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Informal Institutions and Cross-Country Income Differences

by

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Abstract

There is a growing literature which analyses, using cross-country data, whether institutions or geography is the most important deep determinant of income per capita. The empirical proxies used for institutions in this literature, however, focus only on formal institutions, rather than informal institutions, despite the fact that North (1990) emphasised the importance of informal institutions. We include a measure of informal institutions, a concept we argue is closely related to social capital and cultural norms, in a representative deep-determinants framework and find informal institutions to be just as important a deep determinant of income levels as are formal institutions.

JEL Codes: Z13, O11

Keywords: Institutions, deep determinants, social capital, culture

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1. Introduction

Differences in income per capita across countries are vast, with many developed countries having incomes per capita, measured in purchasing power terms, up to 50 times that of some African countries. Finding answers to the question of why some countries are so much poorer than others is the central focus of what has become known as the deep-determinants-of development literature. Within this literature, proximate determinants of development are defined as those that appear in the aggregate production function, such as physical and human capital per worker. Deep determinants, by contrast, are the variables that explain differences in the proximate determinants; hence they are the underlying, or deep, determinants of development.

Much of this literature analyses the question of whether geography or institutions is the most important deep determinant of economic development, with some papers (eg. Rodrik, Subramanian and Trebbi, 2004) also including openness as a potential deep determinant. The first paper to suggest that institutions could be modelled as a deep determinant was Hall and Jones (1999), with the institutions versus geography debate being sparked by Acemoglu, Johnson and Robinson (2001). Other frequently cited papers in this literature include Acemoglu, Johnson and Robinson (2002), Sachs (2003), Easterly and Levine (2003), Olsson and Hibbs (2005) and Acemoglu and Johnson (2005).[1]

When defining institutions, and discussing their importance in explaining cross-country differences in the level of income per capita, it is typical in the deep-determinants literature to cite North's (1990) definition of institutions as being "the rules of the game in a society or, more formally, [they] are the humanly devised constraints that shape human interaction." However, despite the fact that North drew a distinction between formal and informal institutions, and even argued that informal institutions may be the more important of the two, the empirical proxies used in the deep-determinants literature focus almost exclusively on formal institutions, especially those which relate to the protection of property rights and the enforceability of contracts. This focus on formal institutions perhaps reflects the fact that formal institutions may be easier to measure than informal institutions.

Whereas formal institutions are defined by North (1990) as rules that human beings devised (a good example being laws and regulations enacted by governments), informal institutions include conventions, norms and codes of behaviour. Specific examples of informal institutional arrangements may include the fact that deals are sealed on the basis of a

handshake, and that such agreements are adhered to, that farmers whose crops ripen at different times assist each other with the harvest, that there is a norm within a society that an individual harvest no more fish than his/her family can consume, or that levels of trust and cooperation are high enough that revolving-credit schemes are set up to provide access to credit.

The concepts emphasised in the informal institutions literature also feature in the social capital and cultural-economics literatures. Knowles (2005) argues that informal institutions are a similar notion to what many researchers refer to as social capital. Social capital is a notoriously difficult term to define, with many definitions having been proposed in the literature. One of the most widely cited definitions of social capital is that of Putnam, Leonardi and Nanetti (1993, p.167) who define social capital as "features of social organisation, such as trust, norms, and networks, that can improve the efficiency of society". In another widely cited definition, Knack and Keefer (1997, p.1251) define social capital as "trust, cooperative norms, and associations within groups". At the risk of generalising to some extent, most definitions of social capital include the notions of trust, a shared set of cooperative norms and networks between individuals. The notions of trust and norms of generalised morality also feature in the cultural economics literature (see, for example Platteau, 1994a, 1994b and 2000; Guiso, Sapienza and Zingales, 2006; Tabellini, 2005; Ingelhart and Baker, 2000).[2]

One paper which draws these literatures together to some extent is Tabellini (2005), who examines the effect of culture on incomes per capita across European regions. Tabellini also includes some bivariate correlations examining the effect of culture on incomes per capita across countries. Tabellini's measure of culture, described more fully in Section 3, includes survey-based information on the extent of trust and respect, whether people believe children should be taught to respect others and whether they should be taught to be obedient (the latter of which Tabellini argues will have a negative effect on economic performance) and whether people believe they have control over their own destiny. While Tabellini's paper is a valuable contribution to the literature, he does not analyse the effect of culture within a deep-determinants framework, holding constant formal institutions and geography. Given that no measures of geography are included, and formal institutions enter the analysis only as an instrument for culture, the paper does not contribute to the geography versus institutions debate.

The aim of this paper is to include a measure similar to Tabellini's as a proxy for informal institutions, which we view as being a closely related concept to social capital and/or culture, in a representative deep-determinants framework. We do so in the belief that including a measure of informal institutions will be more true to North's (1990) definition of institutions. In doing so, we build on Tabellini's work by controlling for the level of formal institutions and geography and hence bring informal institutions into the debate over whether institutions or geography is the most important deep determinant of income differences across countries. Our empirical results suggest that informal institutions are important in explaining cross-country income differences, in some specifications more so than formal institutions.

Section 2 will explore further the difference between informal and formal institutions. Section 3 will review the existing deep-determinants literature, discussing how formal institutions and geography are typically measured, and also discussing how the issue of endogeneity is handled in this literature. Section 4 will discuss whether informal institutions can be thought of as a deep determinant of development. Section 5 will discuss how informal institutions can be measured, with our empirical results being presented in Section 6. Section 7 will conclude.

2. Informal Institutions, Social Capital and Culture

As noted in the introduction, North (1990) defines formal institutions as rules that human beings devised (a good example being laws and regulations enacted by governments) whereas informal institutions include conventions, norms and codes of behaviour. North uses the analogy of rules in sports to make clear the distinction between formal and informal institutions. The written rules of a sport are analogous to formal institutions, whereas unwritten codes of conduct, such as an acceptance that it is unacceptable to kick an opponent in the head, are analogous to informal institutions.[3,4]

North (1990, p.36) argues that people in the Western world tend to think of life being ordered by formal rules, when in fact their actions are guided more by informal constraints, such as "codes of conduct, norms of behavior and conventions." He goes on to argue that "underlying these informal constraints/institutions are formal rules, but these are seldom the obvious and immediate source of choice in daily interactions." The implication is that informal institutions are actually just as important as formal institutions. It is also important to note that North acknowledges institutions are not always easy to classify into formal and

informal, but suggests the two should be seen as opposite ends of a continuum, with taboos, customs and traditions at one end, and written constitutions at the other.

Other researchers who emphasise the distinction between formal and informal institutions include McMillan (2003) and Platteau (1994a, 1994b and 2000). Both argue that formal institutions need to be underpinned by informal institutions, with McMillan stressing the importance of trust, and Platteau emphasising the importance of norms of generalised morality, which he defines as taking regard of others. To Platteau, moral norms are important in that they lead to honest behaviour.

Alternatively, some researchers (eg. Ostrom, 1990; Pretty and Ward, 2001) define informal institutions as community-based, local, social or grass-roots institutions, such as micro-credit schemes and groups formed for the purpose of managing common pool resources. In this view, informal institutions differ from formal institutions in that the latter are imposed from above by the state, whereas the former are developed from the bottom up by the community. We could think of informal institutions as encompassing both grass-roots institutions, and North's notion of norms and conventions. In terms of the institutional continuum discussed above, perhaps grass-roots institutions lie somewhat closer to conventions, norms and trust than to written constitutions. Such an institutional continuum is depicted in Figure 1.

[Figure 1 about here]

It is likely that grass-roots institutions are more likely to be established in the first place, and more likely to function effectively once they have been established, when co-operative norms and trust are high. For example, as argued by Pretty and Ward (2000, p.210) collective action problems can be resolved by informal or social institutions "based on trust and reciprocity, and agreed norms and rules for behaviour". Trust, along with norms of cooperation, also features prominently in many definitions of social capital, a concept closely related to that of informal institutions. For example, Pretty and Ward (2001, p.211) define social capital as "relations of trust; reciprocity and exchanges; common rules, norms and sanctions; connectedness, networks and groups". Trust is also emphasised in the cultural economics literature (see for example Platteau, 2000; Tabellini, 2005).

This section of the paper has discussed the distinction between formal and informal institutions, and argued that informal institutions are a similar concept to social capital and culture. However, the deep-determinants literature has focused on formal, rather than

informal institutions, when it comes to explaining income differences across countries. The next section of the paper will provide a review of this deep-determinants literature, including a discussion of how formal institutions are measured.

3. A Review of the Existing Deep-Determinants Literature

The paper generally credited with launching the deep-determinants literature is Hall and Jones (1999). Prior to the work of Hall and Jones, the empirical growth literature tended to focus on explaining differences in the *growth rate* of income per capita across countries, rather than differences in income *levels*, and distinctions were not drawn between the proximate and deep determinants of development.

Whereas proximate determinants are those that appear in the aggregate production function, such as physical and human capital per worker and the level of total factor productivity, deep determinants are those that affect income per capita via their effect on the proximate determinants. For example, if institutions which protect property rights encourage the accumulation of physical capital, and hence income per capita, institutions can be deemed a deep determinant of development. The two variables most commonly argued to be deep, or fundamental, determinants of development are institutions and geography. The remainder of this section of the paper will discuss how institutions and geography are typically measured in the deep-determinants literature, as well as how the problem of endogeneity is dealt with. The institutions versus geography debate will also be discussed.

3.1 Measuring Institutions and Geography

Measures of institutions are typically derived from sources such as the International Country Risk Guide (ICRG), formerly known as the Political Risk Services, or the Business Environment Risk Intelligence (BERI), which are based on assessments by experts on different aspects of the institutional environment, such as corruption, law and order and the protection of property rights. Hall and Jones (1999) construct a measure of institutions which includes data from the ICRG on law and order, bureaucratic quality, corruption, the risk of expropriation and government repudiation of contracts.

Acemoglu, Johnson and Robinson (2001, 2002) and Fielding and Torres (2005) proxy for institutions with the ICRG measure of protection against expropriation risk. Acemoglu

and Johnson (2005) “unbundle” formal institutions into property rights institutions and contracting institutions. Contracting institutions are proxied by a measure of the number of formal legal procedures necessary to evict non-paying tenants or collect an unpaid check. Property-rights institutions are proxied by the risk of expropriation (from the ICRG) and by constraints on the executive from the Polity IV data set (Jaggers and Marshall, 2000). The Polity IV executive constraints variable, also used by Acemoglu, Johnson and Robinson (2006), measures constraints on executive power, which, in principle, reflects North’s concern with institutions as constraints, but it does not take informal institutions into account.

Another data set that has been used to measure institutional quality is that of Kaufman, Kraay and Zoido-Lobatón (1999a,b, 2002), who construct composite indices of six different dimensions of institutional quality (voice and accountability, political stability and the absence of violence, government effectiveness, light regulatory burden, rule of law, freedom from graft) from ratings by country experts (including the ICRG and BERI) and surveys, using an unobserved components model. The Kaufman, Kraay and Zoido-Lobatón data on institutions are used, for example, by Rodrik, Subramanian and Trebbi (2004) and Easterly and Levine (2003). For the purposes of our discussion, the key point to note is that all of the proxies used in the deep-determinants literature for institutions focus on formal institutions, rather than on informal institutions such as conventions, norms or trust.

Various measures of geography have been used in the deep-determinants literature, both as possible deep-determinants, or as instruments for institutions. The two most commonly used geography proxies include distance from the equator (Acemoglu, Johnson and Robinson, 2001; Easterly and Levine, 2003; Fielding and Torres, 2005; Olsson and Hibbs, 2005) and the proportion of the population living where malaria is endemic (Acemoglu, Johnson and Robinson, 2001; Fielding and Torres, 2005; Rodrik, Subramanian and Trebbi, 2004; Sachs, 2003; Batten and Martina, 2005).

3.2 The Issue of Endogeneity With Respect to Formal Institutions

A key issue in the deep-determinants literature is dealing with potential feedbacks from income per capita to institutional quality. In theory, it is just as likely that richer countries can afford better institutions, as it is that better institutions lead to higher incomes. A variety of instruments for formal institutions have been proposed in the literature. For example, Hall and Jones argue that countries more exposed to Western European influence are more likely

to have imported Western institutions, so use the fraction of the population that speak English, the fraction of the population that speak another European language and distance from the equator as instruments. The logic behind using distance from the equator as an instrument is that Europeans did not settle near the equator.

One of the most widely used instruments for formal institutions is the settler mortality instrument first used by Acemoglu, Johnson and Robinson (2001). Acemoglu, Johnson and Robinson argue that Europeans only settled in areas where settler mortality was low, and in these areas introduced European-style institutions which protect property rights. In areas where settler mortality was high, extractive institutions, which did not protect property rights for the majority of the population, were introduced instead. If institutions persist over time, countries where settler mortality was low in the past will be endowed with good institutions today.

Other instruments for formal institutions include population density in precolonial times (proposed by Acemoglu, Johnson and Robinson (2002), state history (proposed by Bocksette, Chanda and Putterman (2002)) and whether a country has an English common law tradition or a French civil law tradition (proposed by La Porta et al (1997)). To the extent that we use these instruments in our empirical work, they will be discussed in more detail in Section 6.

Most of the geography proxies used in the literature, including distance from the equator, are exogenous. However, the risk of malaria is potentially endogenous, given that there are policies that can be put in place, such as the use of mosquito nets and mosquito eradication programmes, to reduce the risk of malaria. The instrument that Sachs (2003) proposes be used for malaria risk is discussed in the next section.

3.3 The Institutions Versus Geography Debate

A controversial finding of Acemoglu, Johnson and Robinson (2001) is that geography is insignificant in explaining cross-country income differences once formal institutions are controlled for. The only role they find for geography is in explaining differences in formal institutions. That is, disease patterns faced by settlers in the past determined, in part, the institutions a country is endowed with today. Hence, the only effect geography has on income per capita is an indirect effect, via institutions. This empirical finding has been confirmed by Rodrik, Subramanian and Trebbi (2004) and Easterly and Levine (2003).

Another argument in favour of the dominance of institutions is put forward by Acemoglu, Johnson and Robinson (2002) who present evidence of a negative correlation between economic prosperity in 1500 and income per capita today, among countries colonised by Europeans. Given that geographic factors have not changed significantly, it seems unlikely geography can explain this reversal of economic fortune. Acemoglu, Johnson and Robinson argue that in regions that were prosperous, and densely populated, extractive institutions were established, whereas European-style institutions were transplanted in sparsely populated regions. Hence institutions are responsible for the reversal of fortune. Empirical evidence is presented that is consistent with this hypothesis.

The primacy of institutions has been contested by Sachs (2003) who finds both the proportion of the population living where malaria is endemic (*MAL*) and the proportion of the population living where fatal malaria is endemic (*MALFAL*) to be significant in a deep-determinants regression, when controlling for the quality of formal institutions. As discussed in the previous section, the risk of malaria is potentially endogenous, hence Sachs instruments for malaria risk with a Malaria Ecology index (*ME*), which makes use of information on what he argues are exogenously determined geographic variables such as temperature and mosquito abundance. Sachs also presents some evidence that the proportion of the population living more than 100 kilometres from the coast is negatively correlated with the level of income per capita. Like Sachs, Batten and Martina (2005) find malaria risk to be a key deep determinant of income differences across countries.

Another study which finds an important direct effect of geography on income levels is Olsson and Hibbs (2005). Olsson and Hibbs include two geographic proxies, following the arguments of Diamond (1997). The first is an index of current geographic conditions made up of climate, latitude, country size and the country's East-West axis divided by its North-South axis. The second measure is an index of initial pre-history geographic endowments, made up of the number of plants and large domesticable mammals known to exist in prehistory in certain parts of the world. Olsson and Hibbs show that both their geography indices have a direct positive effect on income per capita, holding formal institutions constant. Hence, although the first papers to examine the issue of geography and institutions failed to find a direct effect of geography on income per capita, more recent papers have found that geography has a significant direct effect, especially if proxied by the risk of malaria.

3.4 What About Informal Institutions?

As the discussion above has illustrated, within the deep-determinants literature the focus is on formal, rather than informal, institutions. When it comes to measuring institutions, the protection of property rights and the rule of law tend to feature prominently; norms, conventions and trust do not. One paper that does consider the role of informal institutions, but which uses the label "culture" rather than "informal institutions" is Tabellini (2005), who argues that institutions can be interpreted broadly to include systems of belief and norms. Tabellini's main focus is the extent to which cultural differences explain income differences across European regions, rather than explaining cross-country income differences. To measure culture Tabellini constructs a cultural index, which includes information, obtained from surveys, on the extent of trust, the extent to which individuals feel they have the freedom to shape their own destiny, the extent of tolerance and respect for others, and whether people view children obeying their parents as being an important quality. The last of these Tabellini regards as being a negative cultural trait. We will argue below that Tabellini's measure can be interpreted as a measure of either culture or informal institutions.

To Tabellini, formal institutions are important in that they have a part to play in the evolution of cultural norms. For example, an authoritarian regime will breed mistrust. In his regressions, examining the effect of culture on income per capita across European regions, he uses historical data on both formal institutions (data from 1600-1850) and literacy levels (data from 1880) as instruments for culture. Past institutions, he argues, will have no independent effect on income per capita across regions, once country dummies have been included, to pick up the effect of current national institutions on income per capita.

Although not the main focus of Tabellini's paper, he also reports results for some cross-country regressions, which suggest a positive role for culture in explaining cross-country income differences. Acemoglu, Johnson and Robinson's settler mortality variable, and the proportion of the population that is Protestant, are used by Tabellini as instruments for culture. Hence, although Tabellini examines the effect of culture, a concept closely related to informal institutions, on cross-country income differences, neither formal institutions nor geography are controlled for.

3.5 Summary of the Deep Determinants Literature

In summary, the existing deep determinants literature, when it comes to the role of institutions, focuses almost exclusively on what North defined as formal institutions.

Tabellini (2005) examines the effect of informal institutions, but does not control for formal institutions or geography, so does not contribute to the institutions versus geography debate. The next section of the paper discusses whether informal institutions can be thought of as a deep determinant of development.

4. Informal Institutions as a Deep-Determinant of Development

Section 3 defined a deep determinant of development as a variable that affects income per capita via the proximate determinants of development (physical and human capital and the level of total factor productivity). Formal institutions are considered to be a deep determinant in that poor quality institutions reduce the incentive to invest and prevent resources being allocated to their most productive end. We now turn our attention to the question of how informal institutions may affect the rate of factor accumulation and the level of total factor productivity.

Informal institutions will be economically productive in so far as they encourage cooperation and reduce transactions costs. In the words of North (1990, p.138) "[e]ffective traditions of hard work, honesty and integrity simply lower the cost of transacting and make possible complex, productive exchange." If transactions costs can be minimised, this will increase productivity as more time and resources can be devoted to production. Cooperative norms and grass-roots institutions may lead to the resolution of collective action problems, increasing the level of productivity. Grass-roots institutions may also facilitate the accumulation of factors of production. In addition, high levels of trust will also increase the number of trades and increase the incentive for firms and individuals to invest in either physical or human capital.

A good example of informal institutions or social capital reducing transactions costs, that is described by Coleman (1988) and McMillan (2003), is the wholesale diamond market in New York. In this market a seller will give a buyer a bag of diamonds to examine at their leisure, with a view to making a purchase. This creates an obvious opportunity for the potential buyer to substitute fake diamonds, meaning the system is underpinned by a high degree of trust. Business is done on the basis of handshakes rather than contracts.[5]

Continuing with the same theme, Fafchamps and Minten (2002, p.175) argue that when trust is present agents can "lower their guard and economize on transactions costs such as the need to inspect quality before buying, or the need to organize payment in cash at the

time of delivery." They go on to argue that trust "enables agents to place and take orders, pay by check, use invoicing, provide trade credit, and offer warranty", noting that these features of markets are taken for granted in developed countries, but are often lacking in developing countries. In short, high levels of trust lower transactions costs.

The importance of trust is also emphasised by Arrow (1972, p.357) who argues that "[v]irtually every economic transaction has within itself an element of trust, certainly any transaction conducted over a period of time", hence, "much of the economic backwardness in the world can be explained by a lack of mutual confidence". If such trust is absent, investment will simply not take place. In a similar vein, McMillan (2003, p.10) argues that "a market works well, only if people can trust each other". McMillan cites the example of Vietnam, where a lot of business is carried out on the basis of people's word. Those who fail to keep their word will find it difficult to engage in future business transactions.

Grass-roots institutions, which are more likely to exist in a high-trust environment, can also facilitate the accumulation of factors of production and raise the level of productivity. For example, in developing countries where credit markets are incomplete, revolving-credit and micro-credit schemes provide an alternative source of funds for those wishing to invest in physical or human capital. Collective action problems may well be resolved either by norms, or grass-roots institutions, leading to efficiency gains. Externalities are more likely to be internalised, and public goods provided, in societies where cooperative norms exist.

This section has suggested that the presence of informal institutions can potentially lead to higher levels of investment in physical and human capital and higher levels of total factor productivity. Informal institutions, therefore, affect the level of income per capita, via their effect on the proximate determinants of development. Hence, informal institutions, like formal institutions, can be thought of as a deep-determinant of economic development. The remainder of the paper focuses on including a proxy for informal institutions in a representative deep-determinants framework.

5. Measuring Informal Institutions and Dealing With Endogeneity

Before including informal institutions in a deep-determinants regression framework, we need an empirical proxy for informal institutions. The definitions of informal institutions discussed above have included norms, conventions, grass-roots institutions and trust. Specific examples

of informal institutions include the fact that business is done on the basis of a handshake instead of contracts, norms governing the resolution of collective action problems, revolving credit schemes to overcome incomplete financial markets, etc.

Coming up with an empirical proxy which measures all these dimensions of informal institutions in a cross-country context is clearly not possible. It would be extremely difficult, for example, to quantify different types of norms or conventions. This may, in fact, explain why measures of informal institutions have not previously been included in the deep-determinants literature. However, the fact that they may be difficult to measure, does not mean they are unimportant. In the words of North (1990, p.36) "it is much easier to describe and be precise about the formal rules that societies devise than to describe and be precise about the informal ways by which human beings have structured human interaction. But although they defy, for the most part, neat specification and it is extremely difficult to develop unambiguous tests of their significance, they are important."

In an attempt to come up with an empirical proxy for informal instutions, we argue, following the discussion in Sections 2 and 4 of the paper, that the norms and conventions that are likely to increase productivity or factor accumulation will be underpinned by a high degree of trust. For example, business is likely to be done on the basis of a handshake in a high-trust environment. Likewise, norms governing the use of a common pool resource are likely to be more effective in a high-trust environment. Hence, we argue that informal institutions can be proxied by measures of trust. We also argue that for grass-roots institutions, such as revolving credit schemes, to be established, not only requires high degrees of trust, but requires that economic actors believe that they have some control over their own destiny. If people believe that what happens to them is largely the result of fate, they will be less likely to devise informal institutional arrangements to better their economic lot. To this end, we construct a measure of informal institutions, which contains information on two possible measures for trust (*TRUST* and *RESPECT*), as well as a measure of the extent to which people believe that they have control over their lives (*CONTROL*). Our index therefore includes the three positive beliefs from Tabellini's index.

Data for all three variables are derived from questions in the World Values Survey (Ingelhart et al, 2004). The variable *TRUST* measures the percentage of individuals in a country who answered "most people can be trusted" to the question "Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people". Hence *TRUST* is a subjective measure, based on how trusting people say they are.

TRUST, or variants of it, have also been used as a proxy for social capital by Heliwell (1996), Knack and Keefer (1997), Zak and Knack (2001), Whiteley (2000), and as a proxy for culture by Tabellini (2005). In the majority of these social capital studies *TRUST* is found to be positively correlated with economic growth. These papers are generally not cited within the deep-determinants literature, perhaps because most do not analyse the role of formal institutions or geography. Note also, that many of these papers are concerned with the effect of *TRUST* on economic growth, rather than the level of income per capita, providing another reason why they are not cited in the deep-determinants literature. Given that these studies do not control for formal institutions, it is possible that any significant correlation between *TRUST* and economic performance is due to omitted variables bias.

RESPECT measures the percentage of respondents who believe that parents should teach their children tolerance and respect for others. Tabellini argues that this variable can be interpreted as the flip side of *TRUST*. Whereas *TRUST* measures the extent to which people trust others, *RESPECT* measures whether people are trustworthy, as someone who does not respect others is intrinsically untrustworthy. *CONTROL* is the percentage of respondents who believe that they have control over their lives, and can be interpreted as a measure of conviction that individual effort will pay off; in other words, productive and enterprising behaviour will be rewarded. We construct an index of informal institutions (*INFORM*) by summing *TRUST*, *RESPECT* and *CONTROL*. We have argued above that there is a significant degree of overlap between the concepts of informal institutions, social capital and culture, hence our index could also be interpreted as a measure of social capital and/or culture. In fact, Tabellini includes all three variables in his culture index.

We acknowledge that *INFORM* is derived from survey data, based on what people say, rather than what they do. Note, however, that the proxies used in the deep-determinants literature for formal institutions are also based on peoples' perceptions of the institutional environment, so are equally subjective (for a critique of the standard measures of formal institutions, see Glaeser et al, 2004). With respect to *TRUST*, evidence on whether this variable is correlated with how trusting, or trustworthy, people are in economic experiments is somewhat mixed (see Glaeser et al, 2000 and Holm and Danielson, 2005). In defence of the *TRUST* measure, Knack and Keefer argue that its validity is confirmed, to some extent, by an experiment conducted by the *Reader's Digest*, who dropped a number of wallets in various countries around the world to see how many would be returned. The proportion of wallets returned was higher in countries with higher measures of *TRUST*, with a correlation

of 0.67. Hence, we argue that the data from the World Values Survey are just as valid as are the perceptions-based data typically used in the literature for formal institutions.

Just as endogeneity is a potential problem with formal institutions, it is also a potential problem with informal institutions. It seems likely that as incomes rise, people may feel they can afford to be more trusting and act more cooperatively. It is also likely that people living in higher income per capita countries are more likely to feel they have control over their own destiny than will those living in absolute poverty.

Tabellini uses both settler mortality and the proportion of the population which is Protestant as instruments for his culture index. The use of settler mortality would dramatically restrict our sample size; therefore we will use the proportion of the population that is Protestant as an instrument. The idea that the Protestant ethic has been important historically in the spread of capitalism can be traced to Weber (1958), who argued that the Protestant religion placed an emphasis on honesty and taking personal responsibility for one's own fate. Jones (1997, p.766) argues that a person endowed with the Protestant ethic "believes that positive outcomes are the result of his or her own attitudes and behaviour. A person with an external locus of control, by contrast, attributes outcomes to luck, fate, chance, or the influence of powerful others." Hence, we would expect *CONTROL* to be higher in historically Protestant countries.

As has been suggested by Putnam (1993) and Ingelhart and Baker (2000), hierarchical religions, such as Catholicism, are less likely to generate interpersonal trust than are more vertical religions, such as Protestantism. Ingelhart and Baker argue that Protestant religious institutions gave rise to the Protestant ethic, which they define as relatively high interpersonal trust and a relatively high degree of social pluralism. They argue further that these cultural traits have persisted over time, even as levels of religious observance have fallen. Hence, not only can we expect the Protestant ethic to be associated with high levels of *CONTROL*, but also with high levels of *TRUST* and *RESPECT*.

Ingelhart and Baker (2000) present data which show that countries with a Protestant history tend to have higher levels of *TRUST*, as measured in the World Values Survey, than do countries with a Catholic history, including many Latin American countries, or with an Eastern Orthodox or Muslim history (although there are very few countries with a Muslim history in their data set).[6] This result holds if the level of income per capita is controlled for. Ingelhart and Baker are at pains to point out that it is the religious *history* of countries that is

important in explaining levels of *TRUST*, not individuals' religious beliefs today. That is, people in historically Protestant countries are likely to be more trusting than those in historically Catholic countries, but within a given country, a Catholic is likely to be just as trusting as a Protestant.

6. Empirical Results

The previous section of the paper has discussed the measurement of informal institutions, and proposed that the proportion of the population that is Protestant (*PROTFRAC*) can be used as an instrument for our measure of informal institutions (*INFORM*). This section of the paper includes *INFORM* in a representative deep-determinants framework, controlling for formal institutions, geography and trade openness.[7] The estimating equation is given by equation (1)

$$\ln GDP_i = \alpha_0 + \alpha_1 FORM_i + \alpha_2 INFORM_i + \alpha_3 GEO_i + \alpha_4 OPEN_i + \varepsilon_i \quad (1)$$

where ln*GDP* is the natural logarithm of GDP per capita from the Penn World Tables. *FORM* is formal institutions, which is proxied by the average protection of risk against expropriation (*EXPROP*) and constraints on the executive (*EXCON*). *INFORM* is our proxy for informal institutions, as described in Section 4. *GEO* is a vector of geographical variables, proxied by distance from the equator, scaled between 0 and 1 (*LAT*), and Sach's (2003) measure of malaria exposure (*MALFAL*). These are the two most commonly used proxies for geography in the literature. *OPEN* represents openness which, following Rodrik, Subramanian and Trebbi (2004), is proxied by Sachs and Warner's (1995) measure of the fraction of years a nation was open over the period 1950-1994 (*YROPEN*). As an additional robustness check we also proxy for openness with the log of actual trade shares (ln*TSHARE*), data for which are taken from Frankel and Romer (1999). The Sachs and Warner measure includes information not only on tariff and non-tariff barriers, but also on whether the government monopolises exports, the extent of the black market premium and whether or not the country is socialist. Rodriguez and Rodrik (2001) argue that these last three measures are as likely to proxy for institutions as openness, hence the actual trade shares measure may be more orthogonal with respect to both formal and informal institutions. Although we have two proxies each for formal institutions, openness and geography, we only include one proxy for

each variable at a time. Subscript i denotes country i. Data sources and definitions are given in the data appendix.

It is standard in the deep-determinants literature to obtain estimates of the income equation using single-equation instrumental-variables techniques such as 2SLS. In addition to obtaining 2SLS estimates of equation (1), we also include equation (1) in a system of equations, for which empirical estimates are obtained using 3SLS.

6.1 The 2SLS Results

In order to obtain estimates using 2SLS it is necessary to specify a set of instruments for the potentially endogenous variables. The only exogenous explanatory variable in equation (1) is *LAT*. The endogenous variables are *INFORM*, *EXPROP*, *EXCON*, *YRSOPEN*, ln*TSHARE* and *MALFAL*. Our instrument set is chosen to maximise the sample size, hence settler mortality and British legal origin, which have been used as instruments for formal institutions in the existing literature, but are only available for former colonies, are omitted from the instrument set. This gives a sample of 50 countries, which includes an approximately equal number of developed and developing countries. The main constraint on the sample size is availability of data for *INFORM*.

Included in our instrument set are the proportion of the population speaking English (*ENGFRAC*) and the proportion of the population speaking a major European language (*EURFRAC*). As discussed in Section 3, Hall and Jones argue that these variables are correlated with the degree of Western European influence and hence with the quality of formal institutions, which were typically imported from Western Europe. We also include state history (*STHIST*) as an instrument, from Bocksette, Chanda and Putterman (2002). *STHIST* includes measures of the length of time a country has had a government above tribal level, the extent to which countries were ruled by colonial governments and the proportion of the country that was ruled by this government. The index is normalised to lie between 0 and 1, with 1 indicating the greatest state history. Bocksette, Chanda and Putterman find that this index is correlated with a number of measures of formal institutions, but that it has no independent correlation with output per worker.

Following Acemoglu, Johnson and Robinson (2002) we also include the log of population density in 1500 (ln*POPDEN*) in the instrument set.[8] Acemoglu, Johnson and Robinson argue that regions that were densely settled by the native population were not

attractive for Europeans to settle, so in such areas extractive institutions were set up. They therefore use the density of the non-European population in 1500 as an instrument for formal institutions. This instrument is also used by Bardhan (2005) and Acemoglu and Johnson (2006).

The proportion of the population that is Protestant (*PROTFRAC*) is also included in the instrument set. As discussed in Section 4, this variable is likely to be correlated with our measure of informal institutions. Ingelhart and Baker's data on this variable was a binomial variable, measuring whether a country had a Protestant religious history or not. However, it is not clear what criteria were used in determining whether a country had a Protestant history. For this reason, we use data on the current proportion of the population that is Protestant, on the assumption that this will be correlated with whether a country has a Protestant history. It is also possible that informal institutions will be correlated with some of the other instruments. For example, Bocksette, Chanda and Putterman (2002) report a weak correlation between state history (*STHIST*) and *TRUST*. Also included in the instrument set is Sachs' (2003) malaria ecology variable (*ME*) (to instrument for *MALFAL*) and the natural logarithm of the Frankel-Romer (1999) predicted trade share variable (ln*FR*) (to instrument for openness). Given that we only include one proxy each for formal institutions, geography and openness in each regression, our estimating equations are over identified.

[Table 1 about here]

Descriptive statistics for all variables are reported in Table 1. As well as reporting the mean and standard deviation for each variable, we also report the mean value for each variable by quartiles of *INFORM*. It can be seen from the table that the countries in the highest quartile, on the basis of *INFORM*, have a mean log of GDP per capita substantially greater than the countries in the lowest quartile of *INFORM*. In addition, quartiles with higher values of *INFORM* also have higher values of all the control variables, except for *MALFAL* where the correlation is negative. This indicates that there is a high degree of correlation between the explanatory variables in equation (1), emphasising the importance of controlling for all these variables in empirical work.[9]

The results obtained from 2SLS estimation of different variants of equation (1), when *EXPROP* is the formal institutions proxy, are reported in Table 2. We have argued above that

it is desirable to control for formal and informal institutions, geography and openness in the same estimating equation. However, in order to assess the effect of including different controls, we begin in column (1) with informal institutions as the only explanatory variable, and then successively add the other control variables. When *INFORM* is the only explanatory variable it has a positive sign, and is significant at the one percent level. This is in keeping with Tabellini (2005), who found his culture index to be positively correlated with income per capita across countries, when no additional controls were included. Our real interest, however, is in determining whether this correlation remains significant when formal institutions and geography are controlled for. To this end, *EXRPROP* is added as a proxy for formal institutions in column (2) and found to be significant with the expected sign, but *INFORM* is now only significant at the ten percent level. *MALFAL* is added in column (3). In line with Sachs (2003) and Batten and Martina (2005), a higher risk of malaria has a statistically significant negative effect on income per capita. The inclusion of *MALFAL* renders *EXPROP* insignificant, but *INFORM* retains its statistical significance. The Sachs and Warner measure of openness (*YRSOPEN*) is added in column (iv) and distance from the equator is added in column (5), with neither of these variables being statistically significant. In columns (6) and (7) *YRSOPEN* is replaced with the log of the actual trade share, with the coefficient being positive and statistically significant. In general, once additional controls are added, *INFORM* remains statistically significant, but with a smaller point estimate than when no control variables were included.

[Table 2 about here] [Table 3 about here]

To test whether our results are sensitive to the chosen formal institutions proxy, we use constraints on the executive (*EXCON*) from the Polity IV database, in place of *EXPROP*, as the formal institutions proxy for the results reported in Table 3. The results are qualitatively similar to those obtained when *EXPROP* is the formal institutions proxy; the main difference being the results reported in column (3), where informal institutions are insignificant if the Sachs and Warner measure of openness is included as a control variable.

In both Tables 2 and 3 we report the first-stage regressions for *INFORM* and the results of a series of diagnostic tests. The-first stage regression results on the *set* of existing individual instruments for institutions in the existing deep determinants literature (augmented with *PROTFRAC*) consistently indicate that *STHIST*, ln*POPDEN* and *PROTFRAC* are all

robustly correlated with *INFORM*. The robust positive relationship between *INFORM* and *PROTFRAC* is consistent with Ingelhart and Baker's (2000) findings.

The first-stage regressions for the other endogenous variables are not reported in Tables 2 and 3 due to space constraints. Our discussion of the these first-stage regressions focuses on those for reported in column (7) of Table 2 and column (5) of Table 3, given that these are the specifications for which all the deep determinants are included in the second-stage regression, and which include the preferred proxy for openness. These equations also show no evidence of misspecification.

The first-stage regression for *FORM* in column (7) of Table 2 indicates that *ENGFRAC* and *LAT* are strongly positively correlated with *FORM* (as proxied the average protection against expropriation risk) whilst *STATEHIST* and *EURFRAC* are marginally significant. The first-stage regression for *FORM* (as proxied by constraints on the executive) indicates a significantly positive correlation with both *PROTFRAC* and *EURFRAC*. The first-stage regressions also show that *MALFAL* is positively correlated with *ME* and the ln*FR* is significantly positively correlated with the openness. Further, the first-stage *F*-statistics are significant for all the first-stage regressions.

The Sargan test results reported in Tables 2 and 3 imply that the exogeneity restrictions are correctly imposed on the instrument set and that the instruments have no direct effect on the level of income per capita. We note that there is a marginal rejection of the null for the Sargan test (Table 2, columns (4) and (5)) when *YRSOPEN* is included as the proxy for openness, but not when ln*TSHARE* is used as the openness proxy (see Table 2, columns (6) and (7)). It appears that the lower correlation between ln*TSHARE* and formal and informal institutions circumvents any direct channels between the instrument set and income. Given the number of endogenous regressors, we report Shea's (1997) "partial R-squared" measure of instrument relevance that takes inter-correlations among the instruments into account. Whilst there is no 'benchmark' value of Shea's statistic, these partial R-squared measures are substantially greater than zero, exceeding approximately 0.2 in all cases.

Tables 2 and 3 also include a set of tests for heteroskedasticity and normality of the residuals. In general, heteroskedasticity does not appear to be a problem, although there is some evidence of non-normality of the residuals for some results in Table 2. However, non-normality does not appear to be a problem for the results reported in columns (6) and (7), when openness is proxied by the actual trade share.

The empirical results reported in Tables 2 and 3 suggest that informal institutions, as proxied by *INFORM*, have a statistically significant effect on the level of income per capita across countries. This result is robust to the inclusion of a number of control variables for formal institutions, geography and openness, except for the results reported in column (3) of Table 3. Once informal institutions are controlled for, the role of formal institutions is less clear, with *EXPROP* and *EXCON* being insignificant in the majority of regressions in which they are included.

With regards to geography, our results are in line with Sachs (2003), in that malaria risk is significant in every regression for which it is included. However, we confirm the finding of Acemoglu, Johnson and Robinson (2001) and others that once institutions are controlled for, distance from the equator has no direct effect on income per capita. *YRSOPEN* is insignificant when *EXPROP* is the formal institutions proxy, but significant when *EXCON* is the formal institutions proxy. ln*TSHARE* is significant in all regressions in which it is included. Our finding that openness is generally significant is in contrast to Rodrik, Subramanian and Trebbi (2004) who found that openness was generally insignificant and had the wrong sign.

In terms of economic significance, we typically obtain a coefficient of 0.01 on *INFORM*, which is measured on a 0-300 scale, once formal institutions, geography and openness are all controlled for. Hence our results indicate that a one standard deviation (31.6 point) increase in *INFORM* will, on average across countries, increase income per capita by 31.6 percent. By comparison, the risk of malaria exposure typically has a coefficient in the region of -2.0, implying that a one standard deviation (0.250 point) reduction in this variable would lead to an increase in income per capita of 50 percent.

6.2 The 3SLS Results

We now turn to the estimation of a system of equations using 3SLS. We focus on results obtained when formal institutions are proxied by *EXPROP* and openness proxied by ln*TSHARE*. Estimating a system of equations allows us to test whether there is any causal relationship between *FORM* and *INFORM*. Estimation by 3SLS also takes advantage of possible contemporaneous cross-equation error correlation, thereby resulting in efficiency gains.

Identification of the coefficients on the endogenous variables in the system requires that some exclusion restrictions be imposed in order to make the system identified. The choice of which variables to exclude from each equation is guided by our priors on which variables are the least likely to be significant. We assume that the Frankel-Romer trade-share variable (ln*FR*) and the malaria economy variable (*ME*) will not affect any of the left-hand-side variables, other than through their effects on openness and *MALFAL* respectively. This restriction is consistent with the fact that ln*FR* and *ME* were only correlated with openness and *MALFAL*, respectively, in the first-stage regressions from the 2SLS results discussed above. The proportion of the population that is Protestant (*PROTFRAC*), population density in the precolonial era (ln*POPDEN*), state history (*STHIST*), and the proportions of the population speaking English (*ENGFRAC*) or another European language (*EURFRAC*) may affect institutions, but are less likely to affect the risk of malaria or trade openness directly, so are excluded from the *MALFAL* and ln*TSHARE* equations. *MALFAL*, *ENGFRAC* and *EURFRAC* are excluded from the *INFORM* equation, and *MALFAL* from the *FORM* equation, as these variables were insignificant in first-stage regressions for *INFORM* and *FORM*, respectively, reported in Tables 2 and 3. The empirical results obtained from 3SLS estimation of this system of equations are reported in Table 4.

[Table 4 about here]

Perhaps the most interesting result is that all four hypothesised deep determinants, including both formal and informal institutions, are significant in explaining cross-country differences in the level of income per capita. The coefficient on *INFORM* is smaller than that reported in Tables 2 and 3, when a similar set of control variables were included (column (7) of Table 2). The Table 4 results indicate that a one standard deviation (31.6 point) increase in *INFORM* will, on average across countries, increase income per capita by 19.0 percent whilst a one standard deviation (1.65 point) increase in *FORM* will, on average across countries, increase income per capita by 40.4 percent. Hence, the 3SLS results suggest that although formal and informal institutions are both statistically and economically significant, improvements in formal institutions have the largest economic effect.

The results for the *INFORM* and *FORM* equations suggest that income per capita has no direct effect on either formal or informal institutions. Also of interest is the fact that there is no evidence that informal institutions affect formal institutions. However, *FORM* is close to being statistically significant at the ten percent level in the *INFORM* equation (it has a p-

value of 0.142), so there may be some evidence that improvements in formal institutions lead to improvements in informal institutions. Further, in the *INFORM* equation, *STATEHIST*, *PROTFRAC* and ln*POPDEN* are all significant, consistent with the first-stage regression results reported in Tables 2 and 3. In the *FORM* equation, *LAT*, *STATEHIST* and *ENGFRAC* are all statistically significant. Note, however, that *LAT* does not enter the income equation directly, which is consistent with Acemoglu, Johnson and Robinson (2001). Turning to the *MALFAL* equation, it can be seen that the ability to suppress malaria increases with income per capita. The results from the ln*TSHARE* equation also suggest that openness increases with the level of income per capita. That higher incomes lead to less malaria and greater openness, which in turn increases income per capita, suggests a vicious and virtuous circle pattern of development.

Our 2SLS results indicate that informal institutions, the risk of malaria and trade openness are all important deep determinants of development. This result is confirmed by the 3SLS results, and, in addition, formal institutions are now found to be both statistically and economically significant.

7. Conclusion

The key argument of this paper is institutions are measured too narrowly in the existing deep-determinants-of-development literature. Within this literature, the focus is on formal institutions, especially those relating to the protection of property rights and the rule of law, rather than to informal institutions, such as conventions, norms and trust. We have argued that informal institutions are likely to be most effective in societies with high levels of trust, and in which people believe they have control over their own destiny. We have also argued that informal institutions are similar to what others have labelled social capital or culture. Hence, our empirical proxy for informal institutions could also be interpreted as a measure of social capital or culture.

Our empirical work complements that of Tabellini (2005), by including an empirical proxy for informal institutions, which is very similar to his culture measure, in a representative deep-determinants framework. Although we believe Tabellini's work is a valuable contribution to the literature, our paper brings a measure of informal institutions into the geography versus institutions debate. Tabellini found culture/informal institutions to be

important in explaining cross-country income differences, and we find that this result holds when formal institutions and geography are controlled for.

Our results suggest that informal institutions are an important deep determinant of income differences across countries. In fact, in some specifications, informal institutions are more important than formal institutions. With regards to the geography versus institutions debate, we find that although distance from the equator has no direct effect on income per capita, our most robust result is that malaria risk is an important determinant of cross-country income differences. Our results suggest that institutions, geography and openness are all deep determinants of income, with informal institutions being just as important as formal institutions in most specifications.

1. Other papers which contribute to the literature are Batten and Martina (2005), Fielding and Torres (2005) and Owen and Weatherston (2005).

2. For a more detailed discussion on defining social capital see Durlauf and Fafchamps (2006) or Knowles (2005). For a review of the cultural economics literature see Guiso, Sapienza and Zingales (2006).

3. It is true, of course, that in the vast majority of sports it is against the rules to kick an opponent in the head. However, in some sports, there is an unwritten code of conduct that although it may be acceptable to punch an opponent, which is also against the rules, that kicking an opponent in the head goes beyond the pale.

4. McMillan (2003) also uses a sporting analogy to make clear the distinction between formal and informal institutions.

5. Coleman (1988) notes that the trust required in this example is often the result of close religious ties. The New York diamond market is made up of Brooklyn Jews who attend the same synagogues.

6. Ingelhart and Baker (2000) is based on an earlier version of the World Values Survey than is our paper, meaning their data set contains data on fewer developing countries.

7. Many studies do not control for trade openness. However, Owen and Weatherston (2005) have shown that existing representative specifications from many deep-determinants studies are mis-specified, possibly as a result of being too parsimonious. For this reason we include proxies for each of the main contenders (formal institutions, geography and openness) in the deep-determinants literature as control variables.

8. One possible criticism of including ln*POPDEN* in the instrument set is that, strictly speaking, this variable would only be expected to be correlated with formal institutions in countries that are former colonies, given the original argument used by Acemoglu et al (2002) that the European colonial powers were more likely to settle in large numbers, and hence establish institutions which protected property rights, in countries that were not already densely populated. However, as can be seem from Tables 3 and 4, this variable is significantly correlated with formal institutions in the first-stage regressions, possibly because most of the variation in formal institutions across countries comes from the ex-colonies in the sample, rather than the Old World countries.

9 . The simple correlation between *INFORM* and *EXPROP* is 0.608 and between *INFORM* and *EXCON* it is 0.587.

References

Acemoglu, D., S. Johnson and J.A. Robinson. (2001). "The Colonial Origins of Comparative Development," *American Economic Review* 91, 1369-1401.

Acemoglu, D., S. Johnson and J.A. Robinson. (2002). "Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution," *Quarterly Journal of Economics* 117, 1231-1294.

Acemoglu, D. and S. Johnson. (2005). "Unbundling Institutions," *Journal of Political Economy* 113, 949-995.

Acemoglu, D., S. Johnson and J. Robinson. (2006). "The Rise of Europe: Atlantic Trade, Institutional Change, and Economic Growth," *American Economic Review* 95, 477-509.

Arrow, K. (1972). "Gifts and Exchanges," *Philosophy and Public Affairs* 1, 343-362.

Bardhan, P. (2005). "Institutions Matter, But Which Ones?" *Economics of Transition* 13, 499-532.

Batten, A. and A. Martina. (2005). "Diseases Dominate," Australian National University, mimeo.

Bocksette, V., A. Chanda and L. Putterman. (2002). "States and Markets: The Advantage of an Early Start," *Journal of Economic Growth* 7, 347-369.

Coleman, J.S. (1988). "Social Capital in the Creation of Human Capital," *American Journal of Sociology* 94, 95-120.

Diamond, J. (1997). *Guns, Germs and Steel: A Short History of Everybody for the Last 13,000 years*. New York: W.W. Norton and Co.

Doornik, J.A., and H. Hansen. (1994). "A Practical Test for Univariate and Multivariate Normality," Nuffield Economics Working Papers.

Durlauf, S.N. and M. Fafchamps. (2006). "Social Capital." In P. Aghion and S.N. Durlauf (eds), *Handbook of Economic Growth, Volume 1A*. Amsterdam: Elsevier North Holland.

Easterly, W. and R. Levine. (2003). "Tropics, Germs and Crops: How Endowments Influence Economic Development," *Journal of Monetary Economics* 50, 3-39.

Fafchamps, M. and B. Minten. (2002). "Returns to Social Network Capital Among Traders," *Oxford Economic Papers* 54, 173-206.

Fielding, D. and S. Torres. (2005). "Cows and Conquistadors: a Comment on the Colonial Origins of Comparative Development," Economics Discussion Paper No.0504, University of Otago.

Frankel, J. and D. Romer. (1999). "Does Trade Cause Growth?" *American Economic Review*, 89, 379-399.

Glaeser, E. L., D. I. Laibson, J. A. Scheinkman and C. L. Soutter. (2000). "Measuring Trust," *Quarterly Journal of Economics* 115, 811-846.

Glaeser, E.L., R. La Porta, F. Lopez-De-Silanes and A. Shleifer. (2004). "Do Institutions Cause Growth?" *Journal of Economic Growth* 9, 271-303.

Guiso, L., P. Sapienza and L. Zingales. (2006). "Does Culture Affect Economic Outcomes?" *Journal of Economic Perspectives* 20, 23-48.

Hall, R.E. and C.I. Jones. (1999). "Why do Some Countries Produce so Much More Output Per Worker Than Others?" *Quarterly Journal of Economics* 114, 83-116.

Helliwell, J.F. (1996). "Economic Growth and Social Capital in Asia," NBER Working Paper No.5470.

Holm, H.J. and A. Danielson. (2005). "Tropic Trust Versus Nordic Trust: Experimental Evidence From Tanzania and Sweden," *Economic Journal* 115, 505-532.

Ingelhart, R. and W.E. Baker. (2000). "Modernisation, Cultural Change, and the Persistence of Traditional Values," *American Sociological Review* 65, 19-51.

Ingelhart, R., M. Basáñez, J. Díez-Medrano, L. Halman and R. Luijkx. (2004). *Human Beliefs and Values: a Cross-Cultural Sourcebook Based on the 1999-2002 Values Surveys*, Mexico: Siglo Veintiuno Editores.

Jaggers, K. and M.G. Marshall. (2000). "Polity IV Project," Center for International Development and Conflict Management, University of Maryland.

Jones, H.B. (1997). "The Protestant Ethic: Weber's Model and the Empirical Literature," *Human Relations* 50, 757-778.

Kaufmann, D., A. Kraay, and P. Zoido-Lobatón. (1999a). "Aggregating Governance Indicators," World Bank Research Paper No.2195.

Kaufmann, D., A. Kraay, and P. Zoido-Lobatón. (1999b). "Governance Matters," World Bank Research Paper No.2196.

Kaufmann, D., A. Kraay, and P. Zoido-Lobatón. (2002). "Governance Matters II – Updated Indicators for 2000/1," World Bank Policy Research Department Working Paper, No.2772.

Knack, S. and P. Keefer. (1997). "Does Social Capital Have an Economic Payoff? A Cross-Country Investigation," *Quarterly Journal of Economics* 112, 1251-88.

Knowles, S. (2005). "The Future of Social Capital in Development Economics Research," paper presented at the WIDER Jubilee Conference, Helsinki (http://www.wider.unu.edu/conference/conference-2005-3/conference-2005-3.htm).

Koenker, R. (1981). "A Note on Studentizing a Test for Heteroscedasticity," *Journal of Econometrics* 17, 107-112.

La Porta, R., F. Lopez-De-Silanes, A. Shleifer and R.W. Vishny. (1997). "Legal Determinants of External Finance," *Journal of Finance* 52, 1131-1150.

La Porta, R., F. Lopez-de-Silanes, A. Shleifer and R. Vishny. (1999). "The Quality of Government," *The Journal of Law, Economics, and Organization* 15, 222-279.

McEvedy, C. and R. Jones. (1978). *Atlas of World Population History*. New York: Facts on File.

McMillan, J. (2003). *Reinventing the Bazaar: A Natural History of Markets*. New York: W.W. Norton and Co.

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

Olsson, O. and D.A. Hibbs Jr. (2005). "Biogeography and Long-Run Economic Development," *European Economic Review* 49, 909-938.

Ostrom, E. (1990). *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge: Cambridge University Press.

Owen, P.D. and C.R. Weatherston (2005) "What Really Matters for Long-term Growth and Development? A Re-examination of the Deep Determinants of Per Capita Income," Paper presented at the New Zealand Association of Economists Conference, Christchurch, July 2005.

Pagan, A. R. and D. Hall. (1983). "Diagnostic Tests as Residual Analysis," *Econometric Reviews* 2, 159-218.

Platteau, J.-P. (1994a). "Behind the Market Stage Where Real Societies Exist – Part I: The Role of Public and Private Order Institutions," *Journal of Development Studies* 30, 533-577.

Platteau, J.-P. (1994b) "Behind the Market Stage Where Real Societies Exist – Part II: The Role of Moral Norms," *Journal of Development Studies* 30, 753-817.

Platteau, J.-P. (2000). *Institutions, Social Norms and Economic Development*. Amsterdam: Harwood.

Pretty, J. and H. Ward. (2001). "Social Capital and the Environment", *World Development* 29, 209-227.

Putnam, R.D., R. Leonardi and R.Y. Nanetti. (1993). *Making Democracy Work: Civic Traditions in Modern Italy*. Princeton: Princeton University Press.

Rodriguez, F. and D. Rodrik. (2001). "Trade Policy and Economic Growth: A Sceptics Guide to the Cross-National Evidence." In B. Bernanke and K.S. Rogoff (eds) *Macroeconomics Annual 2000*. Cambridge, MA: MIT Press.

Rodrik, D., A. Subramanian and F. Trebbi. (2004). "Institutions Rule: The Primacy of Institutions Over Geography and Integration in Economic Development," *Journal of Economic Growth* 9, 131-165.

Sachs, J.D. (2003). "Institutions Don't Rule: Direct Effects of Geography on Per Capita Income," NBER Working Paper No.9490.

Sachs, J.D. and A. Warner. (1995). "Economic Reform and the Process of Global Integration," *Brookings Papers on Economic Activity* 1, 1-95.

Sala-i-Martin, Xavier X. (1997). "I Have Just Run Two Million Regressions," *American Economic Review* 87, 178-183.

Shea, J. (1997). "Instrument Relevance in Multivariate Linear Models: A Simple Measure," *Review of Economics and Statistics* 79, 348-352.

Tabellini, G. (2005) "Culture and Institutions: Economic Development in the Regions of Europe," CESIFO Working Paper No.1492.

Weber, M. (1958). *The Protestant Ethic and the Spirit of Capitalism* (translated by Talcott Parsons). New York: Charles Scribner's Sons (originally published as two separate essays, 1904-5).

White, H. (1980). "A Heteroscedasticity-Consistent Covariance Matrix Estimator and a Direct test for Heteroscedasticity," *Econometrica* 48, 817-838.

Whiteley, P.F. (2000). "Economic Growth and Social Capital", *Political Studies* 48, 443-466.

Zak, P.J. and S. Knack. (2001). "Trust and Growth," *Economic Journal* 111, 295-321.

Table 1: Descriptive Statistics

	Sample Mean	Mean By Quartiles of *INFORM*			
		(1)	(2)	(3)	(4)
Log of GDP per capita in 2000 (ln*GDP*)	9.233 (0.986)	8.315	9.083	9.478	10.048
Average Protection Against Expropriation Risk, 1985-1995 (*EXPROP*)	8.131 (1.650)	7.035	7.577	8.341	9.601
Constraint on the Executive 1960-2000 (*EXCON*)	4.967 (1.807)	3.783	4.415	5.077	6.628
INFORM (sum of *TRUST*, *RESPECT* and *CONTROL*)	163.28 (31.575)	124.250	149.923	172.692	206.583
Years Open (*YRSOPEN*)	0.444 (0.363)	0.122	0.403	0.532	0.714
Log of Actual Trade Shares (ln*TSHARE*)	3.877 (0.607)	3.699	3.854	3.947	4.014
Log of Predicted Trade Shares (ln*FR*)	2.500 (0.774)	2.426	2.474	2.593	2.501
Risk of Malaria Exposure (*MALFAL*)	0.107 (0.250)	0.284	0.101	0.048	0.001
Malaria Ecology (*ME*)	1.270 (3.617)	1.776	2.863	0.349	0.036
Latitude (*LAT*)	0.377 (0.194)	0.297	0.289	0.364	0.564
Log of population density 1500 (ln*POPDEN*)	1.160 (2.138)	1.736	1.032	1.843	-0.019
State History (*STHIST*)	0.532 (0.256)	0.498	0.548	0.590	0.487
Fraction speaking English (*ENGFRAC*)	0.092 (0.264)	0.006	0.014	0.075	0.279
Fraction speaking European language (*EURFRAC*)	0.376 (0.447)	0.175	0.351	0.587	0.377
Fraction Protestant (*PROTFRAC*)	0.214 (0.305)	0.085	0.057	0.135	0.600
Number of observations	50	12	13	13	12

NOTES: Standard deviations are in parentheses. Quartiles of *INFORM* are (1) less than or equal to 134; (2) greater than 134 and less than or equal to 158; (3) greater than 158 and less than or equal to 181; (4) greater than or equal to 190

Table 2: Two Stage Least Squares Regressions
Formal Institutions Measure: Risk of Expropriation Risk (EXPROP)

	Panel A: Two Stage Least Squares: *Dependent Variable is log GDP per capita 2000*						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
INFORM	0.024** (5.25)	0.010† (1.74)	0.013* (2.18)	0.007† (1.74)	0.008† (1.75)	0.011* (2.01)	0.011* (2.11)
EXPROP	--	0.355** (2.67)	0.154 (1.00)	0.110 (0.61)	0.223 (1.00)	0.160 (1.05)	0.265 (1.48)
MALFAL	--	--	-1.859** (-3.35)	-1.949** (-4.31)	-1.914** (-4.20)	-1.983** (-3.64)	-1.966** (-3.61)
YRSOPEN	--	--	--	0.848 (1.18)	0.595 (0.83)	--	--
lnTSHARE	--	--	--	--	--	0.259† (1.70)	0.262† (1.78)
LAT	--	--	--	--	-0.500 (-0.69)	--	-0.777 (-1.05)
R-squared	0.412	0.770	0.790	0.865	0.874	0.806	0.807
	Panel B: First Stage Regressions for *INFORM*						
STHIST	53.571** (2.58)	53.571** (2.58)	51.729* (2.46)	52.470* (2.46)	45.228* (1.92)	52.470* (2.46)	45.228* (1.92)
ln*POPDEN*	-5.769* (-2.18)	-5.769* (-2.18)	-5.823* (-2.1896)	-6.080* (-2.20)	-5.741* (-2.04)	-6.080* (-2.20)	-5.741* (-2.04)
ENGFRAC	-1.025 (-0.07)	-1.025 (-0.07)	-1.105 (-0.074)	-1.112 (0.07)	-0.963 (-0.06)	-1.112 (0.07)	-0.963 (-0.06)
EURFRAC	11.754 (1.43)	11.754 (1.43)	10.151 (1.189)	9.917 (1.15)	10.254 (1.18)	9.917 (1.15)	10.254 (1.18)
PROTFRAC	68.104** (5.88)	68.104** (5.88)	67.031** (5.712)	64.938** (5.00)	58.144** (3.66)	64.938** (5.00)	58.144** (3.66)
ME	--	--	-0.684 (-0.740)	-0.689 (-0.74)	-0.213 (-0.19)	-0.689 (-0.74)	-0.213 (-0.19)
ln*FR*	--	--	--	1.915 (0.39)	0.221 (0.04)	1.915 (0.39)	0.221 (0.04)
LAT	--	--	--	--	23.108 (0.75)	--	23.108 (0.75)
First stage F-value	11.437**	11.437**	9.529**	8.025**	7.02**	8.025**	7.02**
Partial R squared	0.565	0.565	0.571	0.572	0.401	0.572	0.401
Shea Partial R squared	0.565	0.216	0.211	0.265	0.280	0.233	0.272
Sargan Test *[p-value]*	[0.252]	[0.107]	[0.688]	[0.054]*	[0.085]†	[0.428]	[0.674]
Heteroscedasticity							
Pagan Hall general *[p-value]*	[0.442]	[0.154]	[0.307]	[0.449]	[0.726]	[0.259]	[0.341]
Pagan Hall Norm. *[p-value]*	[0.251]	[0.016]*	[0.170]	[0.247]	[0.565]	[0.211]	[0.215]
White Kron *[p-value]*	[0.371]	[0.161]	[0.177]	[0.123]	[0.079]†	[0.126]	[0.147]
Normality							
Doornik-Hansen *[p-value]*	[0.142]	[0.019]*	[0.170]	[0.038]*	[0.009]**	[0.531]	[0.324]

NOTES: †, * and ** denote statistical significance at the 10%, 5% and 1% levels respectively. Constant term omitted. *t*-statistics are reported in parentheses. Instruments for all endogenous regressors are included in the first-stage regressions for each endogenous regressor. The partial R-squared measure the relationship between the excluded instruments and the endogenous regressor. The first-stage results include Shea's (1997) "partial R-squared" measure of instrument relevance that takes inter-correlations among instruments into account. The null in the Sargan test is of orthogonality of the residuals in the income equation and the instrument set. Three tests for heteroskedasticity are reported: Pagan and Hall's (1983) general test statistic for heteroskedasticity in an IV regression, Pagan and Hall's (1983) test statistic for heteroskedasticity in an IV regression when the error term is assumed to be normally distributed, and the White (1980)/Koenker (1981) nR-squared test statistic. Under the null of homoskedasticity, these test statistics are chi-squared distributed. The Doornik-Hansen (1994) test for normality is also reported.

Table 3: Two Stage Least Squares Regressions
Formal Institutions Proxy: Constraint on the Executive (EXCON)

	Panel A: Two Stage Least Squares: *Dependent Variable is log GDP per capita 2000*				
	(1)	(2)	(3)	(4)	(5)
INFORM	0.019* (2.081)	0.012† (1.927)	0.002 (0.463)	0.010† (1.827)	0.011† (1.888)
EXCON	0.122 (0.711)	0.138 (1.189)	0.146† (1.855)	0.125 (1.131)	0.154 (1.292)
MALFAL	--	-2.067** (-4.442)	-1.937** (-5.580)	-2.246** (-5.343)	-2.367** (-5.040)
YRSOPEN	--	--	1.156** (2.811)	--	--
ln*TSHARE*	--	--	--	0.309* (2.151)	0.330* (2.211)
LAT	--	--	--	--	-0.445 (-0.656)
R-squared	0.513	0.754	0.889	0.778	0.786
	Panel B: First Stage Regressions for *INFORM*				
STHIST	53.571** (2.58)	51.729* (2.46)	52.470* (2.46)	52.470* (2.46)	45.228* (1.92)
ln*POPDEN*	-5.769* (-2.18)	-5.823* (-2.19)	-6.080* (-2.20)	-6.080* (-2.20)	-5.741* (-2.04)
ENGFRAC	-1.025 (-0.07)	-1.105 (-0.07)	-1.112 (0.07)	-1.112 (0.07)	-0.963 (-0.06)
EURFRAC	11.754 (1.43)	10.151 (1.19)	9.917 (1.15)	9.917 (1.15)	10.254 (1.18)
PROTFRAC	68.104** (5.88)	67.031** (5.71)	64.938** (5.00)	64.938** (5.00)	58.144** (3.66)
ME	--	-0.684 (-0.74)	-0.689 (-0.74)	-0.689 (-0.74)	-0.213 (-0.19)
ln*FR*	--	--	1.915 (0.39)	1.915 (0.39)	0.221 (0.04)
LAT	--	--	--	--	23.108 (0.75)
First stage F-value	11.437**	9.529**	8.025**	8.025**	7.02**
Partial R squared	0.565	0.571	0.572	0.572	0.401
Shea Partial R squared	0.194	0.237	0.190	0.243	0.256
Sargan Test *[p-value]*	[0.115]	[0.885]	[0.151]	[0.534]	[0.654]
Heteroscedasticity					
Pagan Hall general *[p-value]*	[0.459]	[0.146]	[0.394]	[0.657]	[0.720]
Pagan Hall Norm. *[p-value]*	[0.361]	[0.162]	[0.360]	[0.827]	[0.856]
White Kron *[p-value]*	[0.468]	[0.120]	[0.215]	[0.354]	[0.209]
Normality					
Doornik-Hansen *[p-value]*	[0.222]	[0.816]	[0.484]	[0.758]	[0.770]

NOTES: Refer to Table 3.

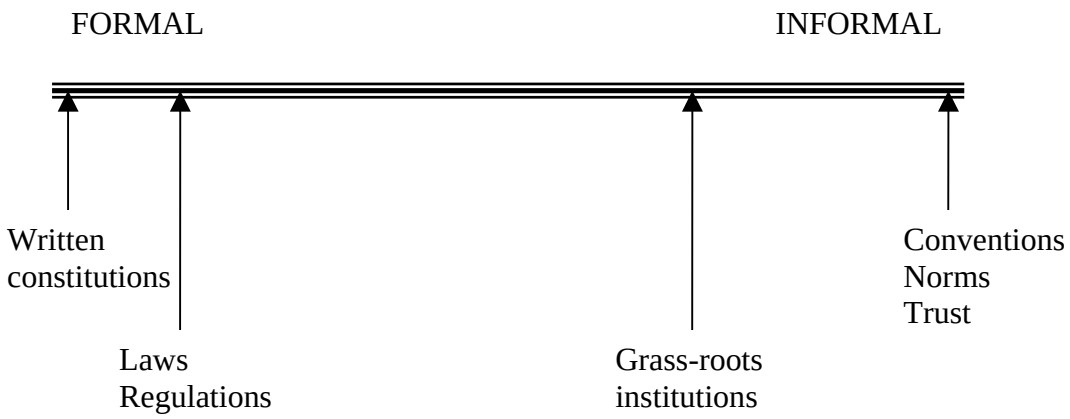
Table 4: Fitted Regression Coefficients using 3SLS

Formal Institutions Measure: Risk of Expropriation Risk (EXPROP)

	(1) ln*GDP*	*(2)* *INFORM*	*(3)* *FORM*	*(4)* *MALFAL*	*(5)* *lnTSHARE*
ln*GDP*	--	-11.836 (-0.73)	0.572 (0.96)	-0.209** (-4.23)	0.376† (1.93)
INFORM	0.006† (1.68)	--	-0.001 (-0.04)	--	0.000 (0.01)
FORM	0.245* (2.19)	15.711 (1.45)	--	--	-0.181 (-1.33)
MALFAL	-2.301** (-5.34)	--	--	--	--
ln*TSHARE*	0.296* (2.21)	-0.712 (-0.10)	0.067 (0.16)	0.025 (0.48)	--
LAT	-0.570 (-1.11)	--	3.198* (2.31)	0.129 (0.73)	--
STHIST	--	31.588† (1.81)	0.972† (1.81)	--	--
PROTFRAC	--	40.358** (3.05)	0.298 (0.21)	--	--
ENGFRAC	--	--	0.611† (1.62)	--	--
EURFRAC	--	--	0.373 (0.66)	--	--
ln*POPDEN*	--	-7.694** (-2.92)	--	--	--
ME	--	--		0.016* (2.41)	--
LOGFR	--	--	--	--	0.571** (7.26)
R-squared	0.796	0.519	0.726	0.597	0.577

NOTES: Refer to Table 2.

Figure 1: The Institutions Continuum



Appendix: Data Definitions and Sources

CONTROL The percentage of individuals in a country who gave a score of 7-10 in response to the question "[s]ome 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 (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". (Source: Ingelhart et al, 2004.)

ENGFRAC Fraction of the population speaking English. (Source: Hall and Jones, 1999.)

EURFRAC Fraction of the population speaking a major Western European language: English, French, German, Portuguese, or Spanish. (Source: Hall and Jones, 1999.)

EXCON A measure of the extent of institutionalised constraints on executive authority. The variable takes seven different values: (1) unlimited authority (there are no regular limitations on the executive's actions, as distinct from irregular limitations such as the threat or actuality of coups and assassinations); (2) intermediate category; (3) slight to moderate limitation on executive authority (there are some real but limited restraints on the executive); (4) intermediate category; (5) substantial limitations on executive authority (the executive has more effective authority than any accountability group but is subject to substantial constraints by them); (6) intermediate category; (7) executive parity or subordination (accountability groups have effective authority equal to or greater than the executive in most areas of activity). This variable ranges from one to seven where higher values equal a greater extent of institutionalized constraints on the power of the executive. This variable is calculated as the average from 1960 through 2000, or for specific years as needed in the tables. Source: Jaggers and Marshall (2000), from Polity IV (as cited in Glaeser et al (2004)).

EXPROP Average protection against expropriation risk (the risk of "outright confiscation and forced nationalization" of property. This variable ranges from zero to ten where higher values indicate a lower probability of expropriation. (Source: International Country Risk Guide at http://www.countrydata.com/datasets/).

ln*FR* Natural logarithm of the Frankel-Romer predicted trade share (computed from a gravity model based on population and geography.) (Source: Hall and Jones, 1999.)

ln*GDP* Natural logarithm of GDP per capita. (Source: Penn World Tables version 6.1.)

INFORM Sum of *TRUST*, *RESPECT* and *CONTROL*.

LAT Distance from the equator, scaled between 0 and 1. (Source LaPorta et al, 1999.)

MALFAL Proportion of a country's population at risk of falciparum malaria transmission in 1994. (Source: Sachs, 2003.)

ME	Index of malarial ecology based on temperature, mosquito abundance and vector specificity. (Source: Sachs, 2003.)
YRSOPEN	Sachs-Warner (1995) index of the fraction of years a nation is 'open' during the period 1950-1994. (Source: Hall and Jones, 1999.)
ln*POPDEN*	Natural logarithm of population density in 1500. (Source: Glaeser et al (2004) and McEvedy and Jones (1978).)
PROTFRAC	Fraction of population that is Protestant. (Source: Sala-i-Martin, 1997).
RESPECT	The percentage of individuals in a country who identified "tolerance and respect for other people" as especially important from a list of qualities that children could be encouraged to learn at home (Source: Ingelhart et al, 2004.)
STHIST	Measures the length and coverage of formal states in current geographical borders from AD1 to AD1950. Split into 39 half centuries and allocated points for (a) government above tribal level (b) government foreign or locally based (c) % of the territory of the modern country ruled by this government. (Source: Statehist5 from Bockstette, Chanda and Putterman, 2003.)
ln*TSHARE*	Natural logarithm of the Frankel-Romer actual trade share. (Source: Frankel and Romer, 1999.)
TRUST	The percentage of individuals in a country who answered "most people can be trusted" to the question "[g]enerally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people". (Source: Ingelhart et al, 2004).