

MACROECONOMICS
Bachelor Thesis

INSTITUTIONAL QUALITY AND ECONOMIC GROWTH
- A Comparison across Development Stages

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October 2010

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ABSTRACT

The purpose of this thesis is to examine and compare the effect of institutional quality on the economic growth rate in developed and developing countries. To do this panel data was examined using a pooled regression model and a fixed effects model. Three institutional variables from Freedom House, the International Country Risk Guide and the Database of Political Institutions were used. The results indicate that institutional quality has a significant and positive relationship with growth in both developed and developing countries. While institutional indicators overall performed similarly regardless of development status, civil liberties was deemed more adapt at promoting growth in developing countries, whereas the number of veto players played a greater role in developed countries.

Keywords: institutions, economic growth, development, quality of government, civil liberties.

Acknowledgements

This paper would not have been written without the continuous support and encouragement from Sara Lundqvist. I thank her and Naciye Serkerici not only for their friendship but for giving me a great place to work these past few months.

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1. INTRODUCTION

Even changes in growth rates that are small in size will lead to large changes in GDP levels over time. An economy that moves from a growth rate of two percent to a growth rate of four percent will come to double its income level twice as quickly as it otherwise would have. Over a period of 30 years this has very real effects on the living standard of the country in question. High economic growth rates are therefore of utmost importance to the economic development of today's least developed countries.

This leads us to the question of how growth arises and what policies can be used to promote economic growth. New growth theory, spearheaded by Romer, emphasizes the importance of investment in human capital and technology, as well as real capital, for the continued growth of the economy. But what accounts for differences in the amount and kind of investments that are made in different countries and at different periods of time? The answer lies in the institutional framework under which the economy operates.

This thesis will examine what impact institutional quality has on economic growth by examining changes over time as well as differences across countries. The main focus will be on to what extent institutional quality affects growth at different stages of development, and if different institutions are more or less adept at promoting economic growth at different levels of development. The purpose is to pinpoint which sections of the institutional environment that have the greatest importance for development.

2. THEORETICAL FRAMEWORK

2.1. Institutions

In order to examine what effect institutional quality has on economic growth an important step is to define what is meant by the rather vague term "institution." Although the concept of institutions is well established, even in recent economic research the term has been used with several different meanings. For example, Nelson and Sampat devise a definition of institutions by considering them to be a form of "social technology," somewhat similar in its effect on growth to that of regular technology (1999). Hodgson on the other hand uses a broad definition of institutions that considers organizations to be institutions (1998). However, the most frequently used definition of the past two decades goes back to Douglass North who established the idea of institutions as the rules of the economic "game" (North, 1991). From this point of view wherein the institutions are rules, the

organizations are *not* institutions but rather the players affected by the confines imposed by the institutional environment. This thesis will exclusively use the Northian definition of institutions.

Two aspects of institutions will be focused on. The primary concept is that by shaping the incentives and constraints of those operating in the economy, the institutional environment affects the behavior of individual actors on the market. This is done through formal and informal rules and norms. Moreover, institutions serve an important function in the economy; they reduce the uncertainty inherent in economic interactions by making information more readily available and the behavior of other actors more predictable. Good institutions result in that the fees an actor is likely to incur when engaging in local or cross-border trade are more predictable and smaller in size than they would be in an economy with lesser institutional quality. These concepts will be examined in two sections following.

2.1.1. Formal and Informal Institutions

Formal institutions include constitutions, laws, property rights etc. These tend to create incentives and constraints in a straight forward manner that is relatively easy to grasp. The impact of informal rules and norms on economic behavior is not necessarily as clear. *Informal institutions* are comprised of a wide variety of social constructs. These can be in the form of sanctions, taboos, customs, traditions or codes of conduct. (North, 1991).

In layman terms the informal constraints of the economy could be described as the culture or habits of the population. Formal and informal institutions affect the economy through similar channels: by forming a structure of incentives and constraints that reward and punish the actors in the economy for different choices. What differs between them are the channels through which formal and informal institutions enforce and reward behavior. Formal institutions can punish unwanted behavior for example with prison terms or monetary fines. Informal institutions on the other hand work through peer pressure and reputation building. "Punishment" can be in the form of exclusion from the group, other members of the community refusing to do business with the member being punished or simply spreading gossip about him. While in an individualistic setting this may not seem so harsh of a punishment, in a collectivistic culture this can serve as a strong deterrent against unwanted behaviors. The institutional framework is important in the sense that it determines *what* behavior is wanted or unwanted and through this the constraints and incentives that the "players" are subject to.

To use a specific example of how informal institutions can enable economic transactions, let's consider the Maghribi traders. Greif (1993) described how the Maghribi traders managed to engage

in trade over long distances despite a lack of strong formal institutions supporting long distance contracts. They did this by relying on shared social and religious values in a close-knit and collectivistic but geographically spread out community of Jewish merchants. While at this place and time no formal framework enforcing long distance economic contacts, the Maghrabi were able to ensure that everyone held up their end of the bargain. They did this by using their own social networks to spread information about other traders. This is a good example of how informal norms can serve the same function as formal rules.

However, informal ties are for a variety of reasons not a perfect substitute for formal institutions and enforcement. For example, costs for monitoring are higher when every actor on the market has to know a significant amount about those they chose to do business with in order to ensure that the other party will not renege on the contract. Not least in terms of the time a merchant has to spend making smaller transactions and personally familiarizing himself with the buyer or seller to build enough trust for larger transactions. Furthermore, like the example with the Maghrabi suggests, long distance trade can work in absence of formal rules, but only when ties *within* a group are very strong. On their own, such informal institutions do nothing to encourage trade between this particular community and those *outside* of the group. Thus there are limits to how much informal rules can encourage trade in the absence of complementary formal rules.

2.1.2. Transaction Costs

While formal and informal institutions create the incentives and constraints for behavior in the economy, transaction costs is the mechanism through which these affect economic behavior. Neo-classic economists assume that no transaction costs exist and that all information is perfectly available to all participants in the economic “game.” In reality information is neither symmetrical nor readily available and transaction costs do exist. Coase (1960) challenged the previously widely held notion that the differences between reality and neo-classical theory was of negligible importance. That is, whether or not the simplifying assumptions in neo-classic economic theory affects the model’s accuracy and applicability on real life conditions. For example, even in an ideal neo-classic laissez-faire economy a monetary system, whether or not it is state enforced, must exist. The way this monetary system is constructed will affect how much and what kinds of transactions take place on the market. Coase argues that these effects cannot merely be disregarded.

North (1994) was the first to create a theory merging the concepts of institutions, transaction costs and neo-classical economics. In this view, transaction costs are made up of such things as gathering information about competitive prices in advance of the transaction, costs incurred while

establishing the contract and the cost of enforcing the contract in the event that the other party does not hold up their end of the bargain. These costs affect the profitability of engaging in an economic transaction. More specifically, it affects whether a producer will choose to produce a certain good, another kind of good or no good at all. Institutions affect economic behavior through the impact they have on the size of transaction costs, and *good* institutions reduce the transaction costs per exchange.

Coase (1960) pointed out that transaction costs are a part of all economies, whether *laissez-faire* or not. However, as an economy evolves from merely trading one good for another on the local market to also including for example long-distance trade and transactions where the ordering and delivery of the good do not coincide, transactions grow more complex. Consequently, conflicts pertaining to the terms of the transaction are more likely to arise. These can no longer be efficiently regulated solely through social networks, kinship or religious common ground. Furthermore, increased complexity of transactions often coincide with increasingly complex methods of production – for example a greater degree of specialization – and more complex investment, for example in sunk assets that require a greater initial investment and longer span investment (North, 1990).

Some issues that arise as transactions become more complex concern the agent and principal problem and negotiation and enforcement of contracts with trading parties from different geographic regions or countries. Institutions that can help alleviate these problems are, for example, the establishment of standardized measuring units and monetary systems, which enable negotiation. Furthermore, technical advances such as cheaper ability to print information about what units are used, how things are measured and what formal laws exist have helped make information more readily available (North, 1991).

A primitive economy will either need to expand the institutional framework and thereby address these issues, or the economic activity will stagnate at a level with less advanced forms of transactions. This evolution from a basic institutional environment to more complex institutions are not a given; primitive economic markets are still the norm in parts of the world today.

Yet another thing to keep in mind is that institutions are not in and of themselves “good”. A greater abundance of institutions or more strongly enforced institutions are not the same as better institutions. Formal and informal rules and norms can discourage actions that would be economically beneficial and encourage economically inefficient behaviors among the players of the economy (Nelson & Sampat, 1999). To use a concrete example import-reducing laws are often strongly enforced but tend to hinder rather than help growth by increasing the cost of cross-country transactions. Such laws prevail because they are beneficial for the government, for whom it generates income, and the local producers of goods that would otherwise be imported. The fact that they are strongly enforced does not in and of itself make them high quality institutions.

The basic mechanisms through which institutions affect growth have now been established. Institutions create the rules of the game, which in turn affects the size of transaction costs. However, in order for institutions to be a useful tool for development, their ability to change over time must also be examined.

2.1.3. Institutional Change

The purpose of this thesis is to examine the effect of institutions on economic growth, and through this find out what paths are more likely to lead towards development. With this in mind it is also important to consider how institutions arise, how institutional change occurs and what limitations there are to institutional change.

Arguably, one of the most important institutions when it comes to growth is the distribution and enforcement of property rights. Demsetz (1967) has a theory on how these arise; he argues that changes in circumstance can give rise to external effects. Property rights arise as the response to the need to internalize these externalities, which often occur due to changes in the relative price of a good or new technique becoming available. In turn, this makes the desire for clearly defined property rights a more pressing issue for concerned parties on the market. To exemplify, the following happened in what is now Quebec when the Native Americans there started to trade among each other in furs. Initially, land and hunting had been freely available to all, but as hunting for fur rather than sustenance became the norm, game became overhunted – a negative external effect. A price being established for furs led to a desire for an allocation of rights to land and hunting rights, which in turn internalized the externality from overhunting. As the rights over land and animals were divided among them, the cost of overhunting befell the person benefiting from the hunting. Because of this elimination of external effects, hunting game for fur was limited to an extent that was sustainable in the long term. The alternative to property rights arising would have been the collapse of the fur trade due to overhunting (Demsetz, 1967). Today, a similar example can probably be made with regards to the internet and the effect of this technical advance on intellectual property rights.

It has now been established how institutions can arise. But what can cause existing institutions to change? Traditional theories on institutional change focus on exogenous changes and top-down initiatives by those in power as the reason for changes in the institutional environment. Grief (1998) however argues that institutional change can also be induced bottom-up and occur endogenously. That is, changes in formal institutions can come about as a result to changes in informal norms and rules that have already taken root in the culture. Institutions can be self-enforcing, self-reinforcing and self-undermining. In the latter case the institution will collapse and make way for new

institutions. The gist of this is that, although they *can* be the cause of institutional changes, top-down initiatives are not necessary to stimulate institutional change. To exemplify, private companies arose in communist China despite the fact that they were not legally allowed or encouraged by the government. Eventually the formal laws were adjusted to allow private enterprising, but the changes in formal institutions were precipitated by the previous change in the informal attitude toward private entrepreneurship, not the other way around.

But if it is known that institutional quality is important for growth and that institutional change is possible, why do countries not simply create perfect institutions? Essentially this is due to two things: limits on rationality and path dependency. Poor institutions prevail because of increasing returns to scale in transaction costs, meaning that individual actors are unable to incrementally choose a more optimal choice since a change in system comes with high initial costs (North, 1990). To understand this concept, consider the present day choice of using the metric system versus the imperial system. Few can argue that the imperial system with its inches, feet and pounds makes more sense or is easier to learn than the metric system. But regardless of the metric system being the rational choice of measurement, the imperial system is still preferred in many parts of the world. The cause of this is that changing an existing and deeply ingrained institution is very costly. For example, when passing a new law the actual act of getting the law accepted is only the start of the cost – in order for the law to become effective those that are supposed to adhere to it must be educated about it and the law needs to be enforced. These expenses increase significantly if the law introduced is not compatible with the existing informal norms and rules of the society.

Much economic theory is based on the idea of rational individuals making choices to maximize their benefits. In real life even the most rational of human beings does not have perfect information available about all possible options and their outcomes. This limits the ability to make completely rational choices. Additionally, the access to information is also limited by the fact that new situations constantly arise. To consider game theory, while the economy is a repeat game, the exact same game is not played over and over again (Simon, 1955). An example of this is how every few decades a financial crisis of considerable magnitude occurs. While this would seem to make the crisis predictable and thereby avoidable, the information on why the crisis occurs is not available a priori. In reality, while rational individuals may incorporate what they have learnt from the previous crisis and behave accordingly, the cause of the next crisis is not available to use until after it has occurred. Therefore the cycle continues on.

A further example of how this is relevant for developing countries and institutional change concerns the fact that countries that are struggling to develop today are doing so under conditions diametrically different from those facing today's developed nations as they were in the process of developing. In particular, they have to compete in an increasingly globalized marketplace with

economies that are already considerably more developed. This could affect whether or not the same institutions that contributed to the development of the western world is likely to have the same effect in developing countries in the present.

La Porta et al. (1998) performed a study comparing the success of different legal systems. They did this by separating different legal systems into different families based on their origin, such as the English common law or French or German civil law. They found that some of these systems were better than other at promoting growth. The need for sensitivity with regard to this was however argued for by Berkowitz et al. (2003) who found that the success of legal institutions is less dependent on the particular legal family than it is on how suited the recipient country was to that legal family. They call this the “transplant effect”, which means that imported institutions must be compatible with the existing institutional structure in the country importing the laws. The success of a certain family of law is more dependent on whether the country importing it is predisposed be receptive of that particular family.

What is necessary to understand is that in part due to path dependency, underdevelopment cannot automatically be “cured” with institutions imported from developed countries. In some cases this has worked, in other it has not; it is contingent on the imported institutions being a good match with the existing institutional framework. For example, some former colonies of the UK have been very successful which could lead us to believe in the efficiency of the English common law system – however the UK also have former colonies that have been less successful. Before a particular law for example is summarily advocated as being the solution to underdevelopment, one must also consider how well matched this law would be with existing informal institutions in different countries. This is not to say that implications on policy cannot be drawn from research on institutions and growth, rather that this needs to be done with sensitivity to existing conditions, and the great variety in these.

Another aspect worth taking into account when it comes to institutional change is the considerable inertia of the institutional framework. This can to a great extent be explained by presence of multiple equilibria, which can cause the institutional environment to get locked into a suboptimal position. The concept of strategic complementarities can be useful when it comes to understanding multiple equilibria: When most people in the economy do a particular thing, this becomes the most profitable choice for other individuals in the economy – even if overall this choice produces less welfare than if all individuals in the economy were to make an alternative choice. Multiple equilibria arise where more than one path exist, but once a certain path has been taken there are no forces in the economy that naturally pushes it in another direction (Mauro, 2004). Corruption is an excellent example of this. The greater the prevalence of corruption in the economy, the more sense it makes for an individual entering the market place to become corrupt. When many

others are corrupt, there is little risk of being punished for being corrupt, and much gain from being corrupt. Because of this, once in place, corruption is likely to prevail even though the overall welfare would most likely be higher without it.

An implication of such “path dependency” is that the collective memory of the people in the economy affects what paths to development are available to the economy. Consequently, institutions are generally quite static over time, changing only slowly, although occasionally windows of opportunity open and big changes in the institutional framework of the economy can happen quickly. Furthermore, there are several reasons for why a less than optimal institutional environment may prevail over changes for the better. These can be a lack of laws, the prevalence of unsuitable laws or inadequate enforcement of the right kind of laws (Aron, 2000).

2.1.4. Measuring Institutional Quality

Institutions cannot be measured in the straightforward manner that for example investment can, instead institutional quality must be approximated through other measures. Two methods of doing this are used frequently, and will also be used in this thesis. The first is using a count measure to try to capture the quality of institutions objectively. This can for example be to approximate rule of law by using a count measure of political murders per capita. While such methods are objective to a degree, one must always question whether they capture the institution that they set out to measure and whether or not *accurate* counts are available. A second common method involves indexes compiled from surveys of experts on the country. While they are frequently used, it’s important to be aware of their limitations. Surveys are subjective in nature; one person’s much can be another person’s little. This can limit their accuracy in cross country comparisons.

Regardless of whether count measures or expert indexes are used, institutions are always intangible and thereby difficult to capture with definitive accuracy. Informal institutions even more so than formal institutions, but nevertheless in both cases. Variables used to capture institutional quality are not institutions themselves, rather outcomes of a certain institutional environment. Ideally the variable is highly correlated with the institution and can serve as a proxy of it, but it cannot be defined as an institution in and of itself (The World Bank). This may seem like splitting hairs, but it is relevant to keep in mind when interpreting the result of the model used. It is always necessary to consider whether the estimated coefficient is capturing the institution it intends to well, and if it captures *only* the effect of the institution. For example, it can be argued that the amount of investment can serve as a proxy for overall institutional quality, since investment is strongly correlated with property rights. While this would most likely yield significant results it may not say

much about institutions since many things, not just institutions, can influence the amount of investment in a country.

2.2. Institutions and Economic Growth

This thesis will exclusively refer to GDP per capita growth annually when the term growth is used. The reason for examining growth per capita rather than on an aggregate level is the effect of population growth. A high GDP growth rate has limited effect on living standard if it is severely tempered by a high population growth rate. Since the aim of the thesis is to examine the effect of institutions on development, measuring growth in per capita terms is the appropriate approach.

Several factors affect economic growth. Among those well established in new growth theory are investment in real capital, human capital, technological level and infrastructure. From a theoretical point of view, these affect the steady state level of GDP that the economy is moving towards. In practice, the adjustment period during which the economy is moving towards the new steady state is relatively long. A significantly increased growth rate during a period of 30 years will have an enormous influence on the income level in the country in question. Furthermore, new growth theory emphasize that constant changes in factors affecting the steady state means that the steady state is never reached by the economy since it's ever changing. Because of this, higher economic growth rates can be sustained under indefinitely and changes in factors that affect the steady state level can therefore have a substantial long term effect on the GDP level and living standard in an economy (Jones, 2002).

So how do institutions factor into the growth equation? The relationship between institutions and growth may at first seem tenuous, but this is not the case. Institutions affect growth through the effect it has on other determinants of growth. The basic chain of event is that the rules of the game affect the size of transaction costs, which in turn affects the amount of investment as well as the kind of investment. Higher quality investments for example are more complex and require longer time periods to pay off and are therefore more likely to be prevalent in countries with higher quality institutions (Aron, 2000).

Consider investment. Several aspects of the institutional environment affect the amount of investment that will be undertaken in an economy, as well as the quality of investments made. To exemplify, in an economy where property rights are weakly defined or enforced and the risk for expropriation is high, it makes less sense to make big investments in fixed assets as they may be seized by the state before becoming profitable. Instead, investment would likely be lesser, and endeavors with shorter gestation periods pursued over those with longer gestation periods. An

example could be the choice to mimic existing technology rather than invest in new technology. The risk for expropriation serves as a constraint on how much investment is profitable and the institutional environment in this case does not provide incentive for optimal level investment. A similar example can be made with the quality of bureaucracy. Unnecessarily large amounts of red tape can be expensive to get around – the transaction costs increase because learning the rules and greasing the wheels cost money – and consequently as costs go up fewer investments will be deemed profitable to undertake. These factors also affect the amount of investment in human capital, for example through schooling, and technology. A poor institutional environment where the informal institutions allow criminal behavior or rent-seeking could have a detrimental effect on the investment in human capital; the choice of each individual to invest in higher education becomes relatively less profitable if higher gains can be made through criminal behavior. This argument can also be made when the institutional framework is not meritocratic; when access to a job, promotion or salary is not based on education or performance but on informal connections and nepotism, the incentives for higher education are less than in a meritocracy.

But while an argument can be made for the positive effect of institutions and growth, the causality can also work in the opposite direction. Higher income can for example lead to a greater demand among the population for stable property rights and democracy. The reverse is also possible: institutional quality can deteriorate as a result of strong exogenous shocks to the economy. This endogeneity complicates the relationship between growth and institutions somewhat, and should be kept in mind when growth and institutions are examined (Aron, 2000).

3. EMPIRICAL TESTING

3.1. Data

Several sources were used to construct the data-set used in this thesis. The primary source is the World Bank and their “World Development Indicators”-database. The dependent variable and all the control variables have been compiled from this database.¹

The data used is panel data, meaning it contains information for several countries over several years. The data stretches from the year 1950 until 2009 so for every variable there is up to 60 observations per country. These observations have then been transformed into ten year intervals,

¹ To ensure accuracy, experiments testing the impact of the institutional variables were also run with variables from the Penn World Tables and Barro-Lee. The results were very similar, indicating that the choice of data-set is irrelevant. However, the World Bank databank was used as it allowed more observations in the regressions.

where the value for the period is the average of the available observations.² The purpose of this is to smooth out the business cycle and thereby get closer to the trend value of the GDP changes. This is done because institutional factors are not likely to affect short term fluctuations in GDP growth but rather the long term GDP trend itself.

A further reason to use 10 year intervals is that many developing countries lack observations for many years. By using longer time periods it is ensured that as many countries as possible can be included in the regression. While this overall is beneficial, it does also have some drawbacks. In particular, countries with few observations and volatile economic conditions can get misleadingly large or small averages if important observations are missing or if the observation that exists is an anomaly. This has been controlled for to some extent through the removal of outliers. As a rule of thumb, for all regressions, observations where the residual differs from the estimated value by more than three standard deviations have been removed from the regression.

While the variable for economic growth and the control variables used in the regression uses one time period, the institutional variable used is from the previous time period. This because institutional factors are likely to change slowly, and since they cannot influence growth retroactively the mean value of the current period can be misleading for the period as a whole. This leaves us with five possible time periods per country.

3.2. Sample

All countries with data available were used in the regressions, with the exception of countries that relied primarily on oil exports.³ The reasons for their exclusion are twofold. First, a high growth rate in a country where a natural resource like oil makes up the bulk of the value of the production in the country is most likely caused by an increased price on said natural resource, or increased extraction of it. As the institutional setting in this country has no way of affecting either of these things, analysis of the institutional environment of these countries will not be relevant to the main focus of this thesis: how institutions affect growth at different degrees of development. Second, as mentioned earlier, when GDP growth is caused by export of natural resources, generally only the owners of the resource will be the beneficiaries of the higher GDP level (Dollar & Kraay, 2002). As such, it does very little to raise the living standard in the country or reduce poverty. Because the purpose of studying

² Similar results were reached when five year intervals were used instead of 10 year intervals. This suggests that the model is not overly sensitive to the length of the period.

³ Countries excluded from the sample due to their high oil production as a fraction of GDP were Angola, Argentina, Azerbaijan, Bahrain, Algeria, Kuwait, Libya, Myanmar, Nigeria, Qatar, Iran, Iraq, Saudi Arabia and Yemen.

growth in this thesis is to uncover potential paths to development, growth in countries that are primarily oil producers is determined to be beyond its scope.

Countries were categorized as developing or developed in accordance with the World Bank classifications. Countries are classified by the World Bank as developing if they are low income (\$0-\$995 per capita) or lower middle income (\$996-\$3,945 per capita). Countries with upper middle incomes (\$3,946-\$12,195 per capita) or high incomes (\$12,196 or higher) are classified as being developed (The World Bank).

A few factors are worth keeping in mind. The World Bank classification of a country as developed or developing is quite arbitrary.⁴ No particular line of reasoning is given for why the cut-off point is at \$12,196, and there is no reason to believe that a country just below the cut-off line cannot be more “developed” than a country just above it when more than income level is used as the definition of growth. Nor does it say anything about other factors relevant to development such as the degree of inequality in the country, the amount of people living in poverty or overall living standards. The gist of this is that for our purpose of comparing the effect of institutions on growth in developing and developing countries a classification of countries as such must be made. Because the World Bank classifications are commonly applied they are used in this thesis, but keep in mind that neither developed nor developing countries are homogenous groups.

3.3. The Dependent Variable: GDP per Capita Growth

GDP per capita level is frequently used as a proxy for development, but it is important to remember that these are not interchangeable. While the average income level says something about the living standard in a country, it also has many shortcomings. First of all, it says nothing about the distribution of income in the economy. For example, two countries can have the same average income per capita, but one of the countries could have a significantly larger poor population. From a development perspective we can question whether the fact that some have a lot more makes up for that fact that many have very little. An example of this can be countries that are major oil producers. While the *average* income may be relatively high, this does not necessarily say something about the living standard of the masses. Moreover, income is not the only thing that matters for welfare. This goes back to Sen’s (1979) ideas on capabilities; for a country to be developed the citizens should not

⁴ Separate experiments were also performed classifying all middle income countries as developing or developed. Only for a couple of variables were the middle countries influential enough to elicit some changes in the result.

only have a certain income but also have freedom, equality and the ability to pursue happiness. Access to material things are not the only factors important when looking at development status.

A possible alternative to looking at economic growth could be to use an index to proxy development, such as the United Nations' Human Development Index (HDI). But using measurements like this has its own set of issues, for example both the choice of variables included and the weight given to them are somewhat arbitrarily chosen. While they include life expectancy at birth and education, it can be argued that these factors, like GDP growth on its own, say little about what capabilities are available to citizens. With this in mind, this thesis will use economic growth as the dependent variable.

Dollar and Kraay (2002) argue that economic growth is good for the poor. Because the income of the poor generally increases at the same rate as the GDP per capita growth rate, they benefit from a higher growth rate. While this means that the poor benefit less in absolute terms than the wealthier section of the population, they do still benefit more from a higher growth rate than from a lower one. However, there is an exception to this rule: when the growth is caused by increased production of a natural resource such as oil it rarely benefits the poor. In those cases the benefits of the economic growth befalls only the owner of that resource. With this in mind, countries where oil production makes up a sizable part of the GDP have been excluded from the sample.

There are some problems with measuring GDP that are important to be aware of. First of all, because production within the home is not included when GDP is calculated, the production level of developing countries tends to be underestimated for example due to considerable subsistence production in agriculture. As long as these measuring errors remain consistent over time they are unlikely cause problems. However as a country becomes more developed it will generally tend to move towards a greater proportion of production that is included when GDP is calculated. As a country becomes developed, the calculated GDP growth rates can therefore be somewhat exaggerated compared to actual growth in production.

3.4. Control variables

While many different factors can affect economic growth, only a few will be included in these regressions. The intuition behind this is data availability: rather than trying to include as many control variables as possible and putting the focus on increasing the explanatory power of the model the choice has been made to include as many countries as possible in the regressions. It can be argued that this is especially relevant when comparing developing and developed countries since developing countries – according to the World Bank classifications – are more numerous than developed

countries, but data availability for these countries is considerably lower. While many control variables performed well in the sense that they produced significant results and inflated the R^2 -value, each added variable tended to disproportionately shrink the sample of developing countries relative to the sample of developed countries.⁵ As data unavailability most likely is not a random occurrence this could potentially have significant effects on the validity of the end results, especially with regard to developing countries. Control variables were therefore limited to three variables with high data availability, as well as dummy variables for geographic regions in the pooled regression model. The following variables were used in the regressions:

Investment. The World Bank databank provides a few variables that can serve as a proxy to investment level. In test runs of the model they all proved to be significantly correlated to growth in a similar manner. Gross capital formation as a percentage of GDP was chosen due to its relatively high availability of data, both in developed and developing countries.

Education. Primary years of schooling was chosen to approximate education level. The variable has high data availability, and most importantly: primary education is widespread throughout both the developed and developing world. Because of this the length of primary education was deemed suitable.

Infrastructure. The number of telephone lines per 100 citizens was chosen as a proxy for the quality of the infrastructure. In the process of determining the model, several tests were performed on the data set and one of these indicated that telephone lines per 100 citizens does not have a linear relationship to GDP per capita growth. As a response to this, the variable was changed from telephone lines per 100 citizens to the logarithm of telephone lines per 100 citizens. This solved the issue of non-linearity in the regressions.

Region Dummies. The sample is separated into seven categories based on region: East Asia and the Pacific, Europe and Central Africa, Latin America and the Caribbean, the Middle East and North Africa, North America, and Sub-Saharan Africa. Dummy variables have the benefit of not affecting the sample size in any way. They can also filter out some effects that are not related to the variables of interest or the control variables included in the regression that otherwise could be included in the estimations of their coefficients. For example, in the result from the pooled regression model the dummy variable for sub-Saharan Africa is consistently negatively (and often significantly) correlated with economic growth. This implies that factors specific to this region, but not included in the model,

⁵ Several other control variables were included in previous experiments. Most notably technology, population growth rate and several different proxies for the control variables currently included in the model. With the exception of changes in the explanatory power of the model and significance-level of individual variables, the results were essentially the same.

affect growth negatively. Without the regional dummies such effects may be inaccurately absorbed by the estimated coefficients for the other variables included in the model.

3.5. Hypotheses Development: Growth and Institutions

The basic intuition is that good institutional quality is positively correlated with economic growth. Therefore – all other factors being kept equal – better institutional quality should lead to higher growth levels. Three different aspects of institutional quality will be used to test this hypothesis, as well as to examine any potential differences between how the effect of institutions differs across different development statuses. This is of interest whether such differences exist or not; if they do this is important for the implications on policy, if they do not this provides evidence that the institutional variables pass some robustness checks. While a plethora of indexes attempting to proxy the institutional environment exist and can be fit into different categories according to institution type, the reality is that institutional quality indicators are strongly connected to one another. There is not so much a set of separate institutions, rather different aspects of the same institutional environment – an interwoven network where every thread contributes to the institutional environment but simultaneously is affected by it. Because of the high degree of correlation between different institutional variables they will be examined in separate regressions.

The institutional indicators chosen are all of the nature that they have potential to be changed over time through political action. Because the aim of the thesis is to investigate how changes in policy can affect development, institutional indicators that are descriptive of the demographic makeup of citizens – such as ethnic and linguistic fractionalization – will not be included, despite their relatively strong correlation with economic growth.

While one aim of this thesis is to investigate if there is any difference between how different aspects of the institutional environment affect economic growth at different development stages, no hypothesis will be made on what those differences will be. As for the impact of individual indicators, their hypothesized effect on growth will be discussed in the following sections.

3.5.1. Civil Liberties

The index used to approximate civil liberties is from Freedom House. It is composed of several different aspects such as associational and organizational freedom, rule of law, and personal autonomy without interference from the government. Although the measure is to some degree related to the concept of democracy, the two are not interchangeable. The mechanism through

which civil liberties is expected to affect growth is that increased rule of law and lessened interference by the state will encourage the amount and quality of investment. While there are of course individual exceptions to this – most notably China which has sustained a high growth rate for the past decades while offering very few freedoms to its citizens – there is still a theoretical basis for anticipating that civil liberties and growth have a positive correlation. Because a high score on this civil liberties scale implies lesser rule of law and freedom, the hypothesis is that:

H₁: Civil Liberties have a positive influence on growth; the estimated coefficient for Civil Liberties will therefore be negative.

3.5.2. Number of Veto Players: Legislative checks and balances

The index used to approximate legislative checks and balances is from Database of Political Institutions. Countries are scored on how many players that can veto a law. The higher the score, the more checks and balances are involved in the legislative process. While a strong government in many ways can be a good thing as it enables it to enforce laws, it can also have a negative effect since as very strong government has the power to expropriate its citizens. With this in mind, a greater number of checks and balances in the legislative systems are theorized to indicate a stronger institution:

H₂: The number of checks and balances influences growth positively; the estimated coefficient for number of veto players will therefore be positive.

3.5.3. Quality of Government

An index from the International Country Risk Guide will be used to measure the quality of government. It includes information the amount of bureaucracy and corruption in the country. These factors and their effect on growth have been sufficiently discussed earlier in the thesis, and so without further ado the hypothesis is as follows:

H₃: Quality of government affects growth in a positive direction; the estimated coefficient for quality of government will therefore be positive.

3.6. Model Specification

Two different models will be used to compare the different effects institutional variables can have on growth in developed and developing economies: a pooled regression model and a fixed effects model. Both of these methods are based on ordinary least square (OLS) regressions.

The pooled regression model will be used to examine the difference between how, all other factors kept constant, institutional variables affect growth in developed and developing countries. The main reason this model will be used is that it lets us quantify differences between the estimated coefficients for the developed and developing countries. Thereby it lets us examine not only *if* an institutional variable is significantly correlated with growth, but also to what degree its impact on growth differs depending on development status. However, due to the fact that the data used has a time-series component this form of regression is not necessarily ideal; this because a pooled regression model does not take into account that there are more than one observation per country. In the event that there are specific country effects in play, this is of particular importance. Another issue with the pooled regression model concerns omitted variables, which the pooled regression model does not control for. A Ramsey RESET test of the pooled regression model indicated omitted variables were present in the specification of the model.

To rectify these issues, a model that takes the time-series aspect of the data set into account is used to supplement the pooled regression model and make the analysis more multifaceted. While this method should produce higher accuracy in the estimated coefficients, the differences between how different institutional aspects affect economic growth depending on development category cannot be examined in a single regression. Instead, three separate regressions for all countries, developed countries and developing countries will be examined. Together, the two models should produce a strong basis for analysis of the effect that institutional quality has on economic growth.

A variety of tests were performed to examine the suitability of the model to the data. The Hausman test indicated that a fixed effects model should be used rather than a random effect or between effects model. The residuals were tested for heteroscedasticity and multicollinearity, neither of which was indicated. The Shapiro-Wilks test for normality was failed; the data is not perfectly normally distributed. A further examination of the residuals in graph form did indicate that they were reasonably normally distributed. Because they are not statistically perfectly distributed, the p- and f- values provided by the regressions can have some statistical errors.

3.6.1. Pooled Regression Model

The first model used is a pooled regression model. It's a linear ordinary least square estimation of panel data. It is specified as follows:

$$\Delta y_{it} = \alpha + \beta_1 EDU_{it} + \beta_2 INFRA_{it} + \beta_3 INV_{it} + \beta_4 Dummy + \beta_5 (Dummy * INST_{it-1}^j) \\ + \beta_6 INST_{it-1}^j + \beta_7 REG_{it}^1 + \beta_8 REG_{it}^2 + \beta_9 REG_{it}^3 + \beta_{10} REG_{it}^4 + \beta_{11} REG_{it}^5 + \beta_{12} REG_{it}^6 + \varepsilon_{it}$$

Where Δy_{it} signifies the average annual growth in GDP per capita for country i during the time period t , α is a constant, EDU_{it} is a proxy for the investment in education in country i at time t , $INFRA_{it}$ is the average yearly investment in real capital in country i during time period t , $Dummy$ is a dummy-variable for development level (with 1 signifying that the country is a developing country and 0 signifying that it's a developed country), $INST_{it-1}^j$ is a proxy for institutional quality j in country i at time period $t-1$, REG_{it}^1 through REG_{it}^6 are dummy variable for the geographic region of country i (the dummy takes on a value of 1 if the country is located in the particular region and 0 if it is located in one of the other regions. Each country takes on a value of 1 in one, and only one, of the dummies). The World Bank divides the countries into seven geographic regions but only 6 regions are included in the regression; the seventh region serves as a benchmark against which we can compare the estimated coefficients of the other dummies. ε_{it} signifies the residual, the differences in economic growth that cannot be accounted for through the model. Last but not least there is $(Dummy * INST_{it-1}^j)$, which is the institutional variable j for the country i at the time t multiplied by the dummy for development category. This variable takes on a value of 0 for all developed countries and the value of the institutional quality j at time t for all developing countries i .

The $(Dummy * INST_{it-1}^j)$ enables examination of the particular effect of the institutional variable on growth in developing countries as opposed to in developed countries. In order to use this variable $Dummy$ and $INST_{it-1}^j$ must also appear separately. The institutional variable must be present because otherwise the growth-related effects of institutions in developed countries would be overlooked. The dummy because otherwise factors specifically related to developing countries (such as the very fact that they have a lower income level) would wrongfully be attributed to the combined variable. This would skewer the results and render β_6 useless when it comes to comparing the importance of institutions in different countries.

Because institutional quality is believed to influence economic growth partly through the amount of investment done, it could also be interesting to take this into account in the pooled regression

model. To accomplish this, the investment variable will be orthogonalized in order to filter out the effect of institutional quality on the investment variable.

Aside from the investment variable, the model will be as in the previous version of the pooled regression model:

$$\Delta y_{it} = \alpha + \beta_1 EDU_{it} + \beta_2 INFRA_{it} + \beta_3 INV_{it}^{ortho} + \beta_4 Dummy + \beta_5 (Dummy * INST_{it-1}^j) + \beta_6 INST_{it-1}^j + \beta_7 REG_{it}^1 + \beta_8 REG_{it}^2 + \beta_9 REG_{it}^3 + \beta_{10} REG_{it}^4 + \beta_{11} REG_{it}^5 + \beta_{12} REG_{it}^6 + \varepsilon_{it}$$

All abbreviations still hold the same meaning as in the previous incarnation of the model, with the exception that the investment variable INV_{it}^{ortho} has replaced INV_{it} . The Orthogonalized investment variable is gotten by running a regression with the old investment variable as the dependent variable and the institutional variable as the independent variable:

$$\Delta INV_{it} = \alpha^{ortho} + \beta * INST_{it-1}^j + \varepsilon_{it}^{ortho}$$

The Orthogonalized investment variable is then gotten by adding the constant to the residuals from each individual observation:

$$\Delta INV_{it}^{ortho} = \alpha^{ortho} + \varepsilon_{it}^{ortho}$$

In the event that institutional quality has a great impact on investment level, this version of the pooled regression model could give a clearer idea of what role institutional quality plays in a country's economic growth rate.

3.6.2. Fixed Effects Model

This model also estimates a linear relationship between the dependent and the independent variables. Essentially, it can be described as an OLS regression that includes a dummy variable for each individual country, thereby eliminating country effects and controlling for the effect of omitted variables on the estimated coefficients of variables included in the model. Because of this we cannot include dummy variables for development status or region in the model as the effect from these are already accounted for in the country dummies. Consequently, as discussed in the section for the pooled regression model, the $(Dummy * INST_{it-1}^j)$ variable is no longer a useful tool. This means that the effect of development status on the efficacy of institutional quality in affecting growth

cannot be examined in a single regression. Instead, three separate regressions will be run: One that includes all countries with available data, one for countries classified as developed and one for countries classified as being developing. The model is specified as follows:

$$\Delta y_{it}^{\text{all}} = \alpha + \beta_1 \text{EDU}_{it} + \beta_2 \text{INFRA}_{it} + \beta_3 \text{INV}_{it} + \beta_4 \text{INST}_{it-1}^j + C_{it}^1 + \dots + C_{it}^{n-1} + \varepsilon_{it}$$

$$\Delta y_{it}^{\text{developed}} = \alpha + \beta_1 \text{EDU}_{it} + \beta_2 \text{INFRA}_{it} + \beta_3 \text{INV}_{it} + \beta_4 \text{INST}_{it-1}^j + C_{it}^1 + \dots + C_{it}^{n-1} + \varepsilon_{it}$$

$$\Delta y_{it}^{\text{developing}} = \alpha + \beta_1 \text{EDU}_{it} + \beta_2 \text{INFRA}_{it} + \beta_3 \text{INV}_{it} + \beta_4 \text{INST}_{it-1}^j + C_{it}^1 + \dots + C_{it}^{n-1} + \varepsilon_{it}$$

All variables are still the same as in the pooled regression model, although for the second and third equations two GDP per capita growth-variables has been generated that only include one of the categories per variable. Furthermore, the variables C_{it}^1 through C_{it}^{n-1} signify dummy variables for all countries included in the regression minus one (which serves as a benchmark).

Separating the sample into different categories is not without benefits. Let's first consider the fact that institutional quality is generally lower in developing countries than in the developed world. Without control variables included in the model, estimating the effect of institutional quality on economic growth would only lead to significant results if economic growth as a general rule is lower in developing countries. In a perfect model, control variables should filter out all other factors affecting growth by keeping these fixed. The resulting estimated coefficient for the institutional variable is to be interpreted as the effect of institutions on economic growth, all other factors being kept equal. But because of limited data availability, this model does not include enough control variables to completely control for all other economic conditions. Without sufficient control variables, other variables in the model may absorb the impact of omitted variables.

Much of these effects are filtered out through the use of the fixed effects model. However, in order for this model to completely filter out the effect of omitted variables, the sample should ideally have a relatively smaller amount of countries and a greater amount of periods (Princeton University). This sample has five time periods available for each country but for many countries data unavailability limits the number of observations per country to one or two periods only. This may not be enough to *completely* control for omitted variables. Therefore independent investigation of the developed and developing countries could potentially give us a more accurate idea of the different impact that institutional quality has depending on development status.

4. RESULTS

Overall the evidence from the regressions is in line with the hypotheses, that institutional quality has a significant positive effect on economic growth. This is true for both developing and developed countries, although some aspects of the institutional environment appear to have a more significant effect in developing or developed economies. When interpreting these results, it must however be kept in mind that the model is relatively basic and that if additional factors were to be included the significance level of the institutional variables could change. Nevertheless, there is at least some indication that the institutional indicators withstand robustness checks as they yield quite similar results under different economic conditions.

The results from the pooled regression model can be seen in table 1. Each column contains information about the estimated coefficients of variables included in the regression. The results indicate that civil liberties as well as the number of veto players have similar effect, if any, on the economy regardless of development status. The orthogonalization of the investment variable had no

Table 1. Regression Results from Pooled Regression Model

VARIABLES	<i>Unorthogonalized Investment</i>			<i>Orthogonalized Investment</i>		
	(1) Growth	(2) Growth	(3) Growth	(4) Growth	(5) Growth	(6) Growth
<i>Variables of Interest:</i>						
CL*Dummy	0.108			0.110		
NoVP*Dummy		0.0738			0.0734	
QoG*Dummy			5.893***			6.208***
<i>Control Variables:</i>						
Civil Liberties	0.0360			0.0319		
Number of Veto Pl.		0.119			0.0889	
Quality of Gov. Dummy	-0.242	0.121	-3.330***	-0.242	0.170	-3.366***
Education	-0.184	-0.236	0.0724	-0.173	-0.212	0.0632
Infrastructure	0.156	0.0630	0.197	0.236*	0.124	0.238
Investment	0.154***	0.162***	0.151***	0.120***	0.137***	0.159***
<i>Region:</i>						
Europe & Cen. Afr.	0.554	0.458	1.135**	0.482	0.388	1.059**
Lat. Am. & Carib.	-0.646*	-0.745*	-0.821	-0.671*	-0.831**	-0.870*
Mid. East & N. Afr.	-0.311	-0.0994	-0.338	-0.337	-0.177	-0.448
North America	-0.222	-0.319	0.777	-0.417	-0.502	0.736
South Asia	1.242**	1.007*	1.015	1.428**	1.040*	1.013
Subsaharan Africa	-0.807*	-0.721	-0.903	-0.810*	-0.800*	-0.887
Constant	-0.697	-0.549	1.534	-0.242	-0.146	1.306
Number of Obs.	406	385	216	413	390	218
R-squared	0.308	0.310	0.375	0.300	0.308	0.398

*Notes: *** p<0.01, ** p<0.05, * p<0.1*

impact on these results. The regressions that include civil liberties or number of veto players also indicate that the growth level is unaffected by development status, as the coefficients for the development status dummy is insignificant, but often significantly affected by region. Characteristics exclusive to Latin America, the Caribbean and sub-Saharan Africa, have a significant and strong negative correlation with economic growth. Factors specific to South Asia have a strong and significant positive correlation with economic growth. This is not an indication that Latin America and the Caribbean cannot affect the growth rate through policy change, rather that variables greatly affecting these regions are omitted from the model. A suggestion for further research could be a more extensive examination of other macroeconomic and country specific variables that could be the cause of the stunted growth rate in Latin America and sub-Saharan Africa.

As for quality of government, the results indicate that this variable has a greater positive impact on growth in developing countries than it does in developed countries. This effect is determined with 99% significance. Because the development dummy in this case is significantly and negatively correlated with growth, all other things in the regression being equal, developing countries are still likely to have lower economic growth than a developed country.

One thing that is important to keep in mind is that the number of observations differs considerably between the first two regressions and the third. This is because the quality of government variable has fewer observations, which decreases the sample size. It cannot be definitely concluded that this is due to random factors; for example, it is possible that countries with lower quality of government have lower data availability. This would then skewer the results. While this cannot be known for certain, the possibility should be kept in mind.

Orthogonalizing the investment variable provided little further insight beyond this. Aside from the region dummies for Latin America and sub-Saharan Africa becoming more significant, the results were the same as in the pooled regression model without Orthogonalized investment. Furthermore, orthogonalizing the investment variable did not lead to any substantial changes in the explanatory power of the models, nor in the F-test-statistics. From this it can be concluded that to the extent that institutional variables do affect economic growth, this is not only done through the impact on investment.

Moving on to the fixed effects model, the results of these regressions are strongly in line with the hypotheses presented earlier. The results of the fixed effects model are displayed in Table 2. The first hypothesis stated that a greater abundance of civil liberties will have a positive effect on economic growth. Because the variable approximating civil liberties takes on a higher value when the country has fewer freedoms, the estimated coefficient for the civil liberties variable was therefore expected to be negative. The evidence from the fixed effects model is in line with the hypothesis when all

Table 2. Regression Results from Fixed Effects Model

VARIABLES	<i>All</i>	<i>Developed</i>	<i>Developing</i>	<i>All Countries</i>		
	(1) Growth	(2) Growth	(3) Growth	(4) Growth	(5) Growth	(6) Growth
<i>Variables of Interest:</i>						
Civil Liberties				-0.416*** (0.121)		
Number of Veto Players					0.431*** (0.121)	
Quality of Government						3.412* (1.997)
<i>Control Variables:</i>						
Education	0.437	-0.0220	0.728	-0.178	-0.0738	0.299
Infrastructure	-0.0189	-0.358	0.204	0.541***	0.503***	0.279
Investment	0.115***	0.104***	0.109***	0.126***	0.117***	0.187***
Constant	-3.127	1.212	-5.122*	0.889	-2.048	-6.140
Number of Obs.	552	285	267	409	387	219
R-squared	0.075	0.058	0.122	0.217	0.230	0.207
Number of Countries	166	83	83	156	149	119
<i>Notes: *** p<0.01, ** p<0.05, * p<0.1</i>						
<i>Standard errors in parenthesis.</i>						

VARIABLES	<i>Developed Countries</i>			<i>Developing Countries</i>		
	(7) Growth	(8) Growth	(9) Growth	(10) Growth	(11) Growth	(12) Growth
<i>Variables of Interest:</i>						
Civil Liberties	-0.372** (0.184)			-0.462*** (0.166)		
Number of Veto Players		0.500*** (0.166)			0.322* (0.181)	
Quality of Government			3.232 (3.106)			3.601 (2.512)
<i>Control Variables:</i>						
Education	-0.316	-0.231	-1.324	-0.144	0.0209	1.911**
Infrastructure	0.392	0.508	1.682	0.575***	0.517**	0.0779
Investment	0.102**	0.0896**	0.174**	0.134***	0.129***	0.211***
Constant	1.746	-1.448	-1.467	1.595	-2.010	-15.47***
Number of Obs.	205	188	120	204	199	99
R-squared	0.100	0.146	0.232	0.321	0.301	0.333
Number of Countries	79	74	67	77	75	52
<i>Notes: *** p<0.01, ** p<0.05, * p<0.1</i>						
<i>Standard errors in parenthesis.</i>						

countries are included in the regressions, but also when the development categories are examined separately.

The explanatory power of the model increases significantly for developing countries when civil liberties are added to the regression, but only moderately for developed countries. There are two possible causes for this. First, this could indicate that civil liberties do have a greater impact on growth in developing countries. A possible explanation for this is that civil liberties have diminishing marginal effects. That is, if civil liberties are scarce an extra unit of civil liberties will give greater effect than it would if civil liberties were already abundant. Nevertheless, it is also possible that the civil liberties variable is highly correlated with some other factor that greatly affects growth in developing countries. If such a variable exists and is not included in the model, the civil liberties variable could be absorbing some of the impact this variable would have had. While this factor cannot be ruled out with complete certainty, the effect on the conclusions remains the same; and so hypothesis H1 cannot be rejected and it is concluded that civil liberties is positively correlated with growth.

The second hypothesis states that the number of veto players should influence growth in a positive direction. The number of veto players is significantly positive both for all countries, and for the individual categories, and so the evidence from the regression supports this hypothesis.

The estimated coefficient for the number of veto players is greater in size for the developed countries, as well as more significant. This can possibly be explained with factors unrelated to development status. It is not unlikely that checks and balances must reach a critical mass before they become effective at promoting growth. In this case, the very fact that the average number of veto players is smaller in the developing category could explain why the variable is more significant for developed countries. Whether or not this is the mechanism that causes the difference in the estimated coefficient depending on development status, hypothesis H₂ must be accepted. It can thereby be concluded that the number of veto players is positively and significantly correlated with economic growth, regardless of development status.

The third hypothesis states that quality of government should have a positive effect on growth. The results are not as clear cut when it comes to quality of government as for the other two institutional variables, which is in line with the results from the pooled regression model.

While the estimated coefficients for quality of government have p-values higher than 0.10 for both developed and developing countries, the estimated coefficient for all countries is significant with 90% certainty. There is however some difference in the significance of the estimated coefficient for quality of government, the p-value is 0.303 for developed countries and 0.159 for developing countries. This indicates that quality of government is more significant in developing countries than it is in developed countries, but closer examination of the correlation tables reveal that this conclusion

can be misleading. In developed countries there is a high correlation between quality of government and infrastructure, whereas this correlation is significantly lower for developing countries. Because of the high correlation between infrastructure and quality of government, the p-values for both of these variables are likely to be very insignificant.

It is interesting to note that both for developed and developing countries, although the estimated coefficients are insignificant, the very inclusion of quality of government in the model more than doubles the R^2 for developing countries and more than triples it for developed countries. This signals that the relationship between quality of government and economic growth is not irrelevant. While in further research it would be of interest to examine the variable in a more comprehensive model, here it will have to suffice to examine the effect of quality of government on growth if infrastructure is excluded from the regression. This yields the following results.

Table 3. Fixed Effects Model, Quality of Government Without Infrastructure

	All	Developed	Developing
	(1)	(2)	(3)
<u>VARIABLES</u>	<u>Growth</u>	<u>Growth</u>	<u>Growth</u>
Quality of Government	4.293** (1.753)	5.322* (2.838)	4.068* (2.198)
Investment	0.214***	0.187***	0.245***
Education	0.236	-1.470	1.888*
Constant	-6.336	3.121	-16.28***
Observations	221	120	101
R-squared	0.207	0.194	0.316
Number of Countries	120	67	53

*Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
Standard errors in parentheses*

When infrastructure is excluded from the regression the R^2 for developing countries falls, remains the same for the regressions with all countries included and increases for developed countries. The p-values of the estimated coefficients for quality of government are all lower, indicating a higher significance level, and the coefficients remain positive. When the different sizes of standard errors are taken into consideration, and infrastructure is not included in the regression, quality of government has the same effect on growth regardless of development status.⁶ Because of the strong correlation between infrastructure and quality of government in developed countries, but not in developing countries, it is therefore difficult to make any definitive conclusions on whether or not

⁶ Please note that while the exclusion of the infrastructure variable leads to great differences in significance level for the estimated coefficients in the fixed effects model, excluding the infrastructure variable from the pooled regression model had no significant effect on the estimated coefficients.

the effect of government quality differs for different development categories. The only conclusion that can be made with certainty is that quality of government is positively correlated with growth.

As for what institutions have the greatest impact on growth, this does appear to differ across development level. In order to compare the effect of different institutional variables on growth, the size of the standard errors must be considered: if the institutional variable is increased with one standard error unit, what is the effect on economic growth? For developing countries this experiment indicates that of the three institutions examined civil liberties has the greatest impact on growth. For developed countries this is instead true for the number of veto players.

Finally, none of the hypotheses formulated earlier have been rejected entirely. It is however important to keep in mind that while the theoretical framework supports the idea presented in the hypothesis – that growth rates are positively impacted by institutional quality – the possibility that the causality is the reverse has not been disproven. It can therefore also be argued that increased growth can lead to an increased demand for more civil liberties and higher quality of government. In fact, a reasonable conclusion is that these two effects coexist and interact, pushing both growth rates and institutional quality higher than they otherwise would be.

5. CONCLUSION

The purpose of this thesis was twofold; to examine the impact of institutions on economic development, as well as to what degree the impact of institutions on growth differs depending on development status. This is interesting for a variety of reasons, but most importantly because institutional environment, unlike geographic situation or access to natural resources, is something that individual countries have the potential to change.

In order to do perform this task, two econometric models and three institutional indicators were used. The institutional indicators employed were civil liberties, number of veto players and quality of government. The two models were based on the ordinary least square regression: one of them included fixed effects and the other a variable used to compare the impact of institutions dependent on development status.

The results support the main hypothesis, that institutional quality has a positive impact on economic growth. This is true for all three institutional indicators that were examined in this thesis. The results also indicate that the only difference between how developing and developed countries are affected by institutional quality is in the size of the impact, not in the direction of it. Furthermore, the differences in size can often be explained by factors beyond development status. This implies

that the effect of institutions on growth is somewhat robust, at the very least with regard to development status.

The strategic implication to be drawn from this thesis is that institutions matter for growth. On a more specific level, out of the three institutional indicators studied improved civil liberties appear to yield the greatest effect on growth in developing countries, whereas the number of veto players is of greater importance in developed countries.

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APPENDIX A: Variable Definitions

Variable Definitions

	Variable Name	Description of Measure	Source	Compiled From*
<i>Variables of Interest:</i>	Civil Liberties	Scores the degree of freedom from 1 (most free) to 7 (least free).	Freedom House	Surveys of (few) experts.
	Number of Veto Players	Number of legislative checks and balances are scored between 1 (least checks) and 10 (most checks).	Database of Political Institutions	Categorization of count data.
	Quality of Government	Measures the degree of corruption, law and order and bureaucracy on a scale from 0 (worst) to 1 (best).	International Country Risk Guide	Surveys of (few) experts.
<i>Dependent Variable:</i>	Growth	GDP growth (annual %).	World Bank WDI	
<i>Control Variables:</i>	Education	Average years of primary education.	World Bank WDI	
	Infrastructure	log(Average amount of telephone lines per hundred citizens).	World Bank WDI	
	Investment	Annual gross capital formation (% of GDP).	World Bank WDI	

Notes: *Method of data collection for the institutional indexes.

APPENDIX B: Correlation Tables

Correlation Table, All Countries

	Growth	CL	NoVP	QoG	Edu	Inf	Inv
Growth	1						
Civil Liberties	-0.0575	1					
Number of Veto Players	0.1273	-0.6891	1				
Quality of Government	0.0208	-0.671	0.5391	1			
Education	-0.2745	-0.1446	-0.0179	0.0417	1		
Infrastructure	0.2458	-0.6733	0.4961	0.6883	-0.1551	1	
Investment	0.4586	0.0247	-0.0025	-0.0047	-0.1714	0.2243	1

Correlation Table, Developing Countries Only

	Growth	CL	NoVP	QoG	Edu	Inf	Inv
Growth	1						
Civil Liberties	-0.0994	1					
Number of Veto Players	0.1666	-0.5642	1				
Quality of Government	0.1396	-0.0443	0.2611	1			
Education	-0.4061	-0.0595	-0.1082	-0.149	1		
Infrastructure	0.4415	-0.2476	0.19	0.1902	-0.4269	1	
Investment	0.5208	-0.0321	0.0651	0.0709	-0.3054	0.4856	1

Correlation Table, Developed Countries Only

	Growth	CL	NoVP	QoG	Edu	Inf	Inv
Growth	1						
Civil Liberties	0.0772	1					
Number of Veto Players	0.0214	-0.6516	1				
Quality of Government	-0.1896	-0.6452	0.4956	1			
Education	-0.1692	-0.2558	0.0506	0.1575	1		
Infrastructure	0.0012	-0.5965	0.5073	0.7012	-0.0629	1	
Investment	0.3645	0.159	-0.1349	-0.1372	-0.0515	-0.0489	1

APPENDIX C: Summary Statistics

Summary Statistics, All Countries

	Variable	Obs.	Mean	Std. Dev.	Min	Max
<i>Variables of Interest:</i>	Civil Liberties	425	3.770585	1.843124	1	7
	Number of Veto Players	393	2.466598	1.55258	1	9.4
	Quality of Government	224	0.5683979	0.2388691	0.0555556	1
<i>Dependent Variable:</i>	Growth	732	2.332316	2.620544	-3.992896	13.85329
<i>Control Variables:</i>	Education	595	5.820261	0.8769537	3	8
	Infrastructure*	687	1.373857	1.961378	-3.755724	4.478249
	Investment	651	22.77837	7.583052	5.360259	59.67432

Summary Statistics, Developing Countries Only

	Variable	Obs.	Mean	Std. Dev.	Min	Max
<i>Variables of Interest:</i>	Civil Liberties	215	4.807957	1.404028	1	7
	Number of Veto Players	205	1.744396	1.273582	1	9.4
	Quality of Government	102	0.4073917	0.152861	0.0555556	0.6944445
<i>Dependent Variable:</i>	Growth	342	1.794874	2.596304	-3.371875	13.37976
<i>Control Variables:</i>	Education	289	5.823183	0.8485581	3	8
	Infrastructure*	320	-0.155272	1.530686	-3.755724	3.204981
	Investment	321	20.9541	8.310051	5.360259	59.67432

Summary Statistics, Developed Countries Only

	Variable	Obs.	Mean	Std. Dev.	Min	Max
<i>Variables of Interest:</i>	Civil Liberties	210	2.708515	1.622607	1	7
	Number of Veto Players	188	3.254105	1.445098	1	7.8
	Quality of Government	122	0.7030097	0.213379	0.2222222	1
<i>Dependent Variable:</i>	Growth	390	2.803611	2.553257	-3.992896	13.85329
<i>Control Variables:</i>	Education	306	5.817502	0.9043337	3.4	8
	Infrastructure*	367	2.707158	1.15822	-1.973823	4.478249
	Investment	330	24.55288	6.327224	7.29257	58.96724

Notes: *Because the variable "Infrastructure" is $\log(\text{telephone lines per } 100 \text{ citizens})$, negative numbers for infrastructure are possible because the log of a number smaller than 1 is negative.

Countries in Sample

	Freq.	Percent
Developed Countries	95	52.49
Developing Countries	86	47.51
Total	184	100