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WHICH INSTITUTIONS DETERMINE GROWTH?
A Small Step towards more Practical Policy Advice

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Abstract

Institutions are hot! The international development community has adopted this buzzword in its discourses and policies. There is ample literature pointing to the importance of institutions for economic development, and this paper is not to deny this irrefutable fact. In fact, this paper provides evidence that institutions impact economic performance through human capital, rather than directly. However, it questions the relevance of the empirical literature for policymakers, and tries to take the next step by asking which institutions are important to income and/or growth, by categorizing them into economic, political, legal and social institutions. The analysis teaches us that it is difficult to answer this question, but not because research would not be able to do so technically. Rather, the measures for institutions that are currently available are ambiguous outcome measures that all capture similar information and hardly contain any policy information. Disaggregating indices and using straightforward measures of institutional quality, which actually capture a norm instead of an outcome, can provide a small step towards more practical policy advice.

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Abbreviations

AB	Arellano and Bond
AC	Alcalá and Ciccone
AJR	Acemoglu, Johnson and Robinson
BHT	Bond, Hoeffler and Temple
ECOWAS	Economic Community of West African States
EL	Easterly and Levine
EPA	Economic Partnership Agreement
FE	Fixed Effects
FR	Frankel and Romer
GDP	Gross Domestic Product
GMM	Generalized Method of Moments
IMF	International Monetary Fund
IV	Instrumental Variable (technique)
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Squares
PMG	Pooled Mean Group
RE	Random Effects
R&D	Research and Development
RR	Rodriguez and Rodrik
RST	Rodrik, Subramanian and Trebbi
SMR	Settler Mortality Rate
WB	World Bank
WBDB	World Bank Doing Business
2SLS	Two Staged Least Squares

Institutions form the incentive structure of a society and the political and economic institutions, in consequence, are the underlying determinants of economic performance.

Douglas North (1993)[1]

Chapter 1 – Introduction

The international development community has come to focus more and more on institutions, as were it the panacea to the development question. The quality of institutions is said to be vital to economic growth, and an array of studies has proven this theoretically and empirically.

However, there are two knotty issues. The first is about the definition and measures of institutions. The most commonly adopted definition of 'institutions' is given by North (1981) who defines them as "a set of rules, compliance procedures, and moral and ethical behavioural norms designed to constrain the behavior of individuals in the interests of maximizing the wealth or utility of principles" (North 1981, pp. 201-202). This definition is grand, as it comprises almost everything a society is built up of. But this definition is not easily translated to an empirical estimation, or to policy.

Many studies, including this one, use indicators such as Polity IV's '*Polity Score*' or Kaufmann et al.'s (2005) '*Rule of Law*'. However, these indicators typically measure outcomes, and not the actual norm or institution. Also, they are aggregated data based on a vast amount of information and therefore become very difficult to understand. More specifically, they do not at all translate into practical policy advice.

For example, a recent study by Busse et al. (2005) warns for the quick opening up of borders without quality institutions in place. As a measure of institutional quality they construct an index the basis of World Bank Doing Business (WBDB, 2004) information, which they call the '*Regulation Index*'. This is refreshing indicator of institutional quality, in that it is less a subjective measure than for example the '*Polity Score*'. But by creating this index they lose an enormous amount of information, and create yet another index that hardly carries information that can be translated to a policy maker.

Second, there are different kinds of institutions that work differently in an economy and therefore interact differently with economic growth. Empirical studies have typically used

[1] Douglas North in his lecture to the memory of Alfred Nobel, December 9, 1993.

one measure of institutions to conclude that institutions are of importance. This seems hardly realistic, and a more interesting question arises. Which are the institutions important for economic growth?

This paper sets out to understand the debate on the institution-growth nexus, and will try to incorporate the two criticisms. The paper will attempt to understand which institutions are important to economic growth. Where possible, aggregated data will be disaggregated and more useful and easy to interpret measures of norms or institutions will be used. After the empirical analysis, the international community's focus on institutions in its current state will be questioned for usefulness and relevance.

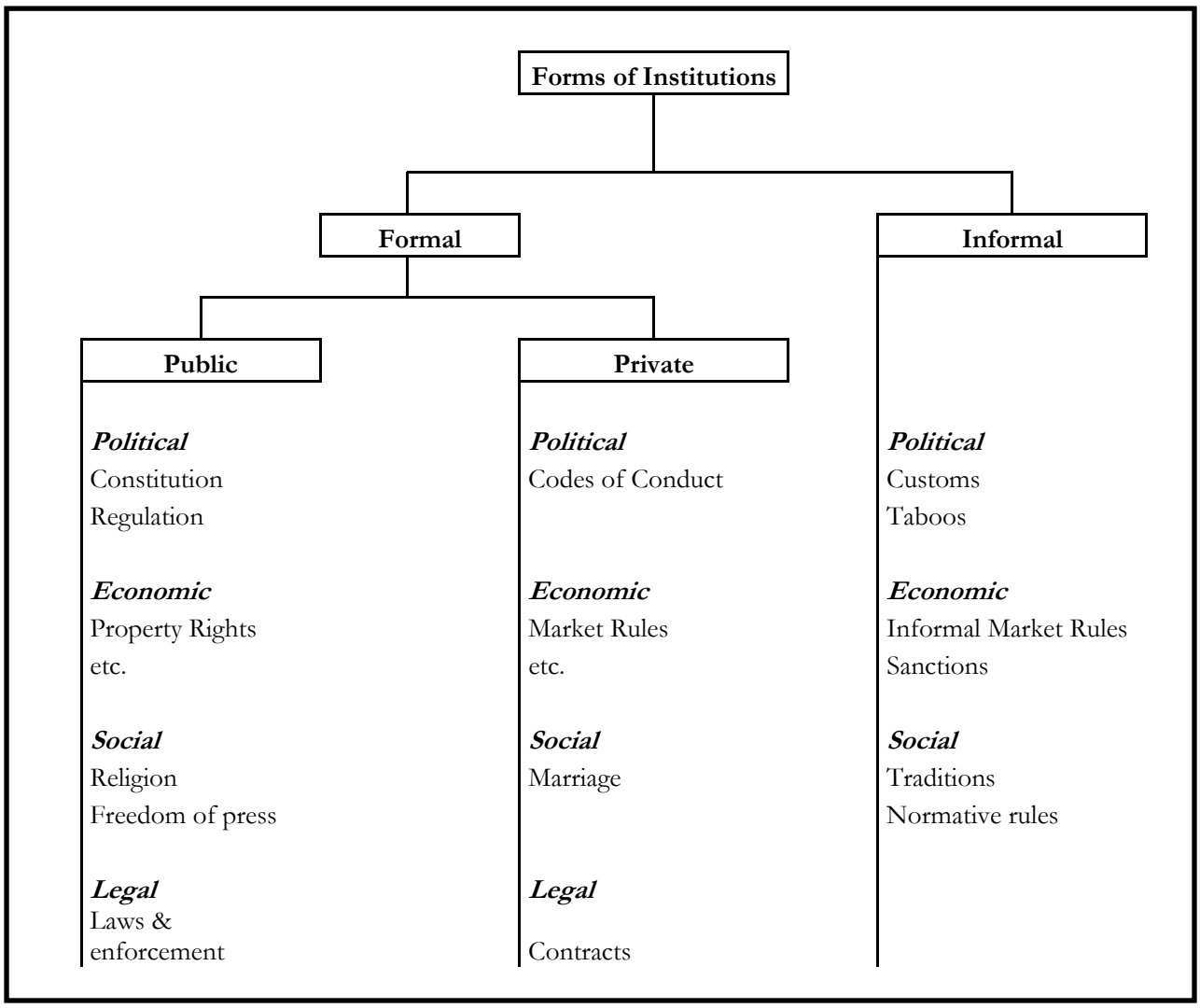
1.1. Defining institutions

Following the contemporary literature on institutions, the definition used in this paper will draw on North's (1981) definition, as it leaves ample room for manoeuvre. A distinction between types of institutions is important. Acemoglu, Johnson and Robinson (AJR, 2004) distinguish between political institutions (constitution and informal power) and economic institutions (property rights and rule of law). Political institutions are relatively static but are nevertheless influenced by economic performance and the distribution of income. Both of which are determined by the economic institutions.

Busse et al. (2005) follow distinguish between formal and informal institutions, noting that in poorer countries the latter are more important. The outcome of the actions of the formal and informal institutions is broadly defined as governance.

But this could be taken one step further. Institutions can be divided into economic, political, legal and social institutions. These institutions can be formal or informal. Although informal institutions are undoubtedly extremely important for an economy, and probably more so in countries where the formal institutions are less developed, this paper will not deal with informal institutions besides this mention. The reason for this is that there is a lack of data on informal institutions. Below, Busse et al.'s figure is adapted to incorporate our distinction between types of institutions.

Figure 1: Forms of Institutions



Source: Adapted from Busse et al. (2005)

1.2. Approach and limits

This paper will categorize institutions into economic, political, legal and social institutions and will use disaggregate measures of their quality (where possible) to try and answer the question: Which institutions are vital to economic development?

It addresses the debate of comparative development and criticises the methodologies of studies that use aggregated measures of institutions which leads them to conclude that institutions are crucial to economic development. Also, the available measures of institutional quality are almost always outcome variables rather than measurements of a norm or rule. This paper will propose some measures of norms.

The biggest limitations of this paper come threefold. First, informal institution cannot and will not be dealt with. Second, the availability of data on institutions is limited. There is hardly any data on actual norms. Therefore, the same aggregated measures of institutions, which the paper criticises for their questionable interpretability, are used. However, where possible, there are deviations from the indices and more straightforward measures are proposed.

Finally, the power of some of the statistical techniques used depends on the validity of the underlying assumptions. These can be questioned. However, in the author's opinion, before criticising the literature it should be covered. In that sense, the results are as valid as any other recent paper on institutions.

1.3. Main findings in a nutshell

Whereas (income) level regressions show institutions to play a significant role, this paper confirms Rodrik's (2006) finding that the link between institutions and growth is hard to make. Despite the categorisation, it is also difficult to establish which institutions are important, but there is some evidence that legal and social institutions have a bigger weight in determining economic performance than economic and political. More specifically, the only variable that is strongly significant and does not seem to work *through* human capital is 'Getting Credit' (categorised as a legal institution), a measure of the ease of lending and borrowing money. The two proposed social institutions are surprisingly important as well.

Panel data analysis shows that institutions have an effect on average growth rates outside their impact on growth through human capital. However, the critique that the commonly used measures of institutional quality used do not contribute to a practical understanding of what the policy implications are still holds.

1.4. Structure of the study

The rest of the paper is structured as follows. Chapter 2 provides a critical review of the literature on institutions and their relation to growth. In chapter 3, the methodology that will be applied to establish which institutions are important is presented. Also, this chapter contains an exploratory analysis of the data. Chapter 4 presents the main findings, investigating which institutions determine growth and whether human capital might not be more important. Chapter 5 concludes.

It is unresolved questions, such as what might the factors of economic growth be, that inspire the best minds to look for answers.

Peter de Haan (2006: 45)

Chapter 2 – A dive in the literature

Over the years, there has been ample literature on how economic growth interacts with the quality of a country's institutions. While consensus seems eminent on physical and human capital's role in raising a country's growth potential, controversy remains on how these come about most effectively. Below, an overview of the literature is provided.

2.1. Institutions for growth

Many studies have established institutional quality to be vital for economic and social development. These studies contest that long-lasting institutions are crucial for economic development and any other determinants impact growth through institutions. An economy must first get the political and economic institutions right, before it can think of growth. A common definition of institutions is given by North (1981) as: "a set of rules, compliance procedures, and moral and ethical behavioural norms designed to constrain the behaviour of individuals in the interests of maximizing the wealth or utility of principles" (North 1981: 201-202). These constraints, then, provide the favourable environment for investment in human and physical capital, which in turn will lead to economic growth. According to the institutional view, economic growth is thus a function of the institutions the economy hosts.

There is abundant (empirical) literature on the indirect effects of institutional quality on economic growth. Institutional quality has been cited as the reason for less income inequality by Easterly (2001). Inequality could increase pressures for income redistribution, and policies answering these calls might have distortionary effects on the economy. If these calls are not heard, inequality may even result in political instability, especially in democracies. Thus, a country that has no quality institutions might be more prone to violence and conflict which may eventually hamper economic growth. Alesina et al. (2003) and Murshed (2006) analyse this conflict-growth nexus in further detail and conclude that institutional quality is the most important determinant for avoiding (ethnic) conflicts. Furthermore, institutional quality has been associated with increased investment in human

and physical capital by Knack and Keefer (1995) and Arimah (2004), and to better financial development by Beck et al. (2001).

In addition, studies have tried to analyse the direct impact of quality institutions on economic growth. However, empirical research on the relationship between institutional quality and economic growth is hampered by an endogeneity problem. Institutional quality might spur growth, but growth might improve institutions.

Acemoglu, Johnson and Robinson (AJR, 2001) attempt to tackle this problem. In their influential work, they hypothesize that "settler mortality affected settlements; settlements affected early institutions; and key institutions persisted and formed the basis of current institutions" (AJR, 2002: 1373). Where the Europeans settled they brought with them their superior quality institutions. Where they didn't settle, institutions were designed for exploitative purposes. The differences in settler mortality thus account for differences in institutions, but are unrelated to a country's income. Using this settler mortality rate (SMR) as instrumental variable, AJR estimate large positive and robust effects of institutions on economic growth.

Easterly and Levine (EL, 2002) use the SMR to estimate the relative contributions of endowments, geography, policies and institutions to economic growth. Their results are consistent with AJR and they conclude that policies and endowments affect growth through institutions. They "find no evidence that tropics, germs, and crops affect country incomes directly other than through institutions, nor do [they] find any effect of policies on development once [they] control for institutions" (EL, abstract).

Rodrik, Subramanian and Trebbi (RST, 2002) put together the fitted trade instrument for integration proposed by Frankel and Romer (1999) and the SMR instrument for institutional quality. By combining methods, they are able to estimate the relative contributions of geography, trade and institutions to growth. The authors conclude that "the quality of institutions trumps everything else" (RST, 2002: 4). After controlling for institutions, geography has weak effects on growth at best, and integration has no direct effect whatsoever. But increased integration improves institutional quality, and raises growth through institutions. These findings are robust to changes in the size of the datasets, to the inclusion of regional dummies and different measures of institutions. RST also identify the channels through which institutions affect growth. They find that institutions cause growth

more than anything else and do so by raising income, the human and physical capital stock and productivity.

In 2004, AJR go a step further by theoretically framing how institutions are the fundamental cause of long term growth. They distinguish between political institutions (constitution and informal power) and economic institutions (property rights and rule of law). Political institutions are relatively static but are nevertheless influenced by economic performance and the distribution of income. Both of which are determined by the economic institutions. These have a dominant role in comparative development. "Institutions matter; indeed [they] are central in determining relative prosperity" (AJR, 2004: 29).

But why do countries have different economic institutions? AJR provide a theoretical framework distinguishing between (variants of) the 'Political Coase Theorem', based on negotiation, and the social conflict view. They argue that economic institutions are endogenous, determined as collective choices of society. But these choices result not from consensus but from a *conflict of interests*. The more dynamic economic institutions are thus determined by political power, or political institutions. The question, according to AJR, is answered by looking at politics.

Finally, Busse et al. (2005) follow RST to estimate the importance of institutions for growth in general, and for the looming trade liberalisation under the EPAs for ECOWAS countries in specific. The innovation in their work is the construction of a *Regulation Index*, a weighted average of nine regulation indicators from the WBDB dataset (WB 2005). These "allow us to obtain information on regulatory outcomes, such as time and money spent on bureaucratic procedures, and thus to investigate the efficiency of governmental institutions in place" (Busse et al., 2005: 23). They claim this to be a superior indicator of institutional quality, because it attempts to bypass the subjectivity of commonly employed perception-based indicators of institutional quality.

They too find significant and strongly positive results of institutional quality on economic growth. It trumps everything else. More specifically, Busse et al. point to the importance of having in place good institutions before liberalising trade. The relatively poor performance of countries on the institutional quality indicators should indulge them to adopt a cautious approach towards trade liberalisation. Only through increased institutional quality can the West African countries to reap benefits from increased trade. Through institutions that is.

2.2. Growth for institutions

In contrast, some others see good institutions as a product of economic growth. They do not deny the importance of institutions but argue that economic growth precedes the formation of institutions. An economy starts with the accumulation of human and physical capital, which does not so much depend on North's 'constraints' on the executive power, but rather on the policies of this executive power. As the country's economy and human capital advance, there is a greater plea for democracy and quality institutions to constrain the executive power.

Glaeser et al. (2004) provide an interesting explanation of this argument, showing that a country ruled by a dictator, which by anybody's standards would not be classified as one with good institutions, can still accumulate capital and thus experience growth. Like Lipset (1960) before them, they argue that good policies are essential to growth, and that good institutions will follow in time as a consequence of increased wealth and improved education. According to this view, "countries differ in their stocks of human and social capital […] and institutional outcomes depend to a large extent on these endowments" (Glaeser et al., 2004: 272).

Although Glaeser et al. (2004) state that there seems to be "intellectual consensus" (idem: 272) on the relationship between institutions and growth, the focus on institutions might not be appropriate. First of all, the measures of institutions reflect neither constraints on the government nor the enduring features of the environment, but the outcomes of policy. The measures of institutional quality proposed by the literature so far are reflections of economic development rather than measures of institutions.

Second, there is evidence of reverse causality between institutions and economic growth. Regressing GDP per capita on several institution indicators and years of schooling, they find that economic performance is much better explained by human capital. Whereas "the initial level of education is a strong predictor of subsequent economic growth" (idem: 279), "initial executive constraints have no predictive power for subsequent economic growth outside the 1980s" (idem: 282). Even for longer time spans, they claim the institutional view got it wrong. The argument goes that *average* political outcome is a good measure of durable constraints and that in the long run human capital does not explain growth since it is not one of its 'deep' determinants. However, Glaeser et al. (2004) show

that the measures of average political outcome are much more volatile than measures of human capital in the long run and have less explanatory power.

Thirdly, they claim that the SMR instrument is not a statistically valid tool for empirical testing. An instrument must be uncorrelated with the error term, but this will not be valid if settlement patterns influence growth in other ways than through institutions. Glaeser et al. argue that they do, since they show how human capital in fact is more strongly correlated with the SMR instrument than with institutions. Following Djankov et al. (2003), they argue that "it seems at least as plausible that what [the Europeans] brought with them is themselves, and therefore their know-how and human capital" (idem, p. 289).

So, Glaeser et al. (2004) conclude that "the causal link between institutions [is] extremely difficult [to establish]" (Glaeser et al., 2004: 296) and claim the primacy of human capital over institutions. That is not to say that institutions aren't important but the focus should be "on actual rules rather than conceptually ambiguous assessments of institutional outcomes" (idem: 298), which could be manipulated by policy makers.

Fielding and Torres (2006) show that that the SMR instrument is invalid not only for statistical reasons. They argue that the SMR instrument is statistically insignificant if the sample used for the regression analysis changes. Removing Malta, Hong Kong and Singapore from the regressions leaves the results insignificant.

But more importantly, the theory behind the SMR is not solid. The argument that Europeans settled only where the conditions were right is flawed. Fielding and Torres's counterargument is that Europeans did not consider the costs of settlement (arguably the SMR) in isolation, but contrasted them to the benefits of settlement. There were different phases of colonialism whereby settlement was directly determined by the economic structure back home. In the 14th and 15th century, Europe was mercantilist and needed minerals. The benefits of settling in disease infested countries close to the equator were greater than the costs. Argentina, for example, was not attractive for Europeans at the time, because it was relatively poor in minerals. Conversely, in the 17th through the 19th centuries, this changed with the rise of the industrial revolution. There was now a growing agricultural need and this changed the pattern of settlement. This development is more in line with AJR's reasoning. However, following Celso Furtado (1976), Fielding and Torres (2006) argue that different production structures caused different types of colonisation, not the settlement climate.

The authors then go on to propose an alternative instrument for institutional quality. Arguing that pastoral agricultural production at the end of the colonial period explains a lot about current production structures, they suggest per capita production of tradable meat. Underscoring the lack of theoretical backbone for this new instrument, they show that *meat* and *beef per capita* are good indicators of production structures just as good instruments as the SMR, if not better.

2.3. A panel discussion

Durlauf et al. (2004) note that researchers are constrained by the small number of countries for which data is available. Cross-section research only captures between country variation, which "limits the extent to which researchers can apply more sophisticated methods" (Durlauf et al., 2004: 103).

Therefore, there have been resorts to more sophisticated methods. Panel data estimation, which uses the within country variation, allows for more complicated hypotheses and interrelations. This also allows for a better understanding of the dynamics behind institutions and their interactions with growth. The substantial majority of the panel data studies that concentrate on growth uses a fixed effects estimator, which implies a "full set of country-specific intercepts, one for each country, and inference proceeds conditional on the particular countries observed" (idem: 105).

Using static panel data estimation, Dawson (1998) finds that institutions have a positive effect on growth, that "political and civil liberties may stimulate investment [and that] an important interaction exists between freedom and human capital investment" (Dawson, 1998: abstract). Bassanini et al. (2001) us the Pooled Mean Group (PMG) technique[2] for OECD countries "confirm the importance for growth of R&D activity, the macroeconomic environment, trade openness and well developed financial markets" (Bassanini et al., 2001: abstract). Similarly, Lewer and Saenz (2005) use fixed effects estimation to examine the interaction of the security of property rights and growth. They underscore the 'De Soto

[2] PMG is an option between the two extremes of fixed effects, which does not use the 'between' country variation, and pure time-series, where the coefficients are treated as entirely disparate. Bassanini et al. (2001) claim that "This approach allows intercepts, the convergence parameter, [the] short-run coefficients and error variances to differ freely across countries, but imposes restrictions on the other parameters leading to more efficient estimates.

hypothesis', which "suggests that economic growth is significantly related to the security of property rights in a country" (Lewer and Saenz, 2005: 158).

However, Durlauf et al. (2004) note that many authors have articulated the potential dangers of using fixed effects on cross-country panel data. Particularly, some variables hardly change over time, as a result of which within-country information is not informative. This is especially true for institutions, which are extremely static over time.

Bond, Hoeffler and Temple (2001) argue that the most appropriate procedure to analyse growth in cross-country panel data is to use system GMM (generalised method of moments), a slight variation to the first-differenced GMM Arellano and Bond (1998) proposed. Using this technique, Eicher and Schreiber (2005) find that initial institutional quality among transition economies strongly influences growth performance. As they put it, "[t]he quality of institutions in 1991 can explain almost 50 percent of the variation of GDP per capita in 2001 across countries" (Eicher and Schreiber, 2005: 23). Compton et al. (2006) find mixed results for their analysis of interactions between growth and political stability over time. They find that growth is not dependent on political stability, in the long run or the shorter run, and argue that this might be a sign that informal institutions actually have more weight in determining the economic performance of countries.

All in all, there are still many unresolved questions to be answered, and it is yet to be established which statistical techniques are most appropriate for investigating the relation between growth and institutions.

2.4. Institutional reality: a dead end?

Building a bridge from the theoretical and empirical literature, Rodrik (2006) reviews, in his controversial writing '*Goodbye Washington Consensus, Hello Washington Confusion*', the policies proposed by international institutions. He discusses a recent WB (2005) publication, called "*Learning from Reform*", in which a relatively revolutionary stance is taken. The wave of reforms in Latin America and sub-Saharan Africa has not brought economic growth. Where the WB and International Monetary Fund (IMF) have traditionally univocally advocated the 'stabilize, privatize, and liberalize' mantra as a blueprint for development, there seems to be anything but harmony at present. Interpreting the record of low growth, financial crisis and increased poverty, the IMF disconcertingly contends that reforms were well designed but did

not go deep enough. "The policy implication that follows is simple: do more of the same, and do it well" (Rodrik, 2006: 9).

The WB interprets the dreadful development record of the last two decades in a surprisingly different way. First, conventional policies are not aimed at stimulating dynamic forces behind the growth process but are too concerned with deadweight losses in society. Second, broad objectives of reform cannot be translated into a unique set of policy actions. Third, even if countries have similar problems, there need to be different solutions. Fourth, there is a tendency to exaggerate the advantages of rules over discretion in government behaviour. Finally, the focus has been too broad. Policy makers should focus on the binding constraints to economic development before ticking off the whole reform shopping list. In short, there is no blueprint for development.

Rodrik then goes on to discuss the two orthodox alternatives. Firstly, there is the view that foreign aid will help developing countries on the ladder of development. Jeffrey Sachs and the United Nations seem to advocate that the current levels of international aid are a significant constraint on the achievement of global poverty reduction. An increase in foreign aid, then, may provide the so-called 'big push' for development, helping developing countries climb the ladder of development.

But Rodrik worries about this holistic approach, claiming that the assumption that we know all the barriers to growth and can simply remove them is too simplistic. Besides, some countries in Africa have received large quantities of foreign aid but not performed well, while other countries received little and done well. Also, growth spurs eventually fizzle out, pointing at some binding constraint on growth. As an alternative, Rodrik proposes to diagnose and deal with the most significant constraints in an economy. He distinguishes between two main constraints, namely too high costs of finance and thus access to credit is vital to economic growth, or too low returns to investments.

Secondly, as the IMF advocates, institutions have proven to be weak. It became clear that "sound policies needed to be embedded in solid institutions" (idem, p. 9). But institutions are deeply embedded in society, and if quality institutions are necessary but lacking, that would imply a very deterministic pessimism about development.

The Washington Consensus' focus on quality institutions is a dead end, Rodrik argues. There has not been established a causal link between institutions and economic growth. Besides, empirical studies have focused on the long term relationship between institutions

and growth, as many studies typically use level of income in a recent year as dependent variable, not the rate of growth, and have typically found strong results for these level regressions. The link between institutions and economic growth is much weaker. Also, asking of developing countries to erect quality institutions may not be realistic:

"*Telling poor countries in Africa or Latin America that they have to set their sights on the best-practice institutions of the U.S. or Sweden is like telling them that the only way to develop is to become developed – hardly useful policy advice!"(Rodrik 2006: 13).*

Focus on actual rules,
rather than on ambiguous assessments of institutional outcomes
Glaeser et al. (2004: 298)

Chapter 3 – Methodology and Data Analysis

This chapter starts off with an exploration of the data, investigating the links between levels of income, economic growth and various measures of institutions. Then, the paper presents the econometric methodology applied in the next chapter. It will depart from a baseline regression which is adapted to test the typical specifications from recent literature. The paper will follow both Glaeser et al. (2004) and Busse et al. (2005) in this respect, for reasons of comparison.

The paper will argue that the debate that centres around the question whether institutions are important does not contribute much to the understanding of contemporary development economics. Institutions are important in one way or another and denying this seems folly. Also, it is commonly accepted that human and physical capital are of great importance to comparative development. Institutions have shown to be important either directly on growth and income or indirectly in their role of facilitating the accumulation of capital.

In the author's view, it is more interesting to understand another question. Not whether institutions are important but *which* institutions are important. Using one measure of institutions to capture all the rules of the game might seem an oversimplification. The argument is two-tiered. First, institutions will not work the same in all regions. Many specifications include regional dummies to control for this, as will this paper, but this does not really help our understanding of institutions. This will, however, not be the focus of this paper. Second, and at the centre of this paper, not all institutions are important for economic growth, and some may be more so than others. Therefore, by defining categories of institutions this paper hopes to shed light on which institutions are key.

3.1. Theory

Gross domestic product (Y) is assumed to grow with increases in human capital (*H*) and physical capital (*K*). Exogenous (Solow, 1956, Harrod-Domar, 1948) and endogenous (Lucas, 1988, Romer, 1990) growth models have established these relationships. For trade (*Trade*), the models have been less univocal, but Frankel and Romer (1999), Busse et al.

(2005), Noguer and Siscart (2005) and Mamoon and Murshed (2005) have shown trade to have a positive effect on income as well. Finally, improvements in the quality of institutions (*Institution*) are also expected to exert positive effects on income. The vast volume of empirical literature has shown institutional quality to be of great importance to income. RST (2002), AJR (2001 and 2004) and EL (2002) amongst others have concluded that institutional quality is the main deep determinant of growth.

All in all, income would thus depend on these variables in the following way:

$$Y = \underset{+}{f}(\underset{+}{H}, \underset{+}{K}, \underset{+}{Trade}, \underset{+}{Institution})$$

Income is a function of human and physical capital, the amount of trade and the quality of institutions. This specification can consequently be translated to an empirical specification.

3.2. Exploring the data

This section presents the data that will be used in the cross country analysis with a focus on the variables capturing institutional quality. The definitions and the source can be found in Appendix 1. Specifically, this section will explore which variables will represent which type of institutions. Also, the data from the WBDB dataset will be analysed.

Measuring institutions is a tricky business. Institutions as North (1990) describes them are rules, or norms. A norm could be that women are expected to work. However, the data are mainly composed by outcome variables. For example, gender equity in its broadest sense is an outcome variable, based on certain rules or norms. The same holds true for political stability, which is an outcome variable as well.

In the case of the Kaufmann (2002) data, it seems quite obvious that these measures of institutional quality are outcome variables and will be correlated with economic performance. It is quite evident that improvements in government effectiveness, political stability and rule of law have positive, rather than negative effects on income or growth. So again, the argument for using disaggregated measures where possible gets some backbone. Also, it is interesting to see here how institutional quality differs among regions.

3.2.1. Institutions

The Kaufmann data comprise six indicators of 'good governance' which are summarized in Box 1, together with the Polity IV indicators. These data are all very much correlated to income (see Appendix 2).

The Kaufmann governance indicators have been oriented so that higher values correspond to better outcomes on a scale from -2.5 to 2.5. They are categorized as government effectiveness (*Ge)*, regulatory quality (*Rq*), political stability (*Ps*), rule of law (*Rl*), voice and accountability (*Va*) and control of corruption (*Cc*). Box 1 contains more details.

Box 1: Kaufmann and Polity IV indicators

Variables	***Meaning***
Kaufmann Data	*Range -2.5 to 2.5 (-2.5=low, 2.5=high)*
Government Effectiveness (Ge)	Measures perceptions of "inputs" that are required for the government to be able to produce and implement good policies (a.o. the quality of the independence of the civil service).
Regulatory Quality (Rq)	Measures the incidence of government intervention in the economy (wage or price controls, regulations on foreign trade, legal restrictions on business ownership or equity by non-residents).
Political Stability (Ps)	Measures perceptions of the likelihood that the government in power will be destabilised or even overthrown by unconstitutional and/or violent means.
Rule of Law (Rl)	Measures the extent to which agents have confidence in and follow the rules of society (contracts enforced, prevalence of black market activities, effectiveness of the judiciary).
Voice and Accountability (Va)	Measures different aspects of political rights and civil liberties (free and fair elections, influence of the military in politics, independence of the media).
Control of Corruption (Cc)	Measures the exercise of public power for private gain through effects of corruption on the attractiveness to do business, to the chance that additional payments are needed to 'get things done'.
Polity IV Data	*Range =0 to 10 (0 = low; 10 = high)*
Democracy Score (Demo)	Democracy Score: general openness of political institutions.
Autocracy Score (Auto)	Autocracy Score: general closedness of political institutions.
Polity Score (Pol)	Polity Score: Computed by subtracting Auto from Demo; includes "standardized codes" (i.e., -66, -77, -88) for special polity condition. (Range = -10 to 10)

Source: Busse et al. (2005: 20-21))

The Polity data are measured on an 11 point scale, with 10 being the 'perfect' democracy or autocracy. The '*Polity Score*' is an aggregation of these two variables[3]. Also from the Polity data is '*Constraints on the Executive*' (*Xcons80*), which measures the institutionalised constraints on the decision makers. Freedom House (2005) offers two other variables capturing institutional quality, namely '*Political Rights*' (*Pr*) and '*Civil Liberty*' (*Cl*). Freedom House (2006) states that "Political rights enable people to participate freely in the political process, including the right to vote freely for distinct alternatives in legitimate elections […] and elect representatives who have a decisive impact on public policies and are accountable to the electorate. Civil liberties allow for the freedoms of expression and belief, associational and organizational rights, rule of law, and personal autonomy without interference from the state" (Freedom House, 2006: Website). Both are measured on a 1-7 point scale where 1 represents the most free.

The figures in Appendix 2 provide pair wise correlations which show that all institution variables are highly correlated to income. The figures confirm the expectation that increases in institutional quality are associated with higher levels of income. Note that higher values for *Auto*, *Pr* and *Cl* are associated with lower institutional quality. Therefore, the negative slope in figures 10 through 12 is exactly what could have been expected.

3.2.2. World Bank Doing Business

The WBDB database provides data on 175 economies. The aim of the database is to make available "objective measures of business regulations and their enforcement. […] They indicate the regulatory costs of business and can be used to analyze specific regulations that enhance or constrain investment, productivity, and growth." (WB, 2006: www.doingbusiness.org).

Busse et al. (2005) are right to claim that this data is an attempt to bypass the subjectivity of many of the other measures of institutions. Because the "principal data collection methods for the indicators are the study of the existing laws and regulations in each economy; targeted interviews with regulators or private sector professionals in each topic; and cooperative arrangements with other departments of the World Bank, other donor

[3] Where autocracy scores take on negative values. Polity Score thus typically ranges from -10 to 10, unless the country has been in crisis. For details, see http://www.cidcm.umd.edu/polity/

agencies, private consulting firms, business and law associations" (idem), the data provide relatively impartial information.

Box 2: The 10 WBDB indicators

Indicator	***Meaning***
Starting a Business	Captures the procedures and costs of setting up a business,
Protecting Investors	Measures the strength of minority stakeholder protection against directors' misuse of corporate assets for personal gain" (Busse et al., 2005: 25).
Hiring and Firing Workers	Captures the regulations on the labour market
Trading across Borders	Measures the number of documents and signatures and time required to import and export
Paying Taxes	Measures the effective tax paid in the second year of operation
Getting Credit	Is an index measuring the ease of borrowing and lending money
Enforcing Contracts	Measures the number of judicial procedures and the duration and cost of enforcing contracts
Closing a Business	Captures the procedures and costs of setting up a business
Dealing with Licenses	Captures the procedures and time and costs for a business to build a warehouse
Registering property	Captures the procedures, time and costs to transfer a property title from the seller to the buyer

It is interesting to see that the '*Regulation Index*' Busse et al. (2005) construct is highly correlated to income, whereas the individual subcomponent are less so, especially '*Hiring and Firing Workers*'. This might offer some additional backbone for our argument that it is better to use disaggregated measures of doing business, because they seem to capture distinct information, rather than one aggregated regulation index.

The '*Regulation Index*' is constructed by standardising[4] in total 55 variables, each of which falls under one of 10 subcomponents, as summarised in Box 2. Busse et al. create one indicator for the subcomponents, which is an average of the variables that fall under it. For example, the variable '*Dealing with Licenses*' is an unweighted average of the number of

[4] That is, they construct the standardized variable, $\widetilde{x}$, by taking the distance of observation x_i from the mean $\overline{x}$. Thus: $\widetilde{x}_i = (x_i - \overline{x})$

procedures, the time in days and the cost as percentage of per capita income it takes to deal with licences. With nine of these ten standardised averages, Busse et al. the construct the aggregated '*Regulation Index*', which is a weighted average of the subcomponents taking factor loadings in principal components analysis as weights. The value of this statistical technique is questionable, as weights are assigned to a variable on the basis of an analysis of how much variability that variable explains. It makes is very hard to interpret the variable.

Although it is understandable why the authors choose to aggregate the data in light of the statistical difficulties of finding a proper instrument, it does not provide a very sensible and understandable outcome. Especially for policy ends, the aggregation of the measures does not make things much clearer than the already existing measures of institutional quality.

Rather, this paper will adopt those measures that are least correlated with one another and thus provide information on different aspects of doing business. Below, the correlation matrix of the standardised unweighted averages of each of the subcomponents is shown[5].

Table 1: WBDB – Correlation Matrix

	SaB	DWL	HFW	RP	GC	PI	PT	TaB	EC	CaB
Starting a Business	1									
Dealing with Licenses	0.37	1								
Hiring & Firing Workers	0.38	0.44	1							
Registering Property	0.38	0.43	0.28	1						
Getting Credit	0.37	0.28	0.16	0.37	1					
Protecting Investors	0.33	0.23	0.31	0.17	0.43	1				
Paying Taxes	0.38	0.38	0.45	0.31	0.18	0.24	1			
Trading across Borders	0.45	0.45	0.22	0.44	0.53	0.30	0.26	1		
Enforing Contracts	0.46	0.28	0.20	0.25	0.45	0.26	0.30	0.45	1	
Closing a Business	0.48	0.21	0.15	0.23	0.57	0.41	0.26	0.52	0.61	1

Source: World Bank Doing Business database (2005)

As can be seen, the '*Trading across Borders*' variable is most correlated with almost all the other variables. This makes sense, because only if all the conditions of doing business are right, and the chance of being successful is thus larger, will a business be able to import and export.

[5] For example, the subcomponent 'Dealing with Licenses' is an unweighted average of the number of procedures, the time in days and the cost as percentage of per capita income it takes to deal with licences.

Next, there seem to be two sets of variables that capture different information. On the one hand, '*Starting a Business*', '*Enforcing Contracts*', '*Getting Credit*', '*Protecting Investors*' and '*Closing a Business*' all show up on each other's lists of relatively high correlations[6]. These seem to explain the underlying qualifications necessary to be able to get the business off the ground, or the necessary preconditions. On the other hand, the variables '*Dealing with Licenses*', '*Paying Taxes*' and '*Hiring and Firing Workers*' seem to capture the daily handlings of a company. These represent the ease of actually running the business, once it is established.

These three sets of variables thus seem to capture different parts of doing business. This paper will choose one variable out of the subgroups to 'represent' the group besides '*Trading across Borders*'. Of the first group, '*Getting Credit*' is least correlated with the variables in the second group. It also seems an appropriate variable to summarise information from the first group, as getting credit is an indispensable part of starting up a business and as Rodrik (2006) argues vital to economic growth. In the second group, '*Hiring and Firing Workers*' is least correlated with the variables of the first group.

3.2.3. Categorizing institutions

The novelty of this paper lies in its critique of the debate it addresses, and the proposed divergence from it. This critique is quite simple. If institutions are defined as 'rules of the game', isn't it obvious that they be important for the 'game'? Almost all studies so far have aggregated all types of institutions under one measurement. This is done for statistical purposes, the lack of data and problems of endogeneity being the main reasons.

Researchers typically work with for example 'rule of law' or 'expropriation risk' to capture institutional quality within a country. There is one major objections with this reasoning, which also make questionable the conclusions and policy implications.

Using an aggregate measure for institutions is not very illuminating. An aggregate measure does not allow policy makers to discern which of the proxies for the several institutions subsumed in an aggregate measure have an impact on outcomes. There are many different types of institutions that work differently in different parts of the world. It would be naïve to say that institutions affect countries in similar ways in different regions, with different conditions and circumstances.

[6] Correlations are not particularly high, but because of statistical constraints it is impossible to include all of the variables in one regression. By checking correlations, an informed choice as to which variable capture which information is made.

Some institutions may be important for income levels, some may not. Political institutions in China would not be regarded of high quality by international standards, yet its economy experiences unprecedented growth. Freedom of press could be a very important social institution, but may not affect economic indicators as much as would the security of property rights. Therefore, it is useful to distinguish between types of institutions.

Furthermore, in a number of papers (AJR, 2001, RST, 2002, Busse et al., 2005, Fielding and Torres, 2006) that study the effect of institutions, the authors do no include measures of human and physical capital. This is justified on the basis of the argument that the search is for *deep* determinants of growth. However, leaving human and physical capital out of a growth equation might lead to an omitted variable bias and exaggerate the effect of institutions.

This paper distinguishes between four types of institutions. Like in AJR (2004), a distinction is made between political institutions and economic institutions. However, the paper goes a step further. Like Mamoon (2006) does for his empirical analysis of the interaction of institutions with inequality, four different types of institutions are identified: 1) Economic, 2) Political, 3) Legal and 4) Social.

"Economic institutions include state effectiveness at collecting taxes or other forms of government revenue, states' ability to create, deliver and maintain vital national infrastructure, states' ability to respond effectively to domestic economic problems, independence of government economic policies from pressure from special interest groups, trade and foreign exchange system, competition policy, privatization, banking reform and interest rate liberalisation, securities market and non-bank financial institutions etc." (Mamoon, 2006: 5). *"Legal institutions capture the transparency and fairness of legal system, political rights of the citizens, State legitimacy, freedom of speech, independence of judiciary, enforceability of contracts, police effectiveness, access to independent and impartial courts, confidence in judicial system in ensuring property rights, prevention of improper practices in public sphere, control of corruption etc. Political institutions represent political stability, democracy, autocracy or dictatorship"* (Idem).

For social institutions, this paper deviates from Mamoon (2006). In his work, social institutions capture socio economic conditions such as health, education and nutrition etc. and human capital is used as a proxy. But in this debate it would not make sense to define human capital as a social institution, because they are outcome variables. If institutions are

defined as rules of the game then be careful to use those measures of institutions which actually capture a norm or a rule. Rather, freedom of press is forwarded as a social institution and included as a dummy variable. Also, the paper forwards proxies for gender equality, which in itself is an outcome variable too. Therefore, a dummy variable (*gender*) is included to capture the norm or institution 'women are expected to work'. This variable is based on information on the extent to which women enrol in education, how much access they have to health care and preventive measures, and to what extent they participate in the labour force. See the variable definitions on how exactly *gender* is constructed. Human capital does, however, enter the equation as before.

This paper will follow the classification Mamoon (2006) makes to a certain extent and will use the Kaufmann et al. (2002) data on governance to proxy for the different types of institutions.

Economic institutions will be approximated by '*Government Effectiveness*' (*Ge*) and '*Regulatory Quality*' (*Rq*). Also, the '*Regulation Index*' will be used as a proxy for economic institutions. The aggregation of this "wealth of information" (Busse et al. 2005: 23) from the WB data means a loss of the data's value. This paper will thus use the disaggregated measures '*Hiring and Firing Workers*' (*HfW*) and '*Trading across Borders*' (*TaB*) and will argue that this is of more value to policymakers than the index.

For political institutions '*Political Stability*' (*Ps*) seems the appropriate proxy, complemented by two political indicators from the Polity dataset, namely '*Democracy Score*' (*Demo*) and '*Autocracy Score*' (*Auto*) and their aggregation '*Polity Score*' (*Pol*). But also the variables '*Political Rights*' (*Pr*) and '*Civil Liberties*' (*Cl*) from Freedom House (2005) could be used. '*Getting Credit*' (*Gc*), '*Rule of Law*' (*Rl*), '*Voice and Accountability*' (*Va*) and '*Control of Corruption*' (*Cc*) are used as legal institutions.

For social institutions, the self constructed dummy variable indicating whether there is the norm that women are expected to work (*Gender*) enters the equation, and '*Freedom of Press*' (*Fpress*) is used as well. One might not expect an institution like freedom of press to have an enormous impact on economic performance. China is a good example of a country that lacks freedom of press, but where it does not form a constraint to economic development. Let's see if this can be generalised.

3.2.4. Institutional representatives: two options

Since it is statistically impossible to include all measures of institutions in one regression, a selection of institutions has to be made. To see which variable will represent the categories, the objective is to find the least correlated institutional variables. Variables in the 'economic institutions' group that are highly correlated to institutional variables in other groups would not make good candidates to 'represent' the group.

Appendix 3 shows the correlation matrix for all the institutions. Note that the institutions are grouped according to category. From this information, it can be seen that of the economic institutions '*HfW*' is least correlated to any of the variables from the other categories. For the political institutions, '*Pr*' is least correlated to the others, '*Xcons80*' for the legal institutions and '*Gender*' for the social institutions. This paper will adopt these four variables as representatives for the four types of institutions in the regressions.

Besides these four variables, the set of which we will label option 'A', another set of variables will be considered. This option 'B' will be based partly on logical and partly on statistical reasoning. First, Rodrik (2006) argues that a lack of access to credit is often one of the binding constraints to economic growth. Therefore, 'Getting Credit' will represent the legal institutions. '*Gender*' will be replaced by '*Fpress*' as well to test a different aspect of the social institutions. Finally, '*Ge*' for economic institutions and '*Ps*' for political institutions will enter the specification because these variables capture a very broad set of norms[7] and can therefore be expected to have the strongest influence on income levels or growth. That is they are expected to be significant in most of the cases. It should be noted that this choice is arbitrary, but therefore not less meaningful.

3.2.5. Trade

Conventionally, the measure for trade is 'imports and exports over GDP'. This measure has been criticised on two fronts. Firstly, by Alcalá and Ciccone (AC, 2001) who state that "the measure of international trade used in almost all empirical work on the effect of trade on productivity is nominal imports plus exports relative to nominal GDP, usually referred to as *openness*. [They] argue that there are sound theoretical reasons why this measure may result in a misleading picture of the productivity gains due to trade" (AC 2001: 1). Rather, they

[7] Which does not help their interpretation. This again shows the limitations of the current data on institutions.

propose the *lnopen* variable, 'imports and exports over purchasing power parity GDP', which they call a measure of 'real openness'. AC note that the conventional openness indicator (*lcopen*) is not robust to the inclusion of 'distance from the equator', whereas the real openness (*lnopen*) is.

However, as RST (2002) argue, this measure of openness is much more correlated with income. Therefore, they "do not find the case for 'real openness' particularly compelling. [They] worry that the 'more robust' results that AC claim for it derive from the interaction of strong reverse causality with imperfections of the instrument" (RST 2002:16-17). This paper will adopt the conventional measure of openness (*lcopen*) and will neglect the (*lnopen*) variable.

Second, Rose (2002) and Mamoon and Murshed (2005) argue that "the [...] openness measures show a weak relationship with income. This is expected because openness measures capture overall trade in a country. This makes them weak proxies for trade policies as differences in trade shares across countries can have many exogenous reasons along with income itself, such as geography and trade policies" (MM 2005:8).

Although the criticism made by Rose (2002) and Mamoon and Murshed (2005) is valid, the focus of this paper is not on trade in particular and including measures of trade policy will considerably enlarge the scope of this paper. Therefore, the trade openness versus trade policy debate will not be addressed in this paper, and the conventional measure of trade openness will be employed.

3.3. Methodology

3.3.1. Baseline Regression

To assess *which* institutions determine economic growth, the paper departs from the baseline ordinary least squares (OLS) regression:

$$(1) \qquad \ln y_{2003i} - \ln y_{1975i} = \alpha_0 + \alpha_1 X_i + \alpha_2 Institution_i + \alpha_3 Hinit_i + \alpha_4 Kinit_i + \alpha_3 lcopen_i + \alpha_4 lcopen_i * \mathrm{Re}\, gionalDummy_j + \gamma_j \mathrm{Re}\, gionalDummy_j + \varepsilon_i$$

where y_i is PPP GDP per capita in a specified year. X_i are variables capturing country size, access to a sea, population and distance from the equator as control variables and $Institution_i$ is the variable capturing institutional quality. $Hinit_i$ is initial year human capital as captured by the average years of schooling in the population over age 25 in 1975, $Kinit_i$ is initial year physical capital as captured by gross fixed investment as percentage of GDP in 1975. $Lcopen_i$ is our measure for trade openness.

From the baseline regression, this paper will compare level regressions with average growth regressions. Note that the paper follows Glaeser et al. (2004) in the choice of dependent variable. Whereas the majority of the literature investigates the interactions of institutions with the level of income, the dependent variable here is average growth over the 1975-2003 period. As Rodrik (2006) notes, the literature finds strong results for level regressions, but the link between institutions and economic growth is much weaker. By changing the dependent variable to GDP per capita in 2003 (purchasing power parity) this can be verified.

Also, in AJR (2002), RST (2002) and Busse et al. (2005) human capital does not enter the specification, whereas in Glaser et al. (2004) it does. It seems completely inappropriate to try to explain income or growth without accounting for both human and physical capital. The paper will see how the results change when the capitals are included.

3.3.2. Instruments

The common approach is to use one aggregated measure of institutions and to perform a two-stage least squares analysis. Namely, the endogeneity problem demands from the authors some statistical creativity. Instrumental variables (IV) must be found for both institutions and trade to avoid biased estimators.

For trade openness (*lcopen*) the literature has established that the most appropriate IV is the predicted trade shares (*Fittrade*), as introduced by FR (1999). They identify the effects of trade on income levels using the geographical component of trade volumes as an instrument. Rodriguez and Rodrik (RR, 1999) contest this *Fittrade* variable, cautioning that the "results cannot be directly applied to the effects of trade policies" (RR, 1999: 3). Also, FR do not really explain why it is necessary to create a fitted variable as an instrument, instead of using the geography indicators directly. However, Frankel and Rose (2001) argue that the *Fittrade* has generally been well accepted. Despite being critical towards it, this paper's aim is not to question or test the usefulness of *Fittrade* as an instrument and will therefore adopt it.

For institutions the IVs are relatively more contested. The IV introduced by AJR, the settler mortality rate (*SMR*), has been widely applied. However, the dataset of 64 observations then becomes relatively small. RST (2004) extend the sample to 80 observations, but some authors have preferred to use the 'fraction of the population speaking English (*Engfrac*) and Western European languages (*Eurfrac*) as the first language' (Rodrik et al., 2004), which provides them with a larger data set of 140. Also, the legal origin (*Legor*) of countries can be used as IV. This paper will initially use *Engfrac* and *Eurfrac* and legal origin, but later incorporate the *SMR* as well.

3.3.3. Level versus growth

The first step is thus to compare level regressions with average growth regressions. That is, we compare the following two regressions, which are reduced forms of (1):

$$\ln y_{2003i} - \ln y_{1975i} = \alpha_0 + \alpha_1 X_i + \alpha_2 Institution_i + \alpha_5 lcopen_i + \alpha_6 lcopen_i * \mathrm{Re}\, gionalDummy_j + \gamma_j \mathrm{Re}\, gionalDummy_j + \varepsilon_i \quad (2)$$

$$\ln y_{2003i} = \beta_0 + \beta_1 X_i + \beta_2 Institution_i + \beta_3 lcopen_i + \beta_4 lcopen_i * \mathrm{Re}\, gionalDummy_j + \gamma_j \mathrm{Re}\, gionalDummy_j + \varepsilon_i \quad (3)$$

In equation (2) and (3), $Institution_i$ is replaced by the whole range of institutional quality indicators one at a time. This is the simplest possible way to assess which type of institution is most important to economic performance. That is, using 2SLS, estimating the effect of the respective types of institutions one after the other. The second stage regressions would look as follows:

(4) $$Institution_i = \lambda_{1i} + \phi_1 X_i + \nu_1 Engfrac_i + \vartheta_1 Eurfrac_i + \phi_1 Legor_i + \mu_1 Fittrade_i + \varphi_1 Fittrade_i * \text{Re}\, gionalDummy_j + \gamma_{1j} \text{Re}\, gionalDummy_j + \varepsilon_i$$

(5) $$Institution_i = \lambda_{1i} + \phi_1 X_i + \nu_1 Engfrac_i + \vartheta_1 Eurfrac_i + \phi_1 Legor_i + \mu_1 Fittrade_i + \varphi_1 Fittrade_i * \text{Re}\, gionalDummy_j + \gamma_{1j} \text{Re}\, gionalDummy_j + \varepsilon_i$$

3.3.4. Adding capitals

Theoretically and empirically, it seems inappropriate to run a model explaining income levels or growth without accounting for human and physical capital. The next step is thus to incorporate these capitals, and perform IV analysis on equation (1). Thus, $Hinit_i$ and $Kinit_i$ enter the equation. $Hinit_i$ is the initial level of human capital as measured by the schooling years in the total population at 25 or over in 1975, and $Kinit_i$ is the initial level of physical capital as measured by the gross fixed investment over GDP in 1975. The second stage regressions look the same as equation (4) and (5), only now including these two variables.

Although not completely absent, the endogeneity problem for initial year human capital and physical capital does not pose serious problems and Durbin-Wu Hausman tests confirm this. Human capital in 1975 is not directly endogenous to a country's income level in 2003, but might be through some unobserved factor, like a country's mentality or working spirit. In any case, the specification suffers from endogeneity, and the statistical techniques are only imperfect ways of dealing with this. Despite this imperfection, it would be interesting to see how the incorporation of human and physical capital affects the $Institution_i$ coefficient, β_2.

3.3.5. Instrumental juggling

However, so far we have not deviated from the critique that all institutions are aggregated under one measure. Therefore, to start analysing which institutions are important, the paper sets off to establish correlations. Whereas 2SLS is used to avoid biased estimators, it is hard to find good and theoretically sound IVs for institutions. But OLS can be used to establish correlation. The coefficients themselves should not be devoted too much attention, but their sign and relative size give useful insights in understanding our question. The OLS specification looks as follows:

(6) $$\ln y_{2003i} - \ln y_{1975i} = \beta_0 + \beta_1 X_i + \beta_2 LegalI_i + \beta_3 PoliticalI_i + \beta_4 EconomicI_i + \beta_5 SocialI_i + \beta_6 Hinit_i + \beta_7 lcopen_i + \beta_8 lcopen_i * \text{Re}\, gionalDummy_i + \gamma_i \text{Re}\, gionalDummy_i + \varepsilon_i$$

where the dependent variable is also changed to $\ln y_{2003i}$ to compare with level regressions.

But we could go one step further. So far we have seen several instruments for institutions. They have been debated and are controversial at best. But it is all we have and they are most widely adopted. Therefore, we can use the *SMR*, the *Engfrac* and *Eurfrac*, and the *legal origin* variables as instruments for institutions. The second stage regressions will comprise of (5), and the following:

(7) $$LegalI_i = \lambda_{3i} + \phi_3 X_i + \psi_1 SMR_i + \nu_3 Engfrac_i + \vartheta_3 Eurfrac_i + \phi_3 Legor_i + \mu_3 Fittrade_i + \varphi_3 Fittrade_i * \text{Re}\, gionalDummy_j + \gamma_{3j}\, \text{Re}\, gionalDummy_j + \varepsilon_i$$

(8) $$PoliticalI_i = \lambda_{4i} + \phi_4 X_i + \psi_2 SMR_i + \nu_4 Engfrac_i + \vartheta_4 Eurfrac_i + \phi_4 Legor_i + \mu_4 Fittrade_i + \varphi_4 Fittrade_i * \text{Re}\, gionalDummy_j + \gamma_{4j}\, \text{Re}\, gionalDummy_j + \varepsilon_i$$

(9) $$EconomicI_i = \lambda_{5i} + \phi_5 X_i + \psi_3 SMR_i + \nu_5 Engfrac_i + \vartheta_5 Eurfrac_i + \phi_5 Legor_i + \mu_5 Fittrade_i + \varphi_5 Fittrade_i * \text{Re}\, gionalDummy_j + \gamma_{5j}\, \text{Re}\, gionalDummy_j + \varepsilon_i$$

(10) $$SocialI_i = \lambda_{6i} + \phi_6 X_i + \psi_4 SMR_i + \nu_6 Engfrac_i + \vartheta_6 Eurfrac_i + \phi_6 Legor_i + \mu_6 Fittrade_i + \varphi_6 Fittrade_i * \text{Re}\, gionalDummy_j + \gamma_{6j}\, \text{Re}\, gionalDummy_j + \varepsilon_i$$

This specification is statistically possible to execute, namely there are four sets of institutions and there are four instruments. However, it is crucial to note that the results must be approached with caution. The specification is plagued with endogeneity problems and the instruments used for these regressions are contested, or can be theoretically questioned. Nevertheless, the results may help shed some light on what this paper believes to be the more important question of which institutions are important for economic development.

3.3.6. Panel Data

Due to a lack of data, most research has been confined to cross section analysis to answer the question whether institutions are important for economic growth or income levels. But every researcher in this field has been plagued by the problems of endogeneity and a limited amount of countries for which observations are available.

Therefore, panel data is a logical step to take, as it can be used to bypass this problem. As Verbeek (2000) mentions, "the availability of repeated observations on the same units

allows economists to specify and estimate much more complicated and more realistic models than a single cross section […] would do" (Verbeek 2000: 309). The specification looks as follows:

$$\log y_{i,t} = (1+\beta)\log y_{i,t-1} + \varphi X_{i,t} + \eta_i + \varepsilon_{i,t} \quad (11)$$

Where η_i is the country specific effect. As a dependent variable, average growth rates over seven consecutive 5-year periods are taken in the period 1970-2003[8]. Similarly, for institutional quality averages of the Polity IV's '*Polity Score*' and of the Fraser Institute's Economic Freedom of the World index ('*efwindex*') are constructed for these five year periods. For trade openness, 5 year averages are created for the log of imports and exports over GDP. The specification furthermore includes initial year human capital (H_{1970i}) and initial year physical capital as the gross fixed capital formation as percentage of GDP (K_{1970i}) in 1970.

The approach will be as follows. First, a pooled OLS with regional dummies will be analysed. Then the paper will follow the literature (Dawson (1998), Durlauf et al. (2004) Lewer and Saenz (2005), Busse et al. (2005)) by differencing equation (12) to take out the country specific effects. Theoretically it has been argued that using random effects (RE) is not appealing for cross-country panel data, as "standard random effects estimators require that the individual effects [η_i] are distributed independently of the explanatory variables, and this requirement is clearly violated for a dynamic panel such as [(12)] by construction, given the dependence of $\log y_{i,t}$ on [η_i]" (Durlauf et al., 2004: 105). Nevertheless, this paper will let the data speak, and conduct a Hausman test to assess whether RE or fixed effects (FE) estimators are most appropriate.

Using FE, specification (12) is differenced to eliminate the country specific effect:

$$\Delta \log y_{i,t} = (1+\beta)\Delta \log y_{i,t-1} + \Delta X_{i,t}\varphi + \varepsilon_{i,t} - \varepsilon_{i,t-1} \quad (12)$$

However, Durlauf et al. (2004) and the many authors they cite argue that there are serious limitations to the application and interpretation of FE estimation for cross-country

[8] Note, the last '5-year' period is actually only 3 years, since data is generally not (yet) available for 2004 and 2005.

panel data. Firstly, the institutional variables are static over time and may thus be treated as a fixed effect. Second, the FE estimator ignores the between-country variation, which comes at the expense of higher standard errors. Therefore, this paper will also touch upon the debate of generalised method of moments (GMM) estimation.

The paper will follow Arellano and Bond (AB 1998), Bond, Hoeffler and Temple (BHT 2001) and Durlauf, Johnson and Temple (DJT 2004), who show this to be the most appropriate type of analysis.

First-differenced GMM (or the Arellano-Bond method) uses lagged levels to instrument for the first differences. This method was proposed by AB (1998). However, BHT show that lagged levels do not make perfect instruments for the first differences, particularly because the explanatory variables may be highly enduring which is the case for institutional variables. Therefore BHT propose a system GMM which adds a component to the regressions in which the levels are instrumented by the differences. Blundell and Bond (1998) provide "some evidence that this estimator is more robust than the Arellano-Bond method in the presence of highly persistent series" (Durlauf et al., 2004:111). This paper shortly touches on all methods, but due to limitations of time, will not go into too much detail.

The obsession with comprehensive institutional reform leads to a policy agenda that is hopelessly ambitious and virtuously impossible to fulfil.

Danny Rodrik (2006:13)

Chapter 4 – Which institutions determine growth?

In this section the results of the statistical analysis are presented and interpreted. Although the analysis comprised an array of regressions, some of which are reported in the annexes, this section will confine itself to the main findings. As shown in Appendix 4[9], the exploratory baseline regressions suggest a significant and positive effect of institutions on the level and growth of income. This is true even after controlling for human and physical capital.

However, the analysis will show that the income-institution nexus is not very clear once human and physical capital are controlled for and that there is some evidence for institutions being important *through* human capital accumulation. Also, disaggregating the data turns out to be a sensible and value added process for the understanding of the result. However, it proves difficult to establish which institutions directly determine for growth, despite some useful insights, especially from the baseline regressions.

4.1. Institutions

Departing from the baseline regressions, the next step is to deal with the endogeneity problem[10] and perform instrumental variable analysis. The results are presented below and are divided into three main subjects. First, institutions interact differently with income level and average growth. Second, the World Bank data is analysed and the Regulation Index disaggregated. Third, the discussion focuses on which institutions are important.

4.1.1. Level and Growth

Estimating equation (1) and (2), it is remarkable that the conclusion that institutions are important depends heavily on the choice of dependent variable. Rodrik (2006) argues that there are generally strong results for institutional quality and its effect on income level. In the bivariate exploratory regressions, these findings are confirmed.

[9] Only the results for the regressions that include human and physical capital are included due to limitations of space. When human and physical capital are excluded, the coefficients are larger and more significant.
[10] Durbin-Wu-Hausman (DWH) tests confirm that there is a problem of endogeneity and that OLS coefficients will be biased.

Table 2: Exploratory Regressions: Institutions without controlling for capital

	(1) OLS - Level	(2) OLS - Growth	(3) IV - Level	(4) IV - Growth
Economic Institutions				
Government Effectiveness	0.648**	0.334**	0.793**	0.217
	[0.088]	[0.078]	[0.209]	[0.158]
Regulatory Quality	0.575**	0.461**	1.066**	0.398*
	[0.097]	[0.070]	[0.298]	[0.181]
Regulation Index (Busse)	0.134**	0.077**	0.138**	0.070+
	[0.025]	[0.021]	[0.046]	[0.037]
Hiring and Firing Workers	0.155+	0.053	0.194	0.196
	[0.085]	[0.067]	[0.183]	[0.127]
Trading Across Borders	0.305**	0.194*	0.600*	0.289
	[0.097]	[0.075]	[0.285]	[0.196]
Political Institutions				
Political Stability	0.482**	0.268**	0.921**	0.259
	[0.093]	[0.076]	[0.302]	[0.188]
Democracy Score	0.125**	0.041+	0.160**	0.043
	[0.026]	[0.022]	[0.044]	[0.036]
Autocracy Score	-0.106**	-0.054*	-0.203**	-0.066
	[0.034]	[0.026]	[0.065]	[0.048]
Polity Score	0.062**	0.024*	0.090**	0.027
	[0.015]	[0.012]	[0.026]	[0.021]
Political Rights	-0.167**	-0.091*	-0.583*	-0.186
	[0.047]	[0.035]	[0.226]	[0.117]
Civil Liberty	-0.206**	-0.151**	-0.588**	-0.240+
	[0.059]	[0.042]	[0.211]	[0.123]
Legal Institutions				
Getting Credit	0.472**	0.285**	0.728**	0.188
	[0.081]	[0.068]	[0.221]	[0.165]
Rule of Law	0.692**	0.322**	0.880**	0.248+
	[0.082]	[0.076]	[0.172]	[0.146]
Voice and Accountability	0.552**	0.248**	1.142**	0.336
	[0.095]	[0.080]	[0.319]	[0.211]
Control of Corruption	0.569**	0.271**	0.639**	0.163
	[0.086]	[0.076]	[0.187]	[0.143]
Constraints on the Executive	0.130**	0.029	0.233**	0.098+
	[0.037]	[0.030]	[0.072]	[0.058]
Social Institutions				
Freedom of Press	0.693**	0.325*	1.520**	0.508+
	[0.178]	[0.136]	[0.439]	[0.304]
Women Expected to Work	0.606**	0.493**	1.489**	0.652+
	[0.167]	[0.119]	[0.548]	[0.345]

Standard errors in brackets,+ significant at 10%; * significant at 5%; ** significant at 1%

First of all, since there are more instruments (*Legal origin*, *Engfrac* and *Eurfrac*) than instrumented variables, Hansen-Sargan overidentification tests can be preformed to test the instruments. These show that the instrumental variables have the desired statistical properties.[11] The first stage regressions also show that all the instruments used are technically viable, whenever the institutional variable is significant. In case it isn't, the instruments are typically not significant in the first stage regressions.

As can be seen in column (3) of table 2, 17 out of the 18 institutions are significant when human and physical capital do not enter the equation. The coefficients are quite robust compared to the OLS regressions when institutions and openness are instrumented for. If anything, the coefficients increase. These are the results that a typical paper of the recent literature on the interaction between institutions and income uses to stress the important role played by institutions.

However, the results for the regressions with average growth over the 1975-2003 period as dependent variable show completely different results. The results shown in column (4) are quite weak indeed. Only 7 out of the 18 institutions variables are significant. The coefficients of the significant results are similar to the OLS coefficients. Of the variables that are significant, it is somewhat surprising to see that the two social institutions are significant at the 10% level. Apparently, freedom of press is important, which would underscore the philosophy that a free media translates to a greater control of corruption and finally to a more efficient use of resources. The norm that women should work also has a significantly positive effect on average growth.

4.1.2. WB: index or disaggregate?

The results do not differ greatly for the WBDB data. One of the critiques of the approach taken by Busse et al. (2005) is on the '*Regulation Index*' they create. This index is produced by assigning weights on the basis of a statistical technique (principle components analysis), but all this technique does is establish where most of the variation comes from and assign the biggest weight to that variable. It is not easily interpreted. Why Busse et al. do not use the individual subcomponents of their index, arguably much more practical, is not obvious.

[11] The Hansen Sargan χ^2-statistics and their p-valus are not reported, due to limitations of space, but can be obtained on request.

But more severe is that they compile a mass of information and create an indicator of institutional quality and the result hardly translates into useful policy advice. Appendix 5 shows the results for both level and growth regressions for this regulation index, but also for a self-constructed *unweighted* index (*Reg_KV*) and more sensibly, for the ten subcomponents of these indices[12].

It is interesting that the simpler index, which gives equal weights to all the subcomponents, gives very similar results. This unweighted average is significant whenever the Regulation index by Busse et al. is, albeit less so, and has a larger coefficient.

Also, the results for the subcomponents provide a strong argument to disaggregate the '*Regulation Index*' made by Busse et al. (2005). Busse et al. scrutinize level regressions without controlling for capital. In the level regressions, several of the subcomponents are significant, although not all. The variables '*Getting Credit*', '*Trading across Borders*', '*Enforcing Contracts*' and '*Closing a Business*' are all significant at the 5 % level and '*Dealing with Licences*' is at the 10% level. Their coefficients range from 0.528 to 0.802, which is considerably larger than the 0.138 for the '*Regulation Index'* proposed by Busse. Logically, the unweighted index's coefficient lies much closer to these coefficients at 0.691. The other subcomponents are not significant.

For growth, only the indices and '*Protecting Investors*' are significant, but only at the 10% level. As mentioned before, institutions are hardly significant for average growth and from these results it is hard to strong establish a link between the WBDB indicators, the thereof derived regulation indices and growth.

All in all, the value added of constructing an index on the basis of principle components is not straightforward to see. Instead, using the individual subcomponents of this index shows that different aspects of doing business in countries affect a country's income in different ways. Some aspects of doing business are important for income levels than others, and maybe deserve more attention from policy makers. An index will not show this.

[12] The exploratory OLS regressions are not reported due to limitations of space. They can be obtained on request.

4.2. Institutional circus

So far, the paper has employed one institution at a time. In this section, the results of the attempt to combine the four categories of institutions in equation (6) are presented. Unfortunately, it is not possible for statistical reasons to employ all the institutions at the same time. Already, the proposed methodology proves a high demand on the data. Therefore, it turns out to be difficult to answer the question of which institutions determine growth.

4.2.1. The two options

There are two different sets of institutions that are used, presented in Table 3. The first option, option 'A', is based on the correlation between the institutional variables and includes '*Hiring and Firing Workers*' as a representative for economic institutions, '*Political Rights*' for political institutions, '*Constraints on the Executive in 1980*' for legal institutions, and '*Women are Expected to Work*' for social institutions. These four institutions variables are least correlated to all the other institutions variables, as is explained in Chapter 3.

Option 'B' is a slightly more arbitrary combination of institutions, and consists of '*Government Effectiveness*', '*Political Stability*', which capture a very broad range of information and are therefore significant in most cases, '*Getting Credit*', to test Rodrik's (2006) claim to that access to credit is often a determinant factor of economic growth and '*Freedom of Press*', which captures a different aspect of social norms.

Table 3: Two options of institutional combinations

	A	***B***
Economic Institution	*Hiring and Firing Workers*	*Government Effectiveness*
Political Institution	*Political Rights*	*Political Stability*
Legal Institution	*Constraints on the Executive*	*Getting Credit*
Social Institution	*Women Expected to Work*	*Freedom of Press*

4.2.2. Tricky outcomes

Below in Table 4, the incidence and level of significance are shown for the three options. Note that the main conclusion is that the analysis most probably suffers too much from the high correlations between the institutions variables, and thus produces results that are not viable. In all honesty, the IV coefficients are probably not very meaningful.

However, the OLS regressions can be checked for correlation, although the size of the coefficients should be approached with care. On the basis of the benchmark regressions, some very cautious conclusions can be made. In option 'A', Hiring and Firing Workers is never significant. The ease of hiring and firing workers in a country does not seem to have an impact on the income level and/or growth averages. '*Political Rights*' and '*Constraints on the Executive*' are both significant for the level rgeressions but not so for the growth regression. What is remarkable is that the variable '*Women are Expected to Work*' is significant for growth, even after controlling for human and physical capital. Subsequently, whether women are expected to work is important for income levels. Moreover, the OLS coefficients are quite robust as compared to the bivariate exploratory regressions.

In option 'B', the most interesting finding is the '*Getting Credit*' variable, which is significant yet again. This coefficient is robust as well. For the level regressions, the '*Getting Credit*" coefficient goes down from 0.472 to 0.220 after controlling for three extra institutional variables, and stays significant at the 5% level.

For the growth regressions, the coefficient only declines from 0.285 to 0.182. In addition, the results for this variable are robust to the inclusion of human and physical capital, something which catches the attention since many of the institution variables lose significance once the human and physical capital are controlled for.

Therefore, these results do seem to hint at the fact that access to credit is a very important factor in determining economic development, maybe more so than the other institutional variables. These results underscore Rodrik's (2006) claim that the access to credit can be a very influential factor in the comparative growth record of countries.

Table 4: Including four institutions in the regression

	Human and Physical Capital excluded				***Human and Physical Capital included***			
	OLS - level	OLS - growth	IV - level	IV - growth	OLS - level	OLS - growth	IV - level	IV - growth
Option A:								
Hiring and Firing Workers	0.103	0.061	-0.152	-0.165	0.063	0.062	-0.088	-0.069
	[0.075]	[0.065]	[0.635]	[0.540]	[0.073]	[0.069]	[0.321]	[0.263]
Political Rights	-0.108*	-0.051	0.181	0.215	-0.073	-0.052	0.083	0.116
	[0.046]	[0.040]	[0.323]	[0.275]	[0.047]	[0.044]	[0.174]	[0.142]
Constraints on the Executive	0.092*	-0.023	0.206	0.045	0.058	-0.033	0.093	-0.070
	[0.037]	[0.032]	[0.165]	[0.140]	[0.037]	[0.035]	[0.141]	[0.115]
Women are Expected to Work	0.346*	0.479**	1.520	1.362	0.226	0.475**	0.738	0.654
	[0.167]	[0.145]	[1.185]	[1.007]	[0.167]	[0.157]	[1.034]	[0.847]
Human Capital					0.135*	0.013	0.267	0.273+
					[0.053]	[0.050]	[0.194]	[0.159]
Physical Capital					0.008	0.002	-0.018	-0.018
					[0.009]	[0.008]	[0.031]	[0.025]
Option B:								
Government Effectiveness	0.397**	0.202	-0.172	-0.536	0.255+	0.272+	-0.163	-0.446
	[0.129]	[0.122]	[0.632]	[0.921]	[0.134]	[0.137]	[0.497]	[0.702]
Political Stability	0.080	0.016	0.353	1.080	0.094	-0.017	0.095	0.604
	[0.110]	[0.104]	[0.666]	[0.970]	[0.107]	[0.109]	[0.378]	[0.535]
Getting Credit	0.220*	0.182*	0.697+	0.553	0.220**	0.185*	0.183	-0.035
	[0.084]	[0.079]	[0.383]	[0.558]	[0.079]	[0.080]	[0.325]	[0.459]
Freedom of Press	0.242	0.120	0.831	0.100	0.109	0.142	0.299	-0.354
	[0.159]	[0.150]	[0.749]	[1.091]	[0.160]	[0.163]	[0.581]	[0.822]
Human Capital					0.134**	-0.010	0.277	0.345
					[0.045]	[0.045]	[0.186]	[0.264]
Physical Capital					0.007	0.008	-0.008	-0.034
					[0.008]	[0.008]	[0.030]	[0.042]

Standard errors in brackets,+ significant at 10%; * significant at 5%; ** significant at 1%

The '*Getting Credit'* variable is made up of the following[13]: "a Legal Rights Index, which measures the degree to which collateral and bankruptcy laws facilitate lending, a Credit Information Index, which measures rules affecting the scope, access, and quality of credit information, public credit registry coverage, and private credit bureau coverage" (WB 2006: website).

[13] From http://www.doingbusiness.org/

This provides relatively useful information. Remarkable, and ironic in my view, is that this is one of the least straightforward subcomponents of the WBDB dataset indicators. Whereas the other subcomponents deal with information like 'time spent in days', 'percentage of GDP per capita spent' etc., arguably more straightforward to interpret, this variable is made up of indices, which makes the information relatively *less* appealing.

Nevertheless, it is a sizeable step forward, because both '*Getting Credit*' and '*Women are Expected to Work*' are very easily interpretable variables and translate to practical policy advice.

4.3. Ranking institutions

On the basis of the regressions so far, a ranking of the institutions' importance can be made. There are several ways to do this, but this paper will confine to two forms of ranking. First, the number of times the variables in the different categories of institutions are significant for the various regressions can give us an idea of which institutions are more important. Second, for the Kaufmann data, the coefficients can be compared, because they are measured on the same scale. This is unfortunately only true for the Kaufmann data and excludes social institutions, because the data was grouped under the other three categories.

Table 5 below shows that social institutions are on average most often significant. This could be a bit misleading because there are only two social institutions, '*Fpress*' and '*Gender*'. If the variable '*Constraints on the Executive*' (*Xcons80*) would be excluded from the legal institutions, this category would be more important according to this methodology (average of 6.25). Nevertheless, it is very interesting indeed to see that the variables defined as social institutions are significant so many times. Especially because they are less complicated variables to interpret and better reflect an actual norm instead of an outcome than the other measures of institutional quality.

Table 5: Ranking of Institutions

	No. times Significant	***No. of Variables***	***Average***	***RANKING***
Economic Institutions	23	5	4.60	3
Political Institutions	26	6	4.33	4
Legal Institutions	28	5	5.60	2
Social Institutions	12	2	6.00	1

The Kaufmann indicators' coefficients are compared on the basis of the OLS level and growth regressions only, because for these regressions the Kaufmann indicators are *all* significant. The IV regressions are not included, and thus the ranking looks at which of the Kaufmann indicators is most correlated with growth and income? Table 6 summarizes these results.

Table 6: Ranking the Kaufmann data

	OLS - level	***OLS - growth***
Economic Institutions		
Government Effectiveness	0,648	0,334
Regulatory Quality	0,575	0,461
Political Institutions		
Political Stability	0,482	0,268
Legal Institutions		
Rule of Law	0,692	0,322
Voice and Accountability	0,552	0,248
Control of Corruption	0,569	0,271

These results suggest very little, other than that these measures are very much correlated and capture similar information. It is almost impossible to assess which institutions determine income levels or growth. For income levels, a one point increase on the 11 point scale is associated with higher increases in income for '*Rule of Law*' than for '*Government Effectiveness*'. For growth, the results suggest exactly the opposite, namely that economic institutions have more weight.

Note that political institutions again are ranked last, for both income and growth. This might give some extra body to the claim made by Compton et al. (2006), who find that growth is not dependent on political stability, in the long run or the shorter run.

It is to be noted that these findings are far from conclusive. Actually, the results have shown it to be very difficult to see which institutions are important. Nevertheless, from these results we can cautiously conclude that the measures proposed for political institutions do not perform as well as the others and that the ones chosen for legal and social institutions perform especially well. The fact that social institutions perform quite well, even in equation (6), is surprising but promising because the measures are much more straightforward than

the aggregated indices that capture a lot of similar information. A comforting conclusion is that turning away from aggregations and focusing on more disaggregated variables, like the social institutions and WBDB subcomponents ('*Getting Credit*' in particular), represents an improvement in terms of policy understanding.

4.4. Human and physical capital

Now, it is interesting to see what happens if human and physical capital are included in the regressions. Below, the results are presented that lead to an interesting finding, closely related to the findings of Glaeser et al. (2004). It seems plausible that institutions may exert an impact on income through their effect on the accumulation of physical and human capital instead of on income of growth directly. Therefore, the interaction between institutions and human and physical capital are examined here as well.

4.4.1. Capital controls

In Table 7, it can be seen that once human and physical capital are controlled for, the significance as well as the size of the coefficients of the institutional variables decline. These results suggest that institutions may not directly exert an impact on income but rather through their effect on the accumulation of physical and human capital.

For the exploratory level regressions in column (3), now only 6 out of the 18 institutions are significant. Note that three of these are legal institutions, all at the 5% level. Legal institutions are consistently important in the OLS and the IV-level regressions, whereas the other categories seem to lose their importance once controls for human and physical capital are included.

In most of the cases (11 out of 18), initial year human capital is significant. Physical capital is never significant and thus of little importance in these specifications. From this, one might argue that not institutions are so important, but human capital. The focus on institutions is then important in that it provides a way to most effectively come about the accumulation of capital, less so because of their direct impact on income.

For the growth regressions, none of the institutions is significant once human and physical capital are controlled for. The results are very weak indeed and based on these results the link institutions-growth is difficult to make.

Table 7: Exploratory Regressions: Institutions while controlling for capital

	(1) OLS - Level	(2) OLS - Growth	(3) IV - Level	(4) IV - Growth
Economic Institutions				
Government Effectiveness	0.478**	0.374**	0.652*	0.251
	[0.098]	[0.097]	[0.290]	[0.270]
Regulatory Quality	0.372**	0.476**	0.441	0.455
	[0.094]	[0.079]	[0.324]	[0.274]
Regulation Index (Busse)	0.082**	0.075**	0.03	0.062
	[0.026]	[0.025]	[0.055]	[0.052]
Hiring and Firing Workers	0.06	0.029	-0.062	0.128
	[0.075]	[0.072]	[0.149]	[0.143]
Trading Across Borders	0.135	0.176*	0.051	0.287
	[0.091]	[0.083]	[0.323]	[0.294]
Political Institutions				
Political Stability	0.328**	0.246**	0.576*	0.147
	[0.084]	[0.082]	[0.254]	[0.235]
Democracy Score	0.059*	0.028	0.081	0.014
	[0.029]	[0.027]	[0.055]	[0.050]
Autocracy Score	-0.041	-0.045	-0.087	-0.03
	[0.032]	[0.029]	[0.071]	[0.062]
Polity Score	0.027+	0.019	0.043	0.011
	[0.016]	[0.014]	[0.031]	[0.028]
Political Rights	-0.056	-0.074+	-0.309	-0.061
	[0.045]	[0.040]	[0.192]	[0.136]
Civil Liberty	-0.07	-0.142**	-0.383	-0.171
	[0.057]	[0.049]	[0.254]	[0.178]
Legal Institutions				
Getting Credit	0.355**	0.270**	0.471*	0.145
	[0.071]	[0.072]	[0.202]	[0.202]
Rule of Law	0.492**	0.326**	0.647*	0.135
	[0.096]	[0.096]	[0.269]	[0.272]
Voice and Accountability	0.338**	0.216*	0.587*	-0.037
	[0.099]	[0.095]	[0.291]	[0.278]
Control of Corruption	0.368**	0.289**	0.276	0
	[0.103]	[0.099]	[0.262]	[0.263]
Constraints on the Executive	0.058	0.002	0.113	0.049
	[0.035]	[0.033]	[0.079]	[0.072]
Social Institutions				
Freedom of Press	0.341+	0.302+	1.206*	0.42
	[0.173]	[0.159]	[0.561]	[0.445]
Women Expected to Work	0.205	0.418**	0.633	0.223
	[0.158]	[0.138]	[0.856]	[0.720]

Standard errors in brackets, + significant at 10%; * significant at 5%; ** significant at 1%

4.4.2. So human capital after all?

What is striking in all the regression is that controlling for the capitals decreases the significance of the institutional variables so considerably. This gives the inkling that these institutional variables may be working through allowing countries to build up human and physical capital. It is appealing to investigate whether institutions have a bearing on physical and human capital. If so, institutions per se are not so important to economic development but rather in their facilitative role allowing countries to build up physical and human capital. Hence, they are important not directly but indirectly.

To test this claim, this paper explores the effect of the institutional variables on human and physical capital. In Appendix 6, it can be verified that in the OLS regressions with human capital as the dependent variable on institutions, openness, initial year human capital and other control variables[14] show a strong significance of institutions as determinants of the level of human capital. These results, summarized in Table 8 below, suggest that institutions are important for the accumulation of human capital. This is robust to the inclusion of initial year physical capital as well.

However, institutions are insignificant in all specifications with physical capital as the dependent variable. This could be explained by the fact that the accumulation of physical capital, on its turn, works through the accumulated human capital. Investments will be made by people who have the knowledge and the skills to do so in a sensible way. The regressions of physical capital on institutions and human capital give some validity to this claim, as human capital is generally significant.[15]

Although the Durbin-Wu-Hausman tests showed that initial year human and physical capital were exogenous and OLS estimates should thus provide unbiased estimates, a possible critique on this approach is that the capitals are in fact endogenous. Therefore, the paper also uses instrumental variables to instrument for institutions and trade openness. The results are robust to this as well as to the inclusion of the 'other' capital.

[14] The same variables as in the regressions with average growth or income as a dependent variable.
[15] Due to limitations of space, and because it is not part of the central argument of this paper, the regressions with physical capital as the dependent variable are not reported. They can, however, be obtained upon request.

Table 8: Regressing human capital on institutions

	(1) OLS	(2) IV		(3) OLS	(4) IV
Economic Institutions			***Legal Institutions***		
Government Effectiveness	1.057**	1.858**	*Getting Credit*	0.296	1.472+
	[0.228]	[0.605]		[0.217]	[0.836]
Regulatory Quality	0.749**	2.866**	*Rule of Law*	1.259**	2.132**
	[0.267]	[1.071]		[0.225]	[0.568]
Regulation Index (Busse)	0.207**	0.356*	*Voice and Accountability*	1.081**	1.823**
	[0.063]	[0.147]		[0.237]	[0.628]
Hiring and Firing Workers	0.384*	0.791	*Control of Corruption*	1.121**	1.604**
	[0.189]	[0.526]		[0.205]	[0.511]
Trading Across Borders	0.634**	1.761*	*Constraints on the Executive*	0.250**	0.442*
	[0.233]	[0.849]		[0.080]	[0.180]
	(5) OLS	(6) IV		(7) OLS	(8) IV
Political Institutions			***Social Institutions***		
Political Stability	0.526*	1.487+	*Freedom of Press*	1.657**	3.608**
	[0.225]	[0.779]		[0.416]	[1.108]
Democracy Score	0.252**	0.300*	*Women Expected to Work*	1.484**	4.944**
	[0.061]	[0.128]		[0.375]	[1.711]
Autocracy Score	-0.218**	-0.381*			
	[0.073]	[0.171]			
Polity Score	0.125**	0.170*			
	[0.034]	[0.073]			
Political Rights	-0.424**	-0.929**			
	[0.105]	[0.348]			
Civil Liberty	-0.578**	-1.267**			
	[0.126]	[0.406]			

Standard errors in brackets, + significant at 10%; * significant at 5%; ** significant at 1%

In all cases, the results suggest that institutions are important for the accumulation of human capital, except possibly for '*Getting Credit*'. The results for physical capital are also very clear. Institutions in the way they are measured do not have a significant effect on physical capital. Rather, there is some evidence that human capital is a stronger determinant of physical capital accumulation. Care is asked for with these conclusions, but the results lead us into a very interesting alley. Not institutions are important for income and growth,

but human capital. Institutions have an indirect effect on growth, in that they can facilitate or hamper the accumulation of human capital. These results closely link to Glaeser et al. (2004) and Rodrik (2006) and have interesting implications for international development paradigms and policy, which will be addressed in the next chapter.

Note the fact that '*Getting Credit'* is not significant in the OLS and only just (at the 10% level) for IV. To some extent, this again underscores Rodrik's claim that access to credit has a direct and significant impact on economic growth and income levels. That is, it does not work through human capital.

4.5. Panel

Below the results of equation (11) and (12) for the panel data analysis are shown. First, the results from the Pooled OLS, Random Effects and Fixed Effect estimations are treated. Then, the results from the GMM analysis are presented.

4.5.1. Pooled, random and fixed

The panel results show a brighter picture for institutions. As summarised in Table 9, the results for the Pooled OLS, the RE and FE estimators show that the '*Polity Score*' and '*Efwindex*' are significantly positive. In the Pooled OLS and the RE, human capital and initial year GDP are positive and significant. In the FE estimation, these variables are treated as country specific effects because they do not display any variation and are thus ignored.

The Hausman tests show that there is no systematic difference between the RE etimators and the FE estimators for the '*Polity Score*' case. The data therefore suggest using RE estimation for regressions with this variable as they are consistent and more efficient than FE estimators. For the '*Efwindex*' the Hausman test suggests that FE estimation is more appropriate.[16]

Note that the coefficients are very robust to changes in estimation technique. The coefficient of the '*Efwindex*' does not vary much and the coefficient of the 'Polity Score' varies even less. The Economic Freedom of the World index has a little more explanatory power than the '*Polity Score*', since its R-squared is larger. This index "uses data for 38 components to construct a measure of economic freedom [where] the 38 components of the EFW index are divided into five major areas: (1) size of government, (2) legal system and

[16] The χ^2-statistic for '*Polity Score*' is 2.31, with a corresponding p-value of 0.5097. For the '*Efwindex*', the χ^2-statistic is 12.63 with a p-value of 0.0055.

protection of property rights, (3) access to sound money, (4) freedom to trade with foreigners, and (5) regulation of credit, labor, and business" (Gwartney and Lawson, 2006: www.freetheworld.com).

Since, after controlling for FE, the results are robust there seems to be enough variation in the institutional variables and help explain comparative growth records. However, the '*Polity Score*' and the '*Efwindex*' are indices that are measured on a different scale and are therefore not easy to compare. However, the '*Democracy*' and '*Autocracy*' variables that the 'Polity Score' is made up of *are* based on a same scale. Regressing growth on these instead of their aggregated index, gives almost identical results. The coefficients are almost exactly the same.[17]

Then, a one point increase in the '*Efwindex*' is associated with a much bigger impact on economic growth than a one point increase in the two components of the '*Polity Score*'. Also, the R-squared of the latter is lower for all estimation techniques, but not by much. That suggests, that the 'Efwindex' better explains variability in growth averages.

It is noteworthy that the trade openness indicator (*lcopen*) is significant and positive as well. This is interesting, because in the cross section analysis this variable was never significant, which can be verified in Appendices 4 through 6. This suggests that more open countries perform better on average.

In any case, the institution variables as well as the human capital variable are significant at the conventional levels and all have the expected sign. This, to some extent, counters the results obtained from the cross-section data, in that this does not provide evidence that institutions work through human capital. However, it is worth noting that this is a relatively simple form of panel data, and more extensive investigation is required. Nevertheless, the results do fit closely the contemporary studies on the interaction between institutions and economic growth.

[17] And therefore not reported, save the following. Demo: 1) Pooled OLS: 0.0025 [0.001] 2) RE: 0.0025 [0.001] 3) FE: 0.002 [0.001] and Auto: 1) Pooled OLS: 0.002 [0.001] 2) RE: 0.002 [0.001] 3) FE: 0.0014 [0.001]. The complete results can be obtained from the author upon request.

Table 9: Panel Data results

	(1)	(2)	(3)	(4)	**(5)**	**(6)**	**(6)**	**(7)**	(3)	**(8)**
	Pooled OLS	*RE*	*FE*	*1st Differenced GMM*	*System GMM*	*Pooled OLS*	*RE*	*FE*	*1st Differenced GMM*	*System GMM*
Polity Score	0.002**	0.002**	0.002*	0.003**	0.003**					
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]					
Efw - index						0.022**	0.028**	0.020*	0.029**	0.029**
						[0.007]	[0.007]	[0.009]	[0.007]	[0.007]
lnGDP70	-0.043**	-0.035**	0.000	-0.035*	-0.035*	-0.059**	-0.053**	0.000	-0.052**	-0.052**
	[0.012]	[0.012]	[0.000]	[0.015]	[0.015]	[0.012]	[0.013]	[0.000]	[0.017]	[0.017]
Hinit70	0.011*	0.014**	0.000	0.014**	0.014**	0.010*	0.017**	0.000	0.016**	0.016**
	[0.005]	[0.005]	[0.000]	[0.005]	[0.005]	[0.004]	[0.005]	[0.000]	[0.005]	[0.005]
Kinit70	0.001	0.001	0.000	0.001	0.001	0.001	0.001	0.000	0.001	0.001
	[0.001]	[0.001]	[0.000]	[0.001]	[0.001]	[0.001]	[0.001]	[0.000]	[0.001]	[0.001]
Openness	0.031**	0.031**	0.037	0.031**	0.031**	0.024*	0.025+	0.040	0.023+	0.023+
	[0.011]	[0.012]	[0.029]	[0.011]	[0.011]	[0.011]	[0.013]	[0.031]	[0.014]	[0.014]
Year	-0.014**	-0.014**	-0.014**	-0.014**	-0.014**	-0.014**	-0.014**	-0.014**	-0.015**	-0.015**
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Europe & offshoots	0.064*					0.099**				
	[0.031]					[0.028]				
Latin America	0.034					0.049*				
	[0.023]					[0.022]				
Africa	0.000					0.000				
	[0.000]					[0.000]				
Asia	0.083**					0.089**				
	[0.020]					[0.020]				
Constant	27.560**	27.530**	27.284**	27.561**	27.561**	28.558**	28.960**	27.633**	29.368**	29.368**
	[1.374]	[1.373]	[1.513]	[1.278]	[1.278]	[1.500]	[1.498]	[1.769]	[1.511]	[1.511]
Observations	685	685	685	685	685	587	587	587	587	587
R-squared	0.39	0.38	0.39			0.44	0.43	0.41		
Number of countries		98	98	98	98		96	96	96	96

Standard errors in brackets, + significant at 10%; * significant at 5%; ** significant at 1%

4.2. GMM

Although the FE estimation shows that the institutional variables are not treated as fixed effects and thus that there is enough variation, many authors note (see Durlauf et al. (2004) for an elaborate discussion) that FE might not be appropriate for cross-country panel data. Rather, they suggest that GMM estimation is more appropriate. Below, the results for both first-differenced GMM as well as system GMM are presented.

The results in Table 9 confirm the findings of the static panel estimation. Both '*Polity Score*' and '*Efwindex*' have positive and significant impacts on average growth for the five year periods. Initial year human and physical capital also have the expected signs, although only human capital is significant. Again, '*lcopen*' is also significant and positive.

Note that the magnitude of the coefficients does not change much when using dynamic panel data estimation techniques, which may suggest that the RE and FE estimations are actually quite appropriate. However, recent literature typically includes more control variables, but this is beyond the scope of this paper which has already covered a large part of the current debate on the interactions between institutions and growth.

If you believe everything you read,
better not read.
Japanese proverb

Chapter 5 – Conclusions

This paper set out not only to cover the literature on the institution-growth nexus but also to understand a more pressing question, namely which institutions are important for economic development. Arguably, institutions have very diverse functions and thus interact differently with economic growth. In doing so, where possible disaggregated measures of institutional quality have been used. Below the main findings are summarized but most prominent in this chapter is the plea for caution with the current debate on institutions that engulfs the international development community.

5.1. What the paper found

The analysis covered a large section of the contemporary literature on the institutions-growth debate. First of all, it confirms Rodrik's (2006) finding that the empirical literature has typically found a strong influence of institutions on the income level, but that the link between institutions and growth is much harder to make.

Second, to ascertain which institutions determine growth, the paper categorizes the institutions into economic, political, legal and social institutions. There is some evidence that social and legal institutions are more important than economic and political institutions. Especially political institutions have less impact on both income and growth.

However, it proved very difficult to establish which institutions are most important for growth. The categorisation of institutions is a very useful undertaking in that it is recognition of the fact that different institutions interact differently with growth. But unfortunately, the (lack of institutional) data does not support sophisticated statistical techniques to answer the question. Moreover, the measures of institutions researchers have to work with are often such broad measures, that they all capture similar information. Also, they are not measures of norms, but "ambiguous assessments of institutional outcomes" as Glaeser et al. (2004: 298) put it.

Therefore, this paper has adopted straightforward and disaggregated data where possible. More specifically, the two social institutions proposed both are measures of actual norms, are easy too interpret and carry considerable policy relevance. The results suggest that the

norm that women are expected to work is important for income levels and growth. Also, if a country has a free press it is expected to grow faster on average. The variables that capture these norms actually seemed more important than political and economic institutions, which might be counter-intuitive. A possible explanation could be that social institutions are a better reflection of a society's informal institutions, which Compton et al. (2006) claim might actually have more weight in determining the economic performance of countries. This would also explain why political institutions are found to be less important.

But most convincing is the variable '*Getting Credit*' from the World Bank Doing Business dataset and categorised as a legal institution, which measures the access to credit in a country. This variable is significant in almost all regressions and this underscores Rodrik's (2006) claim that poor access to credit is one of two most binding constraints for an economy to grow.

This proves that disaggregating of institutional indices may considerably enrich the analysis. The typical literature uses measures of institutional quality that capture an array of information and that are hard to disentangle logically. The '*Regulation Index*' proposed by Busse et al. (2005) is a good example of such an index. This paper used the subcomponents, of which '*Getting Credit*' is one, that construct this index. It is a valuable undertaking as it shows that the various aspects of doing business interact quite differently with economic performance. An index does not capture this.

Third, the paper suggests that institutions may exert an impact on income through their effect on the accumulation of physical and human capital instead of on income of growth directly. Controlling for human and physical capital in the regressions diminished the effect of institutions, or made them insignificant. Examining the interactions between institutions and human and physical capital, the paper argues that institutions are a main determinant of human capital accumulation. So are they important? Yes, but through their bearing on human capital. This closely links to the findings of Glaeser et al. (2004) and would suggest that the focus should be more on human capital rather than institutions. Note that the 'Getting Credit' variable is the only institutional variable that does not seem to work through human capital but has a direct impact on a country's economic performance.

Finally, the light panel data analysis gives institutions a bit more slack. Both static and dynamic panel estimations show institutions to have an impact on growth averages besides the impact of human capital. But caution is asked for, because the only measures of

institutional quality that are available over a long stretch of time are blurry, aggregate and capture a lot of information. Thus, their meaning is questionable and the critique does not crumble. The fact that more and more data on institutions is available is something that could considerably enrich the analysis in the years to come.

5.2. Taking care of institutions or taking care with institutions?

Institutions are important. Obviously. Whether they impact growth directly or through human capital, it has been established that institutions play an essential role in the comparative development of countries. In that sense, this paper is superfluous. So should countries focus on their institutional quality?

Improving institutional quality is an important policy implication of contemporary research. The international development community has adopted the 'institution' in its discourses and policies full-fledged. But is this appropriate? What is it telling countries that are lower on the economic ladder? Which *are* the institutions at play, really?

The debate on institutions is not, as Rodrik calls it, a dead end. But he is right that the way the 'institution' buzzword has (re-)entered the development debate does not provide useful policy advise. The research measures institutions as aggregated indices, and typically uses one measure to capture the whole range of economic, political, legal and social institutions. The informal institutions are most probably even more important but are treated only as a residual, if at all. This research could tell a country that the index it uses is positively correlated to the country's growth, but that is all. It does not answer which institutions have a (larger) impact on growth, nor does it tell a country's policy maker what to do. That countries should strengthen their institutions for growth would be what the international community wants to hear. But does it bear any practical policy advice?

This paper is guilty too. It used the same blurry indices as many other studies and cannot provide practical policy advice in this respect. However, this paper has also used the disaggregated WBDB data, and has found that restrictions on access to credit can be detrimental to growth. Policy implication is that financial markets should be well regulated but not restricting access to credit.

Also, it has proposed two social institutions, which capture norms rather than outcomes, that have shown to be important. These translate to the relatively straightforward policy

advice to ensure a free and independent press, and to encourage women to work and make this socially acceptable, if economic growth is the aim.

The paper has only partially succeeded in answering which institutions are important due to the limitations of the data. However, the disaggregation and categorization of measures of institutions is a small step towards more practical policy advice. In that sense, within-country investigations on the 'real' institutions at play would be a considerable next step.

Hopefully, within the next decade, researcher will be able to tell a country's policy maker what the institutions really are and which of them are important to economic performance. It is time for research to make the next step.

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Appendices

Appendix 1: Variables, definition and source:

Dependent Variables

Lngni	log of PPP GNI/capita 2003 (Source: World Bank (2006), World Development Indicators)
Growth	lnGDP2003 (PPP per capita) - lnGDP1975 (PPP per capita) Penn World Tables, Mark 6.

Institutions

WB Doing Business	10 indicators of doing business, from the World Bank Doing Business (2005) dataset. (see Table 2 for definitions).
Regulation Index	(Reg_B): Reconstruction of Busse et al.s (2005) weighted average of 10 subcomponents of the WB Doing Business (2005) dataset.
Regulation Index - KV	(Reg_KV): Author's own unweighted average of 10 subcomponents of the World Bank Doing Business (2005) dataset.
Good Governance	Set of six good governance indicators, standardised values, range from -2.5 to +2.5. Six indicators: 1) Government Effectiveness (Ge), 2) Regulatory Quality (Rq), 3) Political Stability (Ps), 4) Rule of Law (Rl), 5) Voice and Accountability (Va), 6) Control of Corruption (Cc). See Table 1.
Polity IV	Set of three indicators: 1) Democracy Score (Demo): general openness of political institutions. Range = 0-10 (0 = low; 10 = high), 2) Autocracy Score (Auto): general closedness of political institutions. Range = 0-10 (0 = low; 10 = high), and 3) Combined Polity Score: Computed by subtracting Auto from Demo; includes "standardized codes" (i.e., -66, -77, -88) for special polity condition. Range = -10 to 10 (-10 = high autocracy; 10 = high democracy). And 'constraints on the executive in the 1980s' (Xcons80).
Freedom House	Political Rights (Pr) - 1 represents the most free and 7 the least free rating and Civil Liberty (Cl): - 1 represents the most free and 7 the least free rating. And Freedom of Press (Fpress) as classified by Freedom House.
Gender	(Gender): Dummy variable taking value 1 if women are expected to get education and work (outside the household), 0 otherwise. Own

	construction on basis of WB 2006 (WDI) data: A country where the girl to boy ratio in primary and secondary education in 2001 was higher than 95% got one point. If the country had less than 50 % female adults with HIV as % of population ages 15-49 with HIV, it got a second point and finally if women made up more than 40% of the total labor force, the country got a third point. If a country had 2 or more points, the dummy variables takes value 1.
EFW index	Economic Freedom of the World Index, Range 0-10, 10 highest. Fraser Institute. See text or website for further explanation. http://www.freetheworld.com/release.html

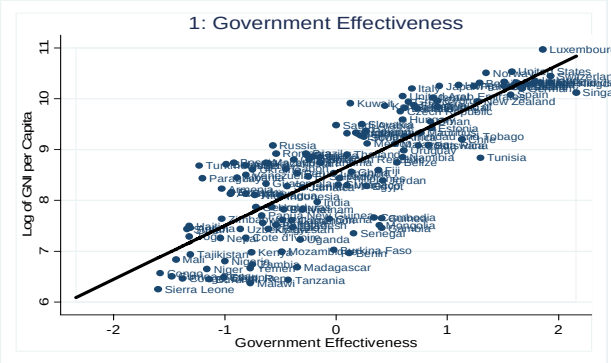
Other independent variables

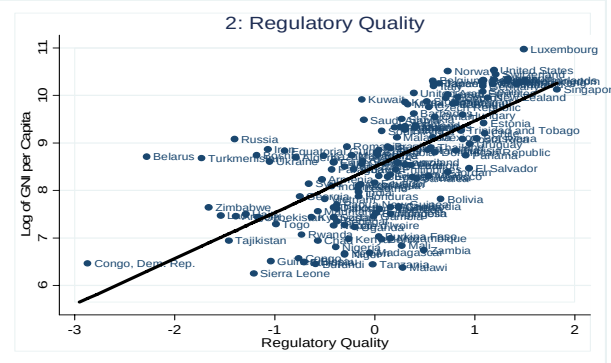
Openness	(lcopen): Natural logarithm of openness as given by the ratio of imports plus exports to PPP GDP, Penn World Tables, Mark 6.
Human Capital	Hinit): average years of schooling of the population aged 25 and over in initial year (1970 or 1975), Barro & Lee dataset:: http://post.economics.harvard.edu/faculty/barro/data.html.
Distance from equator	lat_abst): Absolute value of the latitude of the country measured as abs(latitude)/90. La Porta et al. (1999)
Regional Dummies	Dummy variable taking value 1 if country belongs to specified region, 0 otherwise. Regions: Europe, Western Offshoots, Latin America, Asia, North Africa, Sub-Saharan Africa.
Access to sea	(Access) Dummy variable taking value 1 if country is landlocked = 1, 0 otherwise

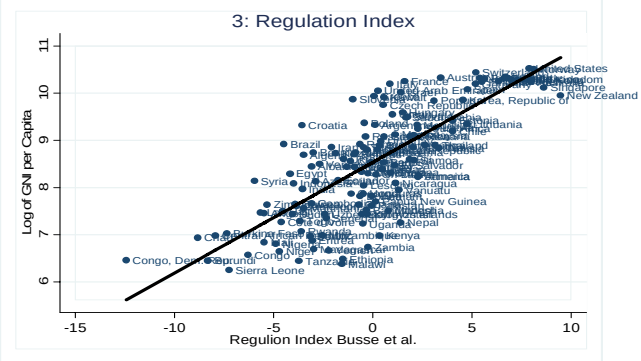
Instrumental Variables

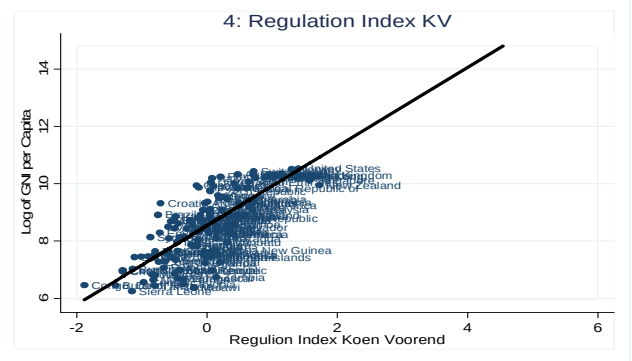
SMR	Settler Mortality Rate, Rodrik, Subramanian & Trebbi (2002)
Engfrac	Fraction of the population speaking English as the first language, Rodrik, Subramanian & Trebbi (2002)
Eurfrac	Fraction of the population speaking a West European language as the first language, Rodrik, Subramanian & Trebbi (2002)
Fittrade	LN Fitted trade (dep. Variable = nom.trade/GDP), Rodrik, Subramanian & Trebbi (2002)

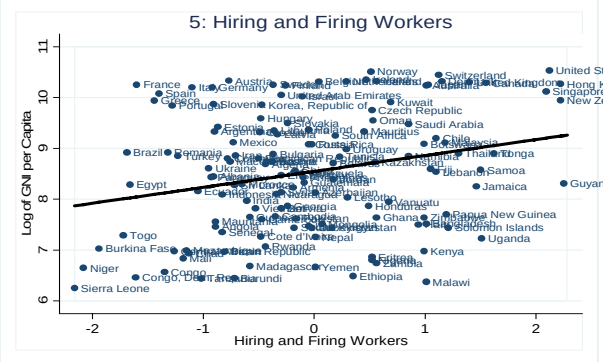
Appendix 2: Pair wise correlations between income and institutions

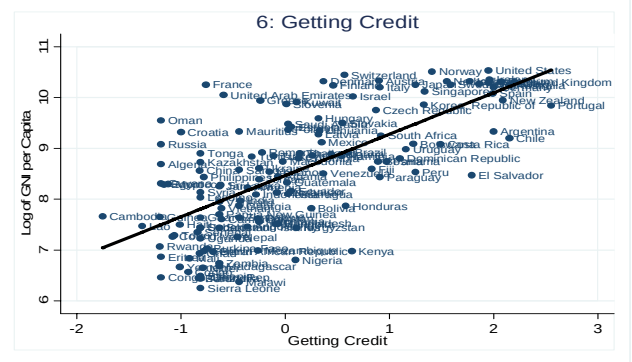


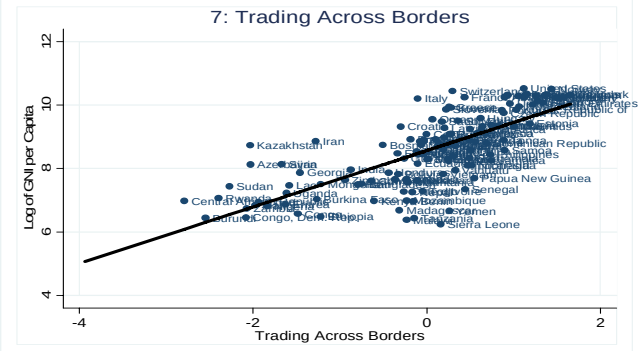


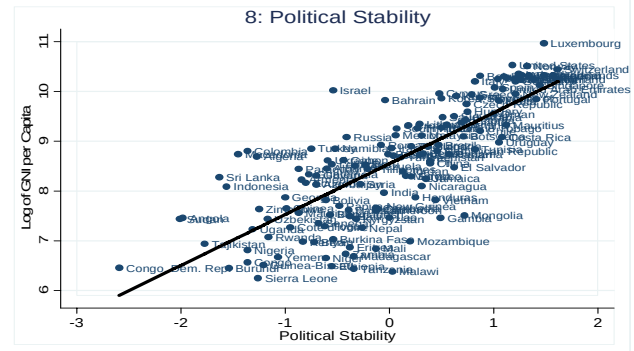


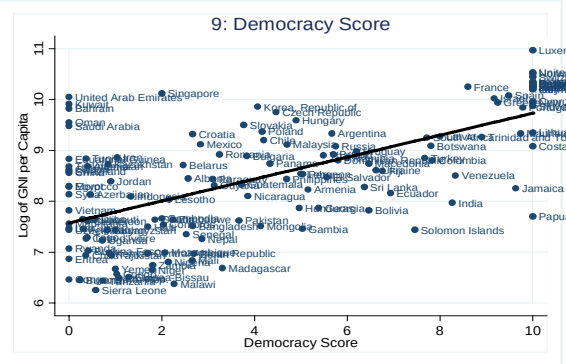


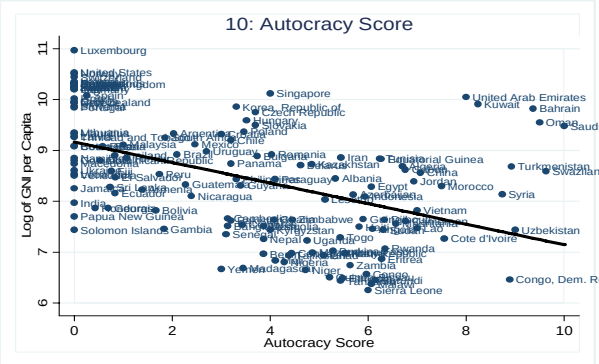


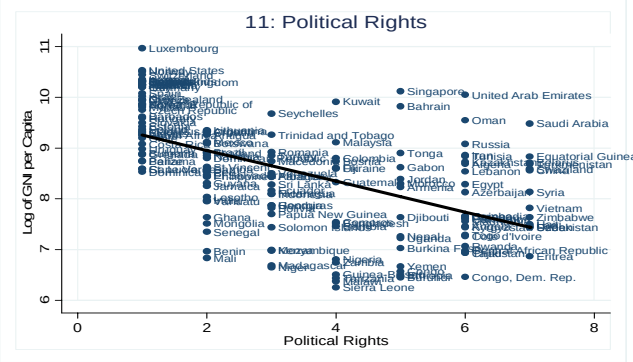


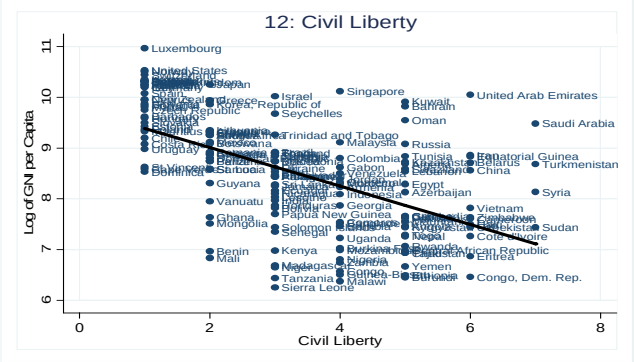


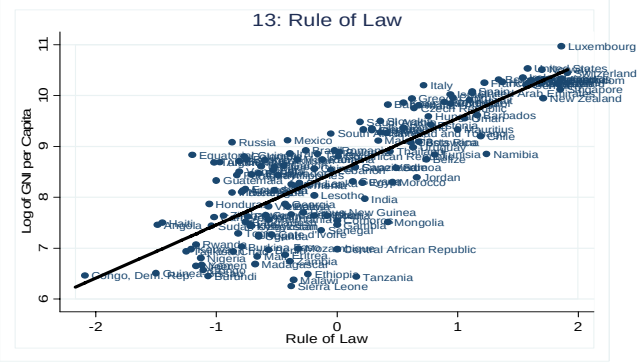


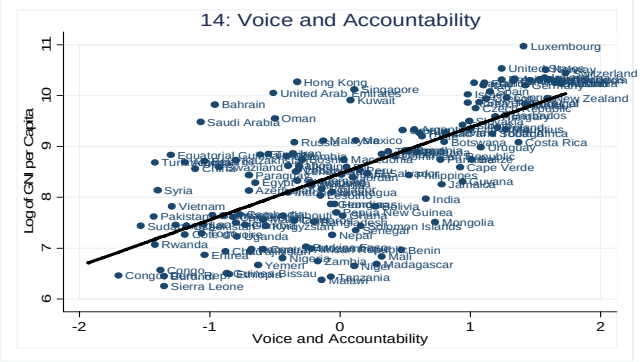

9: Democracy Score
Log of GNI per Capita
Democracy Score

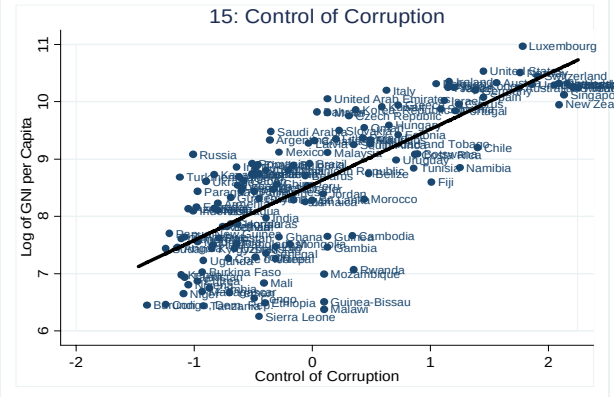

10: Autocracy Score
Log of GNI per Capita
Autocracy Score

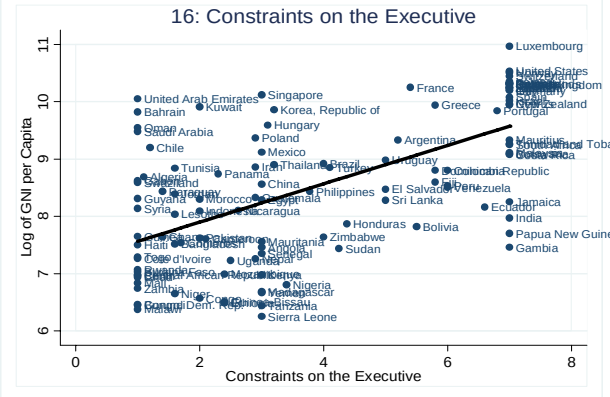

11: Political Rights
Log of GNI per Capita
Political Rights


12: Civil Liberty
Log of GNI per Capita
Civil Liberty


13: Rule of Law
Log of GNI per Capita
Rule of Law


14: Voice and Accountability
Log of GNI per Capita
Voice and Accountability


15: Control of Corruption
Log of GNI per Capita
Control of Corruption


16: Constraints on the Executive
Log of GNI per Capita
Constraints on the Executive

Appendix 3: Determining which institutions – Correlation Matrix Institutions

	GNI	***Economic***						***Political***					***Legal***					***Social***	
	lngni	**ge**	**rq**	**reg_b**	**reg_kv**	**hfw**	**tab**	ps	demo	auto	pr	cl	**gc**	**rl**	**va**	**cc**	**xcons80**	fpress	gender
lngni	1.00																		
Ge	0.82	*1.00*																	
Rq	0.65	*0.82*	*1.00*																
Reg_b	0.79	*0.81*	*0.71*	*1.00*															
Reg_kv	0.77	*0.80*	*0.70*	*0.88*	*1.00*														
HfW	0.25	*0.33*	*0.25*	*0.54*	*0.55*	*1.00*													
TaB	0.74	*0.70*	*0.65*	*0.74*	*0.64*	*0.23*	*1.00*												
Ps	0.77	**0.82**	**0.72**	**0.75**	**0.74**	**0.27**	**0.66**	*1.00*											
Demo	0.66	**0.64**	**0.61**	**0.68**	**0.67**	**0.19**	**0.60**	*0.55*	*1.00*										
Auto	-0.49	**-0.51**	**-0.55**	**-0.58**	**-0.58**	**-0.16**	**-0.53**	*-0.40*	*-0.92*	*1.00*									
Pr	-0.55	**-0.60**	**-0.67**	**-0.58**	**-0.54**	**-0.11**	**-0.58**	*-0.55*	*-0.80*	*0.76*	*1.00*								
Cl	-0.57	**-0.65**	**-0.69**	**-0.61**	**-0.57**	**-0.12**	**-0.59**	*-0.59*	*-0.78*	*0.74*	*0.95*	*1.00*							
Gc	0.69	**0.64**	**0.63**	**0.68**	**0.56**	**0.16**	**0.54**	**0.64**	**0.68**	**-0.60**	**-0.62**	**-0.62**	*1.00*						
Rl	0.82	**0.93**	**0.82**	**0.80**	**0.79**	**0.32**	**0.69**	**0.84**	**0.65**	**-0.48**	**-0.61**	**-0.65**	*0.63*	1.00					
Va	0.70	**0.76**	**0.76**	**0.70**	**0.68**	**0.16**	**0.66**	**0.70**	**0.83**	**-0.76**	**-0.91**	**-0.92**	*0.69*	0.76	1.00				
Cc	0.77	**0.90**	**0.75**	**0.79**	**0.78**	**0.30**	**0.67**	**0.78**	**0.67**	**-0.52**	**-0.62**	**-0.66**	*0.65*	0.89	0.75	1.00			
xcons80	0.62	**0.60**	**0.53**	**0.64**	**0.62**	**0.22**	**0.59**	**0.56**	**0.91**	**-0.86**	**-0.68**	**-0.66**	0.68	0.58	0.72	0.62	1.00		
Fpress	0.57	**0.67**	**0.57**	**0.61**	**0.57**	**0.31**	**0.53**	**0.59**	**0.73**	**-0.59**	**-0.74**	**-0.76**	**0.49**	**0.67**	**0.77**	**0.73**	**0.61**	1.00	
Gender	0.54	**0.41**	**0.43**	**0.44**	**0.35**	**-0.02**	**0.42**	**0.39**	**0.60**	**-0.56**	**-0.46**	**-0.43**	**0.51**	**0.44**	**0.56**	**0.41**	**0.64**	*0.36*	*1.00*

Appendix 4: Baseline Exploratory Regressions - Growth Regressions
(Dependent variable is average growth 1975-2003)

	Economic Institutions					*Legal Institutions*				
	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS
ge	0.374**									
	[0.097]									
rq		0.476**								
		[0.079]								
reg_b			0.075**							
			[0.025]							
hfw				0.029						
				[0.072]						
tab					0.176*					
					[0.083]					
gc						0.270**				
						[0.072]				
rl							0.326**			
							[0.096]			
va								0.216*		
								[0.095]		
cc									0.289**	
									[0.099]	
xcons80										0.002
										[0.033]
hinit	0.000	0.024	0.052	0.095*	0.031	0.073+	0.009	0.041	0.01	0.100*
	[0.044]	[0.032]	[0.044]	[0.045]	[0.042]	[0.040]	[0.041]	[0.041]	[0.048]	[0.045]
kinit	0.008	-0.004	0.001	0.001	0.000	-0.001	0.001	-0.001	0.006	0.000
	[0.008]	[0.006]	[0.008]	[0.009]	[0.008]	[0.008]	[0.007]	[0.007]	[0.008]	[0.008]
lcopen	0.173	0.146	-0.173	-0.083	-0.032	-0.196	0.212	0.156	0.302	-0.007
	[0.228]	[0.198]	[0.265]	[0.288]	[0.248]	[0.255]	[0.224]	[0.232]	[0.240]	[0.275]
lnpop03	-0.009	-0.031	-0.009	0.025	0.058	0.009	0.017	0.003	0.035	-0.021
	[0.061]	[0.052]	[0.068]	[0.072]	[0.063]	[0.065]	[0.059]	[0.061]	[0.065]	[0.067]
area	0.000	0.000*	0.000*	0.000+	0.000+	0.000*	0.000+	0.000*	0.000	0.000*
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
lat_abst	-1.328*	-0.880+	-1.166+	-0.58	-0.225	-0.903	-1.153*	-0.899+	-1.276*	-0.864
	[0.526]	[0.447]	[0.587]	[0.596]	[0.532]	[0.551]	[0.514]	[0.525]	[0.538]	[0.556]
access	-0.079	-0.042	-0.042	-0.084	0.156	0.046	-0.052	-0.079	-0.114	-0.086
	[0.137]	[0.115]	[0.136]	[0.146]	[0.145]	[0.134]	[0.129]	[0.134]	[0.139]	[0.143]
Constant	1.108	1.526	2.361	1.166	0.488	1.943	0.64	0.914	-0.057	1.773
	[1.738]	[1.486]	[1.892]	[2.045]	[1.738]	[1.781]	[1.665]	[1.730]	[1.821]	[1.904]
Reg. Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	89	93	87	87	84	86	94	94	89	91
R-squared	0.47	0.55	0.4	0.32	0.41	0.43	0.42	0.37	0.43	0.32

Standard errors in brackets + significant at 10%; * significant at 5%; ** significant at 1%

Growth Regressions (Dependent variable is average growth 1975-2003)

	Political Institutions						*Social Institutions*	
	-1	-2	-3	-4	-5	-6	-1	-2
	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
ps	0.246**							
	[0.082]							
demo		0.028						
		[0.027]						
auto			-0.045					
			[0.029]					
pol				0.019				
				[0.014]				
pr					-0.074+			
					[0.040]			
cl						-0.142**		
						[0.049]		
fpress							0.302+	
							[0.159]	
gender								0.418**
								[0.138]
hinit	0.051	0.080+	0.078+	0.077+	0.051	0.029	0.058	0.041
	[0.041]	[0.047]	[0.044]	[0.046]	[0.040]	[0.040]	[0.040]	[0.038]
kinit	0.004	0.000	0.001	0.001	0.003	0.004	0.001	-0.001
	[0.008]	[0.008]	[0.008]	[0.008]	[0.007]	[0.007]	[0.007]	[0.007]
lcopen	0.151	0.055	0.055	0.061	0.138	0.150	0.130	0.273
	[0.234]	[0.281]	[0.275]	[0.278]	[0.226]	[0.219]	[0.226]	[0.224]
lnpop03	0.002	-0.012	-0.020	-0.015	-0.038	-0.032	-0.011	-0.018
	[0.063]	[0.072]	[0.071]	[0.072]	[0.055]	[0.053]	[0.055]	[0.053]
area	0.000+	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
lat_abst	-1.508**	-0.822	-0.699	-0.765	-0.975+	-0.963+	-1.173*	-0.753
	[0.554]	[0.559]	[0.563]	[0.560]	[0.508]	[0.493]	[0.529]	[0.495]
access	-0.093	-0.058	-0.046	-0.050	-0.077	-0.073	-0.091	-0.206
	[0.138]	[0.142]	[0.141]	[0.142]	[0.135]	[0.129]	[0.134]	[0.131]
Constant	1.127	1.234	1.575	1.329	1.891	1.955	1.241	0.670
	[1.768]	[2.004]	[1.931]	[1.961]	[1.608]	[1.556]	[1.599]	[1.562]
Reg. Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	90	90	90	90	94	94	95	95
R-squared	0.43	0.33	0.34	0.34	0.36	0.4	0.36	0.41

Standard errors in brackets + significant at 10%; * significant at 5%; ** significant at 1%

Level Regressions (Dependent variable is ln GDP2003)

	Economic Institutions					***Legal Institutions***				
	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS
ge	0.478**									
	[0.098]									
rq		0.372**								
		[0.094]								
reg_b			0.082**							
			[0.026]							
hfw				0.06						
				[0.075]						
tab					0.135					
					[0.091]					
gc						0.355**				
						[0.071]				
rl							0.492**			
							[0.096]			
va								0.338**		
								[0.099]		
cc									0.368**	
									[0.103]	
xcons80										0.058
										[0.035]
hinit	0.127**	0.189**	0.186**	0.230**	0.192**	0.205**	0.122**	0.169**	0.138**	0.226**
	[0.045]	[0.039]	[0.045]	[0.046]	[0.046]	[0.039]	[0.041]	[0.042]	[0.050]	[0.048]
kinit	0.015+	0.002	0.007	0.007	0.000	0.005	0.006	0.004	0.013	0.005
	[0.008]	[0.008]	[0.008]	[0.009]	[0.009]	[0.008]	[0.007]	[0.008]	[0.008]	[0.008]
lcopen	-0.057	-0.084	-0.297	-0.227	-0.169	-0.347	-0.01	-0.096	0.105	-0.18
	[0.230]	[0.238]	[0.275]	[0.299]	[0.271]	[0.251]	[0.223]	[0.242]	[0.250]	[0.296]
lnpop03	0.001	-0.019	-0.004	0.028	0.06	0.013	0.031	0.011	0.053	0.007
	[0.062]	[0.063]	[0.071]	[0.075]	[0.070]	[0.064]	[0.059]	[0.063]	[0.067]	[0.072]
area	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000+	0.000	0.00
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
lat_abst	0.531	1.019+	0.439	1.030	1.539*	0.576	0.543	0.921+	0.590	1.184+
	[0.532]	[0.537]	[0.609]	[0.620]	[0.583]	[0.543]	[0.513]	[0.545]	[0.559]	[0.599]
access	-0.271+	-0.277*	-0.305*	-0.362*	-0.099	-0.182	-0.244+	-0.282*	-0.326*	-0.243
	[0.138]	[0.138]	[0.141]	[0.152]	[0.158]	[0.132]	[0.129]	[0.139]	[0.145]	[0.154]
Constant	8.157**	8.515**	9.322**	8.264**	7.489**	9.054**	7.716**	8.137**	6.738**	8.025**
	[1.758]	[1.786]	[1.963]	[2.128]	[1.904]	[1.755]	[1.663]	[1.797]	[1.891]	[2.050]
Reg. Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	89	93	87	87	84	86	94	94	89	91
R-squared	0.89	0.87	0.88	0.86	0.88	0.9	0.89	0.87	0.87	0.85

Standard errors in brackets + significant at 10%; * significant at 5%; ** significant at 1%

Level Regressions (Dependent variable is ln GDP2003)

	Political Institutions						***Social Institutions***	
	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS	(6) OLS	(1) OLS	(2) OLS
ps	0.328**							
	[0.084]							
demo		0.059*						
		[0.029]						
auto			-0.041					
			[0.032]					
pol				0.027+				
				[0.016]				
pr					-0.056			
					[0.045]			
cl						-0.070		
						[0.057]		
fpress							0.341+	
							[0.173]	
gender								0.205
								[0.158]
hinit	0.191**	0.208**	0.232**	0.219**	0.221**	0.218**	0.211**	0.223**
	[0.043]	[0.050]	[0.049]	[0.050]	[0.045]	[0.046]	[0.043]	[0.044]
kinit	0.009	0.005	0.006	0.006	0.008	0.008	0.007	0.006
	[0.008]	[0.009]	[0.009]	[0.009]	[0.008]	[0.008]	[0.008]	[0.008]
lcopen	-0.087	-0.093	-0.165	-0.126	-0.156	-0.155	-0.170	-0.098
	[0.240]	[0.301]	[0.303]	[0.302]	[0.253]	[0.253]	[0.248]	[0.257]
lnpop03	0.015	0.006	-0.010	-0.003	-0.053	-0.049	-0.032	-0.044
	[0.064]	[0.078]	[0.079]	[0.078]	[0.062]	[0.062]	[0.060]	[0.061]
area	0.000	0.000	0.000	0.000	0.000+	0.000	0.000	0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
lat_abst	0.265	1.202*	1.249*	1.244*	0.808	0.819	0.533	0.911
	[0.568]	[0.600]	[0.620]	[0.609]	[0.570]	[0.570]	[0.578]	[0.568]
access	-0.284*	-0.252	-0.274+	-0.260+	-0.325*	-0.335*	-0.324*	-0.401**
	[0.142]	[0.153]	[0.155]	[0.154]	[0.151]	[0.150]	[0.147]	[0.151]
Constant	8.202**	7.626**	8.535**	8.107**	9.507**	9.466**	9.094**	8.890**
	[1.814]	[2.153]	[2.129]	[2.133]	[1.804]	[1.802]	[1.750]	[1.792]
Reg. Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	90	90	90	90	94	94	95	95
R-squared	0.88	0.85	0.85	0.85	0.85	0.85	0.85	0.85

Standard errors in brackets + significant at 10%; * significant at 5%; ** significant at 1%

Appendix 5: World Bank Doing Business: Indices versus subcomponents

WBDB - Level Regression (Dep. Var. is lnGDP per capita in 2003)

	(1) IV	(2) IV	(3) IV	(4) IV	(5) IV	(6) IV	(7) IV	(8) IV	(9) IV	(10) IV	(11) IV	(12) IV
reg_b	0.138**	0.030										
	[0.046]	[0.055]										
reg_kv			0.691*	0.047								
			[0.276]	[0.307]								
hfw					0.194	-0.062						
					[0.183]	[0.149]						
gc							0.728**	0.471*				
							[0.221]	[0.202]				
tab									0.600*	0.051		
									[0.285]	[0.323]		
dwl											0.802+	0.176
											[0.409]	[0.285]
hinit		0.216**		0.233**		0.247**		0.170**		0.218**		0.192**
		[0.063]		[0.062]		[0.052]		[0.051]		[0.078]		[0.062]
kinit		0.006		0.006		0.006		0.007		-0.009		-0.002
		[0.012]		[0.012]		[0.013]		[0.011]		[0.017]		[0.014]
lcopen	-0.009	-0.274	-0.041	-0.288	-0.056	-0.193	0.321	-0.091	-0.258	-0.209	0.068	-0.224
	[0.420]	[0.382]	[0.450]	[0.393]	[0.586]	[0.458]	[0.430]	[0.357]	[0.547]	[0.375]	[0.668]	[0.396]
area	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
lat_abst	0.824	1.043	1.134	1.207	1.751+	1.398+	0.725	0.579	1.593+	1.637*	1.665	1.448*
	[0.784]	[0.759]	[0.795]	[0.748]	[0.903]	[0.754]	[0.831]	[0.685]	[0.859]	[0.665]	[1.078]	[0.701]
access	-0.359*	-0.311*	-0.379*	-0.319*	-0.531*	-0.298+	-0.139	-0.140	0.155	-0.123	-0.140	-0.199
	[0.171]	[0.148]	[0.181]	[0.151]	[0.216]	[0.165]	[0.201]	[0.156]	[0.308]	[0.280]	[0.283]	[0.160]
lnpop03	-0.036	0.051	-0.070	0.050	-0.091	0.070	0.012	0.047	-0.042	0.080	0.156	0.072
	[0.130]	[0.103]	[0.137]	[0.108]	[0.165]	[0.116]	[0.137]	[0.095]	[0.213]	[0.105]	[0.263]	[0.107]
Constant	9.619**	8.072**	10.247**	8.016**	10.797*	7.135*	7.389*	7.537**	10.172+	7.430**	5.849	7.680*
	[3.414]	[2.832]	[3.633]	[2.972]	[4.583]	[3.498]	[3.549]	[2.572]	[5.360]	[2.735]	[6.412]	[2.904]
Reg. Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	91	87	91	87	91	87	90	86	87	84	88	85
R-squared	0.81	0.87	0.79	0.86	0.69	0.86	0.80	0.89	0.77	0.87	0.58	0.86

Standard errors in brackets
+ significant at 10%; * significant at 5%; ** significant at 1%

WBDB - Level Regression (Dep. Var. is lnGDP per capita in 2003) – cont.

	(1) IV	(2) IV	(3) IV	(4) IV	(5) IV	(6) IV	(7) IV	(8) IV	(9) IV	(10) IV	(11) IV	(12) IV
sab	0.286	-0.177										
	[0.307]	[0.248]										
rp			0.528*	-0.066								
			[0.264]	[0.256]								
pi					0.130	-0.038						
					[0.192]	[0.142]						
pt							0.807	0.566				
							[0.511]	[0.579]				
ec									0.529*	-0.051		
									[0.226]	[0.280]		
cab											0.777*	0.212
											[0.360]	[0.218]
hinit		0.266**		0.250**		0.242**		0.266**		0.222**		0.201**
		[0.063]		[0.067]		[0.056]		[0.062]		[0.067]		[0.047]
kinit		0.003		0.007		0.011		0.004		0.001		0.003
		[0.014]		[0.017]		[0.012]		[0.019]		[0.013]		[0.011]
lcopen	0.181	-0.305	0.647	-0.329	0.043	-0.309	0.407	-0.345	0.177	-0.161	-0.386	-0.324
	[0.553]	[0.412]	[0.499]	[0.490]	[0.597]	[0.429]	[0.641]	[0.486]	[0.435]	[0.402]	[0.639]	[0.360]
area	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
lat_abst	2.024*	1.277+	1.513+	1.284+	2.213*	1.302+	0.914	-0.146	1.499+	1.577*	-0.537	0.853
	[0.871]	[0.694]	[0.826]	[0.705]	[0.935]	[0.732]	[1.401]	[1.642]	[0.795]	[0.720]	[1.678]	[0.987]
access	-0.409+	-0.353*	-0.429*	-0.319+	-0.411	-0.367+	-0.873*	-0.502	-0.394*	-0.202	-0.138	-0.174
	[0.235]	[0.164]	[0.198]	[0.161]	[0.284]	[0.185]	[0.368]	[0.344]	[0.185]	[0.164]	[0.267]	[0.159]
lnpop03	-0.054	0.046	0.156	0.049	-0.124	0.043	-0.040	0.001	-0.084	0.067	-0.237	0.017
	[0.175]	[0.112]	[0.174]	[0.125]	[0.167]	[0.117]	[0.209]	[0.187]	[0.137]	[0.107]	[0.186]	[0.097]
Constant	8.799+	8.149**	3.817	8.083*	10.569*	8.016*	8.213	9.395*	9.370*	7.279*	14.858**	8.950**
	[4.571]	[3.049]	[4.377]	[3.374]	[4.621]	[3.285]	[5.273]	[4.440]	[3.566]	[2.793]	[5.353]	[2.783]
Reg. Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	91	87	90	86	86	83	82	78	88	84	88	84
R-squared	0.66	0.85	0.75	0.85	0.60	0.84	0.58	0.80	0.79	0.87	0.58	0.88

Standard errors in brackets
+ significant at 10%; * significant at 5%; ** significant at 1%

WBDB - Dep. Var. Average growth 1975-2003

	(1) IV	(2) IV	(3) IV	(4) IV	(5) IV	(6) IV	(7) IV	(8) IV	(9) IV	(10) IV	(11) IV	(12) IV
reg_b	0.070+	0.062										
	[0.037]	[0.052]										
reg_kv			0.393+	0.309								
			[0.208]	[0.282]								
hfw					0.196	0.128						
					[0.127]	[0.143]						
gc							0.188	0.145				
							[0.165]	[0.202]				
tab									0.289	0.287		
									[0.196]	[0.294]		
dwl											0.202	0.008
											[0.251]	[0.255]
hinit		0.068		0.074		0.098+		0.090+		0.030		0.091
		[0.059]		[0.057]		[0.050]		[0.051]		[0.071]		[0.056]
kinit		-0.004		-0.002		-0.001		-0.001		-0.008		-0.008
		[0.012]		[0.011]		[0.012]		[0.011]		[0.016]		[0.013]
lcopen	0.068	-0.164	0.035	-0.212	-0.096	-0.373	0.195	-0.121	-0.061	-0.145	0.132	-0.114
	[0.339]	[0.362]	[0.339]	[0.361]	[0.406]	[0.440]	[0.322]	[0.358]	[0.377]	[0.341]	[0.411]	[0.356]
area	0.000*	0.000*	0.000*	0.000*	0.000	0.000*	0.000+	0.000*	0.000+	0.000*	0.000	0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
lat_abst	-0.771	-1.107	-0.678	-1.010	-0.507	-0.940	-0.377	-0.753	-0.242	-0.362	-0.124	-0.410
	[0.633]	[0.718]	[0.600]	[0.688]	[0.625]	[0.725]	[0.622]	[0.685]	[0.592]	[0.605]	[0.662]	[0.629]
access	-0.070	-0.041	-0.074	-0.047	-0.181	-0.113	-0.043	-0.009	0.229	0.250	0.071	0.059
	[0.138]	[0.140]	[0.136]	[0.139]	[0.149]	[0.158]	[0.151]	[0.156]	[0.212]	[0.255]	[0.174]	[0.143]
lnpop03	0.090	0.019	0.074	0.004	0.056	-0.011	0.086	0.022	0.086	0.063	0.136	0.036
	[0.105]	[0.098]	[0.104]	[0.099]	[0.114]	[0.112]	[0.102]	[0.095]	[0.147]	[0.096]	[0.162]	[0.096]
Constant	-0.019	1.901	0.364	2.263	1.382	3.163	-0.584	1.393	0.221	1.005	-1.214	1.262
	[2.755]	[2.679]	[2.742]	[2.734]	[3.174]	[3.364]	[2.659]	[2.574]	[3.693]	[2.487]	[3.939]	[2.606]
Reg. Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yesy	Yes	Yes
Observations	91	87	91	87	91	87	90	86	87	84	88	85
R-squared	0.33	0.38	0.34	0.38	0.20	0.29	0.36	0.40	0.36	0.37	0.09	0.33

Standard errors in brackets
+ significant at 10%; * significant at 5%; ** significant at 1%

WBDB - Dep. Var. Average growth 1975-2003 - continued

	(1) IV	(2) IV	(3) IV	(4) IV	(5) IV	(6) IV	(7) IV	(8) IV	(9) IV	(10) IV	(11) IV	(12) IV
Sab	0.333	0.183										
	[0.220]	[0.240]										
rp			0.393	0.191								
			[0.251]	[0.240]								
pi					0.208+	0.149						
					[0.116]	[0.130]						
pt							0.084	-0.056				
							[0.295]	[0.469]				
ec									0.148	0.251		
									[0.169]	[0.279]		
cab											0.216	0.160
											[0.191]	[0.207]
hinit		0.086		0.083		0.094+		0.100*		0.049		0.081+
		[0.061]		[0.063]		[0.051]		[0.050]		[0.067]		[0.044]
kinit		0.002		-0.010		0.002		-0.004		-0.011		-0.006
		[0.013]		[0.016]		[0.011]		[0.016]		[0.013]		[0.011]
lcopen	0.138	-0.164	0.469	0.033	-0.048	-0.350	0.201	-0.149	0.144	0.020	-0.033	-0.185
	[0.397]	[0.399]	[0.475]	[0.460]	[0.362]	[0.392]	[0.371]	[0.394]	[0.326]	[0.401]	[0.339]	[0.342]
area	0.000+	0.000+	0.000	0.000*	0.000	0.000+	0.000+	0.000+	0.000	0.000*	0.000+	0.000*
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
lat_abst	-0.252	-0.676	-0.649	-0.752	-0.090	-0.686	0.094	-0.110	-0.149	-0.653	-0.630	-0.883
	[0.626]	[0.672]	[0.787]	[0.661]	[0.567]	[0.670]	[0.810]	[1.330]	[0.596]	[0.718]	[0.890]	[0.938]
access	-0.047	-0.032	-0.065	-0.078	-0.004	0.018	-0.149	-0.021	-0.008	-0.009	0.038	0.078
	[0.169]	[0.158]	[0.189]	[0.151]	[0.172]	[0.169]	[0.212]	[0.279]	[0.139]	[0.164]	[0.142]	[0.151]
lnpop03	0.097	0.031	0.226	0.074	0.019	-0.026	0.081	0.045	0.079	0.012	0.011	0.005
	[0.126]	[0.108]	[0.165]	[0.117]	[0.101]	[0.107]	[0.121]	[0.151]	[0.103]	[0.107]	[0.099]	[0.093]
Constant	-0.701	1.324	-3.793	0.297	1.426	3.025	-0.632	0.988	-0.335	1.345	1.638	2.152
	[3.286]	[2.955]	[4.166]	[3.165]	[2.800]	[3.004]	[3.048]	[3.597]	[2.674]	[2.786]	[2.837]	[2.647]
Reg. Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yesy
Observations	91	87	90	86	86	83	82	78	88	84	88	84
R-squared	0.05	0.25		0.31	0.28	0.35	0.23	0.29	0.29	0.25	0.33	0.39

Standard errors in brackets
+ significant at 10%; * significant at 5%; ** significant at 1%

Appendix 6 – Regressing human capital on institutions – Dep. Var. is Initial year human capital

	Economic Institutions– Dependent Variable is initial year human capital									
	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS	(1) IV	(2) IV	(3) IV	(4) IV	(5) IV
ge	1.057**					1.858**				
	[0.228]					[0.605]				
rq		0.749**					2.866**			
		[0.267]					[1.071]			
reg_b			0.207**					0.356*		
			[0.063]					[0.147]		
hfw				0.384*					0.791	
				[0.189]					[0.526]	
tab					0.634**					1.761*
					[0.233]					[0.849]
kinit	0.072**	0.047*	0.057**	0.065**	0.062**	0.114**	0.046	0.103*	0.139**	0.114
	[0.019]	[0.022]	[0.021]	[0.022]	[0.023]	[0.031]	[0.040]	[0.046]	[0.051]	[0.069]
lcopen	1.447*	1.395*	1.542*	1.655*	1.705*	0.121	-0.192	0.562	-0.482	0.315
	[0.585]	[0.689]	[0.703]	[0.750]	[0.702]	[1.088]	[1.543]	[1.243]	[1.754]	[1.332]
lnpop03	0.273+	0.131	0.151	0.217	0.263	-0.307	-0.679	-0.467	-0.703	-0.13
	[0.161]	[0.186]	[0.187]	[0.194]	[0.185]	[0.326]	[0.491]	[0.380]	[0.482]	[0.399]
area	-0.000*	0.000	0.000	0.000	-0.00+	-0.000*	0.000	0.000	0.000	0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
lat_abst	2.423+	4.362**	2.522	4.001*	3.961*	-1.074	1.225	-0.552	0.915	1.282
	[1.379]	[1.516]	[1.585]	[1.534]	[1.498]	[2.217]	[2.632]	[2.513]	[2.816]	[2.315]
access	-0.306	-0.46	-0.46	-0.742+	-0.061	-0.088	-0.095	-0.419	-0.973	0.605
	[0.365]	[0.408]	[0.368]	[0.384]	[0.428]	[0.539]	[0.642]	[0.496]	[0.594]	[0.931]
Constant	-8.201+	-5.46	-5.772	-7.303	-8.933+	6.177	13.598	7.955	15.938	1.824
	[4.556]	[5.272]	[5.151]	[5.445]	[5.024]	[9.187]	[13.446]	[9.982]	[13.983]	[10.026]
Reg. Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	89	93	87	87	84	89	93	87	87	84
R-squared	0.85	0.78	0.83	0.82	0.83	0.74	0.51	0.72	0.6	0.68

Standard errors in brackets,+ significant at 10%; * significant at 5%; ** significant at 1%

	Political Institutions – Dependent Variable is initial year human capital											
	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS	(6) OLS	(1) IV	(2) IV	(3) IV	(4) IV	(5) IV	(6) IV
ps	0.526*						1.487+					
	[0.225]						[0.779]					
demo		0.252**						0.300*				
		[0.061]						[0.128]				
auto			-0.218**						-0.381*			
			[0.073]						[0.171]			
pol				0.125**						0.170*		
				[0.034]						[0.073]		
pr					-0.424**						-0.929**	
					[0.105]						[0.348]	
cl						-0.578**						-1.267**
						[0.126]						[0.406]
kinit	0.073**	0.055**	0.064**	0.059**	0.058**	0.058**	0.121**	0.094**	0.101**	0.097**	0.048	0.054+
	[0.021]	[0.019]	[0.020]	[0.019]	[0.020]	[0.020]	[0.042]	[0.033]	[0.034]	[0.033]	[0.033]	[0.031]
lcopen	1.719**	2.282**	2.205**	2.247**	1.199+	1.160+	0.396	1.178	1.231	1.212	1.853	2.089+
	[0.632]	[0.655]	[0.687]	[0.669]	[0.636]	[0.620]	[1.278]	[1.365]	[1.420]	[1.381]	[1.158]	[1.181]
lnpop03	0.359*	0.229	0.176	0.200	0.018	0.048	-0.269	-0.553	-0.581	-0.562	0.082	0.154
	[0.173]	[0.181]	[0.190]	[0.184]	[0.159]	[0.155]	[0.395]	[0.480]	[0.493]	[0.483]	[0.364]	[0.369]
area	-0.000*	0.000	0.000	0.000	0.000	0.000	-0.000*	0.000	0.000	0.000	0.000	0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
lat_abst	3.109*	4.169**	4.900**	4.561**	3.416*	3.321*	-1.687	2.681	3.905+	3.227+	2.538	2.630
	[1.531]	[1.322]	[1.388]	[1.346]	[1.412]	[1.376]	[3.128]	[1.826]	[1.986]	[1.866]	[1.737]	[1.764]
access	-0.531	-0.265	-0.374	-0.302	-0.304	-0.334	-0.525	-0.375	-0.340	-0.354	0.129	0.071
	[0.388]	[0.358]	[0.374]	[0.365]	[0.386]	[0.373]	[0.615]	[0.492]	[0.517]	[0.500]	[0.532]	[0.506]
Constant	-10.222*	-12.210*	-9.249+	-10.696*	-1.483	-1.521	5.500	4.236	6.571	5.154	-3.898	-5.670
	[4.878]	[4.851]	[5.043]	[4.916]	[4.633]	[4.508]	[10.896]	[12.757]	[12.858]	[12.725]	[9.555]	[9.737]
Reg. Dum	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	90	90	90	90	94	94	90	90	90	90	94	94
R-squared	0.82	0.84	0.82	0.83	0.80	0.81	0.65	0.75	0.73	0.74	0.73	0.72

Standard errors in brackets,+ significant at 10%; * significant at 5%; ** significant at 1%

	Legal Institutions– Dependent Variable is initial year human capital									
	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS	(1) IV	(2) IV	(3) IV	(4) IV	(5) IV
gc	0.296					1.472+				
	[0.217]					[0.836]				
rl		1.259**					2.132**			
		[0.225]					[0.568]			
va			1.081**					1.823**		
			[0.237]					[0.628]		
cc				1.121**					1.604**	
				[0.205]					[0.511]	
xcons80					0.250**					0.442*
					[0.080]					[0.180]
kinit	0.063**	0.043*	0.041*	0.066**	0.058**	0.126*	0.062*	0.037	0.108**	0.082**
	[0.022]	[0.019]	[0.020]	[0.018]	[0.019]	[0.057]	[0.028]	[0.030]	[0.032]	[0.028]
lcopen	1.949*	1.246*	1.122+	1.849**	2.114**	1.020	0.106	1.029	1.152	1.451
	[0.738]	[0.604]	[0.641]	[0.549]	[0.679]	[1.644]	[1.110]	[0.992]	[1.005]	[1.147]
lnpop03	0.268	0.205	0.172	0.417**	0.285	-0.518	-0.309	0.030	0.002	-0.215
	[0.195]	[0.162]	[0.170]	[0.152]	[0.172]	[0.505]	[0.338]	[0.322]	[0.318]	[0.355]
area	-0.000+	0.000	0.000	-0.000*	-0.000*	0.000	0.000	0.000	-0.000*	-0.000*
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
lat_abst	4.355**	2.107	3.343*	1.980	4.385**	0.017	-0.912	1.755	-0.476	2.986
	[1.592]	[1.406]	[1.424]	[1.303]	[1.369]	[3.307]	[2.200]	[1.790]	[2.001]	[1.796]
access	-0.484	-0.216	-0.332	-0.391	-0.247	-0.026	-0.007	-0.193	-0.524	-0.063
	[0.404]	[0.357]	[0.374]	[0.340]	[0.375]	[0.755]	[0.475]	[0.434]	[0.476]	[0.497]
Constant	-9.883+	-5.654	-5.001	-11.85**	-11.977*	5.935	7.144	-2.380	-2.831	-2.394
	[5.286]	[4.574]	[4.829]	[4.255]	[4.805]	[13.115]	[9.381]	[8.612]	[8.668]	[9.846]
Reg. Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	86	94	94	89	91	86	94	94	89	91
R-squared	0.81	0.83	0.81	0.86	0.83	0.5	0.74	0.78	0.77	0.76

Standard errors in brackets,+ significant at 10%; * significant at 5%; ** significant at 1%

	Social Institutions - Dependent Variable is initial year human capital			
	(1) OLS	(2) OLS	(1) IV	(2) IV
fpress	1.657**		3.608**	
	[0.416]		[1.108]	
gender		1.484**		4.944**
		[0.375]		[1.711]
kinit	0.054**	0.045*	0.064*	0.013
	[0.020]	[0.021]	[0.029]	[0.043]
lcopen	1.126+	1.642*	0.155	2.395+
	[0.640]	[0.641]	[1.105]	[1.426]
lnpop03	0.138	0.086	-0.119	-0.108
	[0.159]	[0.158]	[0.321]	[0.393]
area	0.000	-0.000+	0.000	-0.000*
	[0.000]	[0.000]	[0.000]	[0.000]
lat_abst	2.234	4.257**	-0.687	3.193
	[1.502]	[1.395]	[2.229]	[2.175]
access	-0.404	-0.875*	-0.033	-1.310*
	[0.383]	[0.379]	[0.503]	[0.598]
Constant	-4.300	-6.099	3.236	-7.372
	[4.586]	[4.610]	[8.796]	[11.376]
Reg. Dummy	Yes	Yes	Yes	Yes
Observations	95	95	95	95
R-squared	0.8	0.8	0.7	0.55

Standard errors in brackets,+ significant at 10%; * significant at 5%; ** significant at 1%