
BRA
IRN
EGY
CHN
IDN
PHL
ZWE
IND
IRQ
PAK
MDA
BGD
UGA
NGA
TZA

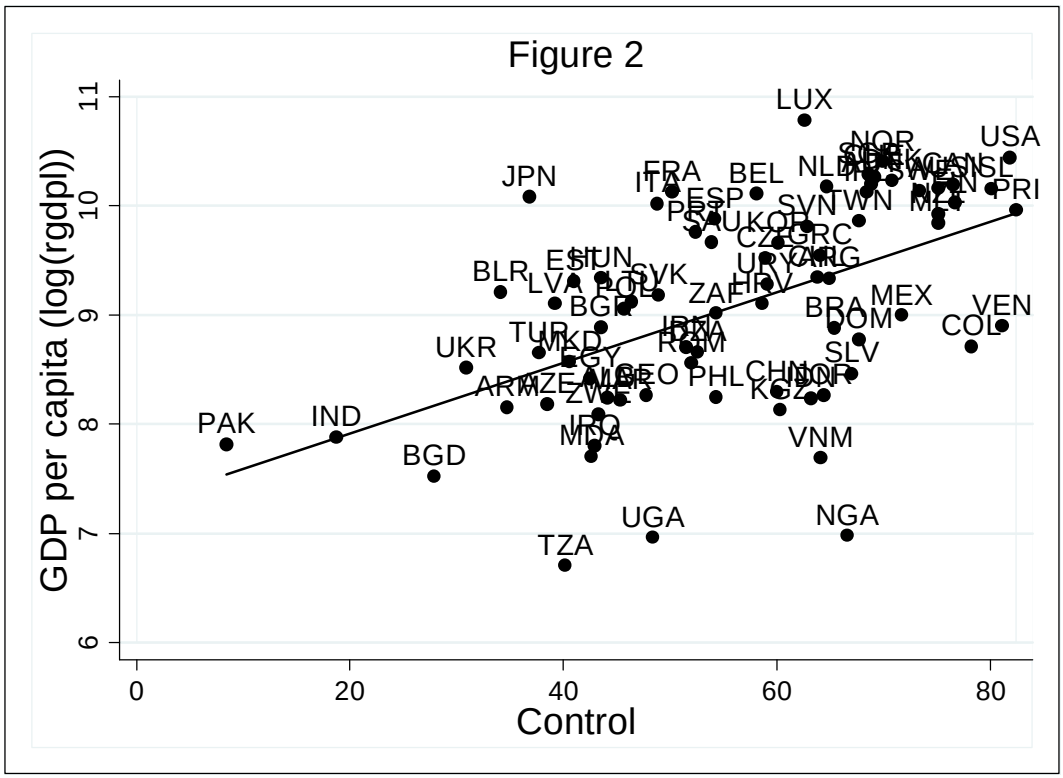
Figure 2
GDP per capita (log(rgdpl))
Control
LUX
USA
JPN
FRA
BEL
PRI
BLR
MEX
VEN
COL
UKR
SLV
PAK
IND
VNM
BGD
UGA
NGA
TZA

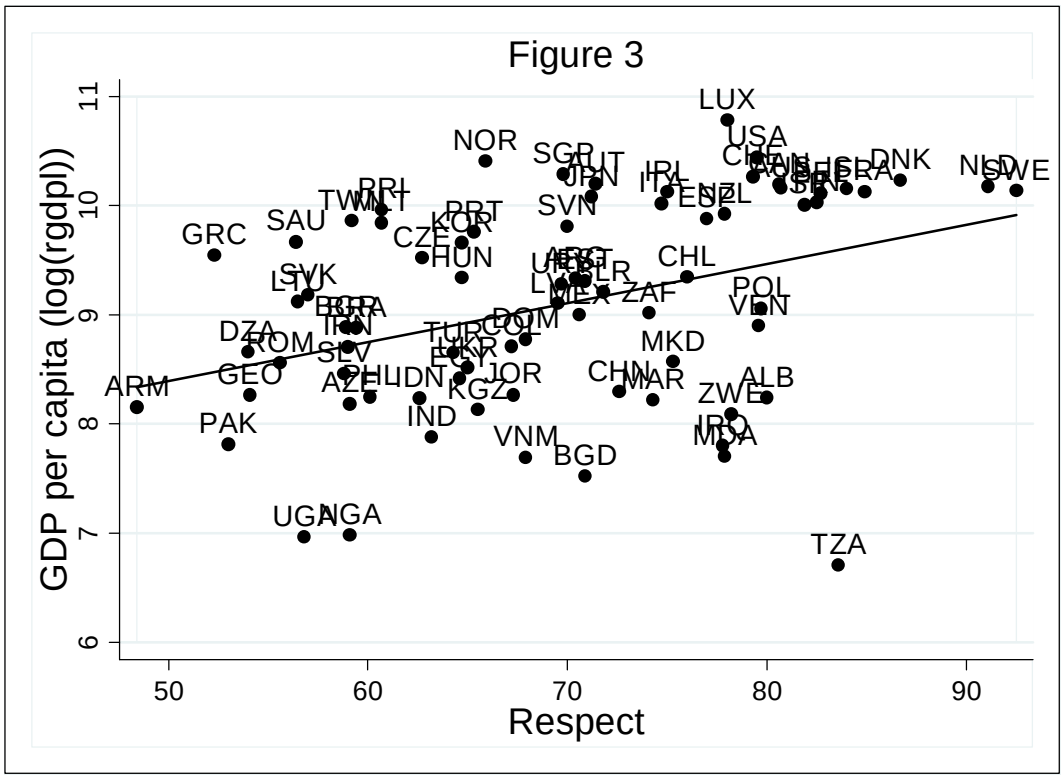
Figure 3
GDP per capita (log(rgdpl))
Respect
6
7
8
9
10
11
50
60
70
80
90
LUX
USA
NOR
SGP
DNK
NLD
SWE
GRC
SAU
SVN
CHL
POL
ZAF
MKD
ARM
GEO
PAK
IND
VNM
BGD
ALB
ZWE
MDA
UGA
NGA
TZA

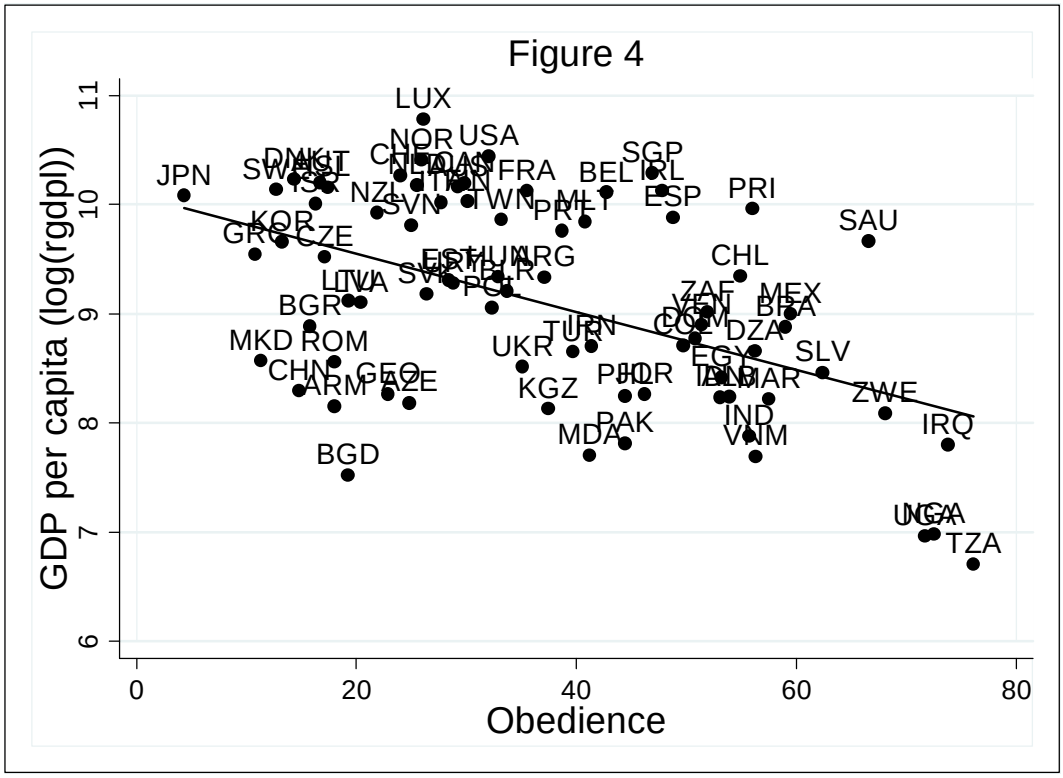
Figure 4
GDP per capita (log(rgdpl))
Obedience
6
7
8
9
10
11
0
20
40
60
80
LUX
USA
JPN
SGP
PRI
SAU
CHL
MEX
BGR
MKD
ROM
UKR
KGZ
SLV
ZWE
IRQ
PAK
MDA
IND
VNM
BGD
TZA

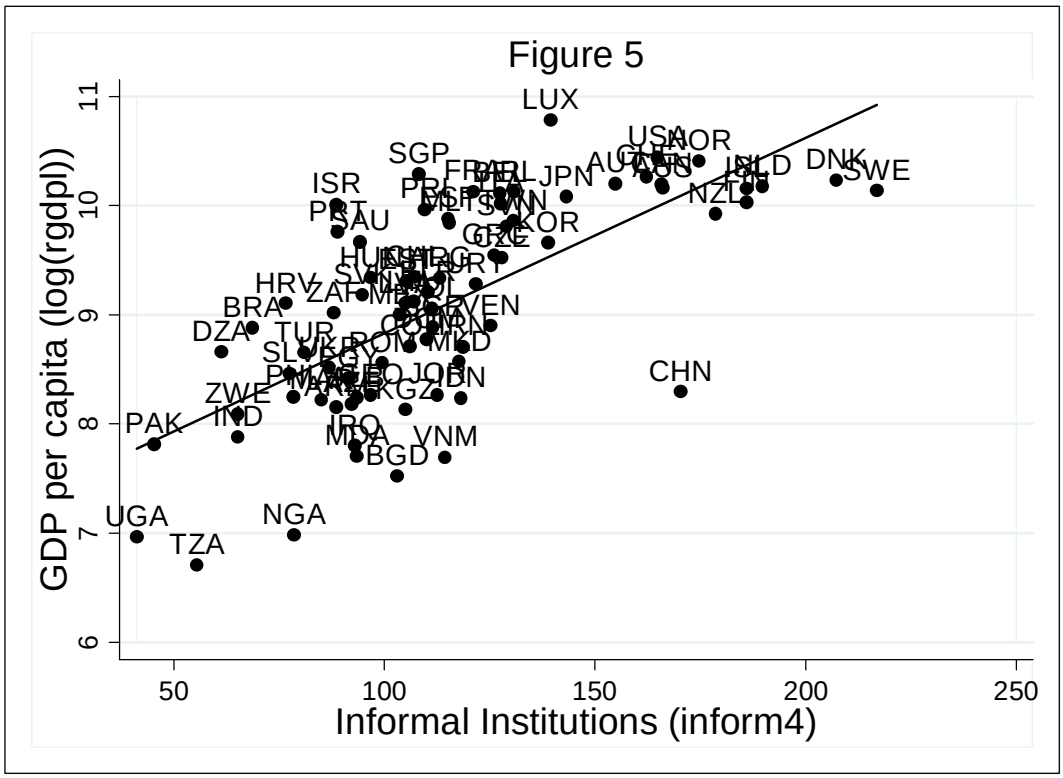
Figure 5
GDP per capita (log(rgdpl))
Informal Institutions (inform4)
6
7
8
9
10
11
50
100
150
200
250
LUX
SGP
ISR
JPN
KOR
NZL
DNK
SWE
HRV
BRA
DZA
TUR
ZWE
IND
PAK
CHN
VNM
BGD
UGA
NGA
TZA

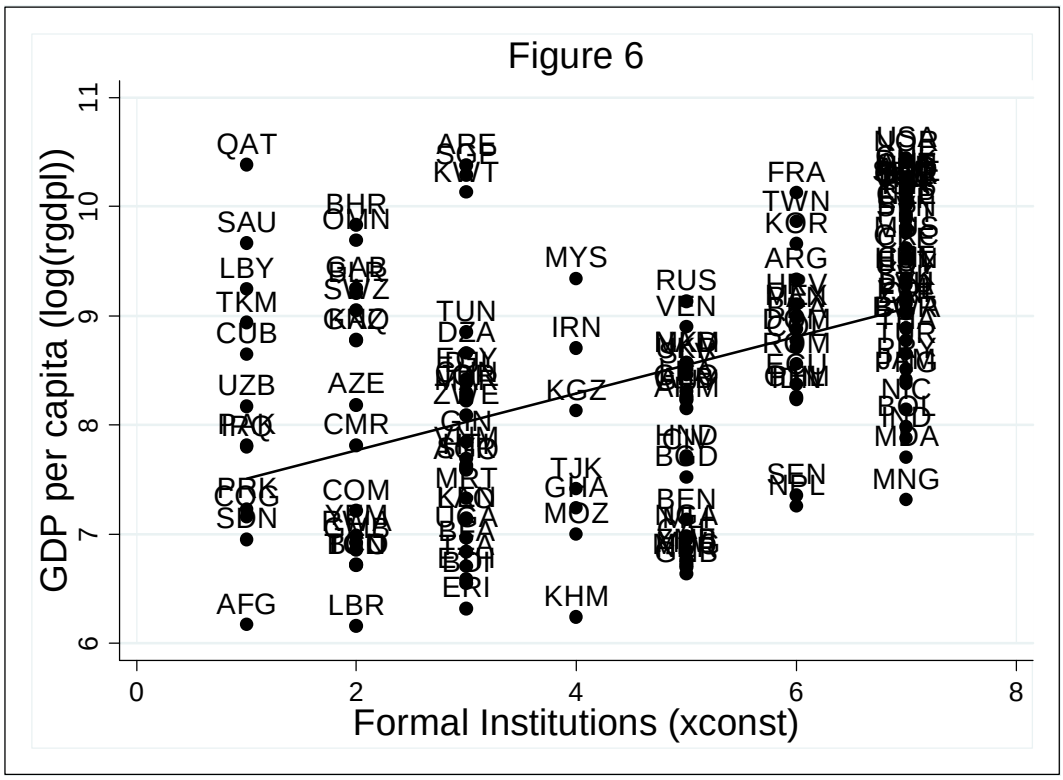
Figure 6
GDP per capita (log(rgdpl))
Formal Institutions (xconst)
6
7
8
9
10
11
0
2
4
6
8
QAT
SAU
LBY
TKM
CUB
UZB
AFG
BHR
OMN
AZE
CMR
COM
LBR
ARE
KWT
TUN
DZA
MRT
ERI
MYS
IRN
KGZ
TJK
MOZ
KHM
RUS
VEN
BGD
BEN
FRA
TWN
KOR
ARG
SEN
NPL
MNG
MDA

Figure 7

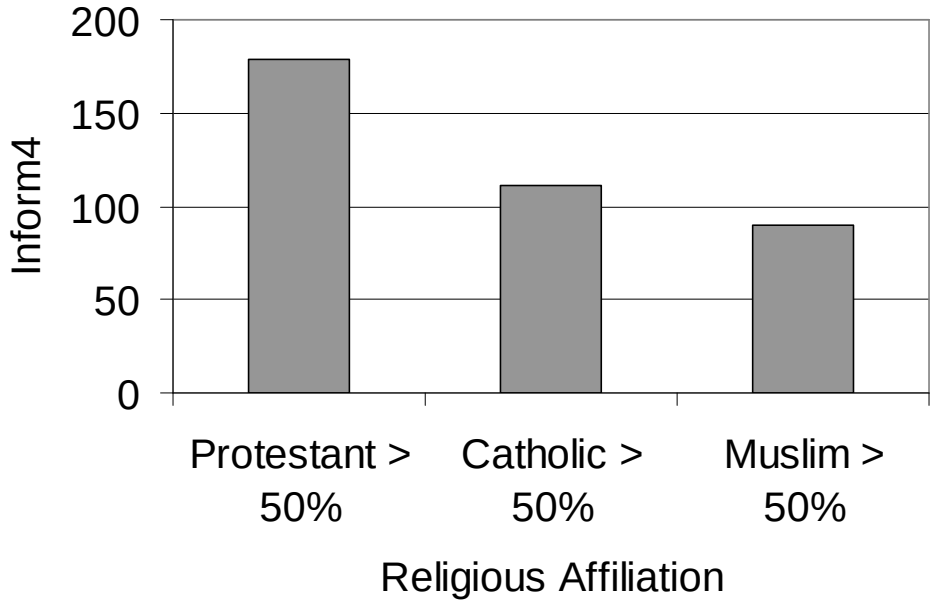

Figure 8

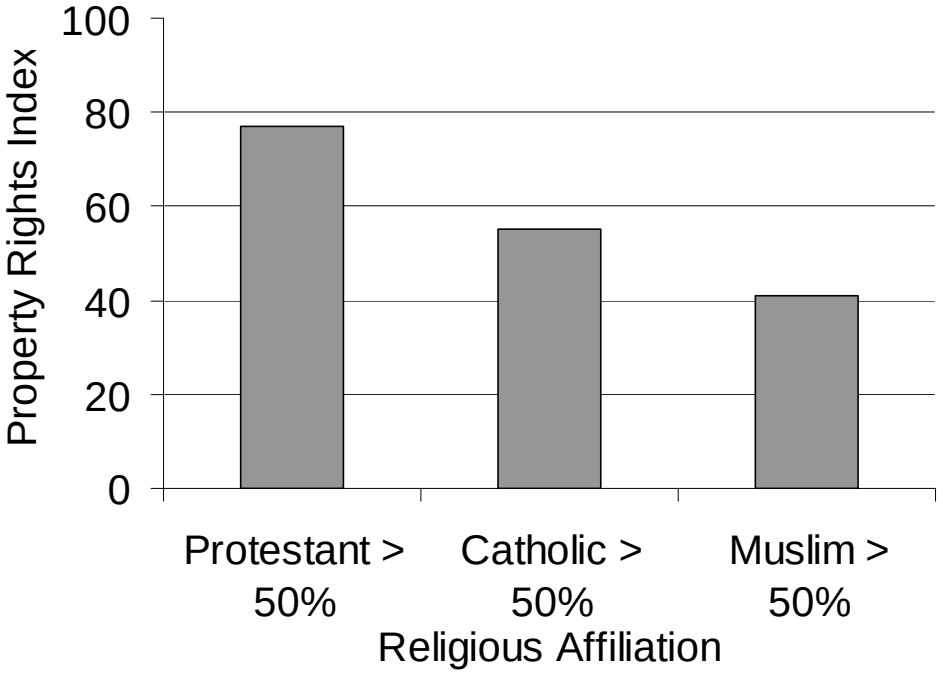

Table 1			
	(1)	(2)	(3)
	OLS Regression: Dependent Variable is GDP Per Capita 2000	2SLS Regression: First Stage Regression for inform4	2SLS Regression: Second Stage Regression for logrgdpl
	logrgdpl	inform4	logrgdpl
inform4	0.0109***		0.0123***
	(0.00202)		(0.00341)
xconst	0.130***	3.127	0.121***
	(0.0391)	(1.893)	(0.0439)
malfal94	-1.228***	-47.29***	-1.167***
	(0.283)	(13.08)	(0.310)
openk	0.00306**	0.00863	0.00303**
	(0.00121)	(0.0591)	(0.00123)
protestant		0.849***	
		(0.140)	
N	72	71	71
R-sq	0.698	0.543	0.696
adj. R-sq	0.680	0.515	0.677
Standard errors in parentheses * p<0.10, ** p<0.05, *** p<0.01			

Table 2			
Beta-Coefficients			
	(1)	(2)	(3)
	OLS Regression: Dependent Variable is GDP Per Capita 2000	2SLS Regression: First Stage Regression for inform4	2SLS Regression: Second Stage Regression for logrgdpl
	logrgdpl	inform4	logrgdpl
inform4	0.428***		0.483***
	(0.00202)		(0.00341)
xconst	0.254***	0.155	0.236***
	(0.0391)	(1.893)	(0.0439)
malfal94	-0.330***	-0.323***	-0.314***
	(0.283)	(13.08)	(0.310)
openk	0.172**	0.012	0.170**
	(0.00121)	(0.0591)	(0.00123)
protestant		0.539***	
		(0.140)	
N	72	71	71
R-sq	0.698	0.543	0.696
adj. R-sq	0.680	0.515	0.677
Standard errors in parentheses * p<0.10, ** p<0.05, *** p<0.01			

Table 3					
Second Stage Regression: Dependent Variable is log GDP per capita 2000					
	(4)	(5)	(6)	(7)	(8)
	logrgdpl	Logrgdpl	logrgdpl	logrgdpl	logrgdpl
inform4	0.0109***	0.00574	0.00858**	0.00701*	0.00799**
	(0.00400)	(0.00504)	(0.00368)	(0.00401)	(0.00364)
xconst	0.173**	0.372***	0.192**	0.264**	0.206**
	(0.0756)	(0.115)	(0.0795)	(0.107)	(0.0784)
malfal94	-1.123***	-0.952**	-1.672***	-1.595***	-1.654***
	(0.311)	(0.395)	(0.441)	(0.473)	(0.443)
openk	0.00306**	0.00318**	0.00357*	0.00378*	0.00330
	(0.00124)	(0.00153)	(0.00207)	(0.00225)	(0.00206)
N	71	71	54	54	54
R-sq	0.692	0.528	0.746	0.714	0.743
adj. R-sq	0.673	0.500	0.726	0.691	0.722
First Stage Regression for inform4					
	inform4	inform4	inform4	inform4	inform4
protestant	0.8574***	0.9494***	0.9469***	1.0744***	0.8767***
	(0.1345106)	(0.136617)	(0.166029)	(0.1714106)	(0.1940608)
muslim	-0.1883**		-0.2240*		-0.2891*
	(0.0918251)		(0.1226835)		(0.1457571)
catholic		0.0733		0.0731	-0.0960
		(0.0836375)		(0.1083806)	(0.1354816)
malfal94	-53.0080***	-53.6000***			
	(12.24383)	(12.56881)			
me			-2.8572**	-2.9466**	-2.9626**
			(1.105264)	(1.153863)	(1.120838)
openk	-0.0132	0.0087			
	(0.0593203)	(0.0599762)			
logfrankrom			1.1941	0.5148	1.4679
			(4.919869)	(5.082386)	(4.960132)
R-sq	0.5522	0.5292	0.5449	0.5127	0.5496
adj. R-sq	0.5251	0.5007	0.5077	0.4729	0.5027
First Stage Regression for xconst					
	xconst	xconst	xconst	xconst	Xconst
protestant	0.0128*	0.03098***	0.0094	0.0319***	0.0112
	(0.006761)	(0.0077258)	(0.0076356)	(0.0090774)	(0.0089577)
muslim	-0.0316***		-0.0320***		-0.0304***
	(0.0046155)		(0.0051822)		(0.006728)
catholic		0.0205***		0.0201***	0.0024
		(0.0047298)		(0.0057395)	(0.0062537)
malfal94	-2.0418***	-2.0514***			
	(0.6154218)	(0.7107797)			
me			-0.1006*	-0.0963	-0.0980*
			(0.0508302)	(0.0611051)	(0.0517371)
openk	-0.0039	-0.00004			
	(0.0029817)	(0.0033917)			
logfrankrom			0.0538	-0.0531	0.0470
			(0.2262607)	(0.2691478)	(0.2289563)
R-sq	0.5383	0.3855	0.5337	0.3380	0.5351
adj. R-sq	0.5103	0.3482	0.4957	0.2840	0.4867
Standard errors in parentheses * p<0.10, ** p<0.05, *** p<0.01					

Continuation Table 3: Tests					
	(4)	(5)	(6)	(7)	(8)
First stage F-value (inform4)			14.66	12.89	11.71
First stage F-value (xconst)			14.02	6.25	11.05
Partial R-squared (inform4)			0.5449	0.5127	0.5496
Partial R-squared (xconst)			0.5337	0.3380	0.5351
Shea Partial R-squared (inform4)			0.3552	0.3365	0.3670
Shea Partial R-squared (xconst)			0.3121	0.1927	0.3249
Pagan Hall (p-value)			0.1628	0.1655	0.1287
Sargan (p-value)					0.34858
White Koen. (p-value)			0.0725	0.0981	0.0662

Table 4					
Beta-Coefficients					
Second Stage Regression: Dependent Variable is log GDP per capita 2000					
	(4)	(5)	(6)	(7)	(8)
	logrgdpl	logrgdpl	logrgdpl	logrgdpl	Logrgdpl
inform4	0.429*** (0.00400)	0.226 (0.00504)	0.356** (0.00368)	0.291* (0.00401)	0.331** (0.00364)
xconst	0.337** (0.0756)	0.724*** (0.115)	0.362** (0.0795)	0.498** (0.107)	0.388** (0.0784)
malfal94	-0.302*** (0.311)	-0.256** (0.395)	-0.458*** (0.441)	-0.436*** (0.473)	-0.453*** (0.443)
openk	0.172** (0.00124)	0.179** (0.00153)	0.199* (0.00207)	0.210* (0.00225)	0.183 (0.00206)
N	71	71	54	54	54
R-sq	0.692	0.528	0.746	0.714	0.743
adj. R-sq	0.673	0.500	0.726	0.691	0.722
adj. R-sq	0.5103	0.3482	0.4957	0.2840	0.4867
Standard errors in parentheses * p<0.10, ** p<0.05, *** p<0.01					

Table 5			
Panel A			
	(6)	(7)	(8)
	Logrgdpl	logrgdpl	Logrgdpl
inform4	0.00936** (0.00463)	0.00732 (0.00514)	0.00866* (0.00455)
xconst	0.201** (0.0824)	0.294** (0.112)	0.211** (0.0810)
malfal94	-2.211*** (0.537)	-2.132*** (0.584)	-2.152*** (0.529)
openk	0.00426* (0.00216)	0.00455* (0.00240)	0.00397* (0.00213)
english	0.655** (0.268)	0.674** (0.294)	0.619** (0.263)
french	0.238 (0.246)	0.241 (0.268)	0.209 (0.242)
N	54	54	54
R-sq	0.741	0.692	0.747
adj. R-sq	0.708	0.653	0.715
Panel B			
	(6)	(7)	(8)
	Logrgdpl	logrgdpl	Logrgdpl
inform4	0.00856** (0.00372)	0.00710* (0.00403)	0.00795** (0.00368)
xconst	0.191** (0.0814)	0.265** (0.111)	0.206** (0.0803)
malfal94	-1.668*** (0.454)	-1.608*** (0.487)	-1.651*** (0.457)
openk	0.00353 (0.00224)	0.00389 (0.00248)	0.00327 (0.00223)
pop100km	0.0206 (0.254)	-0.0639 (0.293)	0.0306 (0.255)
N	54	54	54
R-sq	0.747	0.713	0.744
adj. R-sq	0.721	0.683	0.717
Panel C			
	(6)	(7)	(8)
	Logrgdpl	logrgdpl	Logrgdpl
inform4	0.00853** (0.00382)	0.00707* (0.00418)	0.00805** (0.00381)
xconst	0.191** (0.0810)	0.264** (0.108)	0.206** (0.0798)
malfal94	-1.683*** (0.470)	-1.587*** (0.504)	-1.654*** (0.472)
openk	0.00370* (0.00205)	0.00369* (0.00218)	0.00350* (0.00205)
coastline	0.000000732 (0.00000704)	-0.000000544 (0.00000759)	0.000000566 (0.00000708)
N	54	54	54
R-sq	0.747	0.714	0.744
adj. R-sq	0.721	0.684	0.717

Table 5			
Panel D			
	(6)	(7)	(8)
	logrgdpl	logrgdpl	logrgdpl
inform4	0.00864** (0.00364)	0.00722* (0.00393)	0.00811** (0.00360)
xconst	0.182** (0.0791)	0.247** (0.106)	0.194** (0.0781)
malfal94	-1.699*** (0.442)	-1.627*** (0.471)	-1.689*** (0.445)
openk	0.00290 (0.00202)	0.00313 (0.00219)	0.00268 (0.00202)
landlocked	0.339 (0.257)	0.316 (0.271)	0.336 (0.259)
N	54	54	54
R-sq	0.757	0.732	0.753
adj. R-sq	0.732	0.704	0.728
Panel E			
	(6)	(7)	(8)
	logrgdpl	logrgdpl	logrgdpl
inform4	0.0115** (0.00532)	0.0107* (0.00560)	0.0104** (0.00513)
Xconst	0.198** (0.0851)	0.279** (0.121)	0.212** (0.0826)
malfal94	-1.917*** (0.529)	-1.907*** (0.569)	-1.865*** (0.520)
openk	0.00380* (0.00225)	0.00410 (0.00251)	0.00346 (0.00219)
temperature	0.0254 (0.0241)	0.0330 (0.0289)	0.0220 (0.0236)
N	54	54	54
R-sq	0.715	0.669	0.721
adj. R-sq	0.685	0.634	0.692
Panel F			
	(6)	(7)	(8)
	logrgdpl	logrgdpl	logrgdpl
inform4	0.00972** (0.00432)	0.00735 (0.00476)	0.00886** (0.00426)
xconst	0.203** (0.0954)	0.307** (0.127)	0.227** (0.0929)
openk	0.00673** (0.00276)	0.00682** (0.00296)	0.00606** (0.00270)
N	55	55	55
R-sq	0.628	0.582	0.627
adj. R-sq	0.607	0.557	0.605

Data Definitions and Sources

control	Percentage of respondents who chose a score of 7-10 in response to the question "Some people feel they have completely free choice and control over their lives, while other people feel that what they do has no real effect on what happens to them. Please use this scale were 1 means 'none at all' and 10 means 'a great deal' to indicate how much freedom of choice and control you feel you have over the way your life turns out." Source: www.worldvaluessurvey.org.
trust	Percentage of respondents who answer that "Most people can be trusted" to the question "Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?" (other possible answers are "Can't be too careful" and "Don't know"). Source: www.worldvaluessurvey.org.
respect	Percentage of respondents that mention "Tolerance and respect for other people" when asked the following question: "Here is a list of child qualities that children can be encouraged to learn at home. Which, if any, do you consider to be especially important? Please choose up to five." Possible answers are: "Independence, hard work, feeling of responsibility, imagination, tolerance and respect for other people, thrift, saving money and things, determination and perseverance, religious faith, unselfishness, obedience." Source: www.worldvaluessurvey.org.
obedience	Percentage of respondents that mention "Obedience" when asked the following question: "Here is a list of child qualities that children can be encouraged to learn at home. Which, if any, do you consider to be especially important? Please choose up to five." Possible answers are: "Independence, hard work, feeling of responsibility, imagination, tolerance and respect for other people, thrift, saving money and things, determination and perseverance, religious faith, unselfishness, obedience." Source: www.worldvaluessurvey.org.
inform4	Sum of *trust*, *respect*, and *control* minus *obedience*
xconst	Extent of institutionalized constraints on the executive. The variable ranges from a score of (1) "Unlimited authority" to (7) "Executive parity or subordination". Source: Jaggers, Keith & Marshall (2005); http://www.systemicpeace.org/polity/polity4.htm.
malfal94	Proportion of each country's population that live with risk of malaria transmission multiplied by an estimate of the proportion of malaria cases that involve Plasmodium Falciparum. Source: Sachs (2003); http://www.earth.columbia.edu/articles/view/1040.
openk	Exports plus imports divided by rgdpl. Source: Heston, Summers & Aten, (2006); http://pwt.econ.upenn.edu/.
rgdpl	Real GDP per capita (Laspeyres). Source: Heston, Summers & Aten (2006); http://pwt.econ.upenn.edu/.
me	Instrumental variable for malaria risk. Source: Sachs (2003); http://www.earth.columbia.edu/articles/view/1040.
logfrankrom	Natural logarithm of the Frankel-Romer predicted trade share. Source: Hall & Jones (1999); http://elsa.berkeley.edu/~chad/datasets.html.
protestant	Percentage of the population being Protestant. Source: La Porta et al. (1999); http://mba.tuck.dartmouth.edu/pages/faculty/rafael.laporta/publications.html.
muslim	Percentage of the population being Muslim. Source: La Porta et al. (1999); http://mba.tuck.dartmouth.edu/pages/faculty/rafael.laporta/publications.html.

catholic	Percentage of the population being Catholic. Source: La Porta et al. (1999); http://mba.tuck.dartmouth.edu/pages/faculty/rafael.laporta/publications.html.
french	Dummy variable for French legal origin. Source: La Porta et al. (1999); http://mba.tuck.dartmouth.edu/pages/faculty/rafael.laporta/publications.html
english	Dummy variable for English legal origin. Source: La Porta et al. (1999); http://mba.tuck.dartmouth.edu/pages/faculty/rafael.laporta/publications.html
pop100km	Share of the national population living within 100km of the coast. Source: Sachs (2003); http://www.earth.columbia.edu/articles/view/1040.
latitude	Latitude in absolute degrees. Source: Parker (1997); http://faculty.insead.edu/parker/resume/personal.htm.
coastline	Coastline length in kilometres. Source: Parker (1997); http://faculty.insead.edu/parker/resume/personal.htm.
landlocked	Dummy variable for landlocked. Source: Parker (1997); http://faculty.insead.edu/parker/resume/personal.htm.