Essays on the Quality of Institutions and Economic Performance

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Abstract

This thesis builds a model to describe the process of institutional change in which the probability of revolution depends on the state of the economy and the level of education in the society. The model generates two cases. First, when the cost of revolution is lower than the cost of the recession, institutional change will occur. The magnitude of the negative shock, sufficient to cause a revolution, depends on education; the higher the level of education in the society the lower the magnitude of the negative shock. The second case, when the cost of a revolution is higher than the cost of a negative shock, generates a mechanism of marginal institutional changes. Those who hold the power can adjust the quality of institutions to avoid a revolution; the magnitude of the changes necessary to prevent a revolution depends positively on both the magnitude of the shock and the level of education in the society. Both cases predict that institutional improvement is associated with increasing levels of education. We then test the prediction of our model. First, in a dynamic panel analysis of 86 developing countries, the system GMM results demonstrate that the quality of institutions will increase by 10% if years of schooling increase by one standard deviation. This result is confirmed by two separate bias correction estimations (BCFE and LSDV). Second, we use an EU cross-regional dataset of the Quality of Government to examine the determinants of institutional quality in European regions. Using the share of atheists in every region as an instrument for education, our IV estimations confirm the prediction of our model. More education leads to better institutions. Additionally, our findings confirm other existing theories of the political and social determinants of the quality of institutions and demonstrate that this phenomenon is not confined to developing countries or even post-communist economies.

Ampalaea . . .

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Contents

List of Figures

List of Tables

1

Introduction

"Begin at the beginning," the King said, gravely...

– Lewis Carroll, *Alice in Wonderland*

Human interactions are guided by explicit or implicit rules. Laws, traffic rules, currencies and even the way we speak to others are all rules (formal or informal) that shape the political, economic and social structure. We can define these rules as institutions.

Over the past few decades, research has progressively established the strong and robust link between economic and political institutions and economic performance. The work of North (1989) and his definition of institutions as the rules of the game paved the way for future research. One of the main reasons for the wide use of institutional quality in studying economic performance is the proliferation of datasets measuring a wide spectrum of institutional forms, be it political systems or legal origins, which were non-existent a few decades ago.

From the discussion of property rights and their effects on the economy (Coase 1960; Demsetz 1967; Alchian and Harold 1973) to more recent work on

1

the effects of various economic and political institutions on economic growth, the findings illustrate that the institutional environment of a country is important for the economy (North 1990; Knack and Keefer 1995; Barro 1996; Acemoglu et al. 2005). The broad consensus seems to be that improving the quality of institutions, such as how well a country protects property rights, level of corruption, bureaucratic quality, the power of the rule of law or the inclusiveness of the political system, is associated with a sustainable and even stronger economic performance (North 1989; Rodrik 2000; Acemoglu et al. 2001; Rupasingha et al. 2002; Easterly and Levine 2003; Acemoglu et al. 2005; Acemoglu and Robinson 2007; Aghion et al. 2007; Tebaldi and Elmslie 2008).

Despite the vast amount of literature that examines the effects of institutions, the determinants of institutions and mainly the causes of institutional change are not as well researched. The existing literature on the determinants of institutions focuses on the role of random shocks, for instance, path dependence can explain the current equilibrium of institutions in many countries and negative shocks to the economy may increase the net benefit of institutional change. Besides, it examines the individual aspects of institutional quality such as property rights, democracy, or corruption (Acemoglu and Robinson 2000; Bourguignon and Verdier 2000; Acemoglu and Robinson 2001; Acemoglu et al. 2001; Glaeser et al. 2004; Acemoglu et al. 2005; Glaeser et al. 2007).

However, despite evidence that institutions are a key determinant of economic performance, many nations are failing to adopt better institutions. Important questions then emerge: if "good" or high-quality institutions promote economic development why do certain countries fail to adopt them?; if a negative shock can lead to institutional change why do certain African and Asian countries under-perform consistently in most measures of institutional quality? Based on

the ideas of many scholars, from Plato to Lipset, regarding the role of education in shaping the behaviour and the preferences of the individuals we emphasise the role of education.

The main motivation is the mixed results of reform programs in developing countries that focus on institutional changes to help developing economies perform better. Reform programs, such as the Economic Reform Programs organised by the IMF and the World Bank, focus on institutional changes and in many cases, the results are mixed (Abbott et al. 2010). In this thesis, we argue that education has a significant impact on the process of institutional change as it, directly and indirectly, affects the preferences of the citizens of a country and hence plays an important role in the evolution and the stability of institutions.

The main objective of this thesis is to explain the role of education in the process of institutional change, building a model to describe how education affects institutional change. We argue that the main channel is through the threat of revolution or the pressure from the citizens towards the authorities to adopt higher quality institutions. Further, we empirically test the relationship between the quality of institutions, as it is captured by the Freedom House Index (FHI) and the Quality of Government (QoG) index, and education. Our findings illustrate the need of the reform programs to aim not only at institutional reform but, recognising the relationship between education and the quality of institutions, also at educational reforms that will increase the level of education in developing countries.

In Chapter 2 we discuss the relevant literature. The chapter starts with a review of the existing definitions of institutions and we adopt North's (1989; 1991) definition: "institutions are the . . . humanly devised constraints that structure political, economic and social interactions". We then discuss the existing theories

of the origins and the evolution of institutions that explain how a society may have obtained the existing institutions and whether the changes of institutions are a result of a centralised or decentralised process. Next, we discuss the role of education in the decision-making of the citizens.

From Plato and Aristotle to Hobbes, Rousseau and more recent scholars, many have emphasised the role of education in shaping the economic and political behaviour of the citizens. Following Almond and Verba (1989) and Putnam (2001) education has a significant impact on the economic, political and social behaviour of the citizens, increasing their political participation. Additionally, Welzel et al. (2003) argued that more educated citizens could more efficiently invest resources to "offset a regime's coercive power" promoting a more inclusive regime. Using panel estimation they show that education is positively associated with the stability of democracy. Similarly, Glaeser et al. (2007) contend that people who have achieved higher levels of education are more efficient in organising, coordinating, cooperating and communicating ideas. We adopt these ideas and we incorporate them into our model of the evolution of institutions presented in Chapter 2. Lastly, we present some empirical evidence of the relationship between education and various aspects of institutional quality and the existing models of institutional change that motivated our work.

In Chapter 3, following the discussion of education as a cause of institutional change, we build and discuss our model of the evolution of institutions. Our model describes a simple economy in which citizens produce and the dictator extracts revenue through a set of policies/institutions. The citizens may decide to revolt and the dictator's "fear of revolution" is the main determinant of the evolution of institutions. The model generates two scenarios.

The first, similar to the existing literature (Acemoglu and Robinson 2001), describes the case when the institutional change will follow a negative shock in the economy. However, the innovation of our model is that the magnitude of the shock sufficient to cause an institutional change depends negatively on the level of education in the society; the higher the level of education, the lower the magnitude of the shock sufficient to cause changes in the existing institutions.

The second scenario describes the case in which the dictator may adjust the existing institutions to avoid a revolution. The size of the change in the existing institutions necessary for the dictator to avoid a revolution depends on the combination of the state of the economy and the level of education. This case allows us to explain marginal, smoother changes in institutional quality and why some countries fail to adopt better institutions. Based on the mechanism described in our model, we predict that more education leads to improvements in the quality of institutions.

In the fourth chapter, we test the prediction of our model and present the results of our panel estimations. We use a panel dataset of developing countries to explore the determinants of institutional quality using the Freedom House Index as a proxy for institutional quality. In our system GMM estimation of the determinants of institutional quality, we control for income, education and other possible causes and we find that education and income have a positive impact on institutional quality. The results are robust to alternative estimation methods, as they are confirmed using two different methods of bias correction estimations (Least Square Dummy Variable Corrected and Bias-Corrected Fixed Effect estimators).

In Chapter 5, we use a cross-sectional estimation strategy to test our hypothesis. We use a regional dataset of EU regions to examine the determinants of

institutional quality, with a newly created index of the Quality of Government (QoG) as a proxy for institutional quality. Our IV estimates indicate that education and the level of economic development have a positive and significant impact on the quality of institutions. An innovation of our analysis is the use of atheism as an instrument for education. Additionally, we find evidence that supports existing political and social theories of the determinants of the QoG. Chapter 6 concludes.

2

Literature Review

"To define is to limit."

– Oscar Wilde, *The Picture of Dorian Gray*

2.1 Definitions of Institutions

A key aspect of the definition of institutions is that they are rules and these rules set the framework in which individuals act and interact. The rules can be social conventions or formal laws, but in both cases, they are known to the members of the society. One of the most widely cited definitions for institutions is the one provided by North (1990):

> Institutions are the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction. In consequence, they structure incentives in human exchange, whether political, social, or economic. Institutional change shapes the way societies evolve through time and hence is the key to understanding historical change (North 1990, p3-5).

North (1990) defines institutions as the rules that influence the interaction between players (humans). Additionally, North (1994) adds to this definition that "institutions are the rules and organisations and entrepreneurs are the players" (p. 361) and the interaction between the groups of individuals shape institutions. But, considering organisations (political parties, firms, unions etc.) as actors removes the conflicts that arise within organisations (Hodgson 2006). Such conflicts could determine "winners" and "losers" within the organisations and may have additional political and economic effects for the society or the country and as a result, may impact the evolution of institutions. However, depending on the scenario that the researcher examines, one may choose to define organisations as players, if the main interest is the political and economic system as a whole, or as institutions, when the internal conflicts and rules of the organisations may affect different outcomes.

Furthermore, North (1990, 1991, 1994) distinguishes between formal rules and informal constraints. Hodgson (2006) offers an extensive discussion regarding North's definition. The term "formal rules" corresponds to the laws and orders in a country "enforced by courts", while informal rules are those enforced by the society. Hodgson (2006) argues that the distinction between "formal rules" and "informal constraints" is confusing and a further distinction is necessary. Even if "formal rules" indicate laws and "informal constraints" indicate behaviour or habits, Hodgson argues that "If all rules are formal, and institutions are essentially rules, then all institutions are formal" (Hodgson 2006, p.11). Additionally, Hodgson maintains that North does not include any definitions that separate rules from constraints and, due to the vagueness that these terms create, he proposes they should be either abandoned or defined more accurately.

In conclusion, Hodgson (2006) defines institutions as "durable systems of established and embedded social rules that structure social interactions, rather than rules as such. In short, Institutions are social rule-systems, not simply rules." Hodgson (2006) offers a further distinction between "agent sensitive institutions" and "agent insensitive institutions". An "agent sensitive institution" is one that changes or is abandoned as preferences change, while the "agent insensitive institutions" are those not subject to preferences or the behaviour of the individuals. Compared to North's definition, Hodgson illustrates the importance of an individual's psychology and preferences in explaining the creation of institutions. He argues that some institutions are highly influenced by preferences, while others are set by hard constraints that leave no choice to the individuals. Consequently, some institutions – and institutional change – are influenced by the beliefs of individuals, while others determine the behaviour of people during their interactions (Hodgson 2004).

2.1.1 Levels of Institutions

Further to the definition, Williamson (2000) argues that institutions can be sorted in four levels.

The first level is "the social embeddedness level" and consists of norms, customs, traditions etc. Many scholars, examining the determinants of institutions and the effects of institutions on the economic performance of a country, consider this level of institutions as fixed as it takes centuries or even millennia for them to change. This level of institutions is what most researchers refer to as culture.

The second level of institutions according to Williamson is the "institutional environment" which consists of formal rules and laws. Level two is very important

for the economic performance of a region as it affects the productivity and the economic activities within a society. Institutional change at this level is also slow but may come through civil wars, such as the Glorious Revolution, breakdowns (Soviet Union) or a crisis (New Zealand).

The third level is "the institutions of governance". This level consists of all the rules that govern the contractual relations and these rules can be adjusted every few years, or whenever required, to minimise the transaction costs.

The fourth and final level is referred to as "the resource allocation". At this lowest level, we have the continuous adjustment of prices and quantities within an economy.

There is interaction between the levels defined by Williamson (2000) higher levels have an important role in the shaping of lower levels and there is some feedback from lower to higher levels; for example, level one has a significant role in the designing of level two, setting the constraints for the institutional environment of a society and level two in the shaping of level three etc. In turn, lower levels affect the higher levels, as they are the results of the higher levels' designing. However, as higher levels tend to change much more slowly than each subsequent lower level, this feedback can be ignored.

2.2 Creation and Evolution of Institutions

Apart from the definition of institutions another important subject is the factors that lead to the creation and evolution of institutions.

2.2.1 Origins of Institutions

Many of the early scholars that discussed the creation and persistence of institutions argue that institutions form and persist only because the ideas and the rules that they incorporate are to a large extent habits of the people (Dewey 1888; James 1892; Dewey 1922; Kilpinen et al. 2000). Dewey (1888, 1922) is one of the first scholars that discussed the creation and change of institutions. In his work "Human Nature and Conduct", Dewey argues that institutions emerge due to the fact that people tend to react in the same situation "in like fashion" and they persist because these rules, become social customs and are passed from one generation to the next. Additionally, Dewey (1922) argues that institutional change may come either due to "accumulation of stresses" or due to education. Education for Dewey is separate from training and he argues that adults have been given mostly training to adapt to a fixed set of rules that will allow them to interact with others and "meet old needs". Moreover, education gives a person the ability to acquire further knowledge and use this knowledge for social reconstruction.

Various authors argue that beliefs and habits have a significant impact on the creation and evolution of institutions. Searle (1995, 2005), argues that most institutions exist because people have particular beliefs and attitudes and these become a widely-accepted rule. On the other hand, Tuomela (1995) supports this theory but distinguishes between rules and norms. Tuomela (1995) argues that norms are the product of interactions between individuals with common beliefs, while rules are the result of agreements that are enforced by some authority. People form their preferences based on their beliefs and habits and preferences have a key role in determining the outcome of human interactions. Therefore, institutions are the result of conflicts or cooperation between people or groups

of people with opposing or common interests, or, as Sugden (2000) argues, the creation and evolution of institutions is a result of preferences.

The idea that institutions emerge due to habits can in part explain why they evolve slowly and tend to be sticky. However, if we accept that institutions are formed only because of habit and a rule-following behaviour, we remove from the definition of institutions the intentionality. It is a fact that many behaviours form due to the intentions and expectations of the people during different forms of interactions. As a result, some of the institutions that emerged and persisted through the years are a result of good or bad intentions; one example is the two-term limit for the US president. Though the US Constitution established in 1789 did not include term limits for the presidency, it became a tradition when George Washington decided not to be a candidate for a third time.

> . . . in the opinion of this House, the precedent established by Washington and other Presidents of the United States, in retiring from the presidential office after their second term, has become, by universal concurrence, a part of our republican system of government, and that any departure from this time honored custom would be unwise, unpatriotic, and fraught with peril to our free institutions" (U.S., Congress, House Congress, House, Congressional Record, 44th Cong., 1st sess., 1875, 4, pt. 1:228)

Term limits were a tradition in many US states prior to the establishment of the Constitution and they were regarded as a way to protect democracy and the states from oligarchies. As a result, rotation in office was regarded by voters and officials as natural (Struble 1979).

In the field of the origin of institutions, there are four major views: the efficient institutions view, the social conflict view, the ideology/beliefs view and the incidental institutions view (Acemoglu et al. 2005).

First is the "efficient institutions view", following from the above, according to this view social groups or individuals that maximise their surplus are influencing the existing institutions. One institution (e.g. property rights, the rule of law etc.) is established when the costs are less than the benefits that the groups are facing. Consequently, if the current conditions in societies are beneficial for a certain group but negative for another, these two groups can negotiate and through the negotiations may change the institutions or create new ones, increasing in this way the total surplus. According to "efficient institutions view", the differences in institutions between countries arise from the different characteristics that each country has. No good or bad institutions exist, but only those that are efficient in particular places and times, or not; while an institution may create significant benefits for one country or a society, it might have the opposite effects in another.

The second view is "the social conflict view". Following this view, the institutions may appear as choices of groups, but the major difference with the first view is that institutions are not necessarily efficient. This interpretation, origins from the idea that institutions are shaped mostly by the social groups that hold political power and these groups are making choices in order to increase their own benefits, so in some cases, the emerging institutions may not maximise the total surplus. Schumpeter (1934) describes another aspect of the process of economic growth which is called "creative destruction" that is to some degree based on this view. Economic growth will destroy economic relationships, businesses and sometimes individual incomes by introducing new technologies or institutions and creating new companies that will replace the existing. This process creates a natural social tension, even in a growing society. Simon Kuznets (1957) as cited in Acemoglu (2008) discussed that growth and development are often accompanied by sweeping structural transformations, which can also destroy certain established relationships and create in the process winners and losers.

Greif (2007) offers an example, which supports this view, with the analysis of the origin of constitutionalism. Constitutionalism, or in other words the rule of law, refers to a set of rules that may constrain the government or those who hold the power. Greif (2007) emphasised that constitutionalism evolved due to the need of the ruler for administration; in other words for a group of people to implement policies and monitor the society. This group of people acquired administrative power - political power - and was, therefore, able to negotiate with the ruler, disregarding the non-elite. Furthermore, all the institutions that evolved afterwards were protecting and improving the benefits of the elite.

The third view is "the ideology/beliefs view", which focuses on the role of beliefs that the individuals in a societiy have, in the procedure of influencing the institutions. This view is based on the impact that beliefs may have in the incentives of a society and is linked with the role of culture in the shaping of institutions and the performance of an economy. A major barrier regarding this field of research is the difficulty in measuring this variable and the fact that many individual researchers have different views. Nonetheless, many economists share the view that ideology and beliefs in a society are a significant factor for the set of institutions that exist in a society and the path that the society is following.

The fourth and last of the views regarding the origins of institutions is "the incidental institution's view", which indicates that institutions are a result of the interaction within societies, rather than choices of social groups. As people interact some institutions may form without this being the intention of the individuals participating (Nelson and Winter 1982; Young 1998; Acemoglu 2003; Acemoglu et al. 2005).

We can argue that due to the diversification of societies around the world, the different cultures and historical origins of the countries, we may find evidence to support each view in different cases.

Following the above, a reasonable question is whether it is credible that institutions exist that halt the economic progress of society. Acemoglu et al. (2005) mention that there exist two answers to this question: The first is that there are "multiple equilibria" and the society may have reached an equilibrium with inefficient institutions that do not stimulate growth. However, we can argue that, based on the Coase theorem (Coase 1937), if an equilibrium exists that can make all the individuals better off, through an institutional change, it is very unlikely that the society is unable to cooperate for extended periods of time. Nevertheless, the Coase theorem assumes perfect markets and costless transactions and negotiations which are non-existent in the real world (Coase 1960), thus a society may reach an equilibrium with an inefficient set of institutions when the transaction costs are too high.

The second answer is based on the "conflicts of interest within a society". According to this view changes and advances of institutions creates two groups in a society: winners and losers. The implication of this is that a part of the society, which is strong enough, may block reforms in order to keep their "share of the national pie" and also prevent or decelerate growth. The role of the power of a group is very important in examining the role of institutions on the economic performance of a society and we will return to this later, after presenting the different views of the creation of institutions.

2.2.2 Theories of Institutional Change

The role of institutions and institutional change in the economic performance has received much attention during the past decades, but, as it was discussed earlier, there is no general agreement on either the definition of institutions or the process of the evolution of institutions.

The literature on institutional change can be grouped into two broad categories (Kingston and Caballero 2009). First, the theories in which institutions are created, centralised (by an individual ruler or a government) or by interactions between individuals or groups of individuals that try to implement or block institutions for their own benefit. Second, the theories of "evolutionary" change where the process is decentralised and new institutions are created spontaneously, without the coordination of individuals. Both approaches are useful and the researcher may apply them to different settings.

Centralised Institutional Change

The theories of centralised institutional change consider institutional change as a process in which the new policies and rules are set by the state or groups of individuals during political or economic interactions. Ostrom (2005, p. 254) outlines the process of institutional change "...appropriators ...have to conclude that the expected benefits from an institutional change will exceed the immediate and long-term costs." The author continues stating that the need for cooperation and organisation depends on the current institutions, for example in a dictatorship in which the ruler has absolute power, the decision of the ruler is enough to implement a new policy, while in a democracy the vote of the majority is needed for a new rule to be applied. Additionally, Ostrom argues that the incorrect

beliefs or imperfect information of the individuals participating in the bargaining or negotiations regarding the institutions and the effects of the proposed changes may block the attempts of society to reach an efficient set of institutions that allocate resources efficiently, promotes economic activities and does not restrict access to political power.

Focusing on a specific institution, Libecap (1999) examines the formation and evolution of property rights. He describes property rights as "essential social institutions for combating the potential wealth losses associated with the common pool." Following the work of Thomas Hobbes (1651), John Locke (1689) and Jean-Jacques Rousseau (1762), Libecap argues that property rights are a form of a contract that constrains the competitive behaviour of individuals and their importance lies in their role for the efficient allocation and use of resources. Individuals negotiate sets of rules to successfully protect their property and as a result, the level at which property is protected creates positive or negative externalities; secure property rights allow for investment and trade that promote economic growth while when the property is not effectively protected such economic interactions are impeded. This implies that competitive forces affected by the existing property rights may demand changes or adjustments. Institutional change then comes as a cost/benefit analysis.

However, this does not necessarily mean that the new set of institutions will be more efficient than the existing one. The new set of institutions will depend on the bargaining and negotiations between the individuals. This is supported by Alston et al.'s (1996) research that examines the determinants of property rights in Brazil. Alston argues that the evolution of these institutions depends on the negotiations between demanders (the members of a society) and the suppliers (the government or other political actors). Their findings show that institutions

change not always because it is efficient, but in many cases as the government responds to the interests of different political factors, such as electoral demands or the benefit of special interests groups. On the contrary, the economic or political power of the individuals or groups of individuals participating in the negotiations plays an important role in the shaping of the institutions. One problem of the centralised views of institutional change and the collective-choice process is that they cannot explain the creation and persistence of the "informal constraints", following North's (1991) definition. In particular, the centralised theories of institutional change can explain how lawmakers set up rules that benefit the society and the economy, such as property rights, but they fail to explain why and how some "informal institutions", those not bound by the law, are created or abolished without deliberate action.

Decentralised Institutional Change

In decentralised institutional change theories or evolutionary theories of institutional change, "there is no central mechanism which causes a coordinated shift in the rules perceived by all players, or in their behaviour or beliefs" (Kingston and Caballero 2009, p. 160).

Kingston and Caballero (2009) argue that under the evolutionary theories of institutional change new rules or institutions are created unintentionally or randomly and as a result, successful institutions survive while unsuccessful ones are replaced but this process is not coordinated. In many cases, these changes are the result of changes in the "habits of thought" (Veblen 1899).

North's (1990) work has influenced many scholars who examine the evolution of institutions. North's "formal rules" and "informal constraints" shape the interactions within a society and through these interactions affect the set of

existing institutions in a society. North (1990) argues that changes of formal or informal rules can be the result of changes in technology or preferences and these changes can be abrupt or gradual (North 1990, p. 101).

North's ideas gave birth to the "Equilibrium view" of institutional change. One of these presents the set of institutions in a society as a matter of which equilibrium the society chooses based on their beliefs and preferences (Knight 1995). In most cases, different individuals or groups of individuals will favour different institutions depending on how these institutions benefit them. As a result, the evolution of institutions is driven by the beliefs, behaviour and preferences of the individuals with the most bargaining power. Additionally, the bargaining power can be affected by the set of existing institutions. Levi (1990) argues that some institutions may allocate power or benefit certain groups of people within a society creating "winners" and "losers". However, this process may create tension within the society and if the "losers" coordinate and cooperate they can "revolt" against the existing set of institutions. Institutions and institutional change, therefore, affect and are affected by the expectations of the individuals regarding the outcome of various transactions or interactions within the society. As a result, institutional change and the new institutional equilibrium can be the result of a change in expectations and preferences.

2.2.3 The Role of Political and Economic Power

Following North's definition institutions determine and are determined by the interactions of the players in economic and political activities. Moreover, theories of institutional change describe that the creation and evolution of institutions are driven by a net benefit analysis; when the economic political and social benefits of an institutional change exceed the costs then the transition to a new set of

institutions is possible. However, it is reasonable to wonder whose costs and benefits matter. The political and economic power that some players hold has a significant effect on the process of the creation and evolution of institutions. Acemoglu and Robinson (2000) and Acemoglu et al. (2005) describe the political power and the role in the process of forming institutions. They state that political power may come from two different sources, so they distinguish between two types of political power.

First, an individual or group can be allocated de jure power by political institutions. The second type of political power accrues to individuals or groups if they can solve the collective action problem, create riots, revolts, or demonstrations, own guns, etc. We call this type of power de facto political power (Acemoglu et al. (2005), p. 448).

With the term de jure Acemoglu et al. (2005) describe the political power that is allocated to some individuals due to the institutions, for example a democratic country gives political power to the president – if it is presidential – or to the parliament – if it is parliamentary – and similarly in a monarchy the head of the state that holds political power is the king or the queen. On the other hand, "de facto" political power arises from the distribution of resources or the ability to solve the collective action problem. From this definition, it arises that wealth is not the only determinant of de facto political power. The collective action problem refers to people failing to work together to achieve a common objective and was discussed by Hume (1739) in his work "A Treatise of Human Nature" and later developed by Olson (1965). Lohmann (2003) discusses the inefficient outcomes of the collective action problems and argues that information is important in solving a collective action problem. Some voters do not understand - or it is too costly for them to evaluate - the implications of the policies implemented by the government.

An important aspect of this process is the level of education that an individual has. As Almond and Verba (1989), p. 315-316) write in their seminal book "The Civic Culture":

As in most other studies of political attitudes, our data show that educational attainment appears to have the most important demographic effect on political attitudes. Among the demographic variables usually investigated – sex, place of residence, occupation, income, age, and so on – none compares with the educational variable in the extent to which it seems to determine political attitudes. The uneducated man or the man with the limited education is a different political actor from the man who has achieved a higher level of education."

Similarly, Putnam (2001) argues that:

Education is one of the most important predictors – usually, in fact, the most important predictor – of many forms of social participation – from voting to associational membership, to chairing a local committee to hosting a dinner party to giving blood.

As the role of education in the evolution of institutions is the main focus of this thesis we will return to this topic to discuss it separately in more details.

Acemoglu et al. (2005) continue describing the process during which institutions are shaped emphasising seven points. The first point is the preferences of individuals regarding economic institutions due to the latter determining the allocation of resources. Second, due to different preferences within the society, social conflict arises, which determines winners and losers. The third is the commitment problem of those who hold the political power; which arises from the fact that those who hold the power cannot commit not to use it for their benefit. Fourth,

political power determines economic institutions and the allocation of resources. In the fifth and sixth point, they describe the de jure and de facto political power and finally, the fact that political power is also endogenous, which means that future political power is affected by the economic institutions and the distribution of resources.

Acemoglu et al. (2005, p. 392) illustrate the process of how political institutions interact with economic institutions and affect economic performance in Figure 2.1 below:
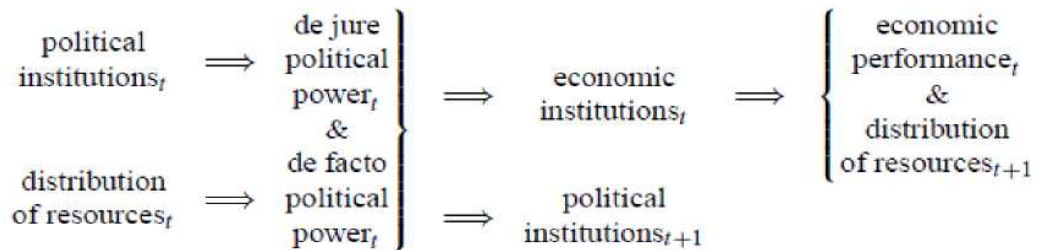
Figure 2.1 Illustration of the relationship between institutions. Source: Acemoglu et al. (2005, p.392)

In this framework, we have two state variables: political institutions and the distribution of resources, which means that for any period t, if we know these two variables we are able to determine all the other variables in this dynamic system, by following the above mechanism. "Economic institutions are endogenous" as they are the result of the choices that social groups make. However, in most cases, there will be a "conflict of interest" among social groups. The equilibrium that determines the economic institutions depends on the involved groups and in spite of the fact that the efficiency of the economic institutions may influence the decision made, the key player in the conflict will be the group that has more political power.

As mentioned above political power takes two forms regarding its origin: de jure political power (institutional) and de facto political power. Those who

hold political power at period t are able to influence the political institutions of the future. Economic institutions shaped at period t determine the economic performance at the current period and through this the distribution of resources at the period $t+1$ (t refers to current period and $t+1$ to the future).

Under this framework we can observe two sources of persistence since political institutions are more difficult to change through time, the distribution of political power has to change a lot in order to pass from a political regime to another; an example is a shift from dictatorship to democracy. Furthermore, when an individual or a group in a society holds a large portion of the wealth of the nation, it subsequently increases its political power (de facto) and thus its influence on the shaping of political and economic institutions, allowing for big differences in the distribution of resources within a nation. However, this model allows shocks, such as in technology or social changes, to "change the game" and lead to very different paths.

Greif (2007) investigated the relationship between constitutionalism[1] with economic prosperity, focusing on the inability of constitutionalism to properly protect property rights. As the author mentions historical evidence suggests that constitutionalism "emerged in order to facilitate cooperation among the powerful." Furthermore, according to the author, constitutionalism is not a tool to achieve equilibrium, on the contrary, it is a result of some equilibria in which the ruler in order to control those with administrative power, had to take into consideration their preferences when designing policies. The main assumption of Greif's analysis is that in the absence of administrators, ruler's decisions are simple wishes, as the administrators are directly involved in the enforcement of those policies. The

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[1]In Greif's (2007) work Constitutionalism has the same meaning as the Rule of Law. Particularly, Constitutionalism is the idea that there should exist established limits to what those who hold the power can do, i.e a constitution

administrative power arises from the fact that administrators have the ability to defy the ruler's decisions.

According to Greif constitutionalism emerged from the need to properly manage the relations between the rulers and the administrators. In other words, following Acemoglu's analysis of the relationship between political and economic institutions using de facto and de jure political power, we may argue that constitutionalism is the response of the society to the de jure political power of administrators. Moreover, administrative power and the link with constitutionalism help us understand why constitutionalism is negatively related with economic prosperity in many cases. Namely, when the administrators are very powerful and cannot be controlled by the rulers, the result favours the elite. On the other hand, when the preferences of administrators line up with economic growth, constitutionalism is positively correlated with economic welfare. The author commented on the final part of his research that his analysis is based on historical facts, rather than systematic empirical evidence, so it would be valuable to attempt and approach this topic empirically considering also geographic and cultural factors that may impact this relationship.

2.2.4   Summary

Institutions are the way that societies are organised and this is what it makes them vital for the behaviour of economies and can be distinguished in two types, political and economic institutions. If we base the description of each type of North's definition for institutions, political institutions are the "rules of the political game" and are those that determine in a society the distribution of political power and the way that political power changes hands. Examples of political institutions are electoral rules, accountability, political stability, the rule of law, the number of

veto players, presidential or parliamentary system, years in the office etc. Similarly, economic institutions can be defined as the "economic rules of the game" and are those that determine economic opportunities in societies. Examples of economic institutions are property rights, the type of credit arrangements, and commercial law. In addition, economic institutions influence economic activities as they shape incentives and have a significant impact on investments and production.

For the purpose of this thesis, we will focus on the second and third levels of institutions as defined by Williamson (2000). The reason is that these are sets of rules and policies that are important for the economic performance of a country and flexible enough to allow for the designing of policies to promote economic activities. Moreover, despite the criticism and flaws of North's definition, we believe it is adequate and for the purpose of this thesis, we adopt the definition provided by North (1990) "Institutions are the rules of the game in society or, more formally, are the humanly devised constraints that shape human interaction."

Furthermore, there are two main theories of institutional change. The first argues that the process can be centralised, meaning that it is the result of negotiations and the new rules are formally implemented. The second considers that it is decentralised; existing institutions depend on the preferences of individuals and new rules emerge due to uncoordinated actions of many individuals and changes of their preferences. Despite the fundamental difference between the two theories, both of them recognise that shocks and changes in other exogenous parameters such as preferences and technology may lead to changes in institutions. Additionally, these theories conceptualise institutional change as, in most cases, a process based on a net benefit analysis. This means that new institutions will be created and old ones will be abolished whenever the benefits exceed the costs of doing so. However, in some cases these changes will not always be efficient; rather

individuals or groups of individuals with the most political or economic power may determine the outcome to their own benefit.

2.3 Models of Institutional Change

In this section, we present some of the models of institutional change. Some of the models focus on the role of inequality and the allocation of natural resources, while others put emphasis on the role of economic recessions in institutional change.

A common characteristic in most models of institutional change is that the creation, persistence and abolition of institutions are based on a net benefit analysis; the agents compare the costs and the benefits of creating new institutions and when the benefits exceed the costs, new institutions are created. But, as mentioned before it is not always the most efficient set of institutions that survives; the agents experiencing the costs and benefits must be capable of doing something to improve or prevent a deterioration in their position (Acemoglu et al. 2001; Engerman and Sokoloff 2002; Glaeser et al. 2004; Banerjee and Iyer 2005; Glaeser et al. 2007).

One of the first mathematical models focusing on the role of revolution in institutional quality is developed by Grossman (1991). The author builds a framework to illustrate how the threat of revolution may lead the ruler to change the existing rules and policies to avoid a possible revolution.

The economy consists of a large number of identical peasant families and the representative family decides how to allocate their time between labour, soldiering and participating in insurrection. The ruler enforces tax collection, employs soldiers to suppress revolutions and maximises the income of the elite. The model

is probabilistic as the probability of a successful revolution depends on the time people allocate to insurrection, soldiering and the technology of insurrections.

The ruler's policy instruments are the fraction of income that is extracted from peasants and the wage and number of soldiers hired. The elite's income is equal to the rent extracted from peasant families minus the cost of soldiers. In this model, the income extraction from peasant families measures the quality of the existing set of institutions. A good set of institutions is one that promotes economic activities and seeks to efficiently allocate resources in the society. The optimal tax rate for a dictator who maximises the elite's income is different from the optimal tax rate that maximises the social benefit or the performance of the economy. For example, in an economy with no corruption, secure property rights, rule of law and in general what is regarded as "good institutions", the ruler or the elite will not be able to extract the same amount of revenue - if any at all - from peasant families.

In contrast, a set of "bad institutions" may allow for higher extractions for the benefit of the elite. Based on the policies decided by the ruler, the representative family maximises its income by allocating their time between, labour, soldiering and insurrection. For a low probability of insurrection and up to a threshold the ruler can choose a set of policies that eliminate the threat of revolution. On the other hand, when the technology of insurrection becomes more efficient, families allocate more time to insurrections as the expected benefit increases. Similarly, when the tax rate is very high the representative family has fewer incentives to allocate time in production and shifts to insurrection, increasing the probability of a successful insurrection. The model implies multiple equilibria that all depend on the technology of insurrections, generating different sets of optimal policies for the ruler and different levels of political stability.

A model that describes the democratisation of the West and the role of inequality is developed by Acemoglu and Robinson (2000). Similar to the model developed by Grossman (1991), the economy consists of the poor and the elite. There is one final good produced using two different methods: the traditional method and a more efficient technology intensive method. The total amount of capital in the economy is shared between the two methods.

Only the elite participates in the political decision, but the poor can decide to revolt and redistribute the resources. The decision of both agents is based on a cost/benefit analysis; the elite will decide how to redistribute the resources and extend the franchise and the poor whether to revolt or not when the benefits exceed the costs. The extension of the franchise means that more people will have access to political power. This could be either achieved by allowing access to a certain group of the population, creating a middle-class or to the whole population, thus transition to a democracy.

Compared with Grossman's model in which the probability of revolution is endogenous and depends on the decisions of the two groups, in this model, the cost of revolution which determines the threat of revolution for the elite depends on the state of the economy – whether there is a recession or not – which is stochastic and captures the fact that social unrest is more likely during some periods than others.

The model generates equilibria in which the set of policies depends on the threat of revolution which in turn depends on the state of the economy. Whenever the cost of revolution is high (during normal times) the probability of revolution is low and the elite has no incentive to extend the franchise. On the other hand, when the cost of revolution is low (during recessions) the probability of revolution is high and the elite has more incentive to extend the franchise.

A different explanation of the democratisation of the West is presented by Bourguignon and Verdier (2000). The authors develop a two-period model in which institutions depend on the political participation and political participation depends on education.

The economy is populated by two groups, the elite that has a high income, high education and interest in political participation and the people with low income, low education and no interest in political participation. Political participation depends on the level of education that individuals have accumulated in the first period. This implies that compared to the other models presented here, the access to political power is not restricted, at least directly, rather the uneducated population decides not to exercise it. Both sets of agents decide whether to get educated or not based on the net benefit of education which consists of a fixed cost (unity) and a private return and a public return (externality). Only a member of the elite can cover the cost of education. The economy has no capital market and borrowing is not allowed so that the people cannot afford to get educated on their own.

However, the members of the elite may decide to cover the cost of education for some people. For this to happen the public benefit has to be larger than the cost of education and the loss of political power for the members of the elite. As a result, the elite can decide whether to subsidise or block the education of the people. In this way, the elite can create a middle class and determine the political and economic progress of the society.

The model generates five different equilibria. In the first, the elite decides not to subsidise the education of the poor, which results in oligarchy and no economic growth. Second, the elite covers the cost of education for a very small fraction of the poor and creates a small middle-class and low growth. Third, the

elite subsidises the education of the people up to the point where the political power remains in their hands generating medium growth. Fourth, the elite extends the franchise, the political power is transferred to the middle class, but the elite is big enough so that they are not eliminated. Lastly, the public benefit is large enough and the elite allows the transition to a democracy with fast growth.

The model implies that the democratisation of the West may have happened because the elite recognised that subsidising the education of the people and extending the franchise would generate large economic benefits that would exceed the costs. In addition, democratisation depends on the initial levels of inequality and the magnitude of the public benefit of education. Higher initial inequality means that the elite has higher incentives to educate the people and generate more income, while the larger the public benefit of education is the more people the elite will decide to educate, creating a middle class.

The mechanism of the transition of a society from a non-democratic regime to a democratic one (or vice versa) is modelled by Acemoglu and Robinson (2001). The authors extend their previous model (Acemoglu and Robinson 2000) to explain political transitions using a game-theoretical framework in which the main driving force is the cost of revolution (or the cost of a coup).

The economy consists of the same groups, the elite and the poor, there are two possible regimes, a non-democratic one where the elite sets the tax rate and a democratic regime where the median voter (poor) sets the tax rate and one final good produced using a unique input. Similar to the previous model, income is stochastic and depends on the state of the economy and the cost of revolution (or coup d'état) depends on income. As a result, revolutions can only happen during recessions as the cost of revolution is lower. The economy is represented as a repeated game between the elite and the poor and the equilibrium is determined

by the state of the economy, the existing regime and the set of policies determined within the same period.

Focusing on the case of a non-democratic regime, the elite decides whether to extend the franchise and sets the tax rate and the poor decide whether to revolt or not. Similar to the previous results, the threat of revolution is higher and political transition more likely during recessions as the cost of revolution is lower and individuals have less to lose. Another implication of the model is that in non-democratic regimes inequality increases the threat of revolution and is consequently associated with political instability.

Another of the few models of institutional change that includes some form of education is presented by Cervellati et al. (2008). The model allows for two different political systems with a different allocation of political power; oligarchy and democracy. Oligarchy excludes citizens from voting and restricts their access to political power, while democracy is an inclusive regime and the citizens have the right to vote. An implication of the above is that the political decisions in the two regimes are taken and applied by different agents, the member of the elite under an oligarchy and the median voter (a citizen) under democracy.

Additionally, the set of institutions that guide all interactions in the economy reflects the group with the most political power. Under oligarchy the risk of expropriation is higher, the elite may manipulate the authorities for their benefit and the allocation of resources may be highly inefficient. In contrast, democracy is characterised by rules and policies accepted by the majority.

Compared with the previous models, this is an overlapping generations model in which we have two generations (old and young) in every period and two groups in every generation (elite and people). All agents derive utility from consumption only, meaning that maximising their income is sufficient for maximising utility.

The young generation acquires human capital during the first period using time only and adults produce and consume. The elite is endowed with land which initially means that their income is higher, implying an initial level of inequality depending on land endowments. The production of the one final good of the economy is similar to the model presented by Acemoglu and Robinson (2000). There are two methods of production, a traditional one which requires natural resources and a modern one that is human capital intensive. The distribution of income is a result of a conflict game. Both groups decide whether to support or not the existing regime.

The economy is competitive and labour moves freely between the two methods of production that implies that the two sector wages are equal and the wages, the return on human capital and rent on land are all equal to their marginal product. The model predicts three different political outcomes based on whether a social contract, as it was defined by Hobbes, Locke and Rousseau and was discussed earlier in this chapter, exists or not (state of nature) in the equilibrium. The first case is when both groups, the elite and the people, decide to revolt against the existing regime and the result is the state of nature where there is no social contract. The second when only the elite holds the political power and the third is a democracy.

The stability of the regime depends on the level of inequality and human capital. Accumulation of human capital and technological progress make the initial resource endowment less important for the production of the final good. Technological progress increases the effectiveness of human capital and its return, decreasing at the same time the relative return of rent. As a result, people shift from the traditional sector of production to the modern. This implies that as people acquire human capital, inequality decreases and as people get more income

their political and economic power increases and the economy will shift to a more inclusive regime. Oligarchy prevails when inequality is very high so that only members of the elite can influence the political process or when conflict is very costly. In contrast, high levels of human capital and low levels of inequality make the transition to democracy more likely.

Similar to previous models, Cervellati et al. (2008) illustrate under what conditions an oligarchy is the "preferred" equilibrium of the society; when the costs of transition are very large. On the other hand, the authors do not explicitly model the costs and benefits of transitions. The costs are exogenous and the focus of the model is on the role of inequality and education. Initially, inequality increases the power of the elite as they have land endowments. The role of education is to decrease the impact of endowments in inequality by increasing the productivity of the people and, as a result their income which subsequently determines the allocation of the power in the economy.

The last model presented in this section is developed by Acemoglu (2006) to explain how the preferences of those who hold the political power lead them to choose inefficient policies resulting in inefficient institutions.

The economy consists of three groups: the workers, the middle-class and the elite. The workers' only role in the model is to supply labour (inelastically) meaning that the specification is almost identical to the models presented earlier. The middle-class and the elite compete in production but the elite holds the political power and can influence policy decisions. The elite can extract revenue from the middle-class setting a tax rate either on their income or on the prices of the production inputs. Due to the political power it holds, the elite can set the tax rate at or beyond the peak of their Laffer curve to maximise their revenue and impoverish the middle-class and restrict their access to political power.

The set-up of the model is very similar to the one developed by Grossman (1991) where the ruler, the elite here, sets a tax to extract revenue from the peasant families, middle-class, to maximise the elite's income. The model generates different Markov Perfect Equilibria (MPE) depending on the set of policies decided in each period. However, the elite cannot commit to any policy they announce before the middle-class moves, as they hold all the political power and can choose the maximum tax rate in the end (hold-up problem). This means that the MPE are no longer the only subgame-perfect equilibria (SPE). The implications of the holdup problem are important for the solutions generated by the model as they affect the investments made by the middle-class. For example, with no risk of expropriation, the middle class may decide to make an investment that generates a public benefit. With the holdup problem, the elite and the middle-class must coordinate and cooperate to make the investment possible and reach an equilibrium.

2.3.1 Case Studies

The role of institutions has been under the microscope of scholars for many decades and in many disciplines. A well-known example of the role of institutions is discussed by Acemoglu et al. (2005) and regards the separation of Korea as a "natural experiment" that demonstrates the importance of institutions.

Korea was under Japanese rule from the beginning of the 20th century until the end of World War II, upon the Japanese defeat in 1945. Separation of Korea was the result of a political game between the Soviet Union and the United States of America. After Korean independence, Soviet forces took over control of a part of the Korean peninsula and the United States afraid of the prospect of the complete control of the Korean peninsula by the communists, supported a

nationalist ruler, Syngman Rhee, who preferred the separation to a communist leader for Korea.

After the elections of May 1948 Korea was separated and two states were established, the Republic of Korea to the south, that followed a more capitalistic type of government, protecting private property and allowed markets to be driven by private incentives, and the Democratic People's Republic of Korea to the north, following a Soviet socialist type of government, eliminating private property and market decisions instructed by the state. Before separation, as Acemoglu et al. (2005) argue, Koreans shared the same culture and history and the country had very little heterogeneity. North Korea had more natural resources and was more industrialised, since the Japanese occupation, however, both had the same GDP per capita in 1945. Therefore, the separation may serve the research for the effects of institutions since the only differences that could affect the economic performances were the different institutional paths each Korea followed.
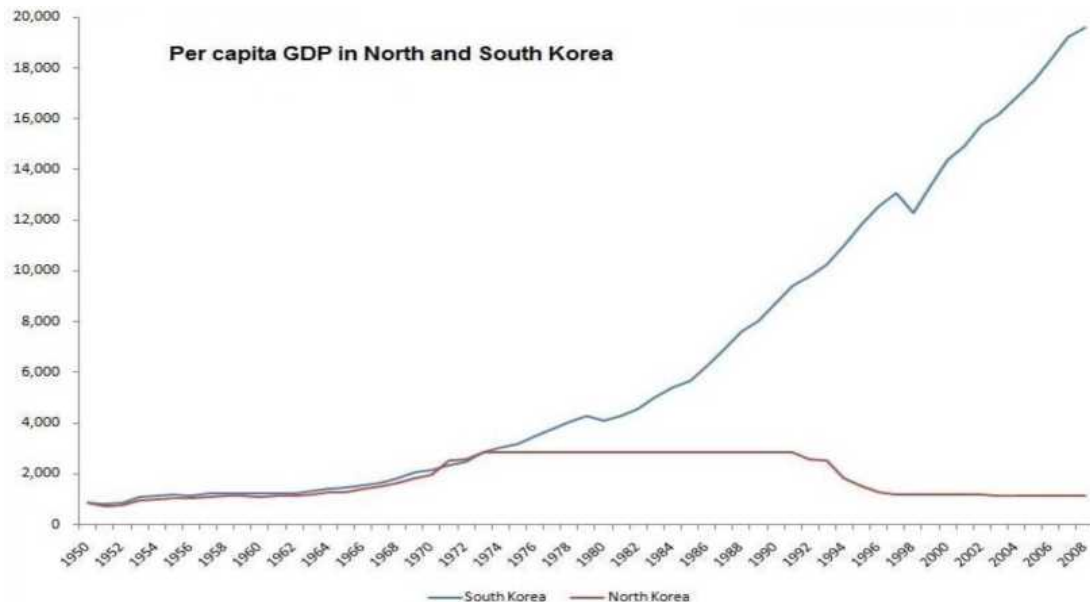
Figure 2.2 Economic Growth of North and South Korea, 1950-2008. Source: CIA World Factbook

As you can see in Figure 2.2 the two Koreas till the early '70s had the same income per capita level but from mid-'70s and after the paths of their economic performance separated. South Korea grew rapidly achieving remarkable growth rates, while North Korea remained at almost the same level of income. By 2000 South Korea's GDP per capita was 15 times greater than North Korea's. This natural experiment provides us with an indication of the importance of institutions in the economic performance of a country. The large difference in the income level of the Koreas can be directly related to the different institutional paths each one followed, but, it is not enough evidence to establish a theory of institutions as the key determinant of economic performance.

Europe during the Middle Ages is another example of how institutions affect the economic performance. Acemoglu et al. (2005) state that ". . . political institutions at the time placed political power in the hands of kings and various types of hereditary monarchies, such rights were largely decided by these monarchs." However, political authorities of that time did little to protect the property of others, while they were protecting their own and in many cases, they expropriated producers and enforced unreasonable taxation in order to gain more political power. Therefore, institutions of the Middle Ages did not provide incentives to invest in land or human capital and failed to promote growth, while enforcing and ensuring that the political power would remain in the hands of the elite.

Conversely, during the seventeenth century major changes took place, that largely altered economic and political institutions and paved the way towards a political regime where the elite would have less political power, particularly in England and in the Netherlands after the Civil War of 1642-1651 and the 'Glorious Revolution' of 1688 in the former and the Dutch revolt against the Spanish in the latter.

The political transition of Britain, Argentina, Singapore and South Africa offers some insights into the origins of democracy (Acemoglu and Robinson 2006). According to their findings, Britain followed the path of "gradual democratisation" because the nature of political and economic institutions was such that they put pressure on the elite to accept democratisation, forcing an understanding that trying to prevent it would cause significant costs. Changes in political institutions during the 17th century, such as the limitation of the power of the monarchy and in economic institutions, such as the end of feudalism in the 15th century, had a significant impact on British society, allowing the improvement of economic institutions, established property rights.

These changes led to the Reform Acts of 1832 and 1867 when more social groups in Britain gained political power and were able to influence decisions. These facts led the British society to demand changes in the structure of the political and economic system of the country, which drove the House of Commons in the mid-19th century. The elite would have suffered large costs if they had attempted to suppress the change. Subsequently, during the 19th century, the democratisation of Britain occurred, which allowed the institutional structure to shift to a more beneficial form, creating incentives for continued economic expansion.

Argentina, on the other hand, faced various uprisings due to economic crises at the beginning of the last century, and as inequality was growing the need for a change towards a more democratic governmental system was apparent. Argentina's economy was based on agricultural exports and with the expansion of exports that occurred during that period, only a few members of the society benefited. The institutional structure of Argentina, established by the elite, was not supporting the democratisation of the country, for example, people could

avoid conscription if they did not register to vote and as a result, the middle class was under-represented in elections (Díaz Alejandro 1970).

During the 20th century, attempts by social groups and the army did not achieve significant results towards the democratisation of the country, due to the benefits of a non-democratic government being more than the costs that the elite would have. The efforts of the social groups demanding democracy were successful towards the end of the 20th century following the unsuccessful invasion of the Falkland Islands which discredited the military dictators and democratic stability came in Argentina during the 1990s.

A key role in this evolution was played by the fact that a large portion of the Argentinian society became educated. Following Peron's regime and his "5-year-plan" Argentina experienced rapid growth, GDP per capita increased by 25% (Maddison 2001) and increased levels of schooling, at the beginning of the 20th century only 3% of the population had attended secondary school which increased to 23% in the '40s, above 50% in the late '80s and more than 90% in the '90s (Auguste et al. 2008). This created a more educated middle class that helped the country to shift from a military dictatorship to a more stable democracy in the mid-'90s.

On the contrary, Singapore did not democratise. This happened because of the absence of inequalities in the society, according to the evidence. The economy of Singapore depends mostly on foreign capital, which with the absence of a privileged group in the society, satisfies the majority of the people, or at least prevents them being unhappy enough to risk changing the status of the country through a revolution. However, further economic development and possibly higher levels of education may eventually create a group of people that will require more democratic political institutions, leading Singapore to democracy.

Lastly, in South Africa, democracy and education delayed because the elite would suffer huge losses. As a settler colony, South Africa had some similarities with other Dominions. The difference was that the white elite through the creation of a philosophy, apartheid, justified the inequalities in the society and the controlling of the indigenous Africans. The rapid growth of South Africa though made the indigenous majority more vital to the system and the further development of the economy. This fact gave power to the indigenous and eventually made the apartheid system unsustainable. Under these circumstances and with the increased international demands for a fairer political structure in South Africa during the 1970s, pushed the white elite to negotiate a democratic political structure. After the end of apartheid the indigenous gained access to free public education that led to an increase in the level of education in the society, the political institutions became more inclusive and the economy kept growing at an average of about 3% per year during the 90s (Cliffe 2000; Atuahene 2011)

Despite the fact that many recognise that Britain was a successful economy during the 18th century and have identified the institutional changes that paved the way towards the Glorious Revolution and the Industrial Revolution later, there are but a few papers that examined the institutional origins of the Industrial Revolution. According to Mokyr (2008), the lack of relevant research on this topic is a result of two different types of confusion that may be identified in the literature. The first is the distinction between the events that took place in Britain before the Industrial Revolution and the events that took place in the rest of the so-called "West".

In particular, if someone emphasizes on the Glorious Revolution or the presence of large amount of mineral resources in a country, while attempting to identify the fundamental causes that led to the Industrial Revolution, they may

be able to explain the cases of Britain or Belgium, however it would be impossible to find any evidence for, say, Saxony and other European areas. On the other hand, if someone focuses on the Enlightenment and the role it had in the events that followed, she may properly explain the Industrial Revolution and its causes for many European countries, but will fail to identify the reason that put Britain in the lead at that time. The second source of confusion arises from the fact that the "...literature focuses on formal institutional transformations, in which the Crown committed to respecting property rights, enforce contracts and reduced transaction costs and uncertainty." This view allowed economists to illuminate some of the main effects of these changes on commerce, finance etc., however, the impact of the Industrial Revolution was far greater.

Mokyr (2008) argues that the role of property rights was less important than the literature has suggested. He proposes that "cultural beliefs" should be taken into consideration as well. Mokyr doubts the importance of Britain's patent system, specifically he argues that despite the fact that Britain had an established patent system since the early 17th century, a closer look at historical evidence, may show that advances of science at that time period were more or less achieved through open discussions or open source technology, meaning that the impact of Britain's patent system on the Industrial Revolution was at least overestimated by the literature.

Furthermore, the solution to the "commitment problem" that arose at the end of the 17th century was significant and affected the events of that time. In other words, it was not whether Britain had "good" or "bad" institutions, rather than it was a matter of timing that allowed Britain to take the lead. The Enlightenment and the impact it had on the political and economic status of the 17th century Europe, allowed the rest of the European countries to follow the

events of the Industrial Revolution. Moreover, he argues that the cultural beliefs in Britain and the gentlemanly codes allowed the improvement of the market conditions and the decrease of transaction costs and in the absence of technological progress the institutional restructuring alone would not have such an important impact on economic growth.

Based on Mokyr's analysis, it is clear that the institutional environment of Britain had a significant role in the origins of Industrial Revolution. However, Mokyr argues that it was not the economic institutions, such as the property rights, that had the most important role, but the British culture. Mokyr's point fits perfectly with the levels of institutions by Williamson (2000) that were presented earlier. The changing institutional environment during the 17th century may have had a significant role, but it was the British culture, level one in Williamson's classification, that allowed Britain to become a leader.

2.3.2   Summary

During the last two decades, the growth literature has focused on the relationship between institutions and economic growth, providing interesting and influential results and it is commonly accepted that institutions, political and economic, have an important role. However, as Sala-i Martin (2002) commented there is still a lot to be done to improve our understanding of the role of institutions and the process of institutional change to be able to build models to properly illustrate how institutions affect and are affected by political and economic interactions. Diving into the fundamental causes of growth allows us to identify why some countries are organised differently than others. Political and economic power are key variables in this process as they determine the distribution of resources as well as the economic institutions in a society.

The models and the case studies presented in this section illustrate the driving forces of the transition to democratic regimes. They show how the political power, influenced by inequality, and the preferences of the elite determine the existing set of institutions and how the people may affect and improve it, either through the threat of revolution or the accumulation of human capital. The common characteristics of all models are the existence of two groups (elite and people) and a simple production that allows us to focus on the evolution of institutions.

Acemoglu (2006) was the inspiration of this thesis, but we are also motivated by the simplicity of Grossman's (1991) model. The model we try to build in the next chapter borrows some characteristics from all the models presented here, but focuses on combining the role of education with the role of recessions in the process of institutional change. We also deviate somewhat from the existing literature with the definition of education. In both cases presented here, when education is included it takes the form of human capital that has some impact on production, while in our model, education is closer to Plato's *"paideia"*. It is education, knowledge and information together, that shape the preferences and the behaviour of individuals and drives institutional change.

The existing framework provides the basis for a good start in this field, but, still, many problems exist. Institutional change and the mechanisms that guide it are complicated. Most of the literature focuses on the role of recessions or crises in revolutions or other conflicts that may restructure a society, while most theoretical models allow only for large changes in institutional quality, as they usually describe transitions from dictatorships to democracies. In this thesis, we try to develop a mathematical model of institutional change that can explain both abrupt changes in institutional quality, such as the transition from a dictatorship to a democracy, but also allows for marginal improvements.

Additionally, we recognise that institutional change is likely to happen during bad times as individuals have less to lose, but we also develop a framework in which the levels of education in a society can lead to marginal improvements in institutions.

2.4 Education, Preferences and Institutions

The discussion so far has illustrated the difficulties in reaching a universal definition of institutions and the complicated process of the creation and evolution of institutions. Exogenous shocks, such as war, recessions and harvest failures, and the distribution of economic and political power play an important role in determining institutions and institutional quality. However, they are not the only factors affecting the evolution of institutions. A central theme in the discussion is the importance of preferences and beliefs in determining the actions and behaviour of individuals. Preferences and beliefs determine the actions of individuals and the interactions of the individuals play an important role in the evolution of institutions. Additionally, many researchers from different disciplines have demonstrated the significance of education in the formation of preferences. More educated individuals make healthier choices (Grossman 1976; Fuchs 1980) or become more patient, thus make more investments for their future (Becker and Mulligan 1997; Carducci 2009; Oreopoulos and Salvanes 2011; Perez-Arce 2011).

Contributing to the existing literature, this thesis considers education as a determinant of the quality of institutions, primarily as it affects preferences. Even though this relationship is not new, the theoretical models and the empirical research on the effects of education on the institutional quality are limited and concern the effects of education on democracy. Most of the existing models

focus on the role of recessions or critical junctures in the creation or evolution of institutions while the empirical literature addresses the relationship between education and democracy (Lipset 1959; Lipset 1960; Kamens 1988; Barro 1999; Acemoglu and Robinson 2000; Acemoglu and Robinson 2001; Bourguignon and Verdier 2000; Acemoglu et al. 2001; Glaeser et al. 2004; Glaeser et al. 2007; Wells 2008). The main purpose of this section is to show the connection between institutions and both the ideal and the actual education in philosophy and in empirical economics.

One of the first scholars that highlighted the importance of education in the political life of the state is the ancient Greek philosopher Plato. In his work "The Republic" Plato uses the "Allegory of the Cave" to demonstrate the importance of education and information in our perception of the world. In a dialogue between, Plato's mentor, Socrates, and his student, Glaucon, Socrates presents a cave in which some prisoners are chained so that they can only see shadows of real objects reflected on the cave wall by the fire outside the mouth of the cave. As the prisoners get accustomed to these images, their perception of the "real world" is determined. However, when one of the prisoners is forced out of the cave and faces the actual "real world" his perception of reality is transformed based on the new information he acquired.

Plato's cave and the events in it symbolise the limitation of individuals to acquire *"paideia"*, while the outside world represents the role of *"paideia"* in our perception of the world. Plato uses this parable to motivate his students and illustrate the importance of *"paideia"*, which in modern terminology means not only education, but also the accumulation of information and skills to develop oneself and help the society and the state to improve. Additionally, in his work "Laws" Plato argues that the role of education is to create "good citizens" that

would be able to monitor the state and its political affairs and know "how to rule and be ruled".

Μὴ τοίνυν μηδ' ὃ λέγομεν εἶναι παιδείαν ἀόριστον γένηται. νῦν γὰρ ὀνειδίζοντες ἐπαινοῦντές θ' ἑκάστων τὰς τροφάς, λέγομεν ὡς τὸν μὲν πεπαιδευμένον ἡμῶν ὄντα τινά, [643ε] τὸν δὲ ἀπαίδευτον ἐνίοτε εἴς τε καπηλείας καὶ ναυκληρίας καὶ ἄλλων τοιούτων μάλα πεπαιδευμένων σφόδρα ἀνθρώπων· οὐ γὰρ ταῦτα ἡγουμένων, ὡς ἔοικ', εἶναι παιδείαν ὁ νῦν λόγος ἂν εἴη, τὴν δὲ πρὸς ἀρετὴν ἐκ παίδων παιδείαν, ποιοῦσαν ἐπιθυμητήν τε καὶ ἐραστὴν τοῦ πολίτην γενέσθαι τέλεον, ἄρχειν τε καὶ ἄρχεσθαι ἐπιστάμενον μετὰ δίκης... ἀλλ' ὁ νυνδὴ λόγος ἡμῖν ὁμολογηθεὶς μενέτω, ὡς οἵ γε ὀρθῶς πεπαιδευμένοι σχεδὸν ἀγαθοὶ γίγνονται, καὶ δεῖ δὴ τὴν παιδείαν [644β] μηδαμοῦ ἀτιμάζειν, ὡς πρῶτον τῶν καλλίστων τοῖς ἀρίστοις ἀνδράσιν παραγιγνόμενον· καὶ εἴ ποτε ἐξέρχεται, δυνατὸν δ' ἐστὶν ἐπανορθοῦσθαι, τοῦτ' ἀεὶ δραστέον διὰ βίου παντὶ κατὰ δύναμιν.

"Then let us not leave the meaning of *"paideia"* ambiguous or ill-defined. At present, when we speak in terms of praise or blame about the bringing-up of each person, we call one man educated and another uneducated, although the uneducated man may be sometimes very well educated for the calling of a retail trader, or of a captain of a ship, and the like. For we are not speaking of education in this narrower sense, but of that other education in virtue from youth upwards, which makes a man eagerly pursue the ideal perfection of citizenship, and teaches him how rightly to rule and how to obey. [Education] is the first and fairest thing that the best of men can ever have, and which, though liable to take a wrong direction, is capable of reformation. And this work of reformation is the great business of every man while he lives." (Plato, Laws 643d-644b)

Plato's views of education not only illustrate its importance in self-development, but it is also crucial for the political affairs and the political participation of the citizens. As citizens become more educated they understand the society, its affairs and its rules better and they are able to influence the political life of the state and help it progress.

...ει δ᾿ όλως έρωτας παιδείαν τών παιδευϑεντων τί μέγα την πόλιν όνίνησιν, ου χαλεπον ειπεῖν οτι παώευϑεντες μεν ευ γίγνοιντ αν άνδρες αγαϑοί, γενόμενοι δε τοιούτοι τά τε άλλα πράττοιεν καλώς...

...ask in general what great benefit the state derives from the training by which it educates its citizens and the reply will be perfectly straightforward, the good education they have received will make them good citizens...(Plato, Laws, 641b-641c)

Later, Aristotle, Plato's student, in his works "Politics" and "Ethics" argues that a state cannot be righteous if the citizens of the state are not righteous, and for Aristotle righteous were those having *"paideia"*. Though Plato and Aristotle agree on the importance of education for the quality of the political life of the state, their main difference is the direction of this relationship. For Plato, the citizen should seek to acquire knowledge to develop oneself and help the government, while in Aristotle the state and its citizens are one political organism in which the citizen has to seek knowledge and the state should create an environment in which the citizen can live a good life.

The ideas of the ancient Greek philosophers were the foundations of political thought and science which were further developed during the Renaissance and Enlightenment. During the 17th and 18th century many scientists and philosophers discussed the role of education and the ideal state. Hobbes (1651) in his work "Leviathan" describes human nature and argues that humans are competitive

and selfish and as a result so are their preferences and actions and the role of government is to protect people from their selfishness. Consequently, it is necessary for the state to educate its citizens:

> For seeing the Universities are the fountains of civil and moral doctrine, from whence the preachers and the gentry, drawing such water as they find, use to sprinkle the same . . . upon the people, there ought certainly to be great care taken, to have it pure, both from the venom of heathen politicians, and from the incantation of deceiving spirits. And by that means the most men, knowing their duties, will be the less subject to serve the ambition of a few discontented persons in their purposes against the state... (Leviathan, 'Review and Conclusion', p. 496)

Bejan (2010) argues that Hobbes blames the mis-education of the English population for the Civil War (1642-1646) and that for Hobbes the role of education is of utmost importance as the government's authority is based on the consent of the citizens and their obedience. Hobbes says: 'The actions of men proceed from their opinions' (Leviathan, 18:9, p. 113) and education and knowledge, in general, are important because they forms opinion and produce citizens that obey laws and seek peace.

Similarly, John Locke (1689) in his work "Two Treatises Of Government" discusses the state of nature as a state where there is no government and laws and all individuals are equal. Contrary to Hobbes' state of nature, where actions are guided by selfishness, Locke believes that in the state of nature actions are guided by reason so as to benefit ourselves but at the same time not to harm others.

Moreover, Locke (1693) in his work "Some Thoughts Concerning Education" sees the role of education as very close to what ancient Greeks called *"paideia"*. For Locke, a person is born with an empty mind – a tabula rasa - and should

seek to become a virtuous adult with the habit of thinking rationally instead of following his desires. Locke believes that the education a person has received will determine their value for society: "I think I may say that of all the men we meet with, nine parts of ten are what they are, good or evil, useful or not, by their education." (Locke 1693, "Some Thoughts Concerning Education", 1-10). For both Hobbes and Locke education is important because it determines how people think and behave hence, their interactions with others and with the state. Moreover, they both argue that a government draws its authority from the willingness of people to surrender some of their natural rights to be protected.

A few decades later Jean Jacques Rousseau (1762b), influenced by Locke, in his work "Social Contract" developed further the ideas set by earlier scholars. Rousseau argues that a legitimate political authority is the one established by the desire of people to forfeit some of their freedom in order to be protected and not by coercive power. In his work "Emile, or on Education" Rousseau (1762a) discusses the role of education in the proper development of a child. Rousseau's idea of education is closely related to Plato's *"paideia"*. Education should give a person the tools to be able to explore and acquire knowledge and not to instruct how to think but how to reason:

> Of all man's faculties, reason . . . is the last . . . you would use for the child's early training. To make a man reasonable is the coping stone of a good education. . . (Rousseau (1762b), p. 22 – Ebook).

Though, neither Hobbes and Locke nor Rousseau talked explicitly about the connection between education and institutions, as we defined them earlier, it is clear that based on their ideas education affects the behaviour and the preferences of individuals and consequently, it should have an impact on the quality of institutions in a society.

One of the most influential philosophers of the 19th century John Stuart Mill also lays emphasis on the importance of education for the development and progress of the society and its political affairs. In his work "On Liberty" Mill and Himmelfarb (1859) states that the role of education is "... the peculiar training of a citizen, the practical part of the political education of a free people, taking them out of the narrow circle of personal and family selfishness, and accustoming them to the comprehension of joint interests" (Ch. 5, page 139 – ebook).

Mill's view of the role of education is similar to Plato's view of *"paideia"*; to guide people in developing themselves and help the society. Moreover, Mill (1861), in his work "Consideration of Representative Government", argues that a good government with a just set of institutions is impossible without educated citizens. His beliefs on the importance of education lead Mill to support the idea of a voting system in which the more educated citizens have plural or weighed votes. Though the purpose of this thesis is not the review of Mill's support of plural voting, we can argue that it is not aligned with his views regarding democracy and equality. As Crittenden (1992, p. 98) discusses "[Mill] feared ... that the uneducated and inept would dominate and tyrannize politics so as to undermine authority and individuality." As a result, too much power for the uneducated would result to bad governments and bad institutions. Therefore, for Mill, the idea of plural voting is a way to protect the society, and mainly the educated, from a majority of the uneducated and unintelligent than to create an elite of educated.

The link between education and democracy was under the microscope of many scholars during the 20th century. American philosopher and psychologist John Dewey (1910-1911) recognised the importance of Plato's arguments regarding the role of education:

... Plato stands almost alone, till the eighteenth century, in his recognition of the fundamental importance of the very early years of life, before technical skill and conscious reasoning are possible (Dewey (1910-1911) edited by Jo Ann Boydston p. 386).

Influenced by the ideas of Plato and Aristotle, Dewey (1916) argued that education nurtures democracy as it allows the development of the ideals, such as equality, morality and righteousness, necessary for a stable democracy. However, compared with the idealism of the ancient Greek philosophers, Dewey's view is pragmatic. Following Plato and Aristotle *"paideia"* is a tool for an individual to become a better person, while Dewey believes that "...education ...is a process of living and not preparation for future living." (Dewey 1897, p. 77-80)

The argument gained popularity half a century later when the political sociologist Seymour Lipset talked about the relationship between education and democracy. Lipset (1959, 1960) argues that to accept the rules of democracy, a citizen has to be highly sophisticated as the more democratic a regime is the more participation is required by a citizen (Lipset 1959, p. 108) and hypothesised that higher literacy and education rates lead to more democratic regimes: "...education [may not be] a sufficient condition for democracy ...[but] it comes close to being a necessary one" (p.40). Lipset supports his hypothesis with evidence from Latin America, Arab nations and European countries. Almond and Verba (1989, p.315) provide an explanation for the role of education in the political behaviour of citizens: "The uneducated man or a man with a limited education is a different political actor from the man who has achieved a higher level of education". Education helps people socialise, exchange information and ideas and coordinate efficiently. The more educated a person is the more easily they can understand a statement and explain to and cooperate with others who have similar views or interests.

Perhaps a way to illustrate the link between education and institutions and particularly institutional change is to examine the role of student demonstrations. There are numerous cases where revolutions started from or with the strong support of students. The overthrow of Peron in Argentina in 1955, the Hungarian Revolution in 1956 that started as a student demonstration, the coup d'état against Perez in Venezuela in 1958 was supported by students, the Prague Spring in 1968, the "Free Besieged" students that demonstrated in the University of Athens and initiated the Fall of Greek Junta in 1974, the student-led demonstrations in Tiananmen Square in 1989 and the Arab Spring that started in 2010 are some examples. However, these examples do not necessarily mean that students have been always pro-democratic. In contrast, Mussolini and Hitler were supported by students as well. Nonetheless, there is evidence that education and political participation are positively associated and as a result, education has played an important role in the history of institutional change (Glaeser et al. 2007).

2.4.1 Education and Institutions: Empirical Evidence

Ever since Lipset's (1959, 1960) work a lot of empirical research, using both cross-section and panel analysis, has supported the hypothesis that education has a positive relationship with democratic transitions and the stability of democracy.

Barro (1999) in a panel study examines the determinants of democracy including income, education, ethnolinguistic fractionalization, colonial origins, religion and urbanisation. He finds a positive relationship between democracy and income and democracy and years of schooling. Colonial origins and ethnic fractionalisation do not seem to have a statistically significant impact on democracy when included in the regressions with the rest of the control variables. Additionally, Muslim countries and urbanisation appear to have a negative impact on democracy.

Papaioannou and Siourounis (2008) examine the democratic transitions during the Third Wave of Democratization (beginning in 1974 with Portugal's revolution), and they show that "democracy is more likely to emerge and consolidate in educated countries. Education is also a significant predictor of the intensity and the timing of political transitions" (p. 384)and the effect persists even when they control for historical and cultural factors and ethnic fractionalization.

Glaeser et al. (2004) argue that the interactions of the citizens of a country shape the institutions, and these are affected by their human and social capital. In an effort to answer the question of "what came first" they examine the effects of education on the institutional environment and separately, the effects of institutions on education using panel regressions with country fixed effects. They discover that the effect is only present in the direction of education to institutions, while they find no effect from institutions to education. However, we may argue that the method used by Glaeser et al. (2004), simple panel OLS regressions, is not enough evidence to infer the direction of causality. On the other hand, Acemoglu et al. (2005) provide evidence that the effects on democracy disappear when country fixed effects are included in the regressions that implies that country-specific factors such as history and culture may be more important than education. However, their findings come from a panel with short time series.

According to Knack (2002), the effect of education on institutions is twofold. One effect arises from the fact that educated citizens may demand better institutions than uneducated citizens. On the other hand, education may have a positive effect on the supply side as with a more educated workforce the public sector can become more efficient. Testing for the determinants of the performance of the government in a cross-sectional study of the US states, Knack reports a positive relationship between the social capital index and government performance, but,

the effects of education and income are not significant. However, the study used a social capital index that is highly correlated with education and additionally, even though the author used instruments for the social capital index he did not use any exogenous instruments to measure education or income, meaning that the estimated effects could be biased.

Another channel through which education may affect institutional quality is discussed in Glaeser et al. (2007). The authors argue that education increases the net benefit of political participation in three different ways. First, most educational systems give emphasis to preparing students for becoming citizens in a democracy. Second, schooling through socialisation teaches students how to communicate and cooperate with others and in this way minimise the cost of social interactions and political participation. Last, education increases the private benefits of political participation as more educated citizens are more effective and capable and more likely to become leaders. These ideas are very close to the ideas of Plato, Aristotle and the philosophers of the 17th and 18th century that were presented earlier; the purpose of education is to prepare an individual to seek not only her personal benefit but to focus on the common interests and the benefits of the society.

According to Glaeser et al. (2007), education promotes democracy because it increases the benefits of civic participation and lowers the costs of social interaction. Educated citizens can exchange information more efficiently than uneducated citizens; it is easier for them to coordinate and avoid miscommunication costs. In a cross-country analysis, they find strong evidence to support their hypothesis that civic participation increases with education.

Moreover, Glaeser and Saks (2006) examine the effects of education on the performance of the government. Specifically, the authors use federal convictions for corruption to investigate the determinants of corruption in the USA. An

innovation of their paper is the use of actual data on corruption; convictions for corruption of federal, state and local officials by state, instead of survey data. However, it can be argued that using real data does not necessarily mean that they measure corruption accurately; for example, a corrupt or incompetent judicial system might not convict someone for corruption or some cases of corruption may not be covered by the law.

The authors test for the effects of income, education, income inequality and ethnic fractionalization. They find a strong negative relationship between corruption and income, and corruption and education. Using exogenous measures as instruments for income (past income and geographical characteristics) and education (religion) they find that the effects are even stronger, illustrating a reverse causality between corruption and the two control variables. Furthermore, they find that states with higher income inequality and racial dissimilarity are more corrupt. These results provide further support to the hypothesis that the level of education in a society has an impact on the quality of institutions as it was discussed earlier.

2.4.2 Summary

From Plato and Aristotle to Mill and Lipset, many scholars have highlighted the importance of education in the political behaviour of the individuals. Information and knowledge are invaluable for determining the decisions of the individuals and education is an important tool in defining our perception of the world. Additionally, based on the findings of Glaeser et al. (2007) education increases the net benefit of political engagement. An implication of the ideas presented here is that education plays an important role in the shaping of the institutional quality in a society. More educated citizens can understand better the institutional environment in

which they act and interact with others and can monitor the government and its policies. Consequently, as the levels of education increase in a society, the demand for better institutions increases as well through the pressure towards the government to improve its rules and policies. Based on the ideas discussed in this section, we can recognise the importance of defining and measuring education correctly. In all cases presented here, education – or *"paideia"* for Ancient Greeks – deviates from the education as it is measured in the empirical literature. The empirical literature focuses on the use of human capital or years of schooling which in some cases may not be appropriate. One, extreme, example is North Korea that has 12 years of compulsory schooling and the literacy rate is approximately 100%, but the main objective of the educational system is to imprint a specific ideology and access to other sources of information, outside the regime approved ones, is not permitted (UNESCO 2004). However, we recognise that measuring *"paideia"*, the seeking of knowledge, is an extremely difficult – if not impossible – task.

3

A Model of Institutional Change

"All models are wrong but some are useful"

– George E. P. Box

3.1 Introduction

During the past few decades, the role of institutions as a determinant of economic performance has received much attention from researchers. The evidence, as it was mentioned before, illustrates that political and economic institutions play an important role in the economic activities (North 1989; Acemoglu et al. 2005; Rodrik 2008).

Some of the literature has examined the causes of institutional change. The existing papers have so far focused on the role of recessions in institutional change. The argument is natural; during recessions, people have less to lose, as a result, it is easier for them to revolt and demand better institutions. However, the existing models fail to explain why we do not observe a revolution every time there is

an economic crisis in countries with low quality of institutions or cases where the improvements are marginal. In some cases, institutional change comes after wars or revolutions against the existing regime, but in other cases, the changes in institutions are marginal and do not follow a violent event.

One of the most recent cases of a revolution against the existing regime in history is that of the Arab Spring. The term refers to a wave of revolutions and anti-government protest that occurred in North Africa and the Middle East. The events started in Tunisia in December 2010 and ended about two years later affecting most nations of the two regions but mostly Libya, Egypt, Yemen, Syria and Iraq.

Delving into the roots of the Arab Spring we can identify the causes that led to the events of December 2010 in Tunisia and spread to the rest of the Arab world. First, is the Great Recession. The financial crisis that started in 2007 had global and significant negative effects; the IMF stated that it was the most severe crisis the world faced since the 1930s (IMF 2009, World Economic Outlook). On the other hand, most of the regions had oppressive leaders and were characterised by human rights violations, high corruption and in general bad institutions (Méon and Sekkat 2005; Gwartney et al. 2016a).

In addition, most of the regions experienced a significant increase in the level of education during the previous decades. Specifically, years of schooling in Tunisia, Libya, Egypt and Syria increased by more than 100% (Barro and Lee 2013). The economic decline due to the crisis, the low quality of the existing institutions combined with a more educated young generation increased the pressure within the society towards demanding a more inclusive political system that would promote economic development that led to the events of the Arab Spring. Although it is still early to evaluate the long-run effects of the Arab Spring, as in some

regions such as Syria the events are ongoing, in some cases the previous regimes were overthrown and the countries experienced a transition to more inclusive institutions. In Tunisia, for example, President Ben Ali was overthrown and in 2014 the country became a unicameral parliamentary republic. In Oman, the regime granted law-making powers to the elected legislature and in Egypt, after a long period of political instability, the country voted for a new constitution in 2014 that granted absolute freedom of belief and more rights for minorities and women. However, the ongoing political instability in Egypt had, as a result, the army to take over the power and appoint a prime minister without elections which resulted in further demonstrations and protests (Anderson 2011; Khondker 2011; Gause 2011; Bellin 2012; Campante and Chor 2012).

Russia has a long history of social unrest. One of the few Russian Revolutions took place in 1905 against Tsar Nicholas. The educated class of Russia had a significant role in the events. Since the reforms in the educational system in the mid-19th century, Russia had developed a movement of student radicalism. Morrissey (1998) argues that despite the fact that the educated class was a minority in Russia, students committed the most political offences and political activism was rising at the end of the 19th century. The combination of the political activism of the educated class which was demanding more inclusive institutions with the fact that the majority of the Russian population was poor (famine 1891-92) led to the Revolution of 1905 and the Constitution of 1906 which established a multi-party system, but with restricted authorities. Nonetheless, the absence of any substantial reforms in the Constitution granting freedoms to citizens, political participation to everyone and significant legislative authorities to the Duma (October Manifesto) left most of the Russian population and especially Lenin, unsatisfied which led to the Bolshevik Revolution (1917) and the Soviet

State, a highly centralised and authoritarian state, that lasted for more than 90 years (Schapiro 1970; Skocpol 1979; DeFronzo 2011).

Greece had been an unstable democracy for the most part of the 20th century. During a long period of political instability (1830s-1970s) the country participated in more than four wars and experienced a civil war. These events brought the country in a state of political and economic instability. The Civil war, particularly, left a country divided and the inability of the political authorities of the time to stabilise the situation led to a coup d'état in April 1967. Apart from the political and economic instability that the country was facing, the Greek population was one of the least educated in Europe – a quarter of the population had received no education while the average in the rest of the Europe was below 10% - with only Portugal and Spain, the other two countries in Europe that experienced long dictatorships, performing worse – 44% and 53% (Barro and Lee 2013) of the population with no schooling respectively (Clogg 2002; Kassimeris 2005).

However, the situation regarding education in Greece changed at the end of the 1950s with a series of educational reforms (1957-1964) aiming to provide free education for all citizens. As a result, the educated population increased in the society and in the early 70s only 10% of the population had received no education. The combination of the state of the economy and the increased level of education led to the events of November 1973. Students and intellectuals of the country revolted against the military dictatorship. The Athens Polytechnic uprising, as the events are known, caused the ideological collapse of the regime which combined with the Turkish invasion of Cyprus a few months later led to the total collapse of the regime and Greece entered a period of democratisation known as Metapolitefsi. The period after the fall of the military dictatorship until present

days is the longest period in which Greece has been a stable democracy since its independence from the Ottoman Empire (1830s) and was a period in which the country adopted more inclusive institutions and experienced an increase in GDP and GDP per capita, in 2007 both had increased about 20 times compared with the early 1970s (World Bank 2016).

In contrast, there are cases of countries where the level of education increased but there was no revolution or significant improvement in institutions or even when there was a revolution the power of the existing regime was large enough to suppress it and remain in power. China is one of these cases.

The level of education in China has been increasing during the past 60 years. In 1950 about 70% of the Chinese population had received no schooling and the average years of total schooling was 1.6 years. The situation improved in the following decades with the percentage of people with no education falling to 25% and total schooling increasing to 5.3 years in the late 80s and then further improved to only 5% of the population had received no education and total schooling reached 8 years (Barro and Lee 2013). These changes in the level of education in China led to the events of the Tiananmen Square in June 1989. After a series of reforms implemented by the regime the economy was growing but in a state of high corruption, bureaucracy and nepotism in favour of a strong elite, resulting in an educated class that had limited opportunities for economic activities and political participation (McMillan and Naughton 1992; Zhao 2004). As a result, the intellectuals and the educated class of the country demanded reforms that would make the country more democratic, liberalise the economy and protect human rights.

In April 1989 thousands of students protested demanding democracy. The events escalated in the following weeks with hundreds of thousands of students

occupying the Tiananmen Square. To suppress a movement that was gaining momentum the regime answered with brute military force on the 4th of June 1989 resulting in hundreds of deaths of civilians and mass arrests (Zhao 2004). Since these events, there have been no significant institutional improvements in China and especially in the period immediately after the Tiananmen Square protests, the existing regime was strengthened. Apart from the memories of the Tiananmen Square Massacre, another reason for the absence of any significant institutional improvements is that the Chinese economy has not experienced a significant recession. In contrast, China has been growing since the 1950s. In the past 50 years, the Chinese GDP increased from 60 billion to 6.1 trillion and the GDP per capita more than doubled (World Bank, 2016).

A possible explanation for this is that the country is "trapped" in a lower quality set of institutions because they provide some level of economic development for the citizens and as a result, they have a lot to lose if they decide to revolt. Other similar cases are the OPEC countries who have, consistently, lower quality of institutions but due to their natural resources, the improvements in institutions are marginal in most cases.

In this chapter, we build a model to explain institutional change focusing on the role of education. The literature presented in the previous chapter argues that education is significant in the decision-making of the citizens. Those with more education can understand better the consequences of the policies that the authorities implement and it is easier for them to cooperate, coordinate and communicate the ideas for a successful revolution, meaning that citizens with more education face lower costs when organising a revolution. As a result, motivated by the theory and the models presented in Chapter 2 and based, mainly on the models presented by Grossman (1991), Acemoglu and Robinson (2001) and

Acemoglu et al. (2008) we build a model of institutional change that allows for improvements to happen either after a revolution or as marginal changes allowed by the existing regime. Additionally, these changes are the result of not only a recession but a combination of the state of the economy and the level of education in the country.

3.2 The Economy

There are two agents in the economy, a dictator who has the absolute power to implement policies and the citizens who produce on final output. The production is characterised by a simple production function with constant returns to scale.

$$Y = A * E \tag{3.1}$$

Where Y is the total product in the economy. A is the available technology and E is the effort that the citizens put in the production process. In this simple economy, all agents seek to maximise their revenue. The citizens decide how much effort to invest in the production process and the dictator sets extractive policies to acquire revenue. This set of policies could be anything that allows the dictator to survive every period and extract revenue from the citizens. We can consider that these policies act as a tax rate on the citizens' production[1] and we denote this tax rate as $\tau \in [0, \bar{\tau}]$, where $\bar{\tau}$ is the maximum upper value that this extractive rate can take. This value could be either set by the existing institutions in the economy or it may be 'natural', meaning that the dictator can extract revenue from the citizens up to this level after which the citizens may start hiding their production to avoid being taxed.

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[1]Similar to Acemoglu and Robinson (2000), Benabou (2000), Acemoglu and Robinson (2001) and Acemoglu (2006)

Moreover, we assume that the revenue extraction process is costly. There are some fixed costs (K) that the dictator faces, such as payments to the tax collectors and the police. Additionally, we assume that the cost of revenue extraction is increasing in the extraction rate (τ). This implies that the higher is τ the harder the collection becomes as people will resist more. Lastly, we assume that the cost of revenue extraction increases with the quality of institutions (ϕ), with $\phi \in \mathbb{R}_+$. This indicates that the higher is the quality of the existing institutions the harder for the dictator to extract revenue. In our analysis, we distinguish between low and high-quality institutions. As they were defined earlier, institutions set the rules for the interactions within the society and are comprised of various components, such as the rule of law, the protection of property rights, how inclusive the political regime is etc. The existing evidence supports that better institutions, as they are captured by their various measures, promote economic development and the well-being of the citizens (North 1989; North 1991; North 1994; Knack and Keefer 1995; Welzel et al. 2003; Frey and Stutzer 2002; Acemoglu et al. 2005; Hudson 2006).

To simplify our analysis we refer to low and high-quality institutions capturing this relationship. The revenue for the dictator is, therefore:

$$R_D = (\tau - \frac{1}{2}\phi\tau^2)Y - K \qquad (3.2)$$

Where R_D is the revenue of the dictator, τ is the set of extractive policies, ϕ is the quality of institutions, Y is the output and K is the fixed cost the dictator faces. The assumption of quadratic costs is made for convenience and the tractability of our solution and does not affect the qualitative results of our model. The dictator

maximises the revenue by setting τ:

$$\max_{\tau} R_D = (\tau - \frac{1}{2}\phi\tau^2)Y - K \tag{3.3}$$

$$\frac{\partial R_D}{\partial \tau} = 0$$

Which yields:

$$\tau^* = \frac{1}{\phi} \tag{3.4}$$

The optimal set of policies $\tau^* \in [0, \bar{\tau}]$ in (3.4) illustrates that the optimal decision for the dictator is negatively related to the quality of institutions. The lower ϕ is the lower the quality of institutions and the higher the tax rate the dictator can implement. On the other hand, the citizens decide how much effort (E) to put into production and their revenue is:

$$R_C = (1 - \tau)Y - \frac{1}{2}\psi E^2 \tag{3.5}$$

Where R_C is the revenue of the citizens, τ is the set of extractive policies, Y is the output, ψ is the relative price of the effort that the citizens put into production, similar to the disutility of labour and E is the effort. Again, the assumption of quadratic costs is made to simplify our analysis. The citizens maximise their revenue by choosing how much effort to put into the production process.

$$\max_{\tau} R_C = (1 - \tau)Y - \frac{1}{2}\psi E^2 \tag{3.6}$$

$$\frac{\partial R_C}{\partial E} = 0$$

Which yields:

$$E^* = \frac{A}{\psi}\left(1 - \frac{1}{\phi}\right) \tag{3.7}$$

From (3.7) we can see that $E*$ is increasing in the quality of institutions (ϕ) and decreasing in the relative price ψ. This implies that the higher is the quality of institutions, the more effort the citizens will invest in the production process of the economy. Substituting the solutions (3.4) and (3.7) in equations (3.2) and (3.5) yields the revenue of the dictator and the citizens in every period.

$$R_D^* = \frac{A^2}{\psi}\left(\frac{\phi - 1}{\phi^2}\right) \tag{3.8}$$

And

$$R_C^* = \frac{A^2}{\psi}\left(1 - \frac{1}{\phi}\right)^2 \tag{3.9}$$

Figures 3.1 and 3.2 illustrate the dictator's and the citizens' income with respect to the quality of institutions. The dictator's income is large when the quality of institutions (ϕ) is low and decreases as ϕ increases. On the other hand, the citizens' income increases with the quality of institutions.

R_D

$$R_d^* = \frac{A^2}{\psi}\left(\frac{\varphi-1}{\varphi^2}\right)$$

φ
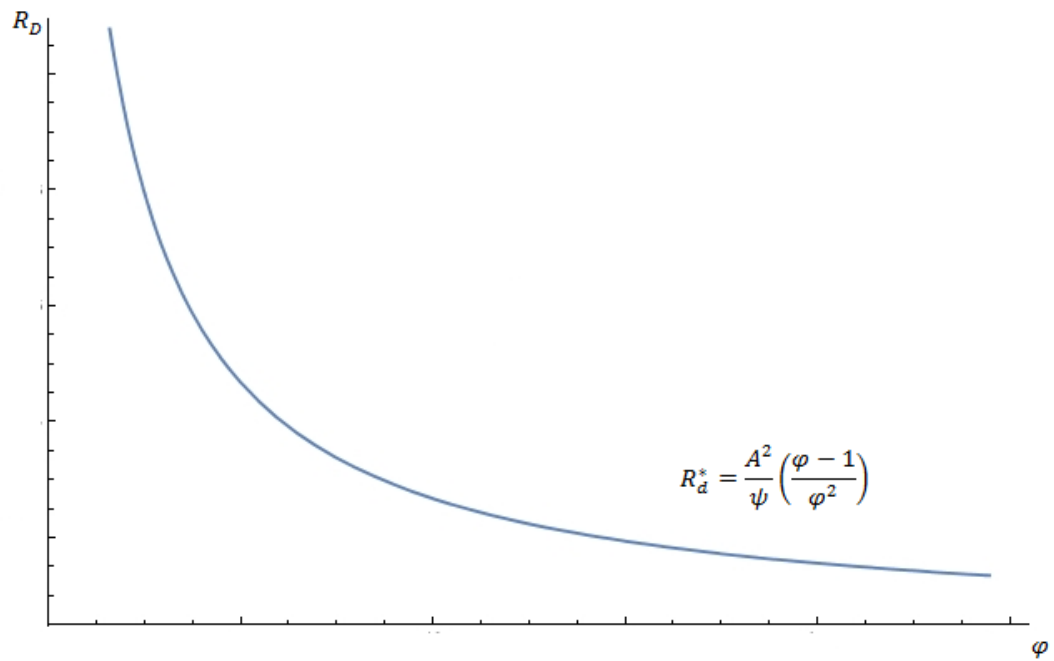
Figure 3.1 Dictator's income and quality of institutions

R_C

$$R_c^* = \frac{A^2}{\psi}\left(1-\frac{1}{\varphi}\right)^2$$

φ
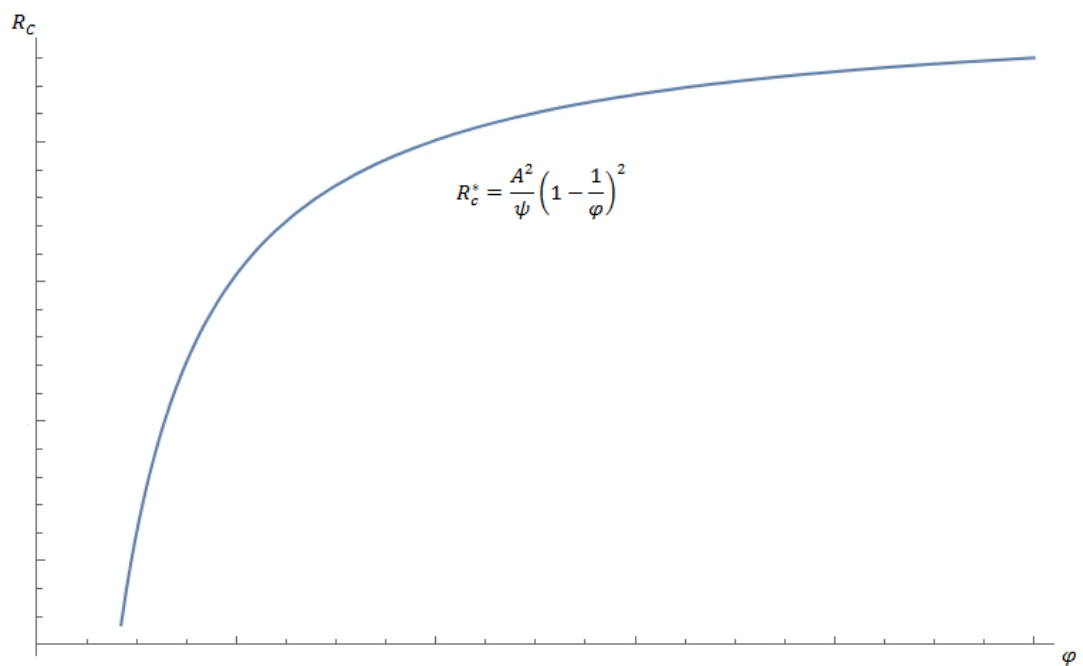
Figure 3.2 Citizens' income and quality of institutions

3.3 Fear of Revolution

In the previous part, we described the economy and the revenue of the agents every period. We now turn to the mechanism of institutional change. Every period the dictator faces a probability of revolution, we name that "fear of revolution". For simplicity, we assume that if people decide to revolt the revolution will be successful and will bring the desired institutional change[2]. The successful revolution will bring benefits to the citizens meaning that collective action is not a problem (Tullock 1971). In addition, if the citizens revolt, the dictator may be removed from the economy, implying that the dictator has the incentive to prevent a revolution. Following the existing literature (Grossman 1991; Acemoglu and Robinson 2001; Acemoglu et al. 2008; Acemoglu et al. 2008;) we assume that the citizens will decide whether to revolt or not by comparing their expected revenue in the two cases.

In our model, the fear of revolution depends on the state of the economy and the cost of revolution. To incorporate this in our model, we assume that a recession will lead to increased unemployment. This means that if equation (3.9) is the maximum possible income for the citizens every period, they are going to lose a proportion of their income due to unemployment. To illustrate, we assume that every period the citizens have a certain amount of time for labour, which we normalise to be equal to one, and they are going to lose a proportion (u) due to unemployment, with $u \in [0, 1]$. In other words, u captures whether the economy faces a recession or not and the severity of it. The higher u is the more severe the recession is while low values indicate less severe or normal times[3].

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[2]We can argue that the citizens incorporate the success or failure of a revolution in their cost/benefit analysis. The main reason for this assumption is to keep our solution simple

[3]We could also add to our model that the recession affects the productivity of the economy. However, this property complicates the solutions and the analysis without changing the qualitative results.

On the other hand, a revolution is costly. Apart from the use of resources, people must organise, cooperate and communicate ideas effectively in order to revolt or, in other words, they must invest time. To simplify our model and make the analysis easier we assume that people must invest a proportion of their time ρ in a successful revolution, with $\rho \in [0, 1]$. Following the theories presented in the previous chapter (Lipset 1959; Almond and Verba 1989; Putnam 2001), we assume that the cost of revolution is decreasing in education. It is easier for more educated citizens to communicate, cooperate and organise a successful revolution. Therefore, as the level of education increases the cost of revolution decreases. Every period the citizens threaten the existing regime with a revolution for institutional changes. We can denote the targeted level of institutions with $\tilde{\phi}$.

As a result, the revenue of workers after a successful revolution is:

$$\tilde{R}_c^* = \frac{A^2}{\psi}\left(1 - \frac{1}{\tilde{\phi}}\right)^2 \tag{3.10}$$

Comparing equations (3.9) and (3.10), we observe that the difference between the maximum revenue the citizens can acquire every period, without and with revolution respectively, depends on the difference between ϕ and $\tilde{\phi}$. It is natural to assume that $\tilde{\phi} > \phi$. This indicates that people will be involved in a costly revolution only if they expect that they are going to benefit from it which further implies that $R_c^* < \tilde{R}_c^*$; the maximum possible revenue for the citizens is higher after a revolution. The citizens will decide whether to revolt or not based on their expected revenue. If citizens decide not to revolt the expected revenue is:

$$E(R_C^{no}) = (1 - u)R_c^* \tag{3.11}$$

Equation (3.11) indicates that the income the citizens will receive when they decide to revolt is equal to the maximum possible income, derived in equation (9), minus any losses they may face due to the state of the economy. On the other hand, if the citizens decide to revolt their expected revenue is:

$$E(R_C^{rev}) = \begin{cases} (1-u)\tilde{R}_c^*, & \text{if} \quad u \geq \rho & (3.12a) \\ \\ (1-\rho)\tilde{R}_c^*, & \text{if} \quad u < \rho & (3.12b) \end{cases}$$

Equations (3.12a) and (3.12b) describe the expected revenue of the citizens if they decide to revolt. In such case, the expected revenue is equal to the maximum they can receive after a revolution $(\tilde{R}_c^*)$ minus the cost of revolution.

At this point, we distinguish between two cases; first, when the cost of revolution is lower than the losses citizens face due to the state of the economy, $u \geq \rho$, the expected revenue after a revolution is given by (3.12a). The reason is that if the share of the available time that citizens lose due to unemployment is higher than the time they need to invest in a successful revolution, then people do not have to invest additional time in a revolution. In contrast, if the cost of revolution is higher, $u < \rho$, then people need to invest additional time for a successful revolution and the expected revenue is given by (3.12b). Equations (3.11), (3.12a) and (3.12b) will determine whether the fear of revolution is a valid threat for the dictator. From these equations, two different scenarios emerge in which the dictator's fear of revolution depends on the relative difference between the cost of the state of the economy (u) and the cost of revolution (ρ) that the citizens face.

Case 1

Assuming a uniform distribution $u \geq \rho$ with probability $(1 - \rho)$. In this case, the cost of revolution is lower than the cost of unemployment due to the state of the economy. This scenario describes cases where the recession is severe, very high values of u, or the cost of revolution is low, which in our model implies high levels of education or combinations of the two. As mentioned above, this means that a successful revolution does not require additional time investment for the citizens and they will revolt if and only if:

$$E(R_C^{rev}) > E(R_C^{no}) \tag{3.13}$$

Result 1

Substituting equations (3.11) and (3.12a) in condition (3.13) gives us that people will revolt if and only if:

$$(1 - u)\tilde{R}_c^* > (1 - u)R_c^* \tag{3.14}$$

Which further simplifies in:

$$\tilde{R}_c^* > R_c^* \tag{3.15}$$

Under the assumption that people will be involved in a costly revolution only to achieve some institutional improvements, $\tilde{\phi}$, then condition (15) always holds. Therefore, if the recession is severe resulting in $u \geq \rho$ people will always choose to revolt as the benefits exceed the costs. People do not need to invest additional time in a successful revolution and they expect a higher income ($\tilde{R}_c^*$).

This result is in agreement with the existing literature. People are more likely to revolt during a recession because "bad times" change the opportunity cost of the revolution. However, compared with the existing literature our model

argues that a recession might be necessary for a revolution, but it is not a sufficient condition, introducing a role for education. The first result of the model is that if the quality of the existing institutions is low, then the magnitude of a negative shock in the economy that may bring a revolution depends on the level of education in the society.

In societies where education is high, meaning lower values for the cost of revolution ρ, even a relatively small shock in the economy may be enough to lead to a revolution.

On the other hand, if the level of education is very low, implying high ρ, the negative shock in the economy has to be significantly large to result in a revolution. This result of our model can explain why certain nations, mainly in Asia and Africa, consistently underperform in most measures of institutional quality and fail to achieve substantial institutional improvements every time the economy is in a recession. Most of these nations have low levels of education which based on our model means that they are facing significantly higher costs of revolution.

Case 2

The second case that emerges from our model is when $u < \rho$, with probability (ρ). In this scenario, the cost of revolution is higher than the cost people are facing due to the state of the economy and as a result, citizens need to invest time in a successful revolution. Similar to the first case citizens will revolt if and only if condition (3.13) holds.

Result 2

Substituting equations (3.11) and (3.12b) in condition (3.13) yields:

$$(1-\rho)\tilde{R}_c^* > (1-u)R_c^* \tag{3.16}$$

Which we can rewrite as:

$$u > 1 - (1-\rho)\frac{\tilde{R}_c^*}{R_c^*} \tag{3.17}$$

Based on condition (3.17) the threat of revolution depends on the relative difference between the two costs of our model, u and ρ. People will revolt if and only if condition (3.17) holds. Compared with the previous case the main difference is that the dictator can choose a set of policies (τ) such that it will make the right-hand side of condition (3.17) marginally larger than the left-hand side and thus avoid a revolution. To illustrate this we can solve condition (3.17) for the set of policies that bring equality:

$$\tilde{\tau}^* = 1 - \left(\frac{1-\rho}{1-u}\right)^{1/2}\left(1 - \frac{1}{\tilde{\phi}}\right) \tag{3.18}$$

Equation (3.18) indicates that under the threat of revolution the dictator may adjust the set of existing – extractive – policies to reduce the threat. From equation (3.17) we can derive that:

$$\frac{\partial \tilde{\tau}^*}{\partial \rho} > 0$$

which means that the optimal set of policies that reduces the threat of revolution for the dictator is positively related to the cost of revolution. This

implies that the higher the cost of revolution, which in our model indicates low levels of education, the smaller the adjustments the dictator has to make. On the other hand,

$$\frac{\partial \tilde{\tau}^*}{\partial u} < 0$$

and

$$\frac{\partial \tilde{\tau}^*}{\partial \tilde{\phi}} < 0$$

The last two indicate that the more severe a crisis is the less extractive the dictator may be in order to avoid a revolution. Similarly, the higher is the targeted level of institutional quality, the larger the adjustments the dictator must make.

The second result of our simple model illustrates marginal, gradual institutional improvements that did not follow a severe event, such as a revolution. The dictator, or those who hold the power, may choose to adjust their policies in order to avoid being overthrown by a successful revolution.

3.4 Conclusion

The main contribution of our model is that it allows us to explain improvements in institutions using a combination of the state of the economy and the level of education. The severity of a recession or the level of education alone fail to explain why in some cases a recession does not cause a revolution (African countries) or substantial levels of education do not always lead to revolutions. On the other hand, we have cases where a revolution happened when the level of education increased. In addition, our model allows us to explain cases in which the quality of institutions did not improve due to a war or revolution but the improvement

was smooth and occurred through marginal changes in institutions, allowed by the existing regime.

The cases discussed in the first part of this chapter illustrate the importance of education in the process of improvements in institutions. The Russian Revolution (1905), the events of May 1968 in France, the uprising of Greek students (1973), the Revolution in Iran (1979) and the Arab Spring (2010-2012) are some of the cases in which the educated class played a significant role in revolting against the existing regimes.

Our model provides a simple tool to explain such cases. In our simple economy, the threat of revolution depends on the state of the economy and the level of education in the society. This relationship generates two scenarios. Under the first scenario, the adverse effects of a recession are larger than the cost of revolution and in this case, the revolution cannot be avoided, resulting in institutional change. This case is similar to the existing literature where revolutions happen during bad times because people have less to lose. The second scenario describes the cases when the cost of revolution is significantly higher than the costs brought by the state of the economy. In this case, the threat of revolution depends on the relative difference between the two costs. However, the innovation of this case is the policy implications that it generates. In our economy, the dictator can adjust the set of policies and allow for institutional improvements in order to avoid a revolution.

The main question that this chapter tries to answer is "If good institutions promote economic activities, why some countries fail to adopt them?" The answer we provide is that these nations have low levels of education and as a result, the citizens face high costs meaning that it is harder for them to cooperate and organise a successful revolution. Lastly, our model predicts that an increase in the

level of education will lead to improvements in the quality of institutions under both cases.

In the following chapters, we will test the prediction of our model using both a panel and a cross-section analysis. Specifically, we will test the hypothesis that the quality of institutions increases when the level of education increases. Additionally, we will test the relationship between unemployment and the quality of institutions. Based on our model we expect to find a positive relationship between education and unemployment with the quality of institutions.

4

The Impact of Education on Institutions

"Education is the most powerful weapon which you can use to change the world."

– Nelson Mandela

4.1 Introduction

There is a vast amount of literature on the role of institutions in explaining cross country variation in economic performance of different countries. Institutions, either economic or political as they are defined in the previous chapters (North 1981; North 1991; Acemoglu and Robinson 2000; Williamson 2000; Acemoglu et al. 2005), have a significant impact on the economic activities and are able to explain the differences in economic development between different countries. However, these differences still exist; if "good" institutions promote economic

development why do some countries fail to adopt them? The answer offered by the relevant literature focuses on special interest groups and mainly the role of political and economic power that some individuals or groups of individuals hold that allows them to determine the institutional environment in their favour leading to an institutional arrangement that blocks further economic development.

The question then becomes how these regions can escape such institutional arrangements. The answer that this thesis offers focuses on the role of education. As citizens become more educated they are able to understand better the consequences of the policies and the institutional environment and a process that can increase the pressure for institutional improvements. The model presented in Chapter 2 describes two different ways that these improvements could be achieved, when the power of the elite – those who hold the economic and political power – is large or the level of education is low, increase in education may lead to marginal improvements in the institutional quality to satisfy the citizens and minimise the risk of revolution. On the other hand, when the power of the elite or the quality of the existing institutions is low enough, there exists a scenario where a revolution cannot be avoided and institutional changes will follow the revolution.

This chapter tests the hypothesis that higher levels of education and economic development lead to better institutions using a panel estimation method.

The rest of this Chapter is organised as follows: Section 2 provides a discussion on the data used, Section 3 discusses the estimation methods, section 4 presents the results and Section 5 concludes.

4.2   Data

Panel data offer several advantages over time-series or cross-sectional data. They allow the researcher to analyse and evaluate the data controlling for individual heterogeneity and are better for understanding dynamic relationships (Baltagi 2008).

This chapter uses aggregate data at a country level. For the dependent variable, we use the index constructed by the Fraser Institute (Fraser Economic Freedom of the World Index) as a proxy for institutional quality (Gwartney et al. 2016a). The Index is an effort to measure the quality of policies and institutions of the countries in the sample that promote economic activities. The Economic Freedom of the World measures the quality of institutions in five areas[1]. Additionally, a Summary Index is produced that represents an average score of the different components. In our opinion, as the different components of the Fraser Economic Freedom of the World Index work together to promote or halt economic activities, the Summary Index is a better representation of the institutional environment of the individual countries. Moreover, the authors produce a chain-linked index in order to assure the comparability of the scores across time. As a result, the chain-linked index is more appropriate for a panel study. The variable is continuous and takes values from 0 to 10, with higher values meaning better institutions. The data is available yearly from 1970 to 2014 and rank up to 159 countries. As far as we are aware this is the only data available that fit the purpose of this thesis. They capture different institutional aspects,

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[1][1] Size of Government; [2] Legal System and Security of Property Rights; [3] Sound Money; [4] Freedom to Trade Internationally; [5] Regulation. See Appendix A for description of the Areas, Components, and Sub-components of the Fraser Economic Freedom of the World Index Index(Gwartney et al. 2016a)

following the classification proposed by Williamson (2000), and are suitable for a panel analysis.

The aforementioned measure of institutional quality, the Freedom House Index (Fraser Institute), FHI from now on, has been extensively used in empirical research but not without criticism.

For instance, Paldam (2003) argues that such indices are constructed to verify the authors' beliefs – "end use loop problem" – but recognises that any biases caused by this issue are most likely within normal measurement errors. On the other hand, De Haan et al. (2006) argue that the beliefs of those who compile these indices should not be a reason for researchers not to use such data, in contrast, they state that:

> Many researchers seem to be hesitant using EF indicators, as they doubt whether the data are reliable, given the strong ideological position of the organisations providing them. In our view, this is probably the best guarantee that the indicators measure what they should (De Haan et al. 2006, p.158).

De Haan et al. (2006) also argue that some of the elements of the FHI are consistent with the IMF's proposed policies in adjustment programs and as a result, they can be used as a proxy for structural changes. Lastly, as Easterly (2007) argues, all researchers "have to make the best of some bad choices" and since the FHI addresses the serious issue of across time comparability, we take a practical view and we believe that for the purpose of this thesis any uncertainty caused by the use of the FHI is acceptable.

Out of the full sample of countries we focus on a sub-sample of 86 developing countries[2] in South and Central America, Africa, Middle-East and Asia. One of the biggest difficulties of the empirical research in this field is that there is no widely

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[2] See Table A.2 in Appendix A for a list of countries in our sample

accepted measure of institutional quality, especially for panel analysis. Some popular datasets used in similar studies as proxies of institutional quality, such as the Worldwide Governance Indicators (WGI) or the democracy index (Polity IV), are not appropriate for use in our study. Either the scores of individual countries demonstrate changes in the sources of the data or in the methodology by which these indicators are calculated or both. This means that they are inconsistent from year to year and as a result, inappropriate for over-time comparisons (Kaufmann et al. 2011), or capture only one aspect of the institutional environment of a region.

Table 4.1 Descriptive statistics

VARIABLES	(1) N	(2) Mean	(3) Median	(4) sd	(5) min	(6) max
FH Index	939	6.072	6.130	1.330	1.780	9.150
Schooling	1,885	5.481	5.250	3.174	0.0200	13.18
Growth	1,307	3.904	3.892	3.686	-31.02	33.22
GDP pc	1,296	10,725	3,355	15,819	149.7	103,870
Unemployment	695	8.596	7.300	5.960	0	37.60
Share of Urban Pop.	1,535	49.80	48.95	24.62	2.154	100
Trade	1,285	74.32	62.30	50.29	0.218	444.8

The main variable of interest measuring education is the average years of total schooling taken from the Barro-Lee Educational Attainment Data (Barro and Lee, 2013) that covers the period from 1950 to 2010. The dataset provides observations in 5-year intervals. In addition, we control for real GDP per capita and real GDP growth rates, unemployment rate, the share of urban population and trade openness. All the macroeconomic variables are taken from the World Development Indicators (World Bank 2016, World Development Indicators 2016). GDP per capita and the share of urban population are used to capture the level of economic development in each country, while the effect of business cycle is

measured by the growth rate of GDP. The unemployment rate is used to capture pressure from the presence of a special interest group. Unemployed citizens can create increased pressure to the government and may require the allocation of additional resources and improvements in the quality of institutions, such as unemployment benefits or an efficient system for unemployed citizens to find a job. Lastly, trade openness is associated with the adoption of policies of foreign countries which may lead to improvements in institutional quality, especially in the case of developing countries[3]. Not all data are available for all countries and all years in our sample and as a result, our dataset is unbalanced. Table 4.1 presents the descriptive statistics of our dataset.

Figures 4.1 and 4.2 illustrate the average FH Index scores for the individual countries over the periods 1970-1990 and 1990-2010 while figures 4.3, 4.4 and 4.5 present average of educational attainment for the periods 1950-1970, 1970-1990 and 1990-2010.
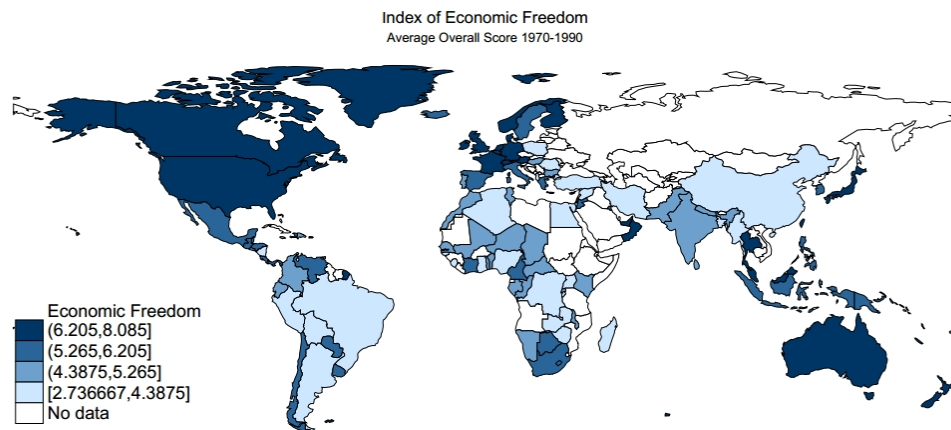
Figure 4.1 Average FHI Score (Period: 1970-1990)

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[3] See Table A.1 for description of all variables
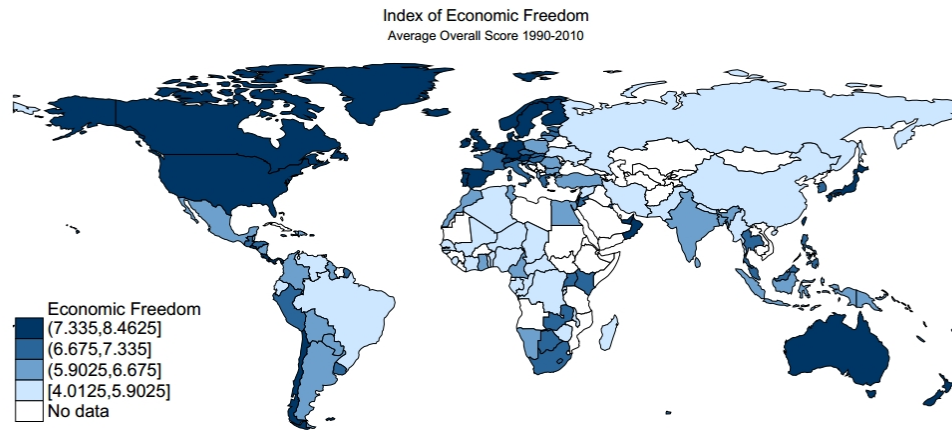
Figure 4.2 Average FHI Score (Period: 1990-2010)
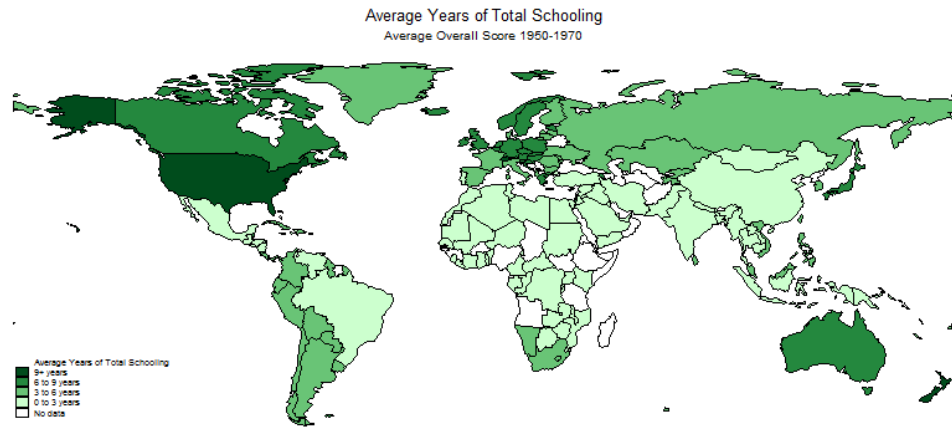
Figure 4.3 Average Years of Total Schooling (Period: 1950-1970)
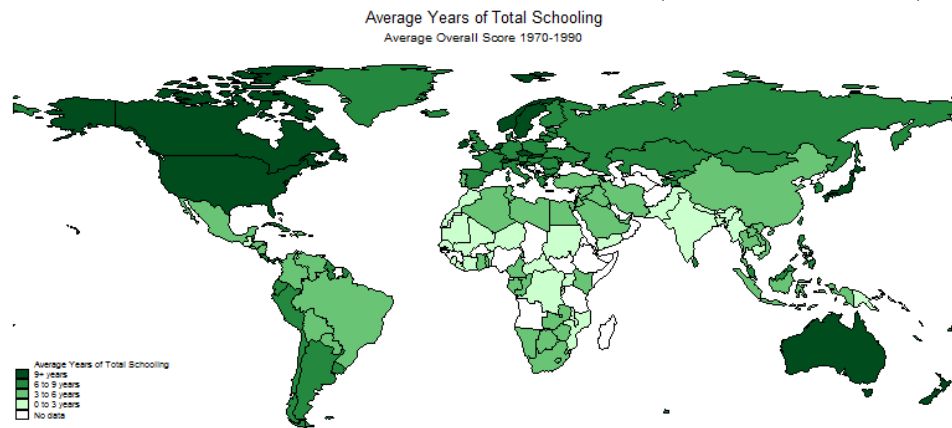
Figure 4.4 Average Years of Total Schooling (Period: 1970-1990)
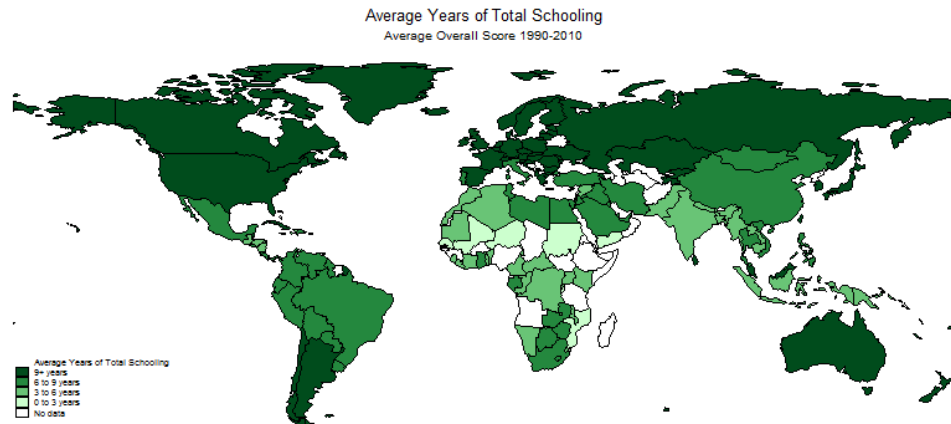
Figure 4.5 Average Years of Total Schooling (Period: 1990-2010)

The first observation we can document by looking at Figures 4.1-4.5 is that both the FHI and education measured by average years of total schooling vary across countries and time. Moreover, these Figures confirm the story of the differences between the Western offshoots and Western Europe with the rest of the world. Since the beginning of our time period (1950 for education and 1970 for the FHI) most African, Asian and Latin American regions underperform in FHI and educational attainment when compared with the Western offshoots and Western European countries.

Figures 4.6-4.8 illustrate the fluctuation of the dependent variable (FHI) over time in three different subsamples (African, Asian and South American Countries) of our dataset. The trend appears to be upwards in most cases.
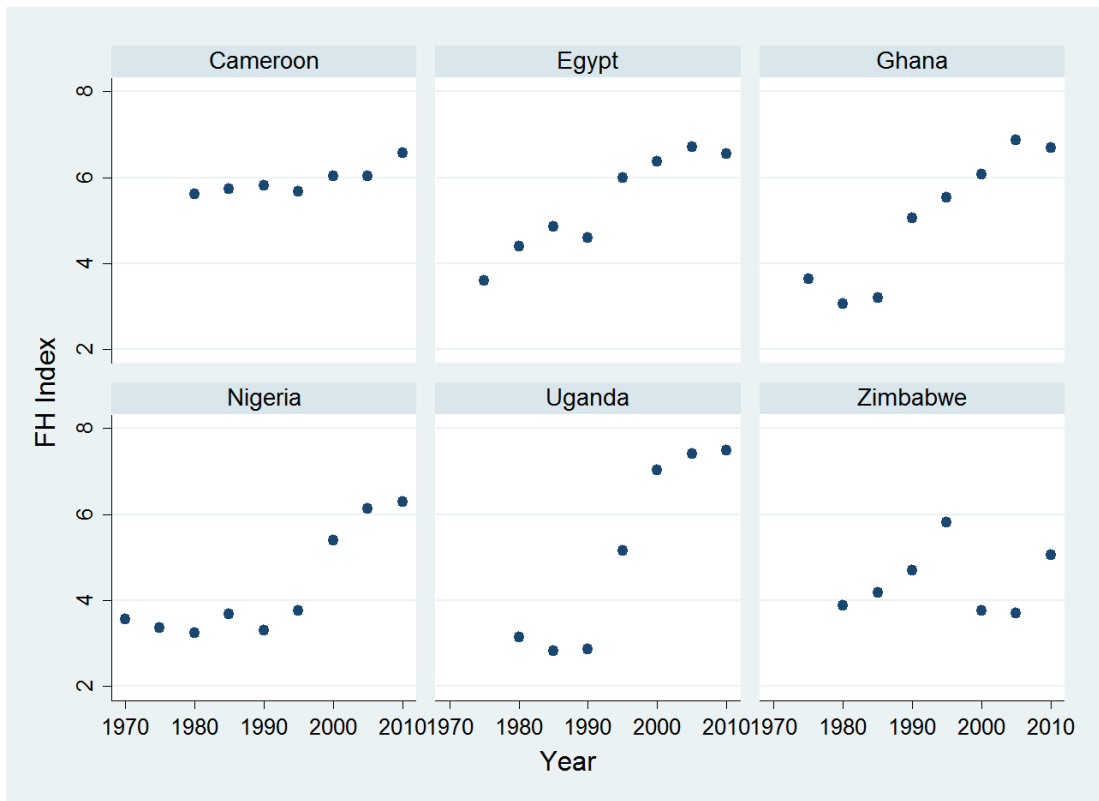
Figure 4.6 Trends in FH Index in African Countries, 1970–2014
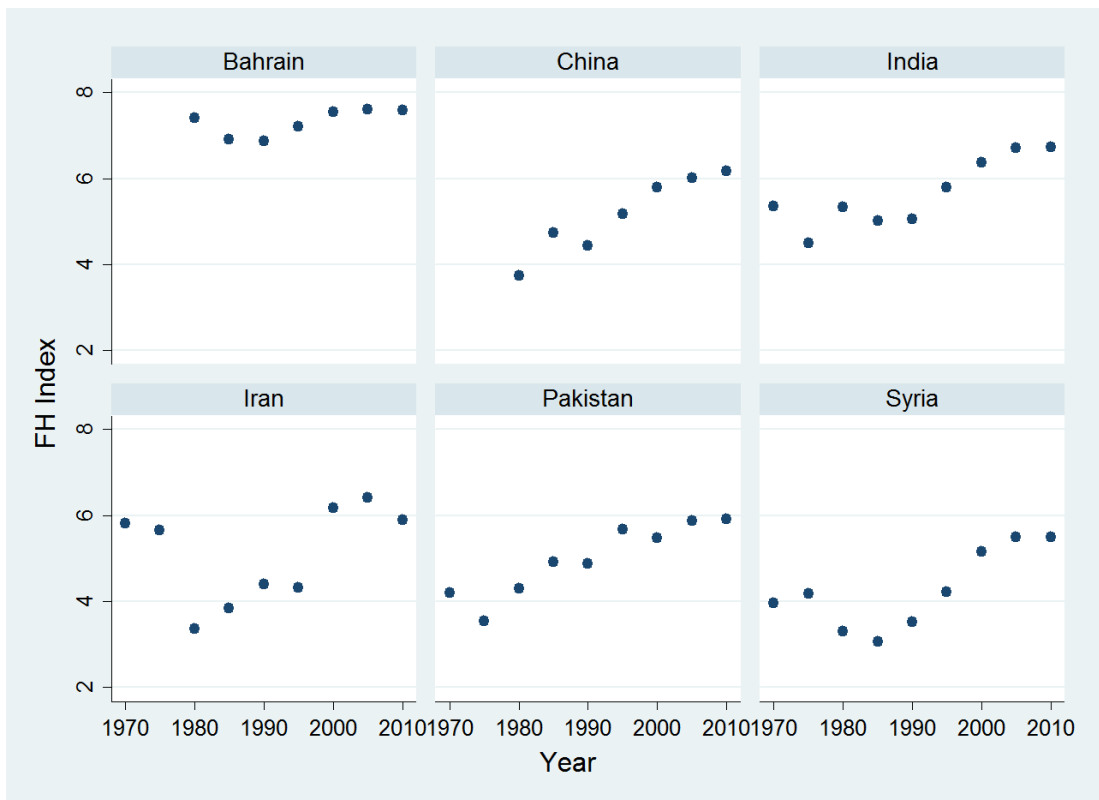
Figure 4.7 Trends in FH Index in Asian Countries, 1970–2014

At the one end there are countries like Egypt, Uganda (Figure 4.6), Pakistan (Figure 4.7) and Chile (Figure 4.8) where institutions as captured by our preferred index have improved throughout the time period under consideration, while there are cases like Cameroon (Figure 4.6), Bahrain (Figure 4.7) and Uruguay (Figure 4.8) where institutional quality hasn't improved much possibly due to the fact that these countries have started with a relative high level of quality. This could be an indication of the middle income institutional trap. Interestingly enough there are also cases like Argentina (Figure 4.8) where institutional quality has even deteriorated in the years under investigation, possibly due to the crisis that the country faced after a decade of economic growth.
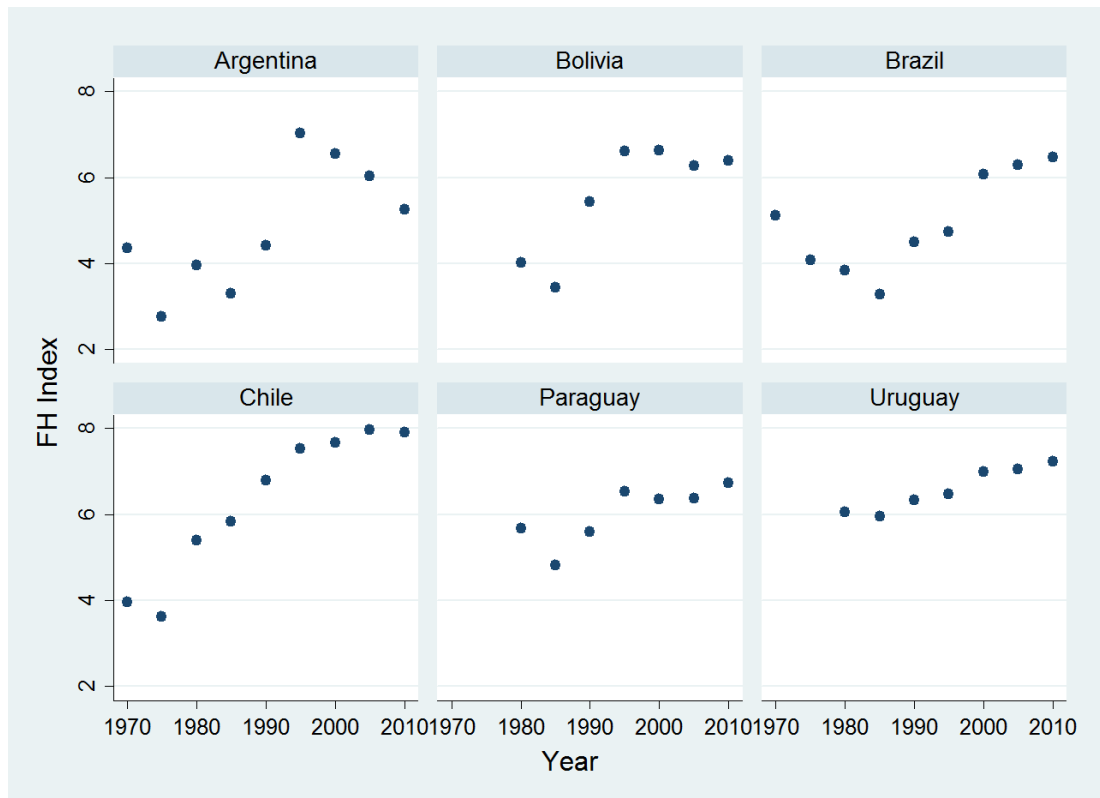
Figure 4.8 Trends in FH Index in South American Countries, 1970–2014

4.3 Methodology

Panel data, compared with time series and cross section, allow the examination of individual heterogeneity, especially, in the case of macro panels of countries. As a result, the researcher may be able to capture country-specific characteristics that are unobservable in time series or cross-sectional studies. Moreover, compared with cross-sectional studies, panel analysis allows the examination of dynamic relationships between the variables. However, for panel studies data availability can pose a significant challenge.

Institutions are highly persistent over time (Williamson 2000; Hodgson 2004; Acemoglu et al. 2005; Acemoglu 2008) and as a result using averages is an appropriate method to examine relationships with long run characteristics (Amendola et al. 2013). Moreover, using averages can reduce the noise generated by survey data (Easterly 2007). In our analysis, we expect past values of the right hand side variables to have an impact on each periods' institutional environment. Hence, we use 5-year averages of non-overlapping periods (1965-1969, 1970-1974, 1975-1979 and so on) for all the variables in our estimations and all the control variables appear in lagged form, i.e. the institutional quality in 1990 will depend on the level of economic development and education measured in 1985 and so on (Barro 1999). Based on the model presented in the previous chapter, our simple estimation model is:

$$
\begin{aligned}
Quality_{(i,t)} = \alpha + \beta_1 Edu_{(i,t-1)} + \beta_2 GDP_{(i,t-1)} + \beta_3 Growth_{(i,t-1)} \\
+ \gamma_i X'_{(i,t-1)} + u_{(i,t)}
\end{aligned}
\tag{4.1}
$$

Where $Quality_{(i,t)}$ is the 5-year average of the FHI of every country in our sample, i indexes countries and $(t = 1, 2, \ldots, T)$ indexes the time dimension. $Edu_{(i,t-1)}$ is the variable measuring education (Average Years of Total Schooling), $GDP_{(i,t-1)}$

is the real GDP per capita, $Growth_{(i,t-1)}$ is the real GDP growth rate and $X'_{(i,t-1)}$ is a vector that includes the rest of our control variables, unemployment rate, the share of urban population and openness to trade. Coefficients β_1 and β_2 are the effects of education and economic development, measured by income, on institutional quality and we expect them to be positive. The growth rate is included in the regressions to capture the effects of the business cycle and the share of urban population is included in our regressions as an additional measure of economic development.

The unemployment rate is included as higher unemployment rates may bring additional pressure for institutional reforms. Openness to trade is calculated as trade as percentage of GDP and is included in our regressions as it can capture a country's competitiveness but is also associated with political and economic stability. Additionally, trade can capture political and economic development especially in developing countries as trade is sometimes connected with investments in technology and in many cases the adoption of policies of more developed regions. Finally, $u_{(i,t)}$ is the error term, capturing all other omitted factors which under OLS requires the standard assumptions (unbiased, efficient and consistent).

As it was mentioned before, a panel study examines the same countries over a period of time. As a result, the assumption that the error terms are uncorrelated is not, usually, realistic and the simple OLS estimator is not efficient. For this reason, we can specify: $u_{it} = \mu_i + \epsilon_{it}$, where ϵ_{it} is assumed to be homoscedastic and uncorrelated and μ_i captures the unobserved or not specified fixed characteristics of an individual or a country. This extension of the simple linear regression model is the fixed effects model that allows us to measure unobservable cross-country

effects. The specification of the fixed effects model is:

$$Quality_{(i,t)} = \mu_i + \beta_1 Edu_{(i,t-1)} + \beta_2 GDP_{(i,t-1)} + \beta_3 Growth_{(i,t-1)}$$
$$+ \gamma_i X'_{(i,t-1)} + \epsilon_{(i,t)}$$

(4.2)

Where μ_i captures the country specific characteristics and remains constant over time, while $\epsilon_{(i,t)}$ is the remainder disturbance that varies across countries and time.

Fixed Effects vs Random Effects

An additional issue in panel studies is whether to treat the individual effects (μ_i) as fixed or random. The two different methods may yield different estimates. The main difference between the two methods is that fixed effects estimation assumes that the unobserved heterogeneity is caused by constant, time-invariant characteristics of the individual countries in the sample, while random effects estimation assumes that the heterogeneity is uncorrelated with the independent variables (x_{it}). Additionally, fixed effects are preferred if the value of μ_i is of specific interest.

Hausman (1978) offers a way to determine which method is appropriate. The Hausman test compares the two estimates, under the null hypothesis both estimators are consistent but the FE is inefficient, while under the alternative only the FE estimator is consistent. In other words, the Hausman test examines whether the difference between the two estimators is significant due to the correlation between μ_i and x_{it}, where x_{it} is the vector of regressors.

Our results illustrate that the fixed effects estimator is more appropriate. In addition, due to the nature of our study and the fact that the sample consists of

individual countries and their specific characteristics and their role in the quality of institutions are of interest we believe that the fixed effects estimator is more appropriate.

4.3.1 Dynamic Estimation

Institutions tend to evolve slowly and are sticky; Williamson (2000) argues that for some institutions it may take decades to centuries for them to evolve. From an empirical point of view, this means that we should expect that past values of institutional quality will affect subsequent period's institutions. This leads us to consider a dynamic panel model. Our linear dynamic model is:

$$Quality_{(i,t)} = \mu_i + \phi_1 Quality_{(i,t-1)} + \beta_1 Edu_{(i,t-1)} + \beta_2 GDP_{(i,t-1)}$$
$$+ \beta_3 Growth_{(i,t-1)} + \gamma_i X'_{(i,t-1)} + \epsilon_{(i,t)} \tag{4.3}$$

The dynamic nature our model is established by the inclusion of lagged levels of the dependent variables in the right hand side our econometric specification ($Quality_{(i,t-1)}$). However, including a lag of the dependent variable creates serious estimating issues as μ_i is now related to $Quality_{(i,t-1)}$, irrespective of whether we treat it as a fixed or random effects estimator, and as a result the simple OLS estimation would yield inconsistent and biased results. This bias is a more significant problem in samples with small time dimension, as the bias of the FE estimator is of order $1/T$, where T corresponds to the time length of the panel (Nickell 1981). In our study the number of time periods is relatively small (T=7) and as a result the bias of the FE estimator in the context of dynamic estimation is not negligible.

4.3.2 Estimation Strategy

In the literature, there are two widely used methods to address the possible bias issue due to the inclusion of the lagged dependent variable, the use of GMM estimators or bias-corrected fixed effects estimators. We apply both.

GMM Estimation

One of the first attempts to address the bias issue was an IV approach proposed by Anderson and Hsiao (1981) in which the initial equation is first-differenced to eliminate the individual characteristics of the countries and then second lags of the dependent variable are used as instruments under the assumption that the error term is not serially correlated. However, Arellano and Bond (1991) argue that this IV method of treating the bias problem yields estimation results that do not use all the available information in the sample. Instead, Arellano and Bond (1991) propose a difference-GMM estimator that takes the first differences to eliminate the individual effects and uses past information as instruments to increases the efficiency. Using lagged (two or more) values of the dependent variable as instruments allows the decrease of the asymptotic variance.

However, more recent literature, Arellano and Bover (1995) and Blundell and Bond (1998), show that the Arellano-Bond GMM estimator may suffer from weak instrument problems especially in cases when the regressors are highly persistent. In order to improve the properties of the AB difference-GMM estimator, they use lagged differences of the dependent variables as instruments for equations in levels in addition to lagged levels of the dependent variables instruments for equations in first differences. The resulting System-GMM estimator integrates the moment conditions for level and difference equations and further reduces the potential bias

and inaccuracy of dynamic estimations, especially in the case of weak instruments (Blundell and Bond 1998; Baltagi 2008; Roodman 2009; Verbeek 2012).

In our specification, the country-specific characteristics captured by the fixed effects terms are correlated with the lagged values of institutional quality. Additionally, our time dimension is short ($T = 7$). As a result, we expect that the estimated results using pooled-OLS and FE estimation may suffer from non-negligible bias. Thus, for our baseline dynamic regression, we rely on the Difference and System-GMM estimators proposed by Arellano and Bond (1991) and Blundell and Bond (1998).

The validity of the moment conditions required by the GMM estimators can be tested using the Hansen test of overidentifying restrictions. The null hypothesis is that the instruments are uncorrelated with the error term, and thus valid, and the excluded instruments are correctly excluded from the estimation. Moreover, the validity of the results of our GMM estimations depends on the order of the autocorrelation in the model. The differenced equation residuals should be serially correlated (AR(1)), but following the assumption of serial independence in the residuals of the initial specification, the residuals of the differenced equation should not indicate AR(2) behaviour. In such case the second lags of the variables would be inappropriate as instruments (Baum 2006).

Additionally, since System GMM uses lagged variables in levels to instrument the differenced equation and lagged differences to instrument levels, a possible issue is that the researcher may end up with too many instruments. Roodman (2009) argues that instrument proliferation is a significant problem resulting in unreliable results and specification tests, as too many instruments overfit the endogenous variables. For this reason, we should treat the Hansen statistic with

caution as very high p-values (close to unity) would be an indication of instrument proliferation.

Bias-Corrected Estimators

A weakness of the GMM estimators is that their bias increases as N decreases. Additionally, they suffer from poor small sample properties and they require a decision on which variables to use as instruments and how many instruments to use which may further lead to instrument proliferation (Roodman, 2009). On the other hand, the simple Least Square Dummy Variable (LSDV) estimator for dynamic panel data models is not consistent for N large and finite T and the estimator is biased of order $O(1/T)$. Kiviet (1995) and Bun and Kiviet (2003) offer two different techniques to correct the LSDV estimator in panel studies with small or moderate N and small T including terms of at most order $(N^{-1}T^{-1})$ and $(N^{-1}T^{-2})$, this means that for the same amount of N and T Kiviet's estimator are less biased.

However, both these methods are not appropriate for unbalanced panels and require a strict set of restrictions. Various authors have provided alternatives based on Kiviet's methods trying to address their issues (Bruno 2005; Bun and Carree 2006; Everaert and Pozzi 2007). Out of them we choose two different bias corrected estimators to test the robustness of our results that are appropriate for our unbalanced panel; the least square dummy variable corrected (LSDVC) estimator (Bruno 2005) and the bootstrap corrected fixed effects (BCFE) estimator (Everaert and Pozzi, 2007; De Vos et al. 2015).

Bruno (2005) extends the existing bias approximation methods to accommodate unbalanced panels. The result is a bias corrected LSDV estimator that uses the Anderson-Hsiao, the Arellano-Bond or the Blundell-Bond system estimators

to approximate the bias. Monte Carlo experiments illustrate that the LSDVC estimator outperforms the IV and GMM estimators in bias and the root mean squared error in unbalanced panels. The second option of bias correction was proposed by Everaert and Pozzi (2007). The proposed BCFE estimator is derived using an iterative bootstrap algorithm that does not rely on any theoretical assumptions. Their method was extended by De Vos et al. (2015) to allow for unbalanced panels. Monte Carlo simulations again indicate that in the case of small T, especially when $T < 10$, the BCFE performs better in terms of bias.

The two bias correction methods presented above are more appropriate for small N and in such cases the performance of these estimators is higher than the GMM ones. However, in this study the country dimension is relatively large ($N = 89$) and as a result we use the system-GMM as our main estimation method and the LSDVC and BCFE estimators to test the robustness of our results.

4.4   Results

4.4.1   Introduction

We begin our empirical analysis with some basic correlations between our variables presented in Table 4.2.

Results presented in Column (1) suggest that almost all of the control variables are positively correlated with our variable of preference used to capture institutional quality. As expected the previous period's values of institutional quality are strongly correlated with current institutional quality (0.89).

Table 4.2 Correlations

	FHI	L.FHI	School.	GDPpc	Growth	Unempl.	Urb. Share	Trade
FHI	1							
lagFHI	0.89***	1						
School.	0.63***	0.61***	1					
GDPpc	0.61***	0.64***	0.73***	1				
Growth	0.11***	0.088*	-0.14***	-0.04	1			
Unempl	-0.10*	-0.14**	0.03	-0.07	-0.077	1		
Urb. Share	0.52***	0.52***	0.64***	0.83***	-0.05	-0.08	1	
Trade	0.42***	0.43***	0.28***	0.26***	0.09**	-0.04	0.28***	1

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Schooling and GDP pc also appear to have a strong positive relationship with our proxy of institutional quality. The two scatterplots illustrate the two relationships.
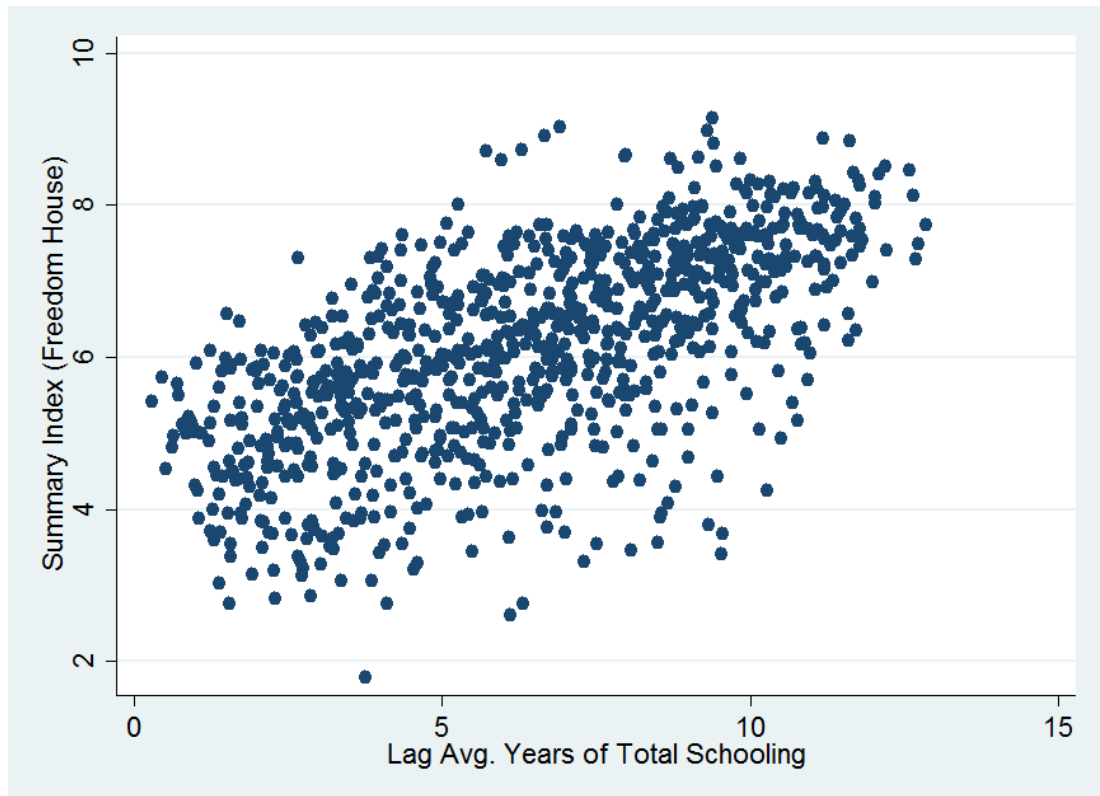
Figure 4.9 Education and FHI

Figures 4.9 and 4.10 illustrate the positive relationship between education and GDP with the proxy of institutional quality.
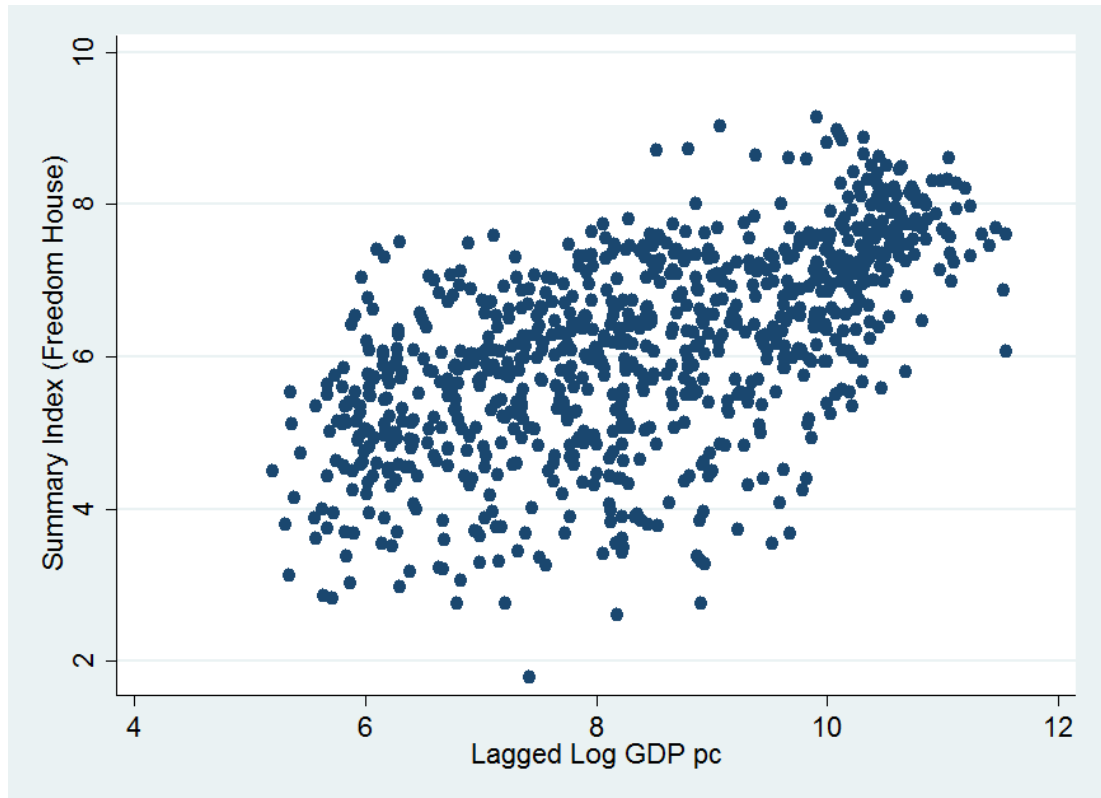
Figure 4.10 GDP per capita and FHI

The rest of this section discusses the results of our estimations. First, we present the basic panel results with simple OLS and FE. We then move to the main results generated by difference-GMM and system-GMM estimations and we then compare our benchmark regressions with the bias-corrected estimations obtained with LSDVC and BCFE.

4.4.2 GMM Results

Table 4.3 presents the results of the simple pooled OLS (POLS) regressions where the dependent variable is our measure for institutional quality (FHI).

Table 4.3 Basic Regressions (Pooled OLS)

VARIABLES	(1) POLS	(2) POLS	(3) POLS	(4) POLS Developing	(5) POLS Developing	(6) POLS Developing
FHI			0.462***			0.455***
			(0.034)			(0.040)
Schooling	0.238***	0.395***	0.181***	0.212***	0.481***	0.210***
	(0.027)	(0.046)	(0.041)	(0.031)	(0.062)	(0.056)
Growth	0.118***	0.113***	0.077***	0.122***	0.110***	0.077***
	(0.011)	(0.011)	(0.0093)	(0.013)	(0.012)	(0.011)
GDPpc	0.122*	0.340*	0.329**	-0.0407	0.197	0.420**
	(0.074)	(0.183)	(0.157)	(0.099)	(0.217)	(0.185)
Unempl.	-0.003	0.025***	0.019**	-0.004	0.025**	0.018*
	(0.008)	(0.009)	(0.008)	(0.009)	(0.012)	(0.009)
Urban	0.004	0.021**	0.023***	0.005	0.014	0.022**
	(0.004)	(0.009)	(0.008)	(0.004)	(0.012)	(0.009)
Trade	0.0015	-0.008***	-0.005***	0.004***	-0.008***	-0.005**
	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
Constant	3.08***	-0.594	3.81***	4.18***	0.677	4.34***
	(0.439)	(1.35)	(1.15)	(0.567)	(1.51)	(1.27)
Obs.	495	495	490	357	357	352
R-squared		0.535	0.688		0.550	0.699
# of groups	110	110	110	86	86	86
Country FE	NO	YES	YES	NO	YES	YES

Note: Dependent Variable is the chain-linked Summary Index of the Fraser Institute. L.FHI is the lagged value of the FHI. Schooling is the lagged value of the average of the total years of schooling. Growth is the lagged value of the annual growth rate. GDPpc is the lagged value of the log of income. Unempl. is the the lag of unemployment (%). Urban is the share of urban population. Trade measures openness and is the share of total GDP. Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Column 1 presents results when equation (4.3) is estimated with POLS on our full sample (110 countries) without fixed effects and lagged value of the dependent variable. Only schooling and the growth rate appear positive and

statistically significant at the 1% significance level. Adding country specific FE (Column 2) increases the coefficient of education and its standard error and the effects of unemployment, urban population and trade appear to be significant.

Including a lagged value of the dependent variable (Column 3) along with the country FE seems to increase the explanatory power of our model. The lagged value of FHI is, as expected, positive and statistically significant, while education and growth rate remain positive and significant. Including the lagged value of FHI increases the significance of GDP pc (at $\alpha = 0.05$). In columns 4-6 we repeat the regressions excluding the Advanced Economies from our sample. The results are similar to the ones we obtained from our full sample. However, as mentioned before the results of Table 4.3 could be biased since they include a lagged value of the dependent variable (Columns 3 and 6). Nonetheless, these results provide some first insights on the effect of education on institutional quality. We now turn to discuss the results when we estimate equation (3) using the difference and system-GMM estimators. Table 4.4 presents them.

Columns 1 and 2 present the results of the difference-GMM and System-GMM with the summary index as the dependent variable and we allow for two lagged values to be used as instruments to avoid instrument proliferation. All errors reported are the robust standard errors. In both cases, the lag of the dependent variable is positive and statistically significant at $\alpha = 0.01$.

The effect of education on the quality of institutions measured by the summary index is also positive and significant. The results suggest that an increase of one standard deviation in the total average years of schooling will lead to an increase in the FHI score of 15% following the D-GMM estimation and 10% in the S-GMM estimation. In addition, we can calculate the long-run effect of education (b_{LR}) on institutional quality using: $b_{LR} = \frac{b_{EDU}}{1-b_{lag}}$, where b_{EDU}

Table 4.4 GMM Estimations

VARIABLES	(1) D-GMM	(2) S-GMM	(3) D-GMM	(4) S-GMM	(5) D-GMM	(6) S-GMM
FHI	0.339***	0.496***				
	(0.071)	(0.072)				
Area2			-0.008	0.281***		
			(0.078)	(0.081)		
Area5					0.232***	0.389***
					(0.077)	(0.086)
Schooling	0.288***	0.187***	0.324**	0.0458	0.100	0.187***
	(0.078)	(0.045)	(0.140)	(0.059)	(0.117)	(0.034)
Growth	0.079***	0.062***	0.057***	0.083***	0.078***	0.031
	(0.013)	(0.019)	(0.013)	(0.024)	(0.027)	(0.021)
GDPpc	0.382	0.392***	0.316	0.688***	0.297	0.415***
	(0.269)	(0.125)	(0.406)	(0.241)	(0.388)	(0.101)
Unempl.	0.029	0.008	-0.011	0.0364*	0.064**	0.003
	(0.019)	(0.010)	(0.028)	(0.019)	(0.029)	(0.013)
Urban	0.027**	0.007**	0.026	-0.015	0.029	0.005
	(0.012)	(0.004)	(0.023)	(0.010)	(0.026)	(0.004)
Trade	-0.007*	0.004***	-0.010	0.005***	-0.002	0.005***
	(0.004)	(0.001)	(0.007)	(0.002)	(0.004)	(0.001)
AR(1)	0.020	0.010	0.030	0.002	0.032	0.006
AR(2)	0.637	0.328	0.337	0.128	0.120	0.251
OverID	0.439	0.225	0.134	0.224	0.306	0.270
CSD Test	19.721	8.139	15.428	5.736	12.965	0.872
Observations	247	321	236	316	248	322
# of Instr.	64	69	44	68	44	69
# of groups	72	74	70	77	72	74

Note: Dependent Variable is the chain-linked Summary Index of the Fraser Institute (Columns 1-2), the Area 2 of the FHI (Columns 3-4) and Area 5 (Columns 5-6). FHI, Area 2 and Area 5 are the corresponding lagged values of the Index. Schooling is the lagged value of the average of the total years of schooling. Growth is the lagged value of the annual growth rate. GDPpc is the lagged value of the log of income. Unempl. is the the lag of unemployment (%). Urb. share is the share of urban population. Trade measures openess and is the share of total GDP. AR(1) and AR(2) refer to the p-value of the Arellano-Bond tests for first and second order serial correlation. OverID is the p-value of the Hansen test of overidentifying restrictions. CSD is the statistic of Pesaran's test for cross-sectional dependence. Robust standard errors in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

is the coefficient of education and b_{lag} is the coefficient of the lagged dependent variable. The long-run coefficients of education are 0.436 and and 0.371, for the D-GMM and S-GMM respectively. Compared with the simple, biased, pooled OLS estimation in Table 4.3, Column 6, the D-GMM coefficient in Table 4 for the effect of schooling is higher, while the effect of GDP pc is not statistically significant.

The growth rate appears to be positive and significant which indicates that institutional improvements follow periods of economic growth. Economic development appears to have a positive impact on the quality of institutions, through the coefficient of the share of urban population, while the effect of trade appears to be negative but marginally significant at $\alpha = 0.10$. Unemployment appears to have no significant impact on the quality of institutions. In comparison, when we estimate our model with S-GMM the effect of the previous period's institutional quality appears to be significantly higher. The effect of education decreases in absolute value and now GDP pc has a strong positive impact on the FHI while the impact of trade changes sign and is now significant at 1%. The differences in these results indicate the problems with D-GMM in samples with finite N and small T.

Columns 3 and 4 present the results of the difference-GMM and System-GMM with area 2 (Legal System and Security of Property Rights) of the FHI as the dependent variable. Legal System and Property Rights corresponds to Williamson's (2000) level 2 of institutions, formal rules, judiciary and property. On the other hand Columns 5 and 6 present the results of the difference-GMM and System-GMM with area 5 (Regulations) of the FHI as the dependent variable which is associated with level 3 in Williamson's (2000) definition that includes the regulations of contractual relations.

The results indicate that education has a positive and significant impact ($\alpha = 0.01$) in the S-GMM regression for Area 5 (Regulations) of the FHI, while GDP per capita is positive and significant for both Areas in the S-GMM specification. The urban share of population appears to have no impact in all estimations of the two individual areas of the FHI while growth appears to be positive and significant especially in determining area 2 (Legal System and Security of Property Rights).

The results pass all the relevant economic and statistical tests, particularly in all our regressions we fail to reject the null hypothesis of the Arellano-Bond test for AR(1) at least $\alpha = 0.05$, in most cases at $\alpha = 0.01$, we reject the null of the Arellano-Bond test for AR(2) and the p-values of the Hansen test of overidentifying restrictions indicate that our instruments are valid and our regressions do not suffer from instrument proliferation. Moreover, using Leamer's (1983) method we perform an extreme bound analysis to test for specification error of the model, either due to including irrelevant variables or omitting relevant ones. The test indicates that all our variables are robust and they do not change sign at 0.95 confidence interval. Finally, Pesaran's[4] test for cross-sectional dependence indicates that our specification does not suffer from cross-sectional dependence except in the result of Column (6).

4.4.3 Bias-Corrected Estimations

To test the robustness of our results we turn to the two different bias correction approaches mentioned before, LSDVC and BCFE. Both methods calculate the standard errors by bootstrapping. In the case of BCFE estimator, the standard

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[4]Pesaran's test for cross-sectional dependence. H0: errors are weakly cross sectional dependent.

errors are estimated from the bootstrap distribution of the BCFE estimator (Table 4.5).

Table 4.5 Bootstrap Corrected Bias

VARIABLES	(1) BCFE(50)	(2) BCFE(200)	(3) LSDVC AB	(4) LSDVC BB
FHI	0.772***	0.774***	0.565***	0.604***
	(0.096)	(0.112)	(0.050)	(0.050)
Schooling	0.164***	0.160**	0.171***	0.165***
	(0.063)	(0.068)	(0.058)	(0.059)
Growth	0.076***	0.076***	0.068***	0.068***
	(0.017)	(0.020)	(0.012)	(0.012)
GDPpc	0.356**	0.347*	0.525**	0.589***
	(0.177)	(0.202)	(0.206)	(0.221)
Unempl.	0.030***	0.029**	0.019*	0.018*
	(0.011)	(0.012)	(0.010)	(0.010)
Urban	0.013	0.012	0.020**	0.019*
	(0.008)	(0.009)	(0.010)	(0.011)
Trade	-0.004	-0.004	-0.004*	-0.004*
	(0.003)	(0.003)	(0.002)	(0.002)
Obs.	332	332	352	352
# of groups	75	75	86	86

Note: Dependent Variable is the chain-linked Summary Index of the Fraser Institute . FHI is the lagged value of the Index. Schooling is the lagged value of the average of the total years of schooling. Growth is the lagged value of the annual growth rate. GDPpc is the lagged value of the log of income. Unempl. is the the lag of unemployment (%). Urb. share is the share of urban population. Trade measures openness and is the share of total GDP. Robust standard errors in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

In Columns 1 and 2 we present the bootstrap corrected bias using 250 bootstrap samples for bias correction and allowing for 50 and 200 iterations for inference respectively. The results in both columns confirm the findings presented in Table 4.4. One significant difference is the estimated effect of the lagged dependent variable which is significantly larger in magnitude. The effects of education, GDP per capita and growth are similar in magnitude and sign with those obtained with S-GMM (Table 4.4, Column 2), with the only exception being

that the statistical significance of GDP per capita decreases when we increase the iterations from 50 to 200. The main statistical differences between S-GMM and the BCFE estimations are the effects of urban population and trade are no longer significant while unemployment appears to have a small positive impact.

In Columns 3 and 4 we present the results obtained using the LSDVC estimator. This method allows the user to specify the consistent estimator to initialise the bias correction process. In our case, we choose the Arellano-Bond, Column 3, and the Blundell-Bond estimators, Column 4 and we specify the accuracy of the approximation to be of order up to $O(1/NT^2)$. Lastly, we calculate (bootstrapping) the variance-covariance matrix using 1000 repetitions. The LSDVC estimation yields similar results to the BCFE estimation and those obtained by S-GMM. All control variables appear with the expected sign, except trade that is marginally significant at $\alpha = 0.10$. Higher levels of education imply better institutions. Unemployment appears to have a small positive effect. Economic development, measured by the growth rate, GDP pc and the share of urban population, also has a positive impact on the quality of institutions.

4.5 Conclusions

This chapter has considered the hypothesis that more education brings better institutions. We have tested the hypothesis using various popular econometric methods found in the literature. Our main findings derived from the S-GMM estimation, Table 4.4 (Column 3), indicate that an increase in educational attainment of one standard deviation would lead to a 10% increase in institutional quality measured by our preferred index when we test the relationship in developing economies.

Additionally, the positive impact of education on the quality of institutions persists when we separately test the relationship between education and two of the areas of the FHI (Legal System and Security of Property Rights, and Regulations) separately. An increase of education by one standard deviation would lead to a 6% and 10% increase in the scores of Area 2 and Area 5 respectively, but the former is marginally significant at a 10% level of confidence.

The relationship is also confirmed when we test our model with two additional methods of bias correction (Table 5). The estimated effect of education on institutional quality is similar in magnitude and sign both in BCFE and LSDVC estimations. Particularly, an increase of one standard deviation in education would lead to an approximately 9% increase in institutional quality.

Moreover, economic development captured by GDP per capita and the share of urban population appears to have a positive impact on institutional quality in most specifications of the model which is in agreement with most of the relevant literature. The positive impact of economic growth indicates that the quality of the institutional quality improves as the economy is growing. Trade openness appears to have a small positive impact on FHI. These findings confirm the predictions of the model presented in Chapter 3. Institutional improvements will follow increases in education and we can in part explain why African, Asian and Latin American countries consistently underperform in almost all measures of institutional quality compared with Western European countries and the Western offshoots.

5

Education and the Quality of Institutions in EU Regions

"διπλοῦν ὁρῶσιν οἱ μαθόντες γράμματα"

[Those who are educated see twice as much as those who are not.]

– Pythagoras

5.1   Introduction

As discussed in previous chapters of this thesis it has been widely accepted that institutions matter for economic growth, hence it is important to understand what determines institutions. Why do some countries have better governments than others? It is important to fathom out what determines aspects of institutional quality in order to suggest the implementation of policies that would improve the quality of institutions.

In this chapter, we use a newly created measure of government performance as a proxy for the quality of institutions in European regions (NUTS 1 and NUTS 2 levels) and we examine the determinants of the quality of government comparable with that of the previous chapter but in a cross-regional context. Following the findings of Chapter 4, that education is positively associated with the quality of institutions, we demonstrate in this Chapter that this phenomenon is not only present in developing countries.

The remainder of the chapter is organised as follows. Section 2 presents the theoretical and empirical background of the determinants of the quality of government. Section 3 introduces the empirical methodologies, the model, and the data used in this chapter. Section 4 presents the results and their analysis. Finally, Section 5 summarises the key findings.

5.2 Quality of Government

A recent and widely agreed tenet in political economy research is that the quality of government has a significant impact on the economic development of countries around the world. Low-quality government institutions responsible for implementing laws and policies do not provide the proper incentives to promote healthy economic activities. The quality of government (QoG) factor has been argued to have considerable effects on a number of important economic -such as economic growth- and non-economic phenomena -such as subjective happiness, improved public health and environmental sustainability (Tavits 2007; Helliwell and Huang 2008; Holmberg et al. 2009). It is for this reason that the quality of government has taken a substantial role in studying economic performance.

5.2.1 Definitions and Measures

Many scholars have attempted to define the quality of government and what it captures. Some of the definitions of a good government focus on how interventionist governments are as they determine the rules of economic activities through taxation, protecting (or not) property, and many other forms of regulations and policies.

Kaufmann et al. (2004) define the quality of governance as:

...the traditions and institutions by which authority in a country is exercised. This includes the process by which governments are selected, monitored and replaced; the capacity of the government to effectively formulate and implement sound policies; and the respect of citizens and the state for the institutions that govern economic and social interactions among them.

They measure six dimensions[1] that capture how citizens perceive the performance of their government, creating the Worldwide Governance Indicators (WGI). Measuring the performance of the government based on the citizens' perception could indicate that the actual performance is different, but in this case, the perception of the citizens is important as they base their economic and political decisions based on how they perceive the government is performing.

La Porta et al. (1999) argue that a good government is one that promotes economic development. They measure the performance of a government using various criteria such as "non-interventionism" and efficiency. However, the definition on non-interventionism is ambiguous as the interpretation of taxation is questionable. Non-interventionism dictates that good governments should impose low taxation. However, in some cases, high taxes mean better public goods provision. Evidence from the 18th century Britain and France and modern-day

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[1]Voice and Accountability, Political Stability and Absence of Violence, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption

Scandinavian countries indicate that high taxation is positively related to better institutions and higher quality of government.

Other definitions add more depth to the above definition by focusing on how efficient the government intervention is; if government intervention is effective then it can promote economic activities (La Porta et al. 1999). Evans and Rauch (1999) find that an efficient "Weberian" bureaucracy, characterised by meritocracy, can foster economic growth. Finer (1999) compares the history of state-building between Eastern and European absolutism to demonstrate differences in efficiency. Both the Eastern empires and the European monarchies were highly interventionists. However, in Europe, monarchs were partially under the control of the law, in some cases social groups with high power or even the Church, allowing some forms of property and political rights. One example is the British aristocracy that managed to limit the power of the Crown and secured property rights, making this European monarchy more efficient, resulting in a better-performing economy.

Huther and Shah (1999) argue that the definition of the quality of governance should aim to evaluate how the government exercises its power, "through formal and informal institutions", and how this affects the quality of the life of the citizens. Compared with the definition provided by Kaufmann et al. (2004) which includes various aspects of government's quality, Huther and Shah (1999) achieve a definition which emphasises the impact of the quality of government on the net well-being of the citizens. In other words, the former definition focuses on the "means" while the latter addresses the "end".

Much literature focuses solely on a particular aspect of government's behaviour to measure the Quality of Government. Government consumption (Barro 1991; Alesina et al. 1999), property rights (Demsetz 1967; Knack and Keefer 1995; Gould and Gruben 1996; Easterly and Levine 2003; Rodrik et al. 2004),

bureaucracy (Rauch 1995; Rauch and Evans 2000) democracy, political rights, freedom (Barro 1996), and corruption (Mauro 1995: Mo 2001 ; Mauro 2004) have been used by many scholars to measure the performance of the government and the effects on economic performance. All these aspects of government performance have been found to have a significant impact on the economic development of different countries. However, as they examine only one aspect of government's influence on the economic activities, we can argue that they fail to capture the quality of government or at best they only capture a part of it. In addition, in this thesis, we examine the determinants of institutional quality and we emphasise the role of education testing the prediction of our model presented in Chapter 3. As a result, we require a broader measure of the Quality of Government than the various individual aspects.

This chapter adopts the definition proposed by Rothstein and Teorell (2008). The authors argue that the existing definitions suffer from three problems: they are either too broad; making the task of measuring the quality of government difficult, too narrow; failing to capture enough aspects of QoG, or suffer from a "functionalist slant" that does not allow the creation of a general theory of the QoG, identifying a policy that could be useful for economic development in any, not just one, country. Rothstein and Teorell (2008) propose instead that the government's performance should be measured by how accessible is the public authority and how the power is exercised focusing on the role of political equality and impartiality. The authors claim that a "high quality" government ought to plan policies not considering individual preferences. Rather policies should aim for the collective good.

The innovation of this definition is the inclusion of impartiality which is strongly related to political equality but at the same time gives the authors the

ability to capture many aspects of the determinants of the quality of government. The concept of impartiality is strongly correlated with the other components of the quality of government. For example, a majoritarian democracy does not mean that impartiality is respected. Clientelism is one case where the impartiality condition is breached. Nepotism (corruption) or limitations of the freedom of expression are forms of discrimination and a direct violation of the impartiality rule. Additionally, Rothstein (2011) argues that other measures used in the literature such as democracy are not enough to measure the effectiveness of a government. Evidence of improvements in the quality of government in Singapore, Colombia and Sweden, provide support to the argument that impartiality is a better instrument to measure the performance of a government.

5.2.2 Economic, Political and Cultural Determinants

The end of the 1980s was a research era based on macroeconomic stabilisation, deregulation and trade liberalisation as the stepping stones of a development strategy. However, policy recommendations based on these cornerstones was not enough for economic development if adequate healthy institutional conditions were not in place. Even though empirical work has attempted to include institutions into the estimated equations, empirical research on the determinants of institutions has been lagging. La Porta et al. (1999) propose that we can categorise the theories of the determinants of the Quality of Government in three groups: economic theories, political theories and cultural/historical theories.

The economic theories focus on the net benefit of institutional change. Institutions emerge from the interaction between different agents in the society. Therefore, efficient institutions are created when the benefits exceed the costs (Demsetz 1967; North 1981; Olson 1996). North (1981) argues that institutions

are shaped by the interactions of the players in all economic or political activities. They are the consequences of the choices of the actors and these choices are all based on a net benefit analysis. Therefore, institutions or institutional change arises when the economic, political or social benefit exceeds the costs. Nonetheless, North's theory could not explain how and why inefficient institutions emerge, why they are not eliminated or why policy-makers do not adopt successful institutions.

Kaufmann et al. (2004) estimate the causal effect from per capita income to the quality of government using an indirect technique and non-sample information (measurement errors). The results are surprising as they convey a negative effect from income to the quality of government which is opposite of what the economic theories predict. Nonetheless, the absence of a valid, exogenous instrument for income makes it impossible to isolate the negative effect. The authors argue that the negative result could mean that economic development does not necessarily mean better government.

According to Olson (1996), most economic theories of institutions predict that if any inefficiencies exist, the markets will adjust to correct these inefficiencies and produce socially beneficial results. All the economic theories are based on the rationality of the decision-makers; the reason why inefficient institutions emerge and persist is that in some cases adopting effective policies and rational behaviour are incompatible, as individual rational behaviour does not always agree with social rational behaviour which results in "institutional sclerosis". Acemoglu (2006) offers a model that can explain how and why inefficient institutions emerge and persist and how individual rationality does not necessarily lead to the social good. They are the result of the efforts of those who hold the power (elite) to reallocate resources to themselves. Through revenue extraction, factor price manipulation and political consolidation the elite is able to benefit from impoverishing other

groups in the economy and exclude them from accessing the political power leading to equilibria with persistent inefficient policies.

The political theories, on the other hand, can explain the creation and persistence of inefficient institutions as they argue that institutions emerge as the government or those in power seek to increase their power, stop others from accessing the power or redistribute resources for their benefit (North 1990; Olson 1993; Acemoglu and Robinson 2000; Acemoglu 2003; Acemoglu et al. 2005; Acemoglu 2008). Marx et al. (1872) argued that the society is divided into classes and the rules are set by those who hold the power, with the aim to remain in power and gather resources.

La Porta et al. (1999) and Barro (1999) show that ethnolinguistic fractionalization has a substantial negative impact on most components of the quality of government. Specifically, higher fractionalization results to more corruption, less efficient bureaucracy, and inadequate public goods provision (La Porta et al. 1999) and has a negative impact on democracy (Barro 1999). However, the effects of ethnic fractionalization on the performance of the government become insignificant when income is included in the regressions.

Mauro (1995), Easterly and Levine (1997) and Alesina et al. (1999) provide further support for the negative effect of ethnic heterogeneity on the behaviour of the government. To prevent ethnic losers from gaining power or access to public goods, those in power restrict the freedom of minorities and redistribute resources away from them. Therefore, higher ethnic heterogeneity means a lower quality of government. Besides, Mo (2001) argues that income inequality and social instability give incentives to the groups at the bottom of the distribution to engage in illegal activities. Corruption promotes illegal activities and political instability.

Charron and Lapuente (2013) examine the effects of historical constraints on the quality of government in a sample of 73 EU regions. They discover that countries with higher limitations on the executive power of the authorities are associated with higher quality of government today. The result illustrates that countries with effective monitoring and accountability system for those who held the power developed a better government, and the effects persisted until today.

A second aspect of the political theories focuses on the effects of legal origins on the performance of the government. The legal systems of the world can be classified into two broad groups: common law and civil law. Common law has British origins, while the civil law has Roman origins. The modern civil law can be further categorised in French, German, Scandinavian and Socialist. The main difference between the two legal systems is that common law was developed case by case as judges had to settle specific disputes, while the civil law was formed based on abstract rules created by scholars. The difference in the development of the two legal systems had a significant impact on the evolution of institutions of the various regions that adopted those systems. Common law developed in a way that was limiting the power of the Crown to an extent, protecting property owners from expropriation by the state. In contrast, civil law developed as a set of rules that was influenced by the State's perspective. Therefore, common law can be taken as an instrument that is limiting the power of the state and promotes economic activity, while civil law could be seen as a proxy of an interventionist government trying to increase its power. Therefore, it is expected that common law countries outperform those with civil law origins.

Furthermore, in terms of the quality of government, within the civil law origins, the socialist civil law is expected to perform the worst as their institutions evolved, mainly, to increase the power of the government. On the other hand,

German and Scandinavian origins are expected to outperform the rest of the civil law origins as they have both developed a more efficient public sector than the French and Socialist origins[2] (La Porta et al. 1997; La Porta et al. 1998; La Porta et al. 1999).

La Porta et al. (1999) assess the effects of legal origins on the quality of government. The findings illustrate that countries with Socialist origins have the lowest quality of government in all specifications of their model; they are more corrupt, less efficient and have poor public goods provision. French origins are associated with less efficiency, but there is no difference in corruption between common law origins and French civil law. Lastly, German and Scandinavian origins have similar performance with common law countries in the quality of government. Many empirical studies have illustrated similar effects of legal origins (Stulz and Williamson 2003; Beck et al. 2003; Al-Marhubi 2004; Asongu and Nwachukwu 2016).

The cultural theories argue that characteristics of the society have a significant impact on the interactions between agents in a society and therefore influence the institutional development. As Almond and Verba (1989) discussed, civic culture affects the performance of the government.

One of the seminal works in the field is the book "Making Democracy Work" by Putnam et al. (1994) regarding the institutional performance and maintenance of democracy in Italy. The book focuses on the role of social trust on institutional performance across 20 Italian regions. Putnam suggests that trust encourages collective action, and collective action promotes better institutions. The authors found that historical differences in civic participation between the North and

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[2]The definition of Socialist legal origins follows La Porta et al. 1997. According to them "the socialist legal tradition originates in the Soviet Union, and was spread by the Soviet armies first to the former Soviet republics and later to Eastern Europe. It was also imitated by some socialist states, such as Mongolia and China."

Central with the South of Italy had a high impact on the performance of the regional governments. Knack (2002) confirmed Putnam's findings in a cross-sectional study of the US states. The results demonstrate a positive effect of social capital on the quality of the government which persists in all specifications of the model.

Additionally, Knack (2002) argues that there is no evidence of an effect running from the quality of government to social capital. In other words, higher social capital creates better governments, but there is no indication that good governments create trusting citizens. Putnam's findings are also confirmed by La Porta et al. (1997) and Knack and Keefer (1997) using cross-country data. Charron and Lapuente (2013) use the first wave of the European Quality Index and find a positive correlation between the human development index, social trust and the quality of government in European regions. They also find that more populated areas report worse quality of government. However, the results for social trust come from a smaller sample of 72 regions from 6 countries. Moreover, their estimations do not include other control variables that may have a significant impact on the performance of a government.

5.2.3 The Role of Education

Adding to the existing literature, this chapter includes education as a determinant of the quality of government. Even though this relationship is not new, the empirical research on the effects of education on the governance is limited. The largest part of the existing literature focuses on the relationship between education and democracy.

The American philosopher John Dewey (1916) pioneered the study of the link between education and institutions. Dewey argued that education nurtures democracy as it allows the development of the ideals necessary for a stable democracy. The argument gained popularity half a century later when the political sociologist Seymour Lipset talked about the relationship between education and democracy. Lipset (1959, 1960) argued that to accept the rules of democracy a citizen has to be highly sophisticated as the more democratic a regime is, the more participation is required by a citizen (Lipset 1959, p. 108) and hypothesised that higher literacy and education rates lead to more democratic regimes. Based on empirical evidence from Latin America, Arab nations and European countries, Lipset claimed that "education [may not be] a sufficient condition for democracy . . . [but] it comes close to being a necessary one" (Lipset 1959, p.40)

Almond and Verba (1989) provide an explanation for the role of education in the political behaviour of citizens: "The uneducated man . . . is a different political actor from the man who has received a higher level of education" (p.315). A person with higher levels of education may be able to understand and evaluate the implications of the policies that the government implements better compared with, say, an uneducated person.

Ever since a lot of empirical research has supported this theory. Barro (1999) and Lee and Barro (2001) find a positive relationship between democracy and years of schooling. Papaioannou and Siourounis (2008) examine the democratic transitions during the Third Wave of Democratization (beginning in 1974 with the Portugal's revolution), and they show that "democracy is more likely to emerge and consolidate in educated countries. Education is also a significant predictor of the intensity and the timing of political transitions" (p. 384) and the effect

persists even when they control for historical and cultural factors and ethnic fractionalization.

Glaeser et al. (2004) argue the interactions of the citizens of a country shape the institutions, and the institutions are affected by the citizens' human and social capital. Testing for the direction of the causal effect they discover that it is only present in the direction of education to institutions, while they find no effect from institutions to education. Acemoglu et al. (2005) on the other hand, using a dynamic panel provide evidence that the effects of education on democracy disappear when country fixed effects are included in the regressions. However, Glaeser et al. (2007) claim that the econometric technique of Acemoglu et al. (2005) is not appropriate and that using the appropriate method the positive effects of education on democracy are significant even when country fixed effects are included in the estimation.

Another channel through which education may affect the institutional quality is discussed in Glaeser et al. (2007). The authors argue that education promotes democracy because it increases the benefits of civic participation and lowers the costs of social interaction. As educated citizens can exchange information more efficiently than uneducated citizens, it is easier for them to coordinate and avoid miscommunication costs. In a cross-country analysis, they find strong evidence to support their hypothesis that civic participation increases with education.

Moreover, Knack (2004) argues that the effect of education on institutions is twofold. One effect arises from the fact that educated citizens may demand better institutions than uneducated citizens. On the other hand, education may have a positive effect on the supply side as with a more educated workforce the public sector can become more efficient. Testing for the determinants of the performance of the government in a cross-sectional study of the US states, Knack

reports a positive relationship between the social capital index and government performance, but, the effects of education and income are not significant. However, the study used a social capital index that is highly correlated with education and additionally, even though the author used instruments for the social capital index he did not use any exogenous instruments to control for education or income, meaning that the estimated effects could be biased.

Glaeser and Saks (2006) provide one of the few empirical studies that examine the effects of education on the performance of the government. Specifically, Glaeser and Saks (2006) use federal convictions for corruption to investigate the determinants of corruption in the USA. An innovation of their paper is the use of 'actual' data on corruption instead of survey data. However, it can be argued that 'real' data it does not necessarily measure corruption accurately as a corrupt or incompetent judicial system might not convict someone for corruption. The authors test for the effects of income, education, income inequality and ethnic fractionalization. They find a strong negative relationship between corruption and income and corruption and education. Using exogenous measures for income (past income and geographical characteristics) and education (religion) they find that the effects are even stronger, illustrating a reverse causality between corruption and the two control variables (income and education). Moreover, they find that states with higher income inequality and racial dissimilarity are more corrupt. The results provide further support to the economic and political theories discussed earlier.

Building Hypotheses

The primary objective of this chapter is to examine the economic, political and cultural determinants of the Quality of Government and corruption. Economic

theories argue that economic development creates demand for higher quality of government. We, therefore, hypothesise that economic development measured by income per capita, urbanisation and education will have a positive effect on the quality of government.

At this point, it is important to note the underlying endogeneity and reverse causality between the Quality of Government and economic development. On the one hand, economic development creates demand for better institutions, and on the other hand, better institutions promote economic growth. This implies that the simple OLS estimates might be weak and biased, and proper instruments are needed to get unbiased estimates of the effects. Therefore, apart from the simple OLS estimations, the results of 2SLS/IV estimations are also presented.

As discussed above, political theories emphasise the adverse effects of heterogeneity on the society. Income inequality and ethnic fractionalization are both associated with low quality of government. In countries with high ethnic fractionalization and inequality, those in power seek to remain in power and extract revenue by restricting minorities the access to power. Therefore, we expect that the poverty index and ethnic fractionalization will have a negative impact on the Quality of Government and corruption. Other political theories noted above focus on the legal origins of the countries and their effects on the institutional development. From the evidence from previous research, we hypothesise that regions with common law origins will outperform the regions with civil law and additionally among the civil law countries, we expect those with Scandinavian and Germanic origins to perform better than those with French and Socialist civil law origins.

Lastly, cultural theories advocate that economies with high social capital and in particular with high social trust have better performing governments than

economies where trust is low, as their citizens participate more in civic activities and politics. This theory implies that regions with higher reported trust would have better institutions and higher quality of government.

5.3   Estimation Strategy

The objective of this section is to investigate the determinants of the quality of government and corruption based on the theoretical background presented earlier in the European Union at a regional level.

5.3.1   Model

We consider the data on the quality of government used in this chapter to be the equilibrium outcome of the performance of the government in every region that is determined by the quality that the government supplies and the quality that the citizens demand.

On the supply side, the government supplies institutions of a certain quality to its citizens. The quality of the supplied institutions will depend on various factors. First, as income per capita increases a government will collect more taxes, keeping the tax rate constant. Therefore, it is able to supply higher quality, more "expensive" institutions. Second, the size of the government has a direct impact on the effectiveness of the public sector and therefore, on the performance of the government. A larger public sector may suffer less from bureaucratic delays, but, at the same time, it may also create more chances for corruption. The population of a region and the share of urban population could have an effect on the effectiveness of the government. Areas with more population may be harder

for the government to manage efficiently. Next, the unemployment rate may affect the distribution of resources of the government, with higher unemployment rates adding more pressure to the supply side; for example, more resources allocated to social care or unemployment benefits. Also, a better educated population means a better trained workforce that can increase the quality and the efficiency of the government. We may therefore write:

$$Quality^S = \alpha_0 + \alpha_1 Income + \alpha_2 Education + \alpha_3 OtherControls \qquad (5.1)$$

On the other hand, the demand-side of the quality of government is determined by the citizens and their decisions and characteristics. People with higher income and education will demand better governance. Specifically for education; as it has been argued before, better educated people can better understand the consequences of the institutional quality of their region on their life or income and may choose to act accordingly, pressuring the government for higher quality institutions or rewarding them for good governance, for example through their voting choices. Moreover, special interest groups, such as unemployed people, demand specific public services or public goods increasing the demand for better governance. Thus we may write:

$$Quality^D = \beta_0 + \beta_1 Income + \beta_2 Education + \beta_3 OtherControls \qquad (5.2)$$

Taking the Supply and Demand sides together we get the equilibrium of the performance of the government:

$$Quality^* = \gamma_0 + \gamma_1 Income + \gamma_2 Education + \gamma_3 OtherControls \qquad (5.3)$$

5.3.2 Methodology

It should be obvious from the above mentioned that there is a reverse causality and endogeneity issue for income and education (Glaeser and Saks 2006). Higher income means better governance and better governance promotes economic development and thus higher income. At the same time, education is correlated with income causing a similar identification problem. Therefore, apart from the simple OLS regressions, we will also use the IV-2SLS estimation method using exogenous instruments for both the income and education - past income and geographical characteristics (Glaeser and Saks 2006; Barro 2015) and religion respectively (Glaeser and Saks 2006). Glaeser and Saks (2006) when estimating the determinants of corruption in the US states used religion (Congregationalism) as an exogenous instrument for education. This study uses the share of atheists in every region. Religion and education are not always compatible, and recent empirical studies have demonstrated a positive association between education and atheism (Glaeser and Sacerdote 2008; Lynn et al. 2009; Hungerman 2014).

As illustrated in our results all the relevant tests confirm that the instruments used in this chapter are valid and strong. The only exception being the regressions when both income and education are included in the IV estimation (Tables 5.3, 5.4, 5.8, 5.9 and Column 6). However, as income and education are highly correlated (VIF=13.26), it is expected that the estimated coefficients will not be precisely measured, and they are only included for completeness.

Lastly, the European Union consists of 28 member states, and each of them has their own historical, cultural and geographical characteristics that may have had a significant impact on the evolution of their institutions. To allow for those features and test their importance in determining the quality of government of the

European regions we repeat all regressions including country fixed effects. Besides, country fixed effects can moderate the omitted variables bias, if there is any.

Hypotheses

Based on the economic, political and cultural theories we, therefore, hypothesise that: Income (H1) and education (H2) will be positively related to the quality of government and the lack of corruption. Higher scores in poverty (H3) and ethnic fractionalization (H4) will be negatively related to the quality of government and corruption. Regions in countries with common law origins will outperform the rest European regions (H5). Whereas, among the civil law regions, those from socialist civil law origins are expected to have the worst performance (H6) and those with German and Scandinavian origins the best (H7). Lastly, a higher social trust will result in better government performance (H8).

5.3.3 Data

The dependent variables of the model are the two measures of the performance of the government: the European Quality of Government Index and Corruption (Charron et al. 2014a). The data for the two variables are taken from the Quality of Government Institute. The European Quality of Government Index is a recent attempt to measure the quality of government at a regional level across Europe. The first wave was published in 2010. This chapter uses the second wave that was released in 2013 and covers the 28 member states of the European Union at NUTS 1[3] and NUTS 2[3] level.

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[3]See APPENDIX B for more detail regrading NUTS classification.

The dataset is the result of a survey in which 85000 participants from 206 regions[4], answered 16 questions[5] regarding the quality, impartiality and corruption (three pillars) of the public services provided by their government (education, health and law), the media, and the elections.

The definition of the quality of government used in the dataset is the one proposed by Rothstein and Teorell (2008) that emphasises the importance of impartiality for good governance. The data were collected for each of the three pillars and with them, the European Quality of Government Index is compiled. The data were extensively tested and were found to be robust, reliable and valid. The only exception is that the overall EQI score improved significantly when the corruption scores of Romania and Turkey are removed (Charron et al, 2016). However, Turkey is not included in the sample used in our analysis due to lack of regional data. These differences in corruption are an additional reason to examine the determinants of corruption separately. It should be noted here that for both the total quality score and corruption, higher scores are better. To put it simply, a high score in the corruption pillar means less corruption in that region.

As with other survey data, these are open to criticism as well. One of the most common arguments against survey data is that the misinformation and lack of objectivity of the participants may create bias, and the same question could be interpreted differently based on the cultural values of the individuals. Nonetheless, it can be argued that the perception and experience of respondents regarding the institutional quality in their region is of key importance. Citizens base their everyday political and economic decisions based on their perception and experience of the quality of institutions established in their regions (Holmberg et al. 2009).

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[4]See Tables B.1-B.5 in APPENDIX B for a list of the regions in our sample.

[5]See APPENDIX B for more detail regarding the questionnaire of the QoG index.

In addition, it should be noted that as the dataset is relatively new - the first wave was published in 2010- it provides only a snapshot of the quality of institutions at a regional level within the European Union. Therefore, it allows only for a cross-regional analysis of the determinants of government performance. However, at the time of writing this chapter, no other similar dataset exists to allow for a different approach.

Out of the 206 regions included in the dataset, only 192[4] are used in this study due to missing data for the control variables. Matching the data for the control variables is facilitated by the quality of government dataset following the EU NUTS classification. The data for the 2013 wave of the regional QoG index were collected in 2010.

The control variables GDP per capita, education (share of the population with tertiary education), the share of the urban population, public workers (share of total employment), unemployment rate, population, poverty and immigration are taken from the Eurostat database. As it was discussed earlier in this thesis, institutions are sticky and tend to change slowly. This implies that past values of the control variables should be added in the regressions. As a result, all the control variables are for the year 2006 unless otherwise mentioned. The year 2006 was chosen to allow for higher country representation in the sample.

Geographical variables -latitude, longitude and distance to coast- are taken from the GISCO database and are calculated using the ArcGIS 10.1 software. The dummy variable "Capital in Region" captures whether the capital city of the country is in the region. This dummy addresses the special characteristics of the capital regions. For instance, it is common in European capitals to have a higher concentration of special interest groups, more policy makers and a larger percentage of the population of the country.

Furthermore, to compare the performance of the regions as measured by the EQI, the Worldwide Governance Indicators are used as a benchmark. The data on government performance was taken from the WGI for the 28 EU countries, and they were ordered based on their performance. Cluster analysis of the WGI scores reported three different groups: top[6], middle[7] and bottom[8] performing countries . From there, a dummy variable is created to categorise the European regions according to the performance of their country as measured by the WGI. In the initial regressions, presented in Tables 5.3-5.7 where we do not include country-specific characteristics, the WGI cluster dummy will allow us to compare the performance of the government of European countries as it is measured by the two different indicators and reduce the omitted variables bias.

Table 5.1 Descriptive statistics

VARIABLES	(1) N	(2) Mean	(3) Median	(4) sd	(5) min	(6) max
QoG	213	0	0.210	1.000	-2.851	2.662
Income	213	9.963	10.05	0.443	8.683	11.05
Education	213	0.222	0.217	0.0825	0.0730	0.457
Population	213	14.61	14.57	1.105	10.20	18.23
Urban	213	0.663	0.693	0.250	0	1
Public W.	213	0.235	0.229	0.0561	0.110	0.355
Unempl.	213	0.0703	0.0650	0.0308	0.0210	0.175

Table 5.1 presents the summary statistics and Table 5.2 the correlations between our main control variables.

To test the first set of political theories regarding heterogeneity we use two variables. Poverty, as a proxy for income inequality since the Gini coefficient is

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[6]Cluster 1: Finland, Denmark, Sweden, Netherlands, Luxembourg, Germany, Austria, United Kingdom, Ireland

[7]Cluster 2: Belgium, France, Estonia, Malta, Portugal, Cyprus, Spain, Slovenia

[8]Cluster 3: Czech Republic, Poland, Lithuania, Latvia, Slovak Republic, Hungary, Croatia, Italy, Greece, Romania, Bulgaria

Table 5.2 Correlations

	QoG	Income	Education	Population	Urban pop.	Public W.	Unempl.
QoG	1						
Income	0.640***	1					
Education	0.521***	0.548***	1				
Population	-0.145*	0.00798	0.165*	1			
Urban	0.122	0.458***	0.304***	0.310***	1		
Public W.	0.632***	0.478***	0.456***	-0.0580	0.187**	1	
Unempl.	-0.305***	-0.379***	-0.126	0.130	-0.108	-0.0389	1

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

not available at a regional level, measured by the share of the population at risk of poverty, and the two are highly correlated at a country level. Additionally, to measure ethnic fractionalization a dissimilarity index is created, as $1 - \sum s_i^2$, where s_i is the share of the ith population, namely the shares of the population born in the country, born in another EU country, born in a non-EU country. As a second measure of ethnic heterogeneity, the share of immigrants in every region is used. All data were taken from the Eurostat database.

Moreover, to examine the effects of the legal origins the classification proposed by La Porta et al. (1999) is followed. The regions are divided into five groups based on the legal origins of their countries. The groups are: common law[9], French civil law[10], German civil law[11], Scandinavian civil law[12] and Socialist civil law[13].

Lastly, data on atheism and social trust are taken from the European Social Survey. Data were collected from waves 4 (published in 2008), 5 (published in 2010) and 6 (published in 2012), depending on the availability of the countries in every wave, earlier waves were preferred. As both religion and social trust change very slowly over time and are determined by historical and cultural values, it

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[9]Ireland, United Kingdom

[10]Belgium, Greece, Spain, France, Italy, Luxembourg, Malta, Netherlands, Portugal

[11]Germany, Austria

[12]Denmark, Finland, Sweden

[13]Bulgaria, Czech Republic, Estonia, Croatia, Latvia, Lithuania, Hungary, Poland, Romania, Slovakia, Slovenia

is assumed that the fact that the data were taken from different waves will not create any issues. Additionally, it is confirmed that neither the methodology nor the questionnaire change between the waves.

The data were available at an individual level, and the respondents are organised according to the region to which they belong following the EU NUTS classification. The data were aggregated for every region using the provided design weights and the score for every region was thus calculated. The share of religion was calculated from the response of the citizens to the question "Do you consider yourself as belonging to any particular religion or denomination?"[14] and the variable of social trust from the responses to the question "Would you say that most people can be trusted, or that you can't be too careful in dealing with people?"[14].

5.4 The Determinants of the Quality of Government and Corruption in European Regions

5.4.1 Introduction

This section presents the empirical results of the estimates of the determinants of the Quality of Government and Corruption. A large part of the literature, as discussed previously in Section 1, identifies the importance of economic development for better and higher quality institutions. Therefore, based on the economic theories of institutions we control for per capita income and urbanisation and to address the underlying endogeneity and reverse causality issues both OLS and IV estimations are used. The instruments used for income are past income (Barro

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[14]ESS Documentation, APPENDIX A7 Variables and Questions, ESS7-2014 ed. 3.1

2015, Glaeser and Saks, 2006) and geographical characteristics – specifically, distance to coast (Gallup J.L et al. 1998; Bloom et al. 1998; Acemoglu and Robinson 2000; **?**). As Barro (2015) argues, the use of lagged variables can remove some of the bias and can treat measurement errors, but it is not an entirely satisfactory approach as the lagged value of income is in most cases highly correlated with present income. Geographic characteristics can promote economic activity and increase productivity, the access to a coast for a region could mean lower transport costs and greater ease of trading with other regions and thus create a higher income. Therefore, the inverse of distance to coast is used as a second instrument for income.

Education has a key role in determining the decisions of agents. An educated citizen is a different political actor from an uneducated one (Almond and Verba 1989) and increasing rates of literacy and schooling are associated with democracy and better institutions (Lipset 1959). It is easier for more educated citizens to understand political arguments, to identify the effects of different policies and institutions on their life and income and it is easier for them to distinguish between bad and good policies thus promoting through voting better government and institutions. Identically with the case of income, the estimated effect of education could be biased due to endogeneity and reverse causality.

Finding a proper exogenous instrument for education has been a challenge for economists and no universal variable exists. However, one of the most-used instruments in the literature is religion that has been found to be correlated with education. In particular, Protestantism (Glaeser and Sacerdote 2008; Glaeser and Saks 2006; Boppart et al. 2014) has been positively associated with education as it was highly influenced by humanism, a Renaissance movement that emphasised the importance of education and academic freedom. On the other hand, other

scholars have used Catholicism and Islamism (La Porta et al. 1997; La Porta et al. 1999) that have been found to be negatively related to education. The reason is that both religions are highly prescriptive religions and have a great impact on everyday issues and in some cases, they directly provide specific instructions and serve as an ethical background for making individual choices.

Our approach follows the literature in using religion as an instrument for education but deviates from it by using atheism. Many social scientists have argued that religion and education are incompatible, and most religions emerged due to the inability of people to explain physical phenomena (Durkheim and Swain 2008). Moreover, Glaeser and Sacerdote (2008) argue that religious belief is strongly and negatively related to education as modern education is not bound by a religious rule and it conflicts with the ideologies of most religions. For example, the reform of the US public education system in the 19th century replaced the religious beliefs with a "secular system" (Glaeser and Sacerdote 2008). Recent empirical studies in social sciences and psychology convey a positive correlation between atheism and education (Lynn et al. 2009; Schwadel 2010; Zuckerman et al. 2013; Hungerman, 2014). Therefore, atheism is used as an instrument to measure the effect of education on the quality of government and corruption exogenously.

The size of government is measured by the share of public workers in every region. The reason for including it in the regressions is that the existing empirical research has provided evidence of a negative effect of the size of government on the economic performance of countries (Barro 1991; Afonso and Jalles 2016) -bigger governments need more resources and crowd out private consumption and investment.

However, it could be argued that bigger governments could be more efficient, for example, more public workers can decrease bureaucratic delays, meaning better government performance. Adolph Wagner (1890) as cited in Singh (2008) argued that "as the economy develops over time, the activities and functions of the government increase". Following Wagner economic development leads to an increase in the size of the government as the latter needs to meet the increasing needs of the people. Mouritzen (1991) as cited in Denters et al. (2014) studies the efficiency of local governments in Denmark. The results show that administrative services were more efficient in areas where the population was less than 15000. Moreover, Martins (1995) argues that the size of the government and the population of a region have a direct impact on the efficiency of the government. It is easier for a bigger government to manage and efficiently provide public goods to a particular population, than a smaller one.

Additionally, different regions have different mixtures of population meaning that the provision of public goods and the supply of public services could be different for different regions. In some areas the unemployment, the number of single mothers or the number of pensioners could be higher and is easier for a bigger government to adjust and offer the services that satisfy the needs of the various groups. On the other hand, when the population is high, it is harder for the government to manage the different needs of heterogeneous citizens efficiently. Finally, a larger government could be more effective simply because it has more public workers to serve the citizens (Denters et al. 2014).

The capital dummy is included as capital regions have different characteristics than the rest of the regions in the country. For example, in most European countries the largest part of the executive and legislative authorities and a higher concentration of lobbies are located in the capital cities, along with 13% of the

total population on average in Europe. This means that it could be harder for governments to manage and supply high-quality institutions in capital regions and the same reasoning holds for unemployment. Lastly, urbanisation captures the level of economic development.

Among the most widely used indicators for measuring governance is the World Governance Indicators (WGI). Significant problems in their construction include, among others, lack of comparability over time and transparency. Most importantly, however, even though WGI constitute an emergence of quality of government data on a national level, indicators at an EU regional level have been lacking. For Europe, the European Quality of Government Index (EQI) has been available ever since 2010 and is based on survey data on corruption and governance at a regional level. The European Quality of Government Index (EQI) used in our analysis is a relatively newly created tool that measures the performance of the government at a regional level, and only a few empirical studies have used it (Charron and Lapuente 2013; Charron et al. 2014b).

The Worldwide Government Indicators (WGI) is the most widely used tool for measuring the performance of a government at a country level. Nonetheless, WGI does not capture the impartiality rule as defined by Rothstein and Teorell (2008) and is used in this chapter. Teorell (2009) argues that WGI's six dimensions capture only a part of the relevant measures of the quality of government. Government Effectiveness as measured by the WGI captures only the ability of the government to get things done but not how government does them, Control for Corruption does not capture clientelism and nepotism, acts that violate the impartiality rule.

In order to compare the performance of the EU regions as measured by the EQI with the WGI, the 28 EU countries are divided into three groups based

on their performance in the Worldwide Governance Indicators as was described before and three dummy variables are generated based on the performance of the country. Moreover, the dummy variables have been included to capture other possible characteristics of the countries that may affect the performance of the government and reduce the omitted variable bias.

5.4.2 Education, Income and the Quality of Institutions

Table 5.3 presents the OLS and IV results for the quality of government index. In Columns 1 - 3 we see the OLS results when only income is included (Column 1), when only education is included (Column 2) and when both income and education are included (Column 3). Columns 4 – 6 present the corresponding IV results.

The results in column (1) show a positive impact of income on the quality of government, while population and urbanisation have negative consequences. The effect of income is positive, as expected and as the economic theories predict, but urbanisation appears with a negative sign. This could mean that urban areas are harder for the government to manage and provide efficient and high-quality institutions. The size of the public sector measured by the share of public workers appears to have a strong, positive impact on the quality of government. A possible explanation for this could be that bigger governments are more efficient, less bureaucratic delays, better monitoring systems and public good provision and is easier for them to supply public goods. The capital dummy shows that capital regions have lower quality institutions than the rest. The reason could be the same as in the case of urbanisation; capital regions are highly populated areas harder for the government to manage efficiently; additionally, more executive and legislative authorities increase the probability of corruption.

Table 5.3 The determinants of the Quality of Government

Quality of Government	(1) OLS	(2) OLS	(3) OLS	(4) IV	(5) IV	(6) IV
Income	0.471***		0.448***	0.564***		0.522***
	(0.122)		(0.122)	(0.123)		(0.140)
Education		1.275**	1.012		6.297***	5.444**
		(0.638)	(0.622)		(2.261)	(2.153)
Population	-0.096**	-0.137***	-0.114**	-0.092**	-0.219***	-0.183***
	(0.043)	(0.045)	(0.044)	(0.042)	(0.061)	(0.059)
Urbanisation	-0.414**	-0.167	-0.404**	-0.463***	-0.178	-0.453**
	(0.171)	(0.163)	(0.170)	(0.168)	(0.184)	(0.189)
Public Workers	2.897***	3.211***	2.711***	2.781***	2.149**	1.682*
	(0.780)	(0.799)	(0.785)	(0.764)	(1.010)	(0.960)
Unemployment	-3.659***	-5.150***	-3.642***	-3.340***	-4.677***	-2.971**
	(1.228)	(1.190)	(1.223)	(1.206)	(1.359)	(1.363)
Capital Dummy	-0.315***	-0.315***	-0.400***	-0.337***	-0.763***	-0.813***
	(0.105)	(0.118)	(0.117)	(0.103)	(0.233)	(0.220)
Cluster 1	0.460***	0.497***	0.443***	0.448***	0.400***	0.347***
	(0.094)	(0.096)	(0.094)	(0.092)	(0.116)	(0.111)
Cluster 3	-0.925***	-0.963***	-0.856***	-0.899***	-0.590***	-0.506***
	(0.101)	(0.109)	(0.109)	(0.099)	(0.201)	(0.190)
Constant	-3.206**	1.660***	-2.923**	-4.156***	1.908***	-3.459**
	(1.381)	(0.625)	(1.386)	(1.389)	(0.713)	(1.599)
OverID				0.249		0.484
Weak Instr.				1277.8	20.71	6.82
UnderID				179.2	19.52	19.51
OV Test	0.46	0.13	0.57	0.23	0.14	0.67
BP Test	0.31	0.22	0.35	0.47	0.25	0.23
Observations	192	192	192	192	192	192
R-squared	0.782	0.769	0.785	0.781	0.691	0.723

Note: Dependent Variable is the QoG. Income is the log of income, education is the share of population with tertiary education, population is the log of population in every region, Urbanisation is the share of urban population, public workers is the share of public workers in total employment. The Capital dummy captures if the capital city of the country is in the region. Clusters refer to the WGI clusters. The instruments for income are past income and inverse distance to coast. The instrument used for education is the share of atheists in the region. The overidentification test is Sargan's Statistic. The weak instruments test is the F-statistic. The underidentification test is the LM Statistic. The OV test is the p-value of the RESET test for omitted variables. Variance Inflation Factor (VIF) indicates that none of the regressions suffers from multicollinearity. BP test is the p-value of the Breusch-Pagan test for heteroskedasticity. Standard errors in parentheses.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Lastly, the cluster dummies indicate that there are significant differences between the three groups, not captured by the rest of our control variables; regions that belong to countries of cluster 1, the top-performing countries following WGI, systematically outperform the rest regions and regions that belong to cluster 3, the poor performing regions, consistently underperform the rest.

These results demonstrate that there are significant differences between the three groups that are captured by the cluster dummies. In column 4 we can see the same regression using past income and the inverse distance to coast as instruments for income. Comparing the results with Column 1, we observe an increase of about 20% of the estimated effect of income on the quality of government, though the difference is not statistically significant. The rest of the results are similar to the OLS estimation both in direction and magnitude.

In Column 2 the OLS results when education is included show a positive relationship between education and the quality of government index. The negative effect of urbanisation is no longer statistically significant while the effect of the size of the government remains significant and similar in direction and magnitude. Comparing these results with the IV regression in Column 5 where the share of atheists is used as an instrument for religion, we observe that the estimated effect of education on the quality of government is positive and statistically significant (6.297). The result is consistent with the recent literature using IV estimation for the effect of education in other countries, published estimates are often substantially higher than OLS estimates (Card and Krueger 1992; Card 1994; Card 2001; Butcher and Case 1994; Ashenfelter and Zimmerman 1997).

The rest of the results in Column 5 are similar to the previous results with two notable differences. Controlling for education now the capital regions seem to perform even worse than estimated in OLS, while the regions that belong to

cluster 3 appear to perform significantly better than estimated before but still underperform the rest.

Finally, in Column 3 both income and education are included. Education loses the significance under this specification, but the strong relationship between income and education along with the endogeneity and reverse causality issues mentioned before, deem the results biased and inaccurate. The IV estimation presented in Column 6 where both income and education are replaced by their instrumented measures indicate that both the effects are significant however the specification suffers from weak instruments ($F-stat = 6.82$).

Table 5.4 is similar to Table 5.3 with the only difference that the dependent variable here is the Corruption score of every region instead of the total quality of government score. It should be noted here that higher scores mean better performance in the corruption pillar, or to put it simply a higher score means less corruption. Therefore, positive coefficients reveal a negative relationship with corruption and vice versa.

The results for corruption are similar to those for the quality of government index as expected because the corruption score is part of the total quality score for each region, and the two are highly correlated. However, there a few significant differences.

In Column 1 the effect of income on corruption is smaller than it is for the total quality score and significant only at $\alpha = 0.1$. The size of the government is again positively associated with the corruption score and similar in magnitude. Cluster 1 performs even better in corruption alone, while the estimated gap between cluster 2 and cluster 3 is smaller in corruption than it was in the total quality of government.

Table 5.4 The determinants of Corruption

Corruption	(1) OLS	(2) OLS	(3) OLS	(4) IV	(5) IV	(6) IV
Income	0.240*		0.176	0.398***		0.357***
	(0.131)		(0.125)	(0.132)		(0.134)
Education		2.915***	2.812***		6.084***	5.366***
		(0.636)	(0.639)		(2.076)	(2.050)
Population	-0.022	-0.079*	-0.070	-0.015	-0.131**	-0.104*
	(0.046)	(0.045)	(0.045)	(0.042)	(0.056)	(0.056)
Urbanisation	-0.401**	-0.281*	-0.374**	-0.485***	-0.288*	-0.475***
	(0.184)	(0.163)	(0.175)	(0.181)	(0.169)	(0.180)
Public Workers	2.929***	2.610***	2.413***	2.732***	1.940**	1.649*
	(0.837)	(0.797)	(0.807)	(0.822)	(0.927)	(0.914)
Unemployment	-2.972**	-3.518***	-2.924**	-2.430*	-3.220***	-2.065
	(1.318)	(1.187)	(1.256)	(1.297)	(1.248)	(1.298)
Capital Dummy	-0.240**	-0.442***	-0.476***	-0.278**	-0.725***	-0.748***
	(0.113)	(0.118)	(0.120)	(0.111)	(0.214)	(0.209)
Cluster 1	0.747***	0.722***	0.701***	0.726***	0.660***	0.627***
	(0.101)	(0.096)	(0.097)	(0.099)	(0.107)	(0.105)
Cluster 3	-0.367***	-0.218**	-0.176	-0.323***	0.017	0.064
	(0.109)	(0.109)	(0.112)	(0.107)	(0.185)	(0.181)
Constant	-2.306	0.284	-1.521	-3.923***	0.440	-3.238**
	(1.482)	(0.623)	(1.424)	(1.494)	(0.655)	(1.523)
OverID				0.732		1.258
Weak Instr.				1277.8	20.72	6.82
UnderID				179.2	19.52	19.51
OV Test	0.49	0.48	0.58	0.78	0.15	0.21
BP Test	0.26	0.39	0.46	0.56	0.14	0.08
Observations	192	192	192	192	192	192
R-squared	0.645	0.676	0.679	0.642	0.632	0.645

Note: Dependent Variable is the Corruption score with higher score meaning less corruption. Income is the log of income, education is the share of population with tertiary education, population is the log of population in every region, Urbanisation is the share of urban population, public workers is the share of public workers in total employment. The Capital dummy captures if the capital city of the country is in the region. Clusters refer to the WGI clusters. The instruments for income are past income and inverse distance to coast. The instrument used for education is the share of atheists in the region. The overidentification test is Sargan's Statistic. The weak instruments test is the F-statistic. The underidentification test is the LM Statistic. The OV test is the p-value of the RESET test for omitted variables. Variance Inflation Factor (VIF) indicates that none of the regressions suffer from multicollinearity. BP test is the p-value of the Breusch-Pagan test for heteroskedasticity. Standard errors in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

The IV results in Column 4 show higher impact (approximately double the size) of the effect of income on corruption scores. Higher income means less corruption.

In Columns 2 and 5 when we control for education only, we can see that regions with higher educated citizens report less corruption and the effect doubles when we use IV. Regions with more urban population report higher corruption, but the effect is significant only at $\alpha = 0.1$.

The most notable difference is that in the regressions where education is included but no income, there appears to be no statistically significant difference between the regions that belong to cluster 2 and those of cluster 3.

5.4.3 Political and Cultural Determinants of the Quality of Institutions

Ethnic heterogeneity and income inequality have been associated with low institutional quality, as they both incentivise those who hold the power to exclude minorities from accessing the power and extract resources or distort the provision of public goods to such groups. La Porta et al. (1999) discuss the relationship between ethnic heterogeneity and the quality of government. They argue that apart from the ethnic hatred that may have significant political implications, it has been a usual practice for those who acquire the power to remove the ethnic losers or restrict their access to public goods to prevent them from getting stronger. As there was no available measure of income inequality at a regional level we use poverty, measured by the at-the-risk-of-poverty share of the population in every region, as the two are highly correlated at a country level. Ethnic heterogeneity is

measured by a racial dissimilarity index and also, the proportion of immigrants that live in every region is used as a second measure of racial heterogeneity.

Moreover, the effects of legal origins on the quality of government and corruption in European regions are examined. The regions are divided into five groups according to their legal origins, common law, French civil law, Germanic civil law, Scandinavian civil law and Socialist civil law. A dummy variable captures in which group the regions belong; it is equal to 1 when the region belongs to a group and 0 otherwise.

Lastly, we examine the effects of Social Trust on the quality of government and corruption. Social trust has been associated with higher quality governments as it raises civic participation and increases social tolerance.

Table 5.5 presents the results of the effects of poverty, racial heterogeneity and immigration on the quality of government (Columns 1-3) and corruption (Columns 4-6).

Poverty is negatively associated with both the quality of government and corruption, though, the effect on the total quality is approximately double, which means that the effect of poverty is larger on the rest of the pillars of the quality index than on corruption. The estimated effect of income is now smaller for the quality index and insignificant for corruption. The estimated effect of education on the quality of government is not significant. However, the effect of education on corruption is significant and similar in magnitude to the previous results presented earlier. The rest of the results are in line with the previously presented results; the size of government is positively related to both the quality index and corruption score and urban areas and capital regions perform worse. Racial dissimilarity and the share of immigrants in every region seem to have no significant effect on either the quality of government or corruption scores.

Table 5.5 The effects of poverty and racial dissimilarity on the Quality of Government and Corruption

VARIABLES	(1) QoG	(2) QoG	(3) QoG	(4) Corruption	(5) Corruption	(6) Corruption
Poverty	-4.403***			-2.134***		
	(0.569)			(0.649)		
Racial dissimilarity		-0.172			-0.309	
		(0.554)			(0.564)	
Immigrants (%)			-0.303			-0.709
			(0.796)			(0.809)
Income	0.189*	0.595***	0.596***	0.0898	0.319**	0.336**
	(0.113)	(0.142)	(0.136)	(0.129)	(0.145)	(0.139)
Education	0.858	0.993	0.989	2.742***	2.761***	2.734***
	(0.553)	(0.646)	(0.644)	(0.630)	(0.658)	(0.655)
Public Workers	2.785***	2.206***	2.201***	2.309***	1.943**	1.895**
	(0.688)	(0.817)	(0.811)	(0.785)	(0.831)	(0.824)
Population	-0.106***	-0.136***	-0.137***	-0.074*	-0.088*	-0.089**
	(0.039)	(0.044)	(0.044)	(0.044)	(0.045)	(0.045)
Urbanisation	-0.386**	-0.389**	-0.388**	-0.362**	-0.358**	-0.354**
	(0.151)	(0.175)	(0.175)	(0.173)	(0.178)	(0.178)
Capital Dummy	-0.413***	-0.404***	-0.399***	-0.488***	-0.466***	-0.448***
	(0.104)	(0.127)	(0.128)	(0.118)	(0.129)	(0.131)
Cluster 1	0.437***	0.485***	0.486***	0.711***	0.734***	0.735***
	(0.083)	(0.095)	(0.095)	(0.094)	(0.097)	(0.097)
Cluster 3	-0.992***	-0.832***	-0.832***	-0.230**	-0.168	-0.175
	(0.0991)	(0.117)	(0.116)	(0.113)	(0.119)	(0.117)
Constant	0.0848	-4.195***	-4.204***	-0.403	-2.746*	-2.878*
	(1.300)	(1.519)	(1.480)	(1.483)	(1.546)	(1.504)
OV Test	0.35	0.56	0.58	0.18	0.26	0.35
BP Test	0.46	0.20	0.19	0.15	0.08	0.08
Observations	192	192	192	192	192	192
R-squared	0.831	0.775	0.775	0.688	0.670	0.671

Note: Dependent Variables are the QoG (1-3) and Corruption (4-6) scores. Poverty is measured by the share of the population at risk of poverty. Racial dissimilarity is calculated by the dissimilarity index. Immigration is the share of immigrants in every region. Income is the log of income, education is the share of the population with tertiary education, population is the log of population in every region, Urbanisation is the share of urban population, public workers is the share of public workers in total employment. The Capital dummy captures if the capital city of the country is in the region. Clusters refer to the WGI clusters. The OV test is the p-value of the RESET test for omitted variables. Variance Inflation Factor (VIF) indicates that none of the regressions suffer from multicollinearity. BP test is the p-value of the Breusch-Pagan test for heteroskedasticity. Standard errors in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 5.6 The effects of legal origins on the Quality of Government and Corruption

VARIABLES	(1) QoG	(2) QoG	(3) QoG	(4) Corruption	(5) Corruption	(6) Corruption
Income	0.902***		0.656***	0.641***		0.407**
	(0.195)		(0.189)	(0.181)		(0.175)
Education		4.147***	3.543***		3.740***	3.365***
		(0.685)	(0.687)		(0.622)	(0.635)
Population	-0.116**	-0.183***	-0.157***	-0.0768	-0.132***	-0.115**
	(0.054)	(0.053)	(0.052)	(0.051)	(0.048)	(0.048)
Urbanisation	-0.004	0.104	-0.107	0.040	0.073	-0.058
	(0.226)	(0.210)	(0.213)	(0.210)	(0.191)	(0.197)
Public Workers	6.111***	5.379***	5.238***	4.656***	3.915***	3.827***
	(0.973)	(0.954)	(0.927)	(0.903)	(0.866)	(0.856)
Capital Dummy	-0.577***	-0.585***	-0.771***	-0.545***	-0.614***	-0.729***
	(0.146)	(0.135)	(0.141)	(0.135)	(0.122)	(0.131)
Unemployment	-4.021**	-7.231***	-5.033***	-2.601*	-4.927***	-3.563**
	(1.604)	(1.417)	(1.515)	(1.488)	(1.287)	(1.400)
French	-0.310*	-0.055	-0.079	-0.841***	-0.607***	-0.622***
	(0.176)	(0.175)	(0.170)	(0.163)	(0.159)	(0.158)
German	0.345*	0.772***	0.626***	-0.272	0.0847	-0.00539
	(0.207)	(0.203)	(0.202)	(0.192)	(0.185)	(0.186)
Scandinavian	0.707***	0.702***	0.650***	0.298	0.276	0.244
	(0.233)	(0.224)	(0.218)	(0.216)	(0.203)	(0.201)
Socialist	-0.165	-0.319	0.0278	-0.524**	-0.557***	-0.342
	(0.238)	(0.209)	(0.226)	(0.221)	(0.190)	(0.209)
Constant	-8.276***	0.952	-5.837***	-5.537***	0.992	-3.220
	(2.194)	(0.809)	(2.108)	(2.035)	(0.734)	(1.948)
OV Test	0.85	0.25	0.44	0.34	0.73	0.58
Observations	192	192	192	192	192	192
R-squared	0.681	0.703	0.722	0.612	0.654	0.664

Note: Dependent Variables are the QoG (1-3) and Corruption (4-6) scores. Income is the log of income, education is the share of population with tertiary education, population is the log of population in every region, Urbanisation is the share of urban population, public workers is the share of public workers in total employment. The Capital dummy captures if the capital city of the country is in the region. French, German, Scandinavian and Socialist refer to the legal origins of the countries. Common law is the excluded legal origin. The OV test is the p-value of the RESET test for omitted variables. Variance Inflation Factor (VIF) indicates that none of the regressions suffers from multicollinearity. Robust standard errors in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 5.6 presents the results of the effects of legal origins; common law and the French, Germanic, Scandinavian and Socialist civil law. The countries are divided into groups following their legal origins, and a dummy variable sorts the

regions in every group based on where the country belongs. The effects of income and education are now significantly higher for both the quality of government and corruption estimations. The negative impact of urban areas presented previously disappears, while the effect of the size of government is now even larger than estimated before in all specifications of the regressions. Countries with French and Socialist civil law origins seem to be the worst performers in the total quality scores and the corruption separately.

Regions from countries with Scandinavian and Germanic civil law origins perform the best in the overall quality scores, but there appears to be no statistically significant difference in performance between Germanic and Scandinavian and common law regions in the corruption scores. On the other hand, regions from countries with socialist civil law origins have similar performance in the total quality scores with common law regions but perform significantly worse in corruption. The most surprising result is that regions with French civil law origins appear to have the worst corruption scores.

Lastly, Table 5.7 demonstrates the results of the effect of social trust on the quality of government and corruption separately. The results are in agreement with past empirical research and the existing theories (Putnam 1993; La Porta et al. 1999; Knack 2002; Rothstein and Uslaner 2005 ; Rothstein 2011), regions with higher social trust have higher quality government and perform better regarding corruption.

Our results are consistent and similar in magnitude in all specifications. Income has a significant impact only on the total quality score, while education is no longer significant in any of the regressions. One possible explanation is the relationship between education and social capital. Social trust is a measure of social capital and Putnam (1993) argues that as education increases civic

Table 5.7 The effects of social trust on the Quality of Government and Corruption

VARIABLES	(1) QoG	(2) QoG	(3) QoG	(4) Corruption	(5) Corruption	(6) Corruption
Trust	0.205***	0.259***	0.204***	0.295***	0.283***	0.271***
	(0.058)	(0.058)	(0.060)	(0.059)	(0.057)	(0.061)
Income	0.368***		0.368***	0.089		0.077
	(0.131)		(0.132)	(0.134)		(0.133)
Education		0.146	0.0286		1.148	1.123
		(0.710)	(0.697)		(0.700)	(0.703)
Population	-0.142***	-0.147***	-0.142***	-0.0932**	-0.102**	-0.101**
	(0.045)	(0.0467)	(0.046)	(0.046)	(0.046)	(0.046)
Urbanisation	-0.298*	-0.0792	-0.298*	-0.201	-0.159	-0.205
	(0.178)	(0.164)	(0.179)	(0.181)	(0.161)	(0.180)
Public Workers	2.582***	2.936***	2.581***	1.951**	1.992**	1.917**
	(0.804)	(0.812)	(0.807)	(0.817)	(0.801)	(0.813)
Capital Dummy	-0.319***	-0.251**	-0.322***	-0.221**	-0.304**	-0.319**
	(0.106)	(0.122)	(0.122)	(0.108)	(0.120)	(0.123)
Unemployment	-1.983	-2.693**	-1.985	-0.827	-1.080	-0.932
	(1.264)	(1.269)	(1.270)	(1.284)	(1.251)	(1.280)
Cluster 1	0.312***	0.294***	0.311***	0.589***	0.571***	0.574***
	(0.108)	(0.111)	(0.109)	(0.110)	(0.110)	(0.110)
Cluster 3	-0.924***	-1.013***	-0.922***	-0.414***	-0.344***	-0.325***
	(0.102)	(0.113)	(0.116)	(0.103)	(0.112)	(0.117)
Constant	-2.538*	0.756	-2.535*	-1.131	-0.336	-1.026
	(1.393)	(0.762)	(1.398)	(1.415)	(0.751)	(1.409)
Observations	176	176	176	176	176	176
R-squared	0.806	0.797	0.806	0.728	0.732	0.732

Note: Dependent Variables are the QoG (1-3) and Corruption (4-6) scores. Trust is the social trust in every region. Income is the log of income, education is the share of population with tertiary education, population is the log of population in every region, Urbanisation is the share of urban population, public workers is the share of public workers in total employment. The Capital dummy captures if the capital city of the country is in the region. Clusters refer to the WGI clusters. Robust standard errors in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

participation increases which leads to an increase in social capital. Similar to previous results the size of the government is positively related to both the quality of government and corruption but the estimated effect is smaller than in the previous regressions.

5.4.4 Country Fixed Effects

As the European Union consists of 28 member states, it is natural to argue that each one of them has unique geographical, historical and cultural characteristics that may have affected the path of their institutional development. To allow for these differences and determine their role in determining government performance all regressions are repeated including country fixed effects.

A dummy variable captures whether regions belong to the same country ($D = 1$) or not ($D = 0$). Tables 5.8 - 5.11 present the results.

Table 5.8 reports similar effects for income and education. The two control variables have a slightly higher impact on the quality of government. The effect of education loses significance in OLS estimation but remains significant in the IV estimation (Column 5). The most significant difference is observed for the estimated effect of the government size which is no longer significant in any of the regressions. Adding country-specific characteristics removes the previously positive estimated effect.

The results for corruption in Table 5.9 follow a similar pattern. Income and education remain significant (Columns 4 and 5), positive and similar in magnitude when we include them separately and control for individual countries characteristics. Similar to the results in Table 6, the effect of the size of the public sector is no longer significant only when we use an instrument for education, but the effect is negative.

In Table 5.10 the estimated effect of poverty on government performance is negative and similar to the one presented in Table 5.5, while racial dissimilarity remains insignificant. Regarding the rest of the control variables, regions with higher income have better governments, but the effect of education is not statisti-

Table 5.8 FE Quality of Government

VARIABLES	(1) OLS	(2) OLS	(3) OLS	(4) IV	(5) IV	(6) IV
Income	0.534***		0.757***	0.692***		0.699***
	(0.196)		(0.185)	(0.188)		(0.224)
Education		0.414	-0.647		8.378**	4.094
		(0.931)	(0.925)		(3.901)	(2.907)
Population	-0.080*	-0.136***	-0.074*	-0.070*	-0.174***	-0.101**
	(0.043)	(0.044)	(0.045)	(0.040)	(0.052)	(0.049)
Urbanisation	-0.524***	-0.263	-0.482**	-0.561***	-0.537**	-0.625***
	(0.187)	(0.191)	(0.190)	(0.171)	(0.247)	(0.195)
Public Workers	-0.947	-0.725	-0.207	-0.785	-2.095	-1.048
	(1.223)	(1.273)	(1.221)	(1.117)	(1.542)	(1.312)
Unemployment	-5.697***	-7.757***	-5.046***	-5.087***	-5.740***	-4.072***
	(1.419)	(1.299)	(1.404)	(1.314)	(1.718)	(1.413)
Capital Dummy	-0.346**	-0.175	-0.407***	-0.420***	-0.938**	-0.837***
	(0.140)	(0.143)	(0.148)	(0.131)	(0.394)	(0.257)
Constant	-3.668*	2.818***	-5.431**	-5.279***	2.368***	-5.065**
	(2.134)	(0.786)	(2.146)	(2.039)	(0.890)	(2.482)
OverID				0.594		2.09
Weak Instr.				712	11.77	5.66
UnderID				179.2	13.23	18.73
Country Dummies	YES	YES	YES	YES	YES	YES
Observations	192	192	192	192	192	192
R-squared	0.887	0.871	0.884	0.886	0.841	0.863

Note: Dependent Variable is the QoG. Income is the log of income, education is the share of population with tertiary education, population is the log of population in every region, Urbanisation is the share of urban population, public workers is the share of public workers in total employment. The Capital dummy captures if the capital city of the country is in the region. Clusters refer to the WGI clusters. The instruments for income are past income and inverse distance to coast. The instrument used for education is the share of atheists in the region. The overidentification test is Sargan's Statistic. The weak instruments test is the F-statistic. The underidentification test is the LM Statistic. The instruments for income are past income and inverse distance to coast. The instrument used for education is the share of atheists. The Capital dummy captures whether the capital city of the country is in the region. The excluded country is Lithuania. Robust standard errors in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

cally significant when we control for poverty and racial fractionalization. Again, the size of government is not statistically insignificant in all the regressions that include fixed effects.

Table 5.9 FE Corruption

VARIABLES	(1) OLS	(2) OLS	(3) OLS	(4) IV	(5) IV	(6) IV
Income	0.289**		0.240*	0.410***		0.108
	(0.141)		(0.132)	(0.136)		(0.214)
Education		0.460	0.124		6.616**	4.275**
		(0.638)	(0.660)		(3.085)	(2.135)
Population	-0.064**	-0.085***	-0.065**	-0.057**	-0.090**	-0.093**
	(0.031)	(0.030)	(0.032)	(0.029)	(0.040)	(0.037)
Urbanisation	-0.513***	-0.454***	-0.523***	-0.541***	-0.556***	-0.631***
	(0.135)	(0.131)	(0.135)	(0.124)	(0.178)	(0.145)
Public Workers	-1.087	-1.408	-1.244	-0.957	-1.085	-2.070*
	(0.882)	(0.873)	(0.871)	(0.806)	(1.149)	(1.059)
Unemployment	-3.171***	-4.190***	-3.331***	-2.711***	-4.362***	-2.792***
	(1.023)	(0.891)	(1.002)	(0.949)	(1.256)	(1.062)
Capital Dummy	-0.177*	-0.0873	-0.161	-0.233**	-0.767**	-0.498***
	(0.101)	(0.098)	(0.106)	(0.095)	(0.329)	(0.170)
Constant	-0.992	1.963***	-0.649	-2.267	0.779	0.491
	(1.540)	(0.539)	(1.531)	(1.483)	(0.628)	(2.151)
OverID				0.414		3.43
Weak Instr.				712	11.26	6.01
UnderID				172.9	12.63	19.89
Country Dummies	YES	YES	YES	YES	YES	YES
Observations	192	192	192	192	192	192
R-squared	0.916	0.915	0.916	0.916	0.873	0.895

Note: Dependent Variable is the Corruption score with higher score meaning less corruption. Income is the log of income, education is the share of population with tertiary education, population is the log of population in every region, Urbanisation is the share of urban population, public workers is the share of public workers in total employment. The Capital dummy captures if the capital city of the country is in the region. Clusters refer to the WGI clusters. The instruments for income are past income and inverse distance to coast. The instrument used for education is the share of atheists in the region. The overidentification test is Sargan's Statistic. The weak instruments test is the F-statistic. The underidentification test is the LM Statistic. The excluded country is Lithuania. Robust standard errors in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Finally, the results for Trust presented in Table 5.11 are almost identical with those in Table 5.7 when country fixed effects were not included. Again, with the only exception being the estimated effect of the size of the government that is insignificant.

Table 5.10 FE Heterogeneity

VARIABLES	(1) QoG	(2) QoG	(3) QoG	(4) Corruption	(5) Corruption	(6) Corruption
Poverty	-3.235***			-1.876***		
	(0.684)			(0.496)		
Racial Dissimilarity		0.290			0.331	
		(0.574)			(0.406)	
Immigration (%)			0.220			0.374
			(0.857)			(0.606)
Income	0.419*	0.945***	0.965***	0.201	0.486***	0.499***
	(0.213)	(0.202)	(0.199)	(0.155)	(0.143)	(0.141)
Education	-0.725	-0.251	-0.300	-0.252	0.0773	0.0477
	(0.926)	(1.003)	(1.003)	(0.671)	(0.710)	(0.709)
Public Workers	-0.466	-1.370	-1.472	-0.835	-1.239	-1.293
	(1.244)	(1.371)	(1.376)	(0.901)	(0.970)	(0.973)
Population	-0.071	-0.071	-0.072	-0.061*	-0.059*	-0.060*
	(0.044)	(0.047)	(0.047)	(0.032)	(0.033)	(0.033)
Urbanisation	-0.487***	-0.550***	-0.549***	-0.494***	-0.530***	-0.528***
	(0.186)	(0.198)	(0.198)	(0.135)	(0.140)	(0.140)
Capital Dummy	-0.339**	-0.552***	-0.540***	-0.179*	-0.317***	-0.313***
	(0.146)	(0.161)	(0.163)	(0.106)	(0.114)	(0.115)
Constant	-2.305	-7.738***	-7.846***	0.0281	-3.016*	-3.092**
	(2.322)	(2.163)	(2.156)	(1.683)	(1.530)	(1.525)
Country Dummies	YES	YES	YES	YES	YES	YES
Observations	192	192	192	192	192	192
R-squared	0.891	0.875	0.875	0.875	0.875	0.919

Note: Dependent Variables are the QoG (1-3) and Corruption (4-6) scores. Poverty is measured by the share of population at risk of poverty. Racial dissimilarity is calculated by the dissimilarity index. Immigration is the share of immigrants in every region. Income is the log of income, education is the share of population with tertiary education, population is the log of population in every region, Urbanisation is the share of urban population, public workers is the share of public workers in total employment. The Capital dummy captures if the capital city of the country is in the region. Clusters refer to the WGI clusters. Robust standard errors in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

As it can be seen, including country fixed effects does not affect the estimated effects for the economic, political and cultural theories that were obtained earlier in this section. The most important difference that arises when we control for the characteristics of the individual countries is that the size of the government changes sign and becomes insignificant. The results for the rest of the control variables, as the last point, the estimated country effects illustrate that regions

Table 5.11 FE Trust

VARIABLES	(1) QoG	(2) QoG	(3) QoG	(4) Corruption	(5) Corruption	(6) Corruption
Trust	0.217***	0.227***	0.218***	0.162***	0.167***	0.162***
	(0.068)	(0.069)	(0.068)	(0.048)	(0.049)	(0.049)
Income	0.405**		0.414**	0.231		0.229
	(0.196)		(0.208)	(0.140)		(0.149)
Education		0.491	-0.120		0.354	0.016
		(0.872)	(0.916)		(0.620)	(0.654)
Population	-0.145***	-0.172***	-0.144***	-0.117***	-0.133***	-0.117***
	(0.046)	(0.045)	(0.046)	(0.033)	(0.032)	(0.033)
Urbanisation	-0.366*	-0.280	-0.363*	-0.434***	-0.389***	-0.435***
	(0.201)	(0.202)	(0.204)	(0.144)	(0.143)	(0.146)
Public Workers	-1.291	-1.783	-1.256	-1.370	-1.667*	-1.374
	(1.209)	(1.225)	(1.242)	(0.864)	(0.871)	(0.887)
Capital Dummy	-0.322**	-0.185	-0.315**	-0.158	-0.087	-0.159
	(0.138)	(0.135)	(0.148)	(0.098)	(0.096)	(0.106)
Unemployment	-4.591***	-5.971***	-4.580***	-2.227**	-2.999***	-2.228**
	(1.430)	(1.268)	(1.437)	(1.022)	(0.901)	(1.027)
Constant	-2.450	1.655**	-2.545	-0.361	1.978***	-0.349
	(2.137)	(0.825)	(2.264)	(1.527)	(0.586)	(1.618)
Country Dummies	YES	YES	YES	YES	YES	YES
Observations	176	176	176	176	176	176
R-squared	0.900	0.897	0.900	0.931	0.929	0.931

Note: Dependent Variables are the QoG (1-3) and Corruption (4-6) scores. Trust is the social trust in every region. Income is the log of income, education is the share of population with tertiary education, population is the log of population in every region, Urbanisation is the share of urban population, public workers is the share of public workers in total employment. The Capital dummy captures if the capital city of the country is in the region. Clusters refer to the WGI clusters. Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

from Scandinavian countries, Germany and the UK are the top performing regions, while those from the Balkan countries, Italy and Spain are among the worst performing.

5.5 Conclusion

In this chapter, we used a newly created cross-sectional dataset of the Quality of Government of the European regions to test the predictions of the model presented in Chapter 2 and support our hypothesis that more education leads to better institutions. Compared with the existing literature this is one of the first studies that examines the determinants of the institutional quality at a regional level and to our knowledge is the first one that uses atheism as an instrument for education.

In sum, the IV estimations (Tables 5.3, 5.4, 5.8 and 5.9) indicate a positive effect of income and education on the Quality of Government and the Corruption score (note again that a higher Corruption score means less corruption) in most specifications of our model. The effects are stronger when we use instruments and their magnitude increases, especially for education. Controlling for the unique characteristics of the European countries does not have any significant impact on the estimated coefficients of the two variables. On the other hand, urbanisation and the presence of the capital city in the region have an adverse effect on the performance of the government and the reported corruption, in both scenarios, with or without fixed effects. A possible explanation for this could be that is harder for the government to manage and provide effective public goods in urban areas. This effect is also illustrated by the negative relationship between unemployment and government performance; higher unemployment rates are associated with worse performing governments implying inadequate public good provision, such as unemployment benefits, or an efficient institution to help unemployed citizens.

A surprising result, compared with the existing literature is the strong, positive effect of the size of government. The size of the government, measured by the share of public workers in every region in our sample, is positively associated with our proxy of institutional quality implying that the efficiency of the government

increases with the relative size of government and the effect is persistent in all the specifications of the model, for both the quality of government and corruption. However, the effect disappears when country fixed effects are included in the regressions. The results for the positive effects of income and education on the performance of the government are similar to the results of other cross-sectional empirical research examining the determinants of the quality of government or corruption (La Porta et al., 1997; La Porta et al., 1999; Knack, 2002; Glaeser and Saks, 2006). The exception is the positive effect of the size of the government which disappears when we repeat the regressions with country fixed effects.

The results presented in Table 3 and Table 4 provide further support for the existing political theories of the determinants of the quality of government with only exception ethnic fractionalization. Table 3 illustrates the results for the effects of poverty and racial heterogeneity on the performance of the government. Poverty is associated with worse performing governments while the effects of racial fractionalization measured by the dissimilarity index and immigration are insignificant. The positive effect of income persists in all regressions but is insignificant when we control for the share of population at poverty and income, possibly due to the correlation between the two variables. On the other hand, the effect of education on the quality of government disappears in all the regressions in which we examine the effects of heterogeneity and social trust on the quality of government. Notably, the effect of the size of government remains significant and positive in all specifications of the model. Adding country fixed effects in the regressions does not change the results significantly; poverty has a negative impact on the performance of the government, but we do not find any evidence of an effect from racial dissimilarity and immigration.

Moreover, the legal origins of the European countries play an important role in determining the performance of the government. Regions from countries with Scandinavian and Germanic origins perform better than common law regions in the total quality of government score, but the difference is not significant when we test for their effects on corruption. There seems to be no significant difference in the total performance of governments of Socialist origins compared with common law origins. However, Socialist regions perform worse in corruption. Lastly, regions with French origins seem to have little or no difference in the quality of government but are the worst-performing regions regarding corruption. These results are different from the findings of La Porta et al. (1999) where French origins are associated with lower efficiency of the government, but there is no difference in corruption.

Lastly, the results confirm the Putnam's (1993) findings in Italian regions and the results of other cross-sectional empirical research (La Porta et al., 1997; Knack and Keefer, 1997; Knack, 2002). European regions with higher social trust have better performing governments. The results are almost identical when we control for individual country characteristics. Additionally, all our regressions pass the relevant tests for heteroscedasticity (Breusch-Pagan test), omitted variables (Variance Inflation Factor) and multicollinearity (RESET).

Our cross-regional analysis does not come without issues. First, the fact that the regional dataset of the Quality of Government is new and offers only a snapshot of the quality of government in the EU does not allow us to compare the performance of regions across time. Second, the existing data at a regional level are limited and as a result, we did not have access to alternative measures for some of our control variables. For example, the level of education in this study is measured by the share of the population with tertiary education. The

main reason is that as most of the EU countries are developed the average share of secondary education would provide no information as the variation between the different regions would be very low. Additionally, other used measures of education such the years of schooling we used in Chapter 4, are not available at a regional level. Nonetheless, our analysis provides us with some insights regarding the determinants of institutional quality in Europe and supports the prediction of the model presented in Chapter 3.

6

Conclusion

…"and go on till you come to an end; then stop."

– Lewis Carroll, *Alice in Wonderland*

6.1   Summary

Based on the existing evidence of the importance of institutions for the economic performance of a country we ask the question: "if good institutions promote economic development, why do certain countries fail to adopt them?" Our answer is simple: Education matters.

The existing models argue that institutional change will occur after a negative shock because the opportunity cost falls; for instance, a recession decreases the income and people have less to lose. However, we argue that a negative shock may be a necessary, but is not a sufficient condition for institutional change. The missing ingredient in many African and Asian countries, that are the worst performing nations in most measures of institutional quality, is education.

In our model, we use revolution, or the fear of revolution, as a mechanism that leads to institutional change and we incorporate a role for education that is derived from the literature. People with higher levels of education can better understand the policies that the authorities implement and the consequences they may have on their life compared to those with lower levels of education. Moreover, educated citizens are more efficient in coordinating, cooperating and communicating ideas. As a result, the net benefit of institutional change increases as the level of education in the society increases.

This mechanism allows us to generate two cases of institutional change. The first one is the scenario under which a revolution and consequently institutional change cannot be avoided. The result is similar to the existing literature that argues that the state of nature determines the opportunity cost of a revolution. The novelty of our approach is that the size of the shock that will lead to an institutional change is decreasing in education. As the level of education increases in the society, the size of the shock decreases.

The second case describes a gradual transition to better institutions. In this case, the dictator has the ability to adjust the existing institutions to avoid a revolution. The changes in institutions that the dictator has to implement depend on the magnitude of the negative shock in the economy and the level of education. The more severe the recession and/or the higher the level of education in the society, the larger the improvement in the quality of institutions necessary for the dictator to avoid a revolution.

Based on our results, someone could argue that elites or dictators will aim to keep the level of education low otherwise they will face a revolution that will overthrow them. This is a well-known puzzle that has a number of possible answers; Glaeser et al. (2007) discuss some. First, there are real-world examples,

such as in Asia and Eastern Europe where education increased and dictatorships were overthrown. Second, Glaeser et al. (2007) argue that a dictator may face a threat (internal or external) and investing in education may help both the economy and their army. On the other hand, even in the absence of a threat economic growth means higher income and an arrogant dictator may ignore the threat of a revolution to become rich. Last, argue that since all dictators face the threat of being overthrown at some point they may prefer to be replaced by a democracy with an educated population that may spare their life (Glaeser et al. 2007).

In Chapter 4, we use a system GMM approach to test the impact of education on the quality of institutions. In a panel study of 86 developing countries, we show that an increase of one standard deviation in the average years of total schooling will lead to a 10% increase in the quality of institutions as they are measured by our preferred proxy (FHI). Additionally, our findings show a positive effect of economic development, measured by GDP per capita and urbanisation, on the quality of institutions. Estimating our model with two different methods of bias correction (BCFE and LSDVC) generates similar results.

Our results indicate that the estimated short-run coefficient of education is 0.187. For most African and Asian countries, this is a significant result. For instance, if the total years of schooling in Cote d'Ivoire increased to those in Australia (from 4.65 to 12.32 years) this would lead to a 25% increase in the quality of institutions, as it is measured by the FHI, in the short run and about 50% in the long run.

Additionally, we test the impact of education on institutions using a cross-sectional dataset of EU regions. Our preferred proxy of institutional quality is the Quality of Government index. The IV estimations illustrate a positive effect from

education and income to the quality of institutions. The results are not affected by the inclusion of country-specific characteristics.

In particular, we find that if the share of the population with tertiary education increased by 1% then the quality of institutions in the region, measured by the QoG, will increase by about 8%. Similar are the results in the regressions when the dependent variable is the regional Corruption index. Education, income and the size of the public sector have a positive impact on the corruption scores of the regions. Specifically, a 1% increase in schooling will lead to a 6% improvement in the Corruption score of the region.

In the IV estimations with country fixed effects, we find that the size of the public sector relative to the total employment of the region has a positive impact on the quality of institutions.

We also test the effects of heterogeneity, legal origins and social trust. Our findings indicate that poverty, measured by the share of the population at risk of poverty, has a negative impact on the quality of institutions while the effect of the share of immigrants in every region is not statistically significant.

On the other hand, we find that the regions with Scandinavian legal origins perform better followed by the regions with German legal origins. The regions with Socialist and French legal origins are the worst-performing regions, especially in terms of corruption. The results coincide with the existing evidence from cross-country studies (La Porta et al. 1997; La Porta et al. 1998; La Porta et al. 1999).

6.2 Policy Implications

The model and the empirical analysis presented in this thesis indicate the importance of education in the process of institutional change. Higher levels of education are associated with better institutions. These results have significant implications.

As it was discussed in chapter 2, education is important because it increases political participation (Bourguignon and Verdier 2000; Glaeser et al. 2007) and has a significant impact on the preferences and the way that people act and interact with others (Grossman 1976; Fuchs 1980; Becker and Mulligan 1997; Oreopoulos and Salvanes 2011). In the current times, the era of information, freedom of press and speech, access to the Internet and other sources of information have a direct impact on the level of education[1] in the society, especially in the case of poor countries.

Institutions are endogenous; they set the rules with which people interact and are chosen by the people. As a result, any reform that may affect the share of informed voters will affect the quality of institutions in the society. This implies that any policy that may increase the level of education, or even the access to information, in the country, will lead to people choosing better institutions.

Many reform programs, such as the Economic Reform Programs in developing countries proposed and supported by the IMF and other international organizations, aim to improve the institutions in developing economies to promote economic growth and/or stabilise the political situation and economic performance

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[1] At this point, it is important to remind the reader that the term education is used in this thesis to describe what the ancient Greeks called "paideia". In other words, education is not only the training or the official education that someone may receive in school, but, following Plato and Aristotle, all kinds of knowledge and information that will allow them to become better citizens.

of those countries. For example, the press release[2,3] regarding the the Economic Reform Program in Egypt states:

> Egypt's priorities are to reform the regulatory framework, strengthen competition, improve access to finance and land, strengthen governance, transparency, and accountability of state-owned enterprises, and better integrate women and youth in the labor market. (IMF Press Release No. 17/511)

The priorities are similar in other countries and are directly linked with levels two and three in Williamson's (2010) classification. The evidence regarding the impact of reform programs, such as the IMF's economic reform programs in Pakistan, Hungary, Liberia, Greece and others, is mixed and few of the cases are considered successful (Abbott et al., 2010). One of the reasons suggested in the literature regarding the mixed results is the rigidity of the policies required by these reforms.

> Detailed conditionality . . . has burdened IMF programs in recent years and made such programs unwieldy, highly conflictive, time consuming to negotiate, and often ineffectual" (Meltzer Report, International Financial Institution Advisory Commission 2000, 7, 8, and 43).

Our results indicate that another important aspect of the process of institutional change is the level of education in the society. As Lipset (1960) discusses, education is not only important in the transition of a country to more democratic regimes but also, if not more important, for the stability of a democracy. The higher the level of education in a democratic country the more stable the democracy (Lipset 1959).

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[2]IMF Press Briefing: September 27, 2017
[3]IMF Press Release No. 17/511: December 20, 2017

Additionally, as Almond and Verba (1989) argue citizens with more education understand better the implications and consequences of policies and existing institutions and as a result, they may decide to put pressure on the government to improve the quality of institutions. In such cases, higher quality institutions are more likely to persist. If "good institutions" are chosen exogenously while the level of education in the country is low, then, it is more likely that they will either have no significant effect or even deteriorate.

The reform programs that focus on institutional changes to promote economic activity should accompanied, if not preceded, by educational reform programs as those organised by the World Bank, such as the "End Poverty in South Asia" and similar programs in other Asian and African countries, that focus, among others, in increasing the access to education, improving the teaching and learning conditions and the quality of education.

Consequently, based on our findings, we could suggest that the reform programs aiming for institutional improvements should be accompanied by educational reforms and investment in human capital. Focusing, not only on institutional reforms but also on the level of education in the country would allow the society to understand the importance of high-quality institutions and increase the probability that those reform programs being successful. Additionally, it would increase the economic and political stability of the developing countries undergoing the reform program.

6.3 Limitations and Future work

Although this thesis has provided some evidence to answer the questions posed at the beginning, some unavoidable limitations exist.

The first limitation of the current study is the use of a simple static model to explain the mechanism of institutional change and the role of education in Chapter 3. As we argued in Chapter 3 a static model is useful for the purpose of this thesis as it allows us to build a framework to explain the role of education in institutional change. Nonetheless, a dynamic model would provide more substantial evidence of the mechanism and the impact of education in this process. The next step for the model presented in Chapter 3 is to make it dynamic by adding an investment decision, making education endogenous and, as a result, endogenising the relationship between education and institutional change.

Regarding the empirical limitations of this study, at this point, we should mention again that one of the issues in this field of study is the absence of a dataset that exactly measures the quality of institutions, especially at a regional level. There is a vast amount of measures for the different components of institutions, but not many that measure the overall quality of the institutions in a country.

In our study, we follow a practical approach. We recognise the limitations and the weaknesses of our preferred measures of institutional quality, for instance, they both are results of surveys, but as we discussed earlier this is not necessarily a bad thing. As it was argued in our literature review, institutions are created and evolve based on the beliefs and behaviour of individuals, as a result, the perception of the individuals regarding the institutions of their country/region is important. To overcome some of the empirical issues and add robustness to our results, we used the chain-linked version of the FHI that is appropriate for

panel analysis and we separately tested two of the five components of the FHI that were closely related to Williamson's (2000) classification.

Another limitation of the empirical analysis in this thesis is the use of an unbalanced panel in Chapter 4. Despite having various sophisticated methods to deal with unbalanced panels and extract important empirical evidence any unbalanced panel suffers from an additional disturbance which is minimised using methods as the ones used in this thesis (Baltagi (2008)). Additionally, the cross-regional analysis in Chapter 5 is based on a newly created index. Future research could focus on more waves of the quality of government index to evaluate the validity of the results obtained.

Lastly, an additional way to support the theory presented in this thesis, regarding the role of education in institutional change, is to examine the relationship between education and revolutionary movements as they are captured by the Integrated Network for Societal Conflict Research (INSCR).

In conclusion, the main purpose of this thesis is to develop a model, building on the existing literature, that can explain the process of institutional change incorporating a role for education. Our model predicts that higher levels of education will lead to improvements in the quality of institutions. We empirically test this relationship and other determinants of institutional quality and we find support of this evidence in our panel study of developing countries. Our findings in the cross-sectional analysis of EU regions demonstrate that this phenomenon is not confined to developing countries or even post-communist economies.

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Appendix A

Data Description (Accompanies Chapter 4)

Description of the structure of the EFW index

The index[1] measures the degree of economic freedom present in five major areas: [1] Size of Government; [2] Legal System and Security of Property Rights; [3] Sound Money; [4] Freedom to Trade Internationally; [5] Regulation. Within the five major areas, there are 24 components in the index. Many of those components are themselves made up of several sub-components. In total, the index incorporates 42 distinct variables. Each component and sub-component is placed on a scale from 0 to 10 that reflects the distribution of the underlying data. When sub-components are present, the sub-component ratings are averaged to derive the component rating. The component ratings within each area are then averaged to derive ratings for each of the five areas. In turn, the five area ratings are averaged to derive the summary rating for each country. The following section provides an overview of the five major areas.

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[1]Source: Economic Freedom of the World: 2016 Annual Report. Fraser Institute. https://www.fraserinstitute.org/

1. Size of Government

The four components of Area 1 indicate the extent to which countries rely on the political process to allocate resources and goods and services. When government spending increases relative to spending by individuals, households, and businesses, political decision-making is substituted for personal choice and economic freedom is reduced. The first two components address this issue. Government consumption as a share of total consumption and transfers and subsidies as a share of GDP are indicators of the size of government. When government consumption is a larger share of the total, political choice is substituted for personal choice. Similarly, when governments tax some people in order to provide transfers to others, they reduce the freedom of individuals to keep what they earn. The third component (Government enterprises and investment) in this area measures the extent to which countries use private investment and enterprises rather than government investment and firms to direct resources. Governments and state-owned enterprises play by rules that are different from those to which private enterprises are subject. They are not dependent on consumers for their revenue or on investors for capital. They often operate in protected markets. Thus, economic freedom is reduced as government enterprises produce a larger share of total output. The fourth component (Top marginal tax rate) is based on the top marginal income tax rate and the top marginal income and payroll tax rate and the income threshold at which these rates begin to apply. These two sub-components are averaged to calculate the top marginal tax rate. High marginal tax rates that apply at relatively low income levels are also indicative of reliance upon government. Such rates deny individuals the fruits of their labor. Thus, countries with high marginal tax rates and low income thresholds are rated lower. Taken together, the four components of Area 1 measure the degree to which a country relies on personal

choice and markets rather than government budgets and political decision-making. Therefore, countries with low levels of government spending as a share of the total, a smaller government enterprise sector, and lower marginal tax rates earn the highest ratings in this area.

2. Legal System and Property Rights

Protection of persons and their rightfully acquired property is a central element of economic freedom and a civil society. Indeed, it is the most important function of government. Area 2 focuses on this issue. The key ingredients of a legal system consistent with economic freedom are rule of law, security of property rights, an independent and unbiased judiciary, and impartial and effective enforcement of the law. The nine components in this area are indicators of how effectively the protective functions of government are performed. These components are from three primary sources: the International Country Risk Guide, the Global Competitiveness Report, and the World Bank's Doing Business project. Security of property rights, protected by the rule of law, provides the foundation for both economic freedom and the efficient operation of markets. Freedom to exchange, for example, is meaningless if individuals do not have secure rights to property, including the fruits of their labor. When individuals and businesses lack confidence that contracts will be enforced and the fruits of their productive efforts protected, their incentive to engage in productive activity is eroded. Perhaps more than any other area, this area is essential for the efficient allocation of resources. Countries with major deficiencies in this area are unlikely to prosper regardless of their policies in the other four areas.

3. Sound Money

Money oils the wheels of exchange. An absence of sound money undermines gains from trade. As Milton Friedman informed us long ago, inflation is a monetary phenomenon, caused by too much money chasing too few goods. High rates of monetary growth lead to inflation. Similarly, when the rate of inflation increases, it also tends to become more volatile. High and volatile rates of inflation distort relative prices, alter the fundamental terms of long-term contracts, and make it virtually impossible for individuals and businesses to plan sensibly for the future. Sound money is essential to protect property rights and, thus, economic freedom. Inflation erodes the value of property held in monetary instruments. When governments finance their expenditures by creating money, in effect, they are expropriating the property and violating the economic freedom of their citizens. The important thing is that individuals have access to sound money: who provides it makes little difference. Thus, in addition to data on a country's rate of inflation and its government's monetary policy, it is important to consider how difficult it is to use alternative, more credible, currencies. If bankers can offer saving and checking accounts in other currencies or if citizens can open foreign bank accounts, then access to sound money is increased and economic freedom expanded. There are four components to the EFW index in Area 3. All of them are objective and relatively easy to obtain. The first three are designed to measure the consistency of monetary policy (or institutions) with long-term price stability. Component "Freedom to own foreign currency bank accounts" is designed to measure the ease with which other currencies can be used via domestic and foreign bank accounts. In order to earn a high rating in this area, a country must follow policies and adopt institutions that lead to low (and stable) rates of inflation and avoid regulations that limit the ability to use alternative currencies.

4. Freedom to Trade Internationally

In our modern world of high technology and low costs for communication and transportation, freedom of exchange across national boundaries is a key ingredient of economic freedom. Many goods and services are now either produced abroad or contain resources supplied from abroad. Voluntary exchange is a positive-sum activity: both trading partners gain and the pursuit of the gain provides the motivation for the exchange. Thus, freedom to trade internationally also contributes substantially to our modern living standards. At the urging of protectionist critics and special-interest groups, virtually all countries adopt trade restrictions of various types. Tariffs and quotas are obvious examples of roadblocks that limit international trade. Because they reduce the convertibility of currencies, controls on the exchange rate also hinder international trade. The volume of trade is also reduced if the passage of goods through customs is onerous and time consuming. Sometimes these delays are the result of administrative inefficiency while in other instances they reflect the actions of corrupt officials seeking to extract bribes. In both cases, economic freedom is reduced. The components in this area are designed to measure a wide variety of restraints that affect international exchange: tariffs, quotas, hidden administrative restraints, and controls on exchange rates and the movement of capital. In order to get a high rating in this area, a country must have low tariffs, easy clearance and efficient administration of customs, a freely convertible currency, and few controls on the movement of physical and human capital.

5. Regulation

When regulations restrict entry into markets and interfere with the freedom to engage in voluntary exchange, they reduce economic freedom. The fifth area of the

index focuses on regulatory restraints that limit the freedom of exchange in credit, labor, and product markets. The first component (Credit market regulations) reflects conditions in the domestic credit market. One sub-component provides evidence on the extent to which the banking industry is privately owned. The final two sub-components indicate the extent to which credit is supplied to the private sector and whether controls on interest rates interfere with the market for credit. Countries that use a private banking system to allocate credit to private parties and refrain from controlling interest rates receive higher ratings for this regulatory component. Many types of labor market regulations infringe on the economic freedom of employees and employers. Among the more prominent are minimum wages, dismissal regulations, centralized wage setting, extension of union contracts to nonparticipating parties, and conscription. Labor-market regulations is designed to measure the extent to which these restraints upon economic freedom are present. In order to earn high marks in the component rating regulation of the labor market, a country must allow market forces to determine wages and establish the conditions of hiring and firing, and refrain from the use of conscription. Like the regulation of credit and labor markets, the regulation of business activities (component 5C) inhibits economic freedom. The sub-components of 5C ((i) Administrative requirements (ii) Bureaucracy costs (iii) Starting a business (iv) Extra payments / bribes / favoritism (v) Licensing restrictions (vi) Cost of tax compliance) are designed to identify the extent to which regulations and bureaucratic procedures restrain entry and reduce competition. In order to score high in this portion of the index, countries must allow markets to determine prices and refrain from regulatory activities that retard entry into business and increase the cost of producing products. They also must refrain from "playing favorites", that is, from using their power to extract financial payments and reward some businesses at the expense of others.

The table below presents the description of all our variables.

Table A.1 Description of Variables. Panel Analysis

Variable	Description
Quality[a]	Summary Index. The summary Index combines the scores in the 5 different categories of the Freedom House report. Size of government, legal structure and security of property rights, access to sound money, freedom to trade internationally, and regulation of credit, labor, and business.The base year for the chain-link index is 2000. Changes in a country's chain-linked index through time are based only on changes in components that were present in adjoining years.
Area 2[a]	Legal System and Property Rights. Protection of persons and their rightfully acquired property is a central element of economic freedom and a civil society. Indeed, it is the most important function of government. Area 2 focuses on this issue.
Area 5[a]	Regulation. The fifth area of the index focuses on regulatory restraints that limit the freedom of exchange in credit, labor, and product markets.
Schooling[b]	Avg. Years of Total Schooling. Education Attainment for Total Population Aged 15 and Over
GDPpc[c]	GDP per capita (constant 2010 US$)
Growth[c]	GDP per capita growth (annual %)
Unemployment[c]	Unemployment, total (% of total labor force) (national estimate)
Urbanisation[c]	Urban population (% of total)
Trade[c]	Openess. Trade (% of GDP)

[a] Source: Economic Freedom of the World: 2016. Fraser Institute
[b] Source: Barro-Lee, 2013, Data Set of Educational Attainment
[c] Source: World Development Indicators 2016. World Bank

The table below presents the list of countries in our sample.

Table A.2 List of Countries in Panel Analysis

Country Name	Country Name	Country Name
Albania	Ghana	Pakistan
Algeria	Guatemala	Panama
Argentina	Guyana	Papua New Guinea
Bahrain	Haiti	Paraguay
Bangladesh	Honduras	Peru
Barbados	Hong Kong	Philippines
Belize	Hungary	Poland
Benin	India	Romania
Bolivia	Indonesia	Russian Federation
Botswana	Iran	Rwanda
Brazil	Israel	Senegal
Bulgaria	Jamaica	Sierra Leone
Burundi	Jordan	Singapore
Cameroon	Kenya	Slovakia
China	Korea	Slovenia
Colombia	Kuwait	South Africa
Costa Rica	Latvia	Sri Lanka
Cote dIvoire	Lithuania	Tanzania
Croatia	Malawi	Thailand
Cyprus	Malaysia	Trinidad and Tobago
Czech Republic	Mali	Tunisia
Dem. Rep. of the Congo	Malta	Uganda
Dominican Rep.	Mauritius	Ukraine
Ecuador	Mexico	United Arab Emirates
Egypt	Morocco	Uruguay
El Salvador	Namibia	Venezuela
Estonia	Nepal	Zambia
Fiji	Nicaragua	Zimbabwe
Gabon	Niger	

Appendix B

Data Description (Accompanies Chapter 5)

NUTS Classification

The Nomenclature of Territorial Units for Statistics (NUTS)[1] was drawn up by Eurostat more than 30 years ago in order to provide a single uniform breakdown of territorial units for the production of regional statistics for the European Union. The NUTS classification has been used in EU legislation since 1988, but it was only in 2003, after three years of preparation, that a European Parliament and Council Regulation on NUTS was adopted. The NUTS classification (Nomenclature of territorial units for statistics) is a hierarchical system for dividing up the economic territory of the EU.

The NUTS Regulation lays down the following minimum and maximum thresholds for the population size of the NUTS regions. The thresholds apply for the average population size in the case of administrative regional levels[1].

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[1]Source: Eurostat

Level	Minimum	Maximum
NUTS 1	3 million	7 million
NUTS 2	800000	3 million
NUTS 3	150000	800000

The current NUTS nomenclature applicable from 1 January 2012 subdivides the economic territory of the European Union into 97 regions at NUTS 1 level, 270 regions at NUTS 2 level and 1 294 regions at NUTS 3 level[1].

QoG Questionnaire

The European Quality of Government Index[2] 2013 combines responses taken from over 84,000 respondents in 236 NUTS 1 and NUTS 2 regions for all EU 28 countries, Turkey and Serbia.

The questions the respondents answered from which the Index is compiled are the following:

1. 'Have you or any of your children been enrolled or employed in the public school system in your area in the past 12 months?'[3]

2. 'In the past 12 months have you used public health care services in your area?'[3]

3. 'Have you had any recent contact (positive or negative) with the security or police forces in your area in the past 12 months?'[3]

4. 'How would you rate the quality of public education in your area?'[4]

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[2] Source: The Quality of Government EU Regional Dataset. University of Gothenburg
[3] Yes/No

5. 'How would you rate the quality of the public health care system in your area?'[4]

6. 'How would you rate the quality of the police force in your area?'[4]

7. "Certain people are given special advantages in the public education system in my area." [5]

8. "Certain people are given special advantages in the public health care system in my area."[5]

9. "The police force gives special advantages to certain people in my area."[5]

10. "All citizens are treated equally in the public education system in my area"[5]

11. "All citizens are treated equally in the public health care system in my area"[5]

12. "All citizens are treated equally by the police force in my area"[5]

13. "Corruption is prevalent in my area's local public school system"[5]

14. "Corruption is prevalent in the public health care system in my area"[5]

15. "Corruption is prevalent in the police force in my area"[5]

16. 'In the past 12 months have you or anyone living in your household paid a bribe in any form to: Education services? Health or medical services? Police?'[3]

17. 'In your opinion, how often do you think other citizens in your area use bribery to obtain public services?'[6]

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[4] 0 (extremely poor quality) to 10 (extremely high quality)
[5] 0 (strongly disagree) to 10 (strongly agree)
[6] 0 (never) to 10 (very frequently)

18. 'In your opinion, if corruption by a public employee or politician were to occur in your area, how likely is it that such corruption would be exposed by the local mass media?'[7]

19. 'Please respond to the following: Elections in my area are honest and clean from corruption'[5]

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[7] 0 (extremely unlikely) to 10 (extremely likely).

The table below presents the description of all our variables.

Table B.1 Data Description

Variable	Description
QoG[a]	The total score of the European QoG Index of every region, adjusted with mean 0 and standard deviation 1
Corruption[a]	The Corruption score of the European QoG Index of every region, adjusted with mean 0 and standard deviation 1
Income[b]	Gross domestic product (GDP) at current market prices by NUTS 2 regions (Euro per Inhabitant)
Distance to coast	The inverse of the distance to coast measured by middle point of every region
Education[b]	Percentage of total population aged 25-64 with Tertiary education by NUTS 2 regions
No Religion[c]	The share of the population that answered "No" in the question "Do you consider yourself as belonging to any particular religion or denomination?"
Population[b]	Total Population on 1 January by NUTS 2 region
Urbanisation[b]	The share of urban population in every region
Public Workers[b]	Public Workers as a share of total employment by NUTS 2 regions
Inequality[b]	Share of the population at risk of poverty or social exclusion by NUTS 2 regions
Racial Dissimilarity[b]	Racial Dissimilarity index for EU regions
Immigrants[b]	Share of the population that were born in another country than the one they currently live
Legal Origins[d]	Captures the legal origins of the regions. 5 dummies for Common law, French, German, Scandinavian and Socialist Civil law.
Trust[c]	The share of the population that answered below 3 in the question "would you say that most people can be trusted, or that you can't be too careful in dealing with people? Please tell me on a score of 0 to 10, where 0 means you can't be too careful and 10 means that most people can be trusted."
Cluster Dummies	The cluster dummies capture whether the regions belong to a high-performing, middle-performing or low-performing country, based on their WGI scores
Capital Dummy	The capital dummy captures whether the capital of the country is within the region

[a] Source: The Quality of Government EU Regional Dataset. University of Gothenburg
[b] Source: Eurostat Regional Database.
[c] Source: European Social Survey Round 6.
[d] We follow La Porta et al., 1997 in the classification of the legal origins.

Table B.2 List of EU Regions

Country	NUTS1 Region	NUTS2 Region
BE - Belgium	BE1 - Région de Bruxelles BE2 - Vlaams Gewest BE3 - Région wallonne	
BG - Bulgaria		BG31 - Severozapaden BG32 - Severen tsentralen BG33 - Severoiztochen BG34 - Yugoiztochen BG41 - Yugozapaden BG42 - Yuzhen tsentralen
CZ - Czech Republic		CZ01 - Praha CZ02 - Strední Cechy CZ03 - Jihozápad CZ04 - Severozápad CZ05 - Severovýchod CZ06 - Jihovýchod CZ07 - Strední Morava CZ08 - Moravskoslezsko
DK - Denmark		DK01 - Hovedstaden DK02 - Sjælland DK03 - Syddanmark DK04 - Midtjylland DK05 - Nordjylland
DE - Germany	DE1 - Baden-Württemberg DE2 - Bayern DE3 - Berlin DE4 - Brandenburg DE5 - Bremen DE6 - Hamburg DE7 - Hessen DE8 - Mecklenburg-Vorpommern DE9 - Niedersachsen DEA - Nordrhein-Westfalen DEB - Rheinland-Pfalz DEC - Saarland DED - Sachsen DEE - Sachsen-Anhalt DEF - Schleswig-Holstein DEG - Thüringen	
EE - Estonia	EE0 - Eesti	

Table B.3 List of EU Regions (Contd.)

Country	NUTS1 Region	NUTS2 Region
IE - Ireland		IE01 - Border, Midland and Western
		IE02 - Southern and Eastern
EL - Greece	EL1 - Voreia Ellada EL2 - Kentriki Ellada EL3 - Attiki EL4 - Nisia Aigaiou, Kriti	
ES - Spain		ES11 - Galicia ES12 - Principado de Asturias ES13 - Cantabria ES21 - País Vasco ES22 - Comunidad Foral de Navarra ES23 - La Rioja ES24 - Aragón ES30 - Comunidad de Madrid ES41 - Castilla y León ES42 - Castilla-la Mancha ES43 - Extremadura ES51 - Cataluña ES52 - Comunidad Valenciana ES53 - Illes Balears ES61 - Andalucía ES62 - Región de Murcia ES70 - Canarias (ES)
FR - France		FR10 - Île de France FR21 - Champagne-Ardenne FR22 - Picardie FR23 - Haute-Normandie FR24 - Centre (FR) FR25 - Basse-Normandie FR26 - Bourgogne FR30 - Nord - Pas-de-Calais FR41 - Lorraine FR42 - Alsace FR43 - Franche-Comté FR51 - Pays de la Loire FR52 - Bretagne FR53 - Poitou-Charentes FR61 - Aquitaine

Table B.4 List of EU Regions (Contd.)

Country	NUTS1 Region	NUTS2 Region
FR - France		FR62 - Midi-Pyrénées FR63 - Limousin FR71 - Rhône-Alpes FR72 - Auvergne FR81 - Languedoc-Roussillon FR82 - Provence-Alpes- Côte d'Azur FR83 - Corse
HR - Croatia		HR03 - Jadranska Hrvatska HR04 - Kontinentalna Hrvatska
IT - Italy	ITC1 - Piemonte ITC2 - Vallée d'Aoste ITC3 - Liguria ITC4 - Lombardia ITH1 - Prov. Autonoma di Bolzano ITH2 - Prov. Autonoma di Trento ITH3 - Veneto ITH4 - Friuli-Venezia Giulia ITH5 - Emilia-Romagna ITI1 - Toscana ITI2 - Umbria ITI3 - Marche ITI4 - Lazio ITF1 - Abruzzo ITF2 - Molise ITF3 - Campania ITF4 - Puglia ITF5 - Basilicata ITF6 - Calabria ITG1 - Sicilia ITG2 - Sardegna	
CY - Cyprus	CY0 - Kypros	
LV - Latvia	LV0 - Latvija	
LT - Lithuania	LT0 - Lietuva	
LU - Luxembourg	LU0 - Luxembourg	
MT - Malta	MT0 - Malta	

Table B.5 List of EU Regions (Contd.)

Country	NUTS1 Region	NUTS2 Region
HU - Hungary	HU1 - Közép-Magyarország HU2 - Dunántúl HU3 - Alföld és Észak	
NL - Netherlands		NL11 - Groningen NL12 - Friesland (NL) NL13 - Drenthe NL21 - Overijssel NL22 - Gelderland NL23 - Flevoland NL31 - Utrecht NL32 - Noord-Holland NL33 - Zuid-Holland NL34 - Zeeland NL41 - Noord-Brabant NL42 - Limburg (NL)
AT - Austria		AT11 - Burgenland (AT) AT12 - Niederösterreich AT13 - Wien AT21 - Kärnten AT22 - Steiermark AT31 - Oberösterreich AT32 - Salzburg AT33 - Tirol AT34 - Vorarlberg
PL - Poland		PL11 - Lódzkie PL12 - Mazowieckie PL21 - Malopolskie PL22 - Slaskie PL31 - Lubelskie PL32 - Podkarpackie PL33 - Swietokrzyskie PL34 - Podlaskie PL41 - Wielkopolskie PL42 - Zachodniopomorskie PL43 - Lubuskie PL51 - Dolnoslaskie PL52 - Opolskie PL61 - Kujawsko-Pomorskie PL62 - Warminsko-Mazurskie PL63 - Pomorskie

Table B.6 List of EU Regions (Contd.)

Country	NUTS1 Region	NUTS2 Region
PT - Portugal		PT11 - Norte PT15 - Algarve PT16 - Centro (PT) PT17 - Área Metropolitana de Lisboa PT18 - Alentejo PT20 - Região Autónoma dos Açores (PT) PT30 - Região Autónoma da Madeira (PT)
RO - Romania		RO11 - Nord-Vest RO12 - Centru RO21 - Nord-Est RO22 - Sud-Est RO31 - Sud - Muntenia RO32 - Bucuresti - Ilfov RO41 - Sud-Vest Oltenia RO42 - Vest
SI - Slovenia	SI01 - Slovenija	
SK - Slovakia		SK01 - Bratislavský kraj SK02 - Západné Slovensko SK03 - Stredné Slovensko SK04 - Východné Slovensko
FI - Finland		FI19 - Länsi-Suomi FI1B - Helsinki-Uusimaa FI1C - Etelä-Suomi FI1D - Pohjois- ja Itä-Suomi FI20 - Åland
SE - Sweden	SE1 - Östra Sverige SE2 - Södra Sverige SE3 - Norra Sverige	
UK - United Kingdom	UKC - North East (UK) UKD - North West (UK) UKE - Yorkshire and The Humber UKF - East Midlands (UK) UKG - West Midlands (UK) UKH - East of England UKI - London UKJ - South East (UK) UKK - South West (UK) UKL - Wales UKM - Scotland UKN - Northern Ireland (UK)	