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Capita Income

by

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Nr. 319/2009



Institut für Volkswirtschaftslehre (520)  
Universität Hohenheim, 70593 Stuttgart

ISSN 0930-8334

# The Impact of Formal and Informal Institutions on Per Capita Income

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## **Abstract**

Despite the many approaches of neoclassical and endogenous growth theory, economists still face problems 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 analyses 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. The regression results affirm a crucial role of informal and formal institutions concerning economic development.

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

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

## 1. Introduction

Despite the many approaches of neoclassical and endogenous growth theory, economists still face problems 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 that 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 (Sachs and Warner, 1995; Porta and Scazzieri, 1997; Gallup *et al.*, 1998; Frankel and Romer, 1999; Hall and Jones, 1999; La Porta *et al.*, 1999; Akerlof and Kranton, 2000; Acemoglu *et al.*, 2001; Acemoglu *et al.*, 2002; Easterly and Levine, 2003; Rodrik, 2003; Sachs, 2003; Dollar and Kraay, 2004; Glaeser *et al.*, 2004; La Porta *et al.*, 2004; Przeworski, 2004; Rodrik *et al.*, 2004; Acemoglu and Johnson, 2005; Acemoglu *et al.*, 2005; Tabellini, 2005; Guiso *et al.*, 2006; Knowles and Weatherston, 2006; Persson and Tabellini, 2006; Fernández and Fogli, 2007; Tabellini, 2007; Fernández, 2008; Persson and Tabellini, 2008; Tabellini, 2008; Persson and Tabellini, 2009; Williamson, 2009). 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. Culture is defined as the values, norms, habits, conventions, codes of conduct, traditions, attitudes and beliefs of a society; and it is 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 them.

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. 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 depicted. The third section emphasizes the issue of endogeneity and reverse causality. The method of instrumental variable estimation is presented as a possible solution concerning the econometric analysis. The fourth part presents the data used in the empirical analysis, which incorporates geography and trade variables. Furthermore, the regression approach is depicted. Accordingly, the fifth section demonstrates the regression results. The conclusions are presented in the last part.

## *2. Formal and informal institutions*

Institutions constitute the social, political, legal and economic systems 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. Without institutions a human's reaction to a particular incentive is unpredictable. No patterns exist that could help to forecast human behaviour. Furthermore, misconduct cannot be sanctioned since a difference between 'good' and 'bad' behaviour is not defined. Therefore, people strive for 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 that 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. Institutions specify how to behave in certain situations and, hence, human actions become predictable. Violations are punished and offences 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. 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. Morals, norms, values, habits, conventions, traditions and codes of conduct also influence human behaviour. These cultural 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 that relate to their conviction rather than by formal institutions.

Much work has been carried out 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 systems. 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 values, morals, conventions, norms, habits, traditions, codes of conduct, attitudes and beliefs. 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 in 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 safe 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.<sup>1</sup> Consequently, beliefs, attitudes and codes of conduct resulting from religious affiliation affect the development of economies. Weber's thesis comes close to this work, as religious origins result in norms and values that people implement in everyday life. For now, the religious dimension will be skipped but we will refer to this point later. At any rate, the hypothesis states that particular informal institutions 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 analysed.

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<sup>1</sup> However, Weber's argument is not without controversy. Becker and Wöbmann (2009) state that the economic success of the Protestant work ethic depended on the fact that people became better educated since they had to be literate to read the Bible.

Therefore, the emphasis is on 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 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 her or his cultural and societal background, as well as on experiences and upbringing. If children are taught to trust other people, they will apply what they have learned without critical request, eventually for all their life, and will pass their attitudes on to their own children.<sup>2</sup> Hence, individuals are taught to trust or not to trust affiliates of a certain group (Greif, 1994; Platteau, 2000). Knack and Keefer (1997), for example, find out that the level of trust is higher in countries with less ethnical and class discrepancy. Hence, in hierarchical societies, where familial or tribal affiliation is important, the level of trust within the respective group is high, whereas beyond the group individuals do not trust others. Since trust is an informal institution, it is slow-moving (Roland, 2005). That is to say, the attitudes responsible for an individual's level of trust change slowly and an external alteration is difficult. At any rate, institutions are dynamic entities. That is to say, they are continually altered through historical accidents and endogenous processes. Logical reasoning, for example, in the course of time, can lead to a modification of attitudes, beliefs and world views.

Trust, however, has several impacts on economic performance. La Porta *et al.* (1997) find that trust increases judicial efficiency, bureaucratic quality and tax compliance, while high levels of trust decrease corruption. In high-trust societies, however, information is replaced by trust. Hence, the corresponding monitoring expenses decrease. Furthermore, people in high-trust societies may not record every detail of an act of sale and spend less time and money on lawyers and on the monitoring process. The business environment and, in general, economic transactions may be less regulated than in low-trust societies. People in high-trust societies put more confidence in the government and other official agencies, which results in higher credibility. Therefore, incentives to innovate and to invest are higher. Since transaction costs are low, more capital and more time is available for innovation and investment. Additionally, investors in a high-trust society will realize the optimal investment strategy over the long run rather than the short run. Trust enhances anonymous market exchange and decreases the need for external enforcement. That is to say, trust also increases the gains from labour division and trade (Putnam, 1993; Knack and Keefer, 1997).

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<sup>2</sup> See for example Fernández and Fogli (2007) for the transferability of norms and attitudes from one generation to the next and the consequences for economic growth.

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. Higher per capita incomes, however, lead to a general change in perspectives and priorities and, hence, modify a society's level of trust in the long term. Thus, a clear causality between trust and the respective formal institutions or rather per capita income does not exist. At any rate, it is obvious that a high level of trust decreases transaction costs while it leads to an increase in the quantity of transactions. Therefore, trust is associated with higher economic growth (Knack and Keefer, 1997; La Porta *et al.*, 1997).

Another informal institutional feature is an individual's conviction concerning control over one's own life. If people are persuaded that they are 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 a 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 formal institutional environment. An authoritarian political system that domineers over its citizens combined with bad economic performance, and therefore low per capita income, probably does not entail self-confidence but resignation. A higher living standard, however, contributes to an attitude of self-determination and self-confidence. People endowed 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. 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. Hence, causality is again 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 carried out. 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 the group are rare. Hence, in societies where limited morality is prevalent, innovation, investment, factor accumulation, trade and hence economic development per se is restricted through the limited possibilities of cooperation. That is to say, a hierarchical society with distinct familial or tribal structures is less supportive of economic growth. Societies that emphasize the individual and in which respectful codes of behaviour are applied to everyone, independent of familial or tribal affiliation, practise what is called generalized morality. This permits an increase in the quantity of cooperation and transactions, while lowering costs, and hence supports growth (Greif, 1993; Greif, 1994; Platteau, 2000; Tabellini, 2005; Tabellini, 2007; Tabellini, 2008). 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 with the Maghribis, can be ascribed to their individualist societal order. Thus, differences in societal organization can be traced back to distinct cultural affiliations. The transition from limited to generalized morality, however, is fluent. Codes of conduct and trust decrease with distance. That is to say, even if generalized morality is prevalent within a society, limited morality might be practised if we extend the geographical scope (Tabellini, 2007). Tabellini (2008) argues that limited and generalized morality not only shape economic development, but are a matter of the development progress itself. Accordingly, 'At early stages of development, transactions are mainly local, and both values and cooperation remain more limited in scope. As development progresses, and impersonal transactions gain relevance, this is accompanied by a generalization of the scope of values and cooperation' (p. 28). Hence, Tabellini hints at the issue of reverse causality, since societal organization influences economic development while economic development impacts on values and beliefs and, therefore, societal organization. This is also true for political institutions. Hence, generalized morality supports good governance and inter alia (Tabellini, 2007). However, we should not rely on the fact that economic development shapes values and beliefs in a way that supports generalized morality and, therefore, further progress. The interdependencies between economic development and generalized versus limited morality can also lead an economy to be stuck in a state of backwardness. Societies that practice limited morality may have less respect for the law and may be more tolerant of lax law enforcement, since informal



institutions govern their interrelationships. On the other hand, the quality of law enforcement may strengthen sound values, beliefs and morals (Tabellini, 2008).

Regarding formal institutions, the protection of property rights is usually described as the decisive institutional feature concerning growth (North, 1990; De Soto, 2000; Platteau, 2000; Rodrik, 2007; Kerekes and Williamson, 2008; Williamson and Kerekes, 2009). The exclusiveness and the irreproachable allocation of ownership offer the crucial incentive to invest that emanates from property rights. That is to say, property rights accord the owner of an asset the exclusive rights to decide on the utilization of her or his asset. Therefore, the owner will use her or his property in a way that maximizes her or his utility. 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, 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. The allocation of secure property rights requires an independent judiciary that 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 that 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 (Rodrik, 2007; Besley and Kudamatsu, 2008). Furthermore, to develop their full potential, ownership rights must be accompanied by a free-market system that 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 and instrumental variable estimation

Empirical analysis of 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). Hence, we are talking about a complex institutional system, characterized by complementarities and feedback between informal and formal institutions; and between institutions and economic development (Williamson, 2000; Roland, 2005; Boettke *et al.*, 2008; Dolfsma and Verburg, 2008). Higher material security modifies perspectives, priorities and the incentives for social affiliation. Hence, informal institutions adjust to new living circumstances. Social patterns that subconsciously exist for security reasons and for the reduction of transaction costs are no longer necessary when income increases. Attitudes concerning individualism, family, society and materialism are altered. However, since humans are social beings, several norms and values are maintained, even if they seem useless from an economic point of view. That is because individuals need these norms and values for self-identification and self-orientation.

However, radical changes in political and economic institutions are difficult to explain without the introduction of informal institutions.<sup>3</sup> An increase in per capita income alters informal institutions, which in turn impact on 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 social system, which repress 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, higher income levels might be correlated with higher educational standards, and therefore with more open-minded and educated individuals. Hence, due to their higher per capita incomes, the individuals are able to enforce institutions that fit their interests. Therefore, people might be rather able to question traditional belief and value systems. Consequently, the political system will be challenged. Hence, a democratic

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<sup>3</sup> Acemoglu *et al.* (2005) have developed a theoretical approach that ascribes the emergence of the political, legal and economic institutional environment to resource endowment. 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.

state supports growth-supporting informal institutions. Independent citizens who can freely participate in political, economic and social processes realize a higher level of trust, self-determination and self-confidence.

*Figures 1 to 5* demonstrate the correlations between our informal institutional measures and per capita income.<sup>4</sup> 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* depicts the relationship between per capita income and a measure of formal institutions, *xconst*. The variable is taken from the Polity IV data set and measures the extent of institutionalized constraints on the executive. 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 with respect to their levels of formal institutions. Indeed, these states are characterized by features that distinguish them from other countries with growth-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; therefore, they are able to afford ‘bad’ institutions.<sup>5</sup> Thus, the positions of these outliers can be traced back to their resource wealth.

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. 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. From a methodological point of

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<sup>4</sup> The measures are taken from the World Values Survey (World Values Survey Association and European Values Study Foundation, 2006) and are called *trust*, *control*, *respect* and *obedience*. *Trust* measures the level of trust within a society, *control* indicates how far people are persuaded that they are in control of their lives, *respect* and *obedience* specify the hierarchical structure of the society, in which high levels of *trust*, *control* and *respect* are supportive of 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.

<sup>5</sup> The term ‘bad’ institutions refers to institutions that are not supportive of economic growth.

view, the instrumental variable must provide a convenient source of exogenous variation and must not be intuitively correlated with institutions (Rodrik, 2007, p. 185ff.). However, an intuitive justification for the use of a certain instrumental variable is desirable, since it will help to understand institutional emergence better.

The following regression analysis uses data on different religious affiliations as instrumental variables for informal and formal institutions. Hence, it is assumed that the religious environment affects institutions, which then influence per capita income (Weber, 2002; Barro and McCleary, 2003; Guiso *et al.*, 2003). 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 any more, tracing the cultural properties back to their origin shows that religion is the starting point.

The relation between religion and formal institutions can best be seen regarding theocratic states where religion claims terrestrial and religious power. However, even in countries where state and religious power are separated, a basic attitude arising out of the religious background is prevalent. Hence, originally religious beliefs constitute world views 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.

*Figure 7* in the appendix depicts the relationship between the 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* 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.<sup>6</sup> However, we use the Protestant and Muslim affiliation of the population as instrumental variables for informal and formal institutions, 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 with 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 of economic growth, while Muslim affiliation is said to be growth-inhibiting (Landes, 1998; La Porta *et al.*, 1999; Guiso *et al.*, 2003). 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.

#### *4. Data and regression approach*

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

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<sup>6</sup> In *figures 7 and 8*, countries with a Protestant, Catholic and Muslim proportion of the population, respectively, greater than 50 per cent are used.

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 the factors influence each other (Rodrik, 2003; Rodrik *et al.*, 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 into the following empirical work.

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. 8ff.). The measures are *trust*, *control*, *respect* and *obedience*.

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 that one has 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 who mentioned ‘tolerance and respect for other people’.

The fourth element of Tabellini’s cultural indicator is *obedience*. This factor is not supportive of 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. 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). 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.

The indicator for informal institutions, *inform4*, is created by adding up the three positive measures minus *obedience* (Tabellini, 2005; Knowles and Weatherston, 2006).

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 of growth. According to Acemoglu and Johnson (2005) ‘... 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). I follow Acemoglu and Johnson’s approach and use Polity IV’s ‘constraints on the executive’ as a proxy for formal institutions in my regression analysis. The variable measures the extent of institutionalized constraints on the executive. Its scale ranges from ‘unlimited authority’ (1) to ‘executive parity or subordination’ (7).

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 *et al.* (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).

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.

The equation to be estimated is:

$$(1) \quad y = \alpha + \beta_1 I + \beta_2 F + \beta_3 \text{GEO} + \beta_4 \text{OPEN},$$

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

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

$$(2) \quad \log(\text{rgdpl}) = \alpha + \beta_1 \text{inform} + \beta_2 \text{xconst} + \beta_3 \text{malfal94} + \beta_4 \text{openk}.$$

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 with 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 vaccines are 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 the 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, *logfrankrom*, is used (Frankel and Romer, 1999).

### 5. Regression results

Since the empirical analysis consists of different data sets, the number of included countries varies between 72 and 55.

The first column of *Table 1* demonstrates the OLS regression results. A 1 percentage point increase in *inform4* leads to a 1.1 percentage point increase in per capita income. The result is significant at the 1 per cent level. The coefficient on *xconst* is also significant at the 1 per cent level. Accordingly, a 1-score increase leads to a rise in per capita income of 13 per cent. 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 per cent 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 with 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 with all the 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 regressions of a 2SLS estimation using *protestant* as an instrument for informal institutions. The remaining independent variables in this regression are assumed to be exogenous. The coefficient on *protestant* in the first-stage regression, which is significant at the 1 per cent level, 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 per cent level. A 1 percentage point increase in *inform4* leads to a 1.2 percentage point rise in per capita income. A 1-score increase of *xconst* on its scale from 1 to 7 leads to a 12 per cent 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 1 standard deviation increase in *inform4* leads to an increase of 0.49 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 per cent 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 the variables are significant at least at the 5 per cent level. A 1 percentage point increase in *inform4* leads to a rise in per capita income of 1.1 percentage points. If *xconst* increases at 1 score, per capita income rises at 17 per cent. A look at the beta coefficients of *Table 4* again demonstrates the superiority of *inform4*, which, when rising by 1 standard deviation, leads to a 0.44 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 per cent 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 the independent variables. Thus, regression (6) uses *protestant* as an instrument for *inform4*, *muslim* as an instrument for *xconst*, *me* as an instrument for *malfal94* and *logfrankrom* as an instrument for *openk*. Regression (7) is consistent with regression (6), but it uses *catholic* instead of *muslim* as an instrument for *xconst*. Regression (8) also corresponds to regressions (6) and (7), but uses *catholic* and *muslim* as instruments for *xconst*. Hence, regressions (6)-(8) differ concerning the instrumental variables that are used to instrument for *xconst*. Apart from that, they are equal. The first-stage regressions for *malfal94* and *openk* are listed in the *continuation 1 of table 3*. 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 the regressors of the second-stage regression are significant at least at the 10 per cent level. A 1 percentage point increase in *inform4* leads to a 0.89 percentage point increase in per capita income. If *xconst* rises at 1 score, per capita income increases at 18.4 per cent. Regarding the beta coefficients in *Table 4*, a 1 standard-deviation increase in *inform4* leads to a rise in per capita income of 0.37 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 the independent variables are assumed to be endogenous. However, *inform4* is significant at the 10 per cent level. The coefficient on *xconst* again increases compared with 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 to 0.47 standard deviations. Hence, using *catholic* as an instrument for formal institutions, *xconst* gains more importance regarding its effect on per capita income and compared with 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 per cent level. *Protestant* is also significant at the 1 per cent level in the first-stage regression on *inform4*. All the regressors are significant in the second-stage regression. A 1 percentage point increase in *inform4* leads to a 0.8 percentage point increase in per capita income. If *xconst* increases at 1 score, income rises at 19.6 per cent. Regarding the beta coefficients, the coefficient on *xconst* decreases to 0.37 standard deviations, but is still slightly higher than the coefficient on *inform4*. However, using *protestant*, *muslim* and *catholic* as instrumental variables, the disturbing effect of *catholic* decreases. The coefficients on *inform4* and *xconst* are comparable with 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 that disturbs the relationship, the result would not be robust in comparison with 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 (*continuation 2 of table 3*). However, the small sample size demonstrates a problem regarding 2SLS estimation as well as testing. However, 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 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 to 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 *et al.*, 2003). 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 the instruments share the same rationale (Murray, 2006). As three religious affiliation variables are used as instrumental variables, this is definitely the case, and thus the test only affirms our regression results but cannot be seen as evidence.

Finally, 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 the instruments are highly significant with respect to the accordant endogenous regressors.

*Table 5\_1* and *table 5\_2* demonstrate 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 the 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 per cent level in all the regressions.

Panel B includes a measure of population density, *pop100km*. Again, the original regression results are robust with 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 per cent level in all the 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 1 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 1 unit per capita, income rises by about 20 percentage points.

## 6. Conclusion

The article tries to incorporate cultural traits into 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 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. In the empirical analysis, several 2SLS regressions are run. The proportions of the population being, respectively, Protestant or Muslim are used as instrumental variables. 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 informal and formal institutions 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 that are responsible in particular for self-identification, that is informal institutions, are even more resistant to change (Roland, 2005; Boettke *et al.*, 2008). 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 that 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 of 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. 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 that 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.

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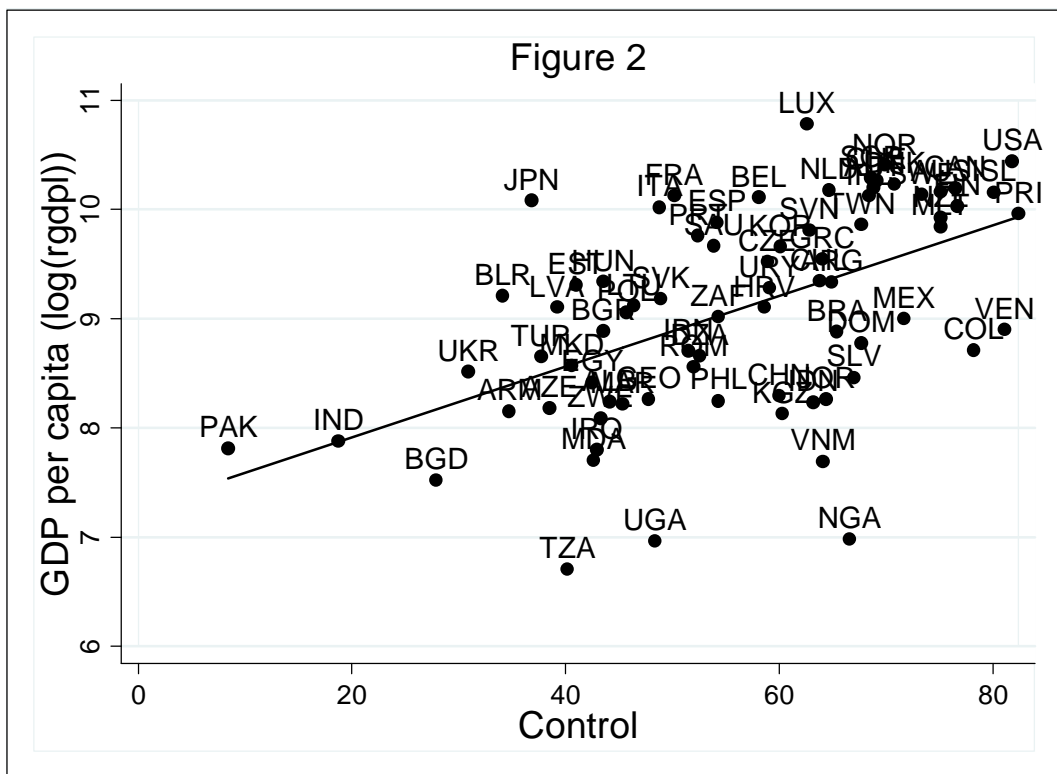
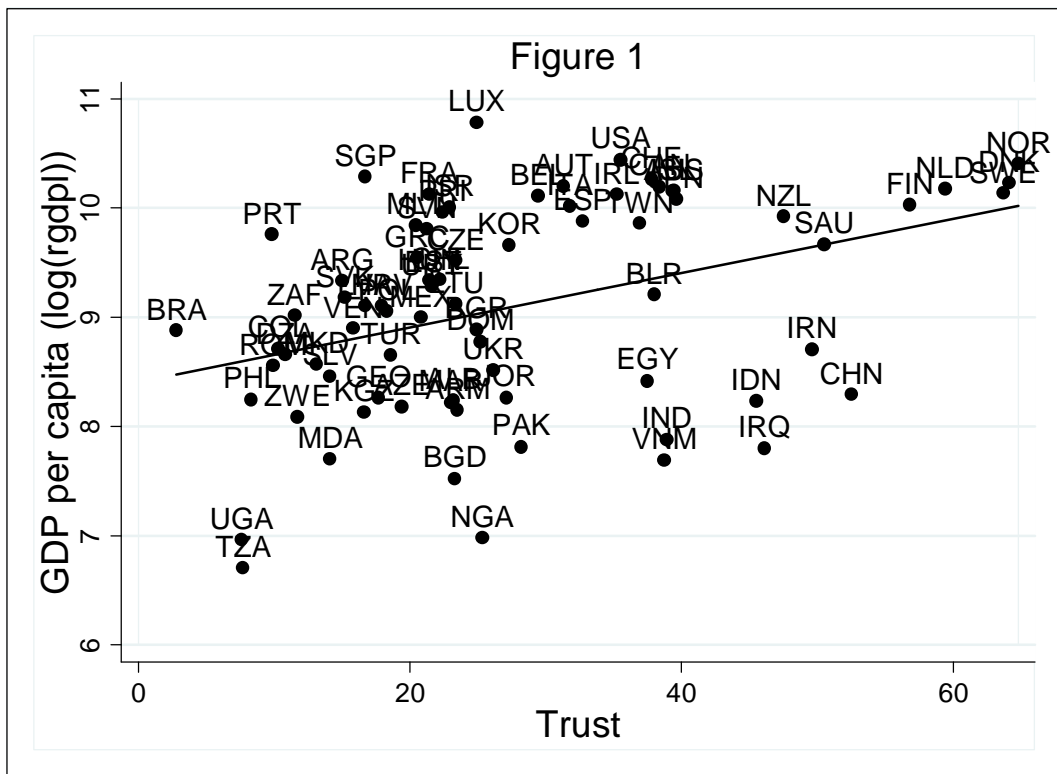
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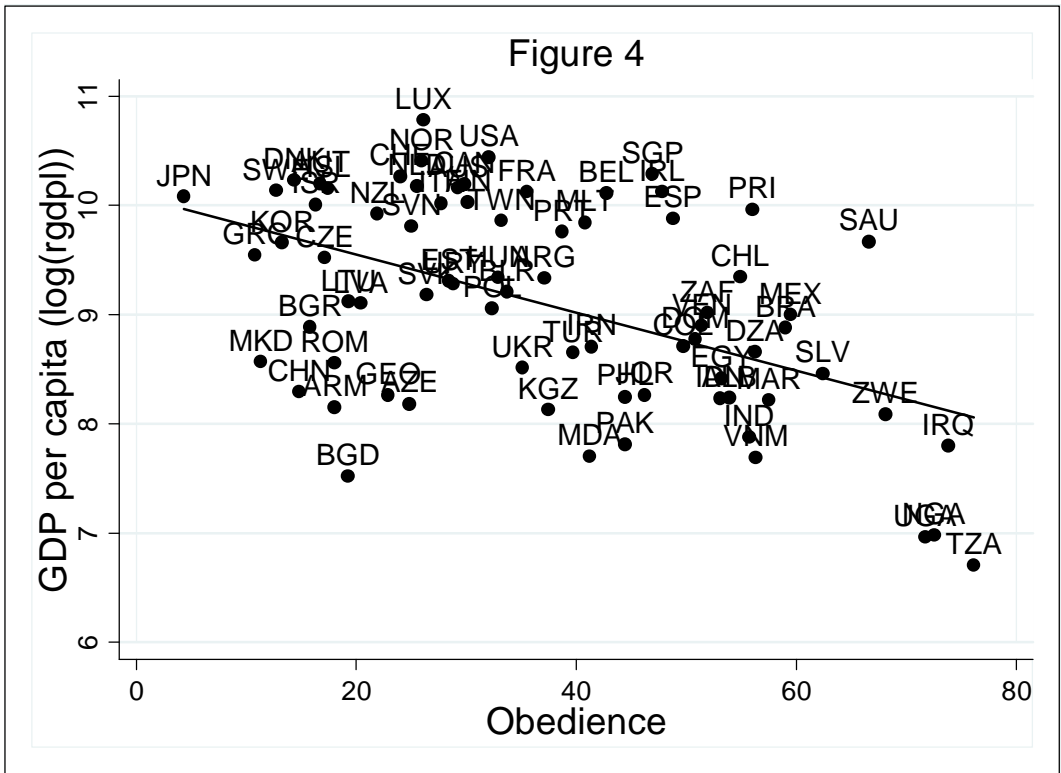
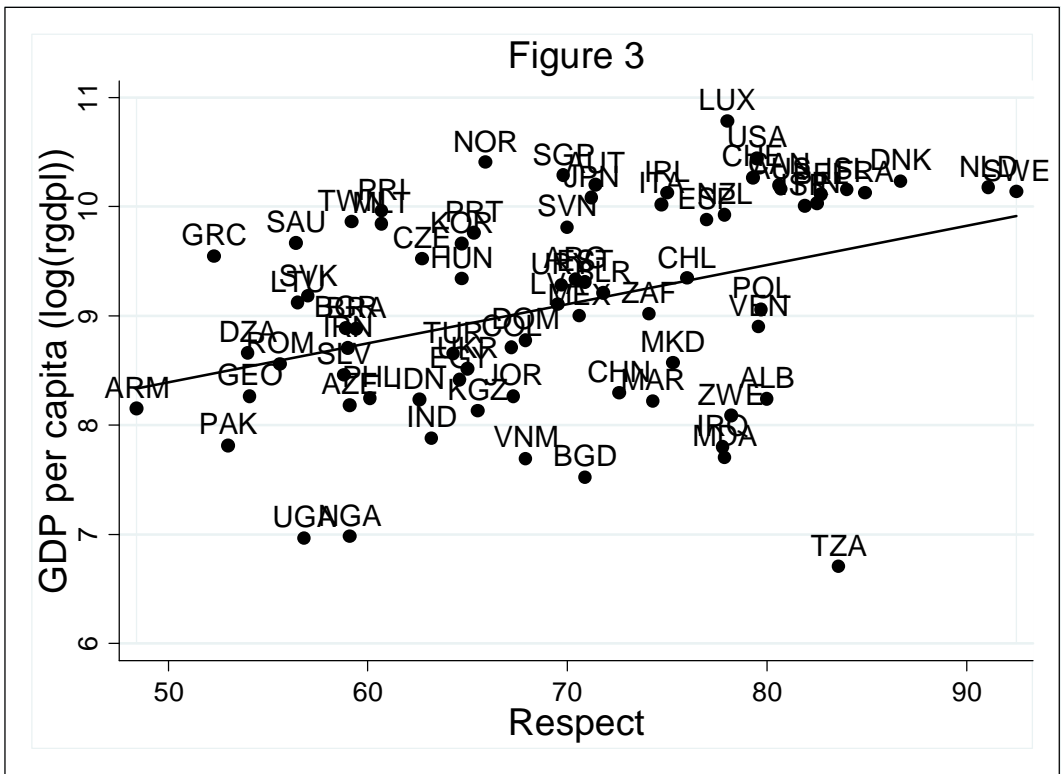
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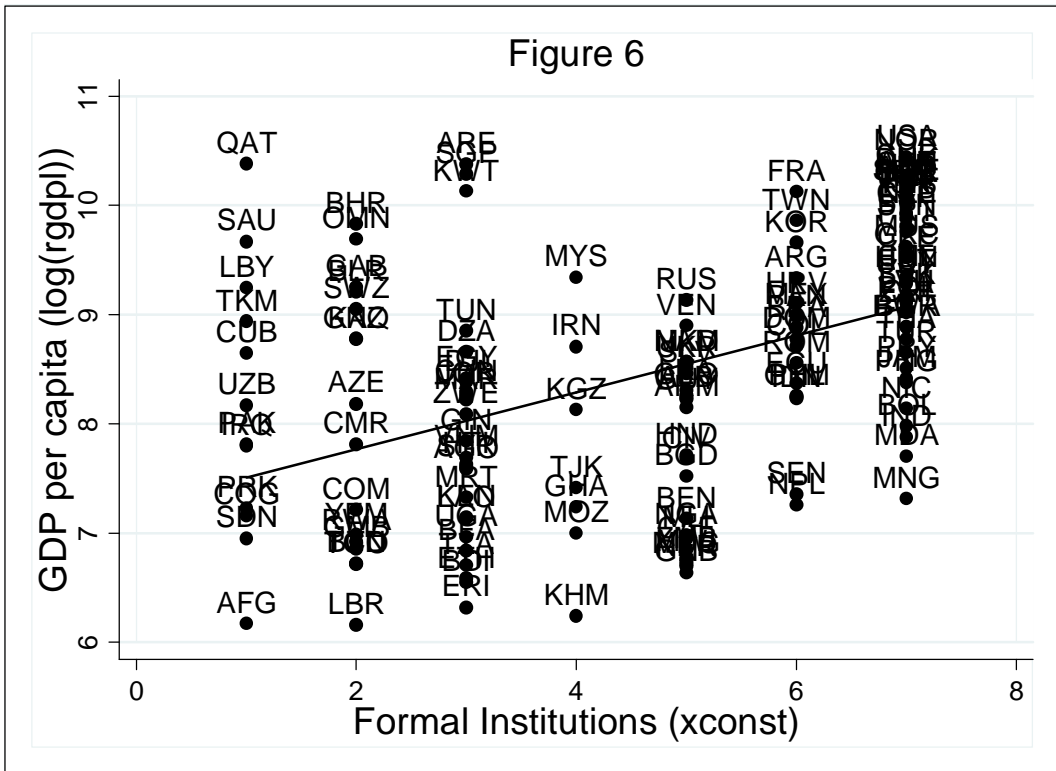
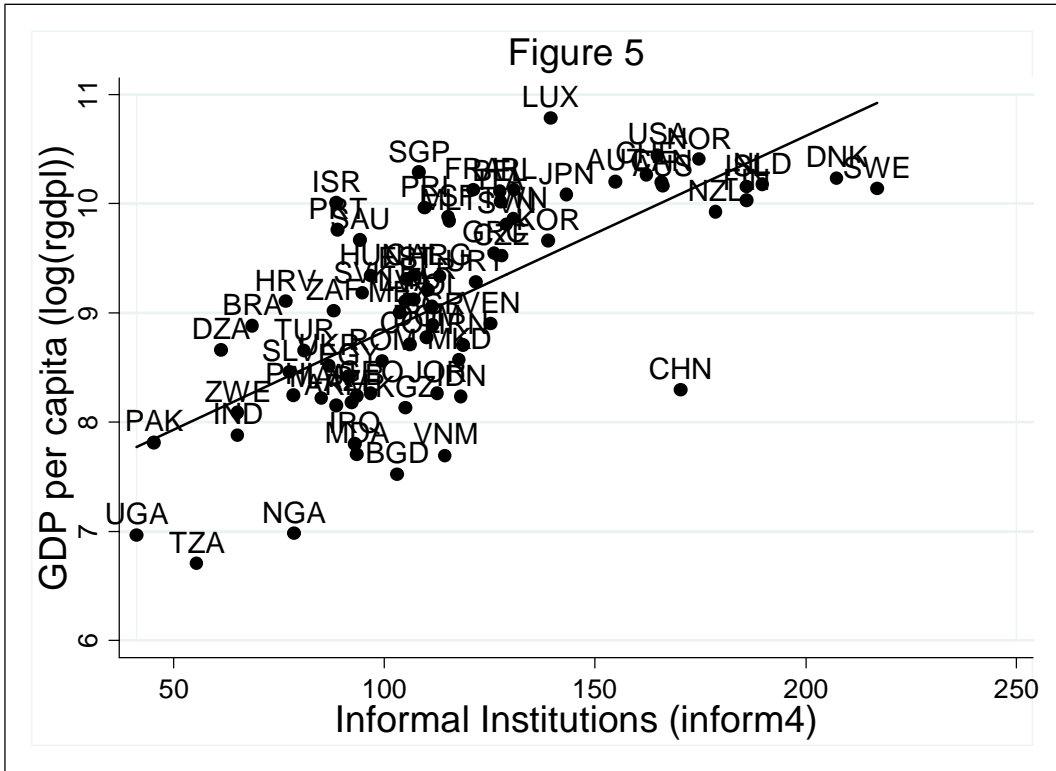
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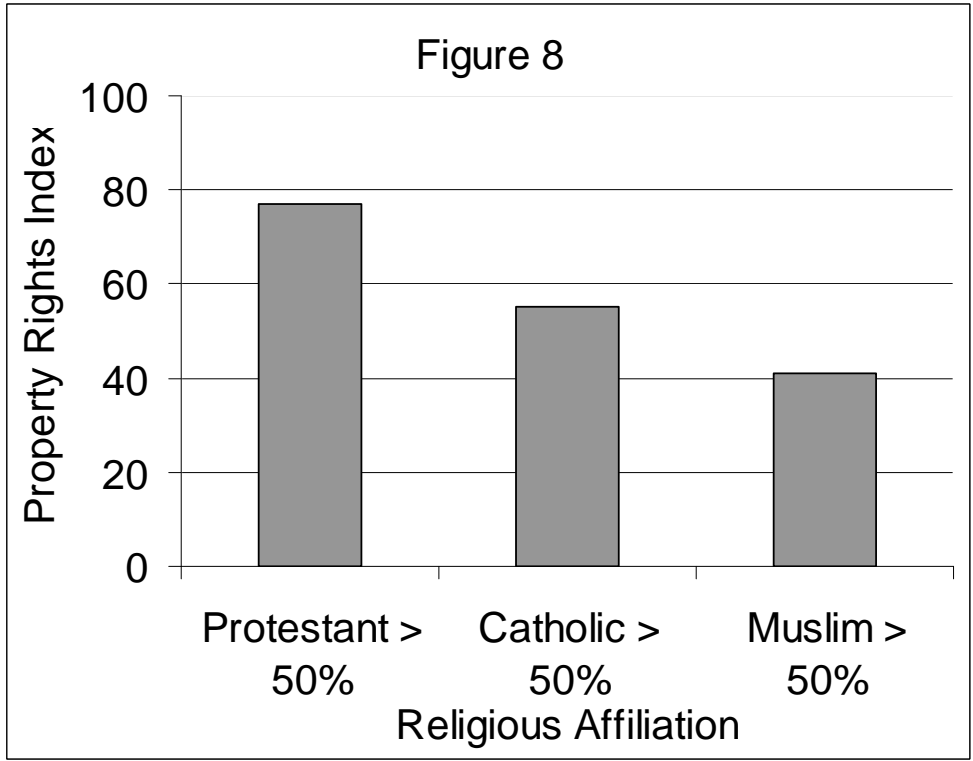
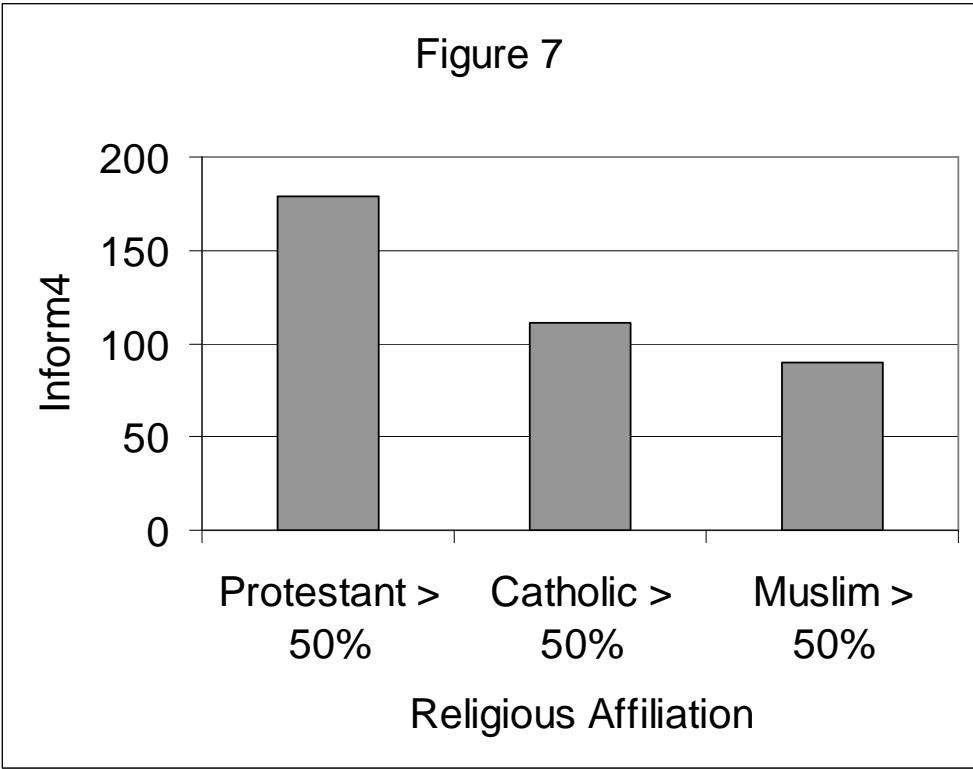
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	OLS Regression: Dependent Variable is GDP Per Capita 2000	2SLS Regression: First-Stage Regression for inform4	2SLS Regression: Second-Stage Regression for logrgdpl
	logrgdpl	inform4	logrgdpl
inform4	0.0109712*** (0.0019954)		0.012326*** (0.0033731)
xconst	0.1301642*** (0.0388388)	3.182979* (1.886719)	0.1218325*** (0.0437352)
malfal94	-1.216108*** (0.2801185)	-46.61603*** (13.02763)	-1.158406*** (0.3064585)
openk	0.0031212** (0.0011989)	0.013975 (0.0585996)	0.003085** (0.0012155)
protestant		0.8527801*** (0.139111)	
N	73	72	72
R-sq	0.6989	0.5417	0.6972
adj. R-sq	0.6812	0.5143	0.6792
Standard errors in parentheses * p<0.10, ** p<0.05, *** p<0.01			

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	0.431*** (0.00200)		0.485*** (0.00337)
xconst	0.254*** (0.0388)	0.157* (1.887)	0.236*** (0.0437)
malfal94	-0.326*** (0.280)	-0.318*** (13.03)	-0.310*** (0.306)
openk	0.176** (0.00120)	0.020 (0.0586)	0.173** (0.00122)
protestant		0.540*** (0.139)	
N	73	72	72
R-sq	0.699	0.542	0.697
adj. R-sq	0.681	0.514	0.679
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	0.0110657*** (0.0039334)	0.0060033 (0.0048982)	0.0088514** (0.0036032)	0.0074439* (0.0038851)	0.0083195** (0.0035529)
xconst	0.1701662** (0.0749776)	0.364313*** (0.114528)	0.1843526** (0.0789653)	0.2490486** (0.1073546)	0.1958257** (0.0779052)
malfal94	-1.116845*** (0.3076477)	-0.949904** (0.3873074)	-1.67678*** (0.4386155)	-1.60776*** (0.4660777)	-1.66728*** (0.4399537)
openk	0.0031156** (0.0012227)	0.0032386** (0.0014964)	0.0037304* (0.0020363)	0.0039139* (0.0021822)	0.0034932* (0.0020212)
N	72	72	55	55	55
R-sq	0.6942	0.5419	0.7479	0.7231	0.7461
adj. R-sq	0.6760	0.5145	0.7277	0.7010	0.7258
First-Stage Regression for inform4					
	inform4	inform4	inform4	Inform4	inform4
protestant	0.8670299*** (0.134401)	0.950064*** (0.1366442)	0.958102*** (.1652765)	1.073868*** (0.1708423)	0.873540*** (0.1932181)
muslim	-0.1786212** (0.0915166)		-0.2148313* (0.112025)		-0.292980** (0.1450689)
catholic		0.058028 (0.0822803)		0.0567608 (0.1061688)	-0.1132904 (0.1330707)
malfal94	-52.37387*** (12.24637)	-53.1000*** (12.56179)			
me			-2.828471** (1.102847)	-2.940639** (1.150023)	-2.95732** (1.116203)
openk	-0.005205 (0.0589431)	0.0149562 (0.0596696)			
logfrankrom			1.613699 (4.889369)	0.9411052 (5.038896)	1.871671 (4.912235)
R-sq	0.5479	0.5257	0.5421	0.5112	0.5487
adj. R-sq	0.5209	0.4974	0.5054	0.4721	0.5027
First-Stage Regression for xconst					
	xconst	xconst	xconst	xconst	xconst
protestant	0.0132785* (0.0067509)	0.031027*** (0.007739)	0.009939 (0.0076016)	0.031890*** (0.0090671)	0.0109815 (0.0089475)
muslim	-0.031136*** (0.0045969)		-0.03154*** (0.0051524)		-0.03058*** (0.0067178)
catholic		0.019568*** (0.00466)		0.019145*** (0.0056347)	0.0013966 (0.0061622)
malfal94	-2.011171*** (0.6151319)	-2.02049*** (0.7114536)			
me			-0.0992628* (0.0507237)	-0.0959334 (0.0610348)	-0.0976744* (0.0516891)
openk	-0.0034739 (0.0029607)	0.0003524 (0.0033795)			
logfrankrom			0.0731941 (0.2248785)	-0.0271093 (0.2674277)	0.0700139 (0.2274758)
R-sq	0.5312	0.3748	0.5268	0.3274	0.5273
adj. R-sq	0.5032	0.3375	0.4889	0.2735	0.4790
Standard errors in parentheses					
* p<0.10, ** p<0.05, *** p<0.01					

Continuation 1 Table 3: First-Stage Regressions for malfal94 and openk					
	(4)	(5)	(6)	(7)	(8)
First-Stage Regression for malfal94					
	malfal94	malfal94	malfal94	malfal94	malfal94
protestant			-0.0002708 (0.0011411)	-0.0004137 (0.0011435)	-0.0000772 (0.0013427)
muslim			0.0003133 (0.0007734)		0.0004921 (0.0010081)
catholic				-0.0000263 (0.0007106)	0.0002593 (0.0009247)
malfal94					
me			0.049746*** (0.007614)	0.050013*** (0.0076972)	0.050041*** (0.0077568)
openk					
logfrankrom			-0.061459** (0.0337559)	-0.0604866* (0.033726)	-0.0620498* (0.0341363)
N					55
R-sq			0.4954	0.4937	0.4962
adj. R-sq			0.4550	0.4532	0.4448
First-Stage Regression for openk					
	openk	openk	openk	openk	openk
protestant			-0.0804346 (0.2505681)	0.0717136 (0.2570871)	-0.1952616 (0.2933571)
muslim			-0.284334 (0.1698359)		-0.3904517* (0.2202536)
catholic				0.0727887 (0.159765)	-0.1538373 (0.2020371)
malfal94					
me			4.285681** (1.671976)	4.132947** (1.730579)	4.110717** (1.694697)
openk					
logfrankrom			39.49943*** (7.412546)	38.60958*** (7.582637)	39.84973*** (7.458096)
N					
R-sq			0.4151	0.3849	0.4219
adj. R-sq			0.3683	0.3357	0.3630
Standard errors in parentheses * p<0.10, ** p<0.05, *** p<0.01					

Continuation 2 Table 3: Tests					
	(4)	(5)	(6)	(7)	(8)
First-stage F-value (inform4)			14.80	13.07	11.92
First-stage F-value (xconst)			13.91	6.08	10.93
Partial R-squared (inform4)			0.5421	0.5112	0.5487
Partial R-squared (xconst)			0.5268	0.3274	0.5273
Shea Partial R-squared (inform4)			0.3593	0.3394	0.3721
Shea Partial R-squared (xconst)			0.3122	0.1855	0.3229
Pagan-Hall (p-value)			0.1592	0.1486	0.1170
Sargan (p-value)					0.40526
White-Koen. (p-value)			0.0715	0.0913	0.0640

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	0.435*** (0.00393)	0.236 (0.00490)	0.367** (0.00360)	0.308* (0.00389)	0.345** (0.00355)
xconst	0.330** (0.0750)	0.706*** (0.115)	0.345** (0.0790)	0.467** (0.107)	0.367** (0.0779)
malfal94	-0.299*** (0.308)	-0.254** (0.387)	-0.457*** (0.439)	-0.438*** (0.466)	-0.454*** (0.440)
openk	0.175** (0.00122)	0.182** (0.00150)	0.207* (0.00204)	0.217* (0.00218)	0.194* (0.00202)
N	72	72	55	55	55
R-sq	0.694	0.542	0.748	0.723	0.746
adj. R-sq	0.676	0.515	0.728	0.701	0.726
Standard errors in parentheses * p<0.10, ** p<0.05, *** p<0.01					

Table 5_1			
Panel A			
	(6)	(7)	(8)
	logrgdpl	logrgdpl	logrgdpl
inform4	0.0094889** (0.0045785)	0.0075245 (0.0050173)	0.0087682* (0.0044858)
xconst	0.1945928** (0.0819317)	0.2846951** (0.1116936)	0.203846** (0.0805763)
malfal94	-2.228658*** (0.5376502)	-2.152575*** (0.579737)	-2.183146*** (0.529676)
openk	0.0043812** (0.00216)	0.0046514* (0.0023407)	0.0041055* (0.0020983)
english	0.6565551** (0.2660942)	0.6754848** (0.2893617)	0.6219092** (0.2613492)
french	0.2283765 (0.2455269)	0.2316959 (0.2653676)	0.1969592 (0.2411923)
N	55	55	55
R-sq	0.7418	0.6990	0.7482
adj. R-sq	0.7095	0.6614	0.7168
Panel B			
	(6)	(7)	(8)
	logrgdpl	logrgdpl	logrgdpl
inform4	0.008841** (0.0036417)	0.0075162* (0.0039005)	0.0082946** (0.0035883)
xconst	0.1838067** (0.0809815)	0.2504497** (0.1111879)	0.1952384** (0.0799616)
malfal94	-1.674253*** (0.4522285)	-1.620561*** (0.4793294)	-1.665716*** (0.4536114)
openk	0.0037066* (0.0021968)	0.0040206 (0.0024029)	0.0034688 (0.0021836)
pop100km	0.0134323 (0.2512838)	-0.061855 (0.2870537)	0.0233186 (0.2518145)
N	55	55	55
R-sq	0.7483	0.7214	0.7466
adj. R-sq	0.7226	0.6930	0.7207
Panel C			
	(6)	(7)	(8)
	logrgdpl	logrgdpl	logrgdpl
inform4	0.0087755** (0.0037577)	0.0074503* (0.0040522)	0.0083239** (0.0037303)
xconst	0.1825715** (0.08044)	0.2490132** (0.107262)	0.1949644** (0.0793047)
malfal94	-1.694253*** (0.4687028)	-1.607031*** (0.4981968)	-1.674253*** (0.4695803)
openk	0.0039155* (0.0020308)	0.0039045* (0.0021287)	0.0037504* (0.0020275)
coastline	1.11e-06 (7.01e-06)	-5.41e-08 (7.48e-06)	1.02e-06 (7.04e-06)
N	55	55	55
R-sq	0.7483	0.7232	0.7467
adj. R-sq	0.7227	0.6949	0.7209

Table 5_2			
Panel D			
	(6)	(7)	(8)
	logrgdpl	logrgdpl	logrgdpl
inform4	0.00891** (0.0035609)	0.0076644* (0.0038069)	0.0084437** (0.0035162)
xconst	0.1734568** (0.0784331)	0.2311892** (0.1061646)	0.1836091** (0.0774783)
malfal94	-1.704199*** (0.4393179)	-1.641676*** (0.4643527)	-1.701954*** (0.4414064)
openk	0.4393179 (0.0019907)	0.0032403 (0.002126)	0.0028494 (0.0019823)
landlocked	0.3485095 (0.2550788)	0.3279966 (0.2661393)	0.3469645 (0.2562887)
N	55	55	55
R-sq	0.7588	0.7403	0.7565
adj. R-sq	0.7342	0.7138	0.7316
Panel E			
	(6)	(7)	(8)
	logrgdpl	logrgdpl	logrgdpl
inform4	0.0115617** (0.0052573)	0.0108259* (0.0054342)	0.0106079** (0.0050568)
xconst	0.1886492** (0.0842191)	0.2597326** (0.1190618)	0.2002203** (0.0819711)
malfal94	-1.902622*** (0.5216246)	-1.893423*** (0.5522283)	-1.86252*** (0.5131576)
openk	0.0039582* (0.0022113)	0.0042222* (0.00243)	0.0036705* (0.0021558)
temperature	0.0232571 (0.0238961)	0.0299827 (0.0282988)	0.0201449 (0.0232954)
N	55	55	55
R-sq	0.7185	0.6833	0.7249
adj. R-sq	0.6898	0.6509	0.6969
Panel F			
	(6)	(7)	(8)
	logrgdpl	logrgdpl	logrgdpl
inform4	0.0097821** (0.0042433)	0.0074649 (0.0046714)	0.0089669** (0.0041732)
xconst	0.2011776** (0.0942365)	0.3036175** (0.1273722)	0.2230783** (0.0919103)
openk	0.0067656** (0.002712)	0.006862** (0.0028934)	0.0061272** (0.0026432)
N	56	56	56
R-sq	0.6325	0.5886	0.6319
adj. R-sq	0.6113	0.5649	0.6106

*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.’ Accessed at <a href="http://www.worldvaluessurvey.org">www.worldvaluessurvey.org</a> on October 27, 2009.
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’). Accessed at <a href="http://www.worldvaluessurvey.org">www.worldvaluessurvey.org</a> on October 27, 2009.
respect	Percentage of respondents who 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.’ Accessed at <a href="http://www.worldvaluessurvey.org">www.worldvaluessurvey.org</a> on October 27, 2009.
obedience	Percentage of respondents who 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.’ Accessed at <a href="http://www.worldvaluessurvey.org">www.worldvaluessurvey.org</a> on October 27, 2009.
inform4	Sum of <i>trust</i> , <i>respect</i> and <i>control</i> minus <i>obedience</i> .
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: Jagers and Marshall (2005); accessed at <a href="http://www.systemicpeace.org/polity/polity4.htm">http://www.systemicpeace.org/polity/polity4.htm</a> on October 27, 2009.
malfal94	Proportion of each country’s population that live with the risk of malaria transmission multiplied by an estimate of the proportion of malaria cases that involve Plasmodium falciparum. Source: Sachs (2003); accessed at <a href="http://www.earth.columbia.edu/articles/view/1040">http://www.earth.columbia.edu/articles/view/1040</a> on October 27, 2009.
openk	Exports plus imports divided by rgdpl. Source: Heston <i>et al.</i> (2006); accessed at <a href="http://pwt.econ.upenn.edu/">http://pwt.econ.upenn.edu/</a> on October 27, 2009.
rgdpl	Real GDP per capita (Laspeyres). Source: Heston <i>et al.</i> (2006); accessed at <a href="http://pwt.econ.upenn.edu/">http://pwt.econ.upenn.edu/</a> on October 27, 2009.
me	Instrumental variable for malaria risk. Source: Sachs (2003); accessed at <a href="http://www.earth.columbia.edu/articles/view/1040">http://www.earth.columbia.edu/articles/view/1040</a> on October 27, 2009.
logfrankrom	Natural logarithm of the Frankel–Romer predicted trade share. Source: Hall and Jones (1999); accessed at <a href="http://elsa.berkeley.edu/~chad/datasets.html">http://elsa.berkeley.edu/~chad/datasets.html</a> on October 27, 2009.
protestant	Percentage of the population being Protestant. Source: La Porta <i>et al.</i> (1999); accessed at <a href="http://mba.tuck.dartmouth.edu/pages/faculty/rafael.laporta/publications.html">http://mba.tuck.dartmouth.edu/pages/faculty/rafael.laporta/publications.html</a>

	on October 27, 2009.
muslim	Percentage of the population being Muslim. Source: La Porta et al. (1999); accessed at <a href="http://mba.tuck.dartmouth.edu/pages/faculty/rafael.laporta/publications.html">http://mba.tuck.dartmouth.edu/pages/faculty/rafael.laporta/publications.html</a> on October 27, 2009.
catholic	Percentage of the population being Catholic. Source: La Porta et al. (1999); accessed at <a href="http://mba.tuck.dartmouth.edu/pages/faculty/rafael.laporta/publications.html">http://mba.tuck.dartmouth.edu/pages/faculty/rafael.laporta/publications.html</a> on October 27, 2009.
french	Dummy variable for French legal origin. Source: La Porta et al. (1999); accessed at <a href="http://mba.tuck.dartmouth.edu/pages/faculty/rafael.laporta/publications.html">http://mba.tuck.dartmouth.edu/pages/faculty/rafael.laporta/publications.html</a> on October 27, 2009.
english	Dummy variable for English legal origin. Source: La Porta et al. (1999); accessed at <a href="http://mba.tuck.dartmouth.edu/pages/faculty/rafael.laporta/publications.html">http://mba.tuck.dartmouth.edu/pages/faculty/rafael.laporta/publications.html</a> on October 27, 2009.
pop100km	Share of the national population living within 100 km of the coast. Source: Sachs (2003); accessed at <a href="http://www.earth.columbia.edu/articles/view/1040">http://www.earth.columbia.edu/articles/view/1040</a> on October 27, 2009.
latitude	Latitude in absolute degrees. Source: Parker (1997); accessed at <a href="http://faculty.insead.edu/parker/resume/personal.htm">http://faculty.insead.edu/parker/resume/personal.htm</a> on October 27, 2009.
coastline	Coastline length in kilometres. Source: Parker (1997); accessed at <a href="http://faculty.insead.edu/parker/resume/personal.htm">http://faculty.insead.edu/parker/resume/personal.htm</a> on October 27, 2009.
landlocked	Dummy variable for landlocked. Source: Parker (1997); accessed at <a href="http://faculty.insead.edu/parker/resume/personal.htm">http://faculty.insead.edu/parker/resume/personal.htm</a> on October 27, 2009.



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