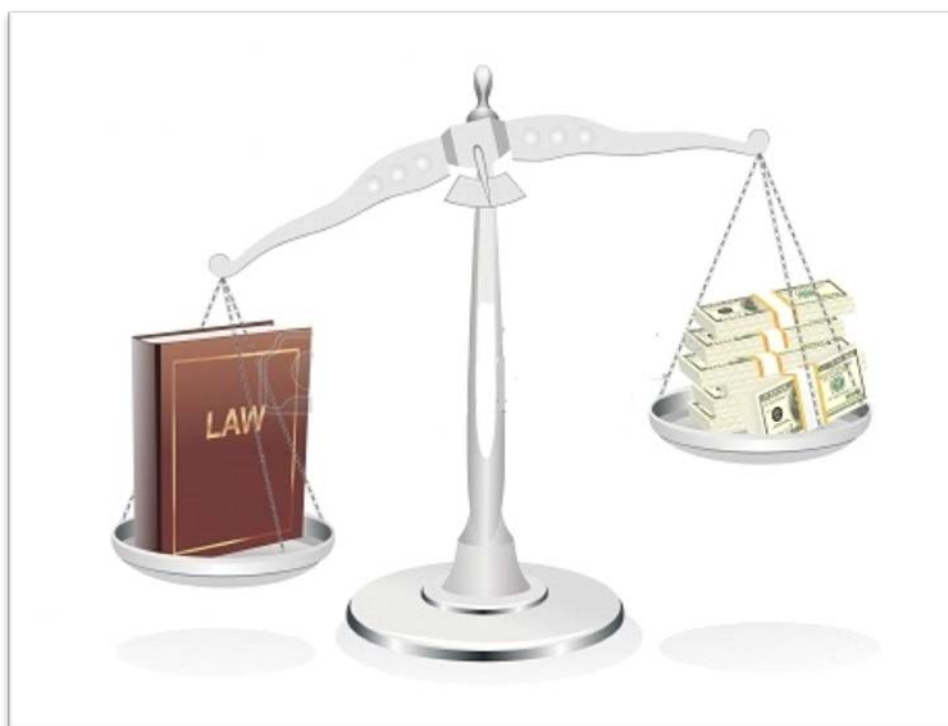


Wageningen University
Department of Development Economics

“ The Impact of Institutional Environment on Economic Policy:
Efficiency of Economic Measures Under Different Forms of Governance ”



MSc student: Terzidis Nikolaos
Registration number: 830530-826-060
Supervisor: Dr. Jeroen Klomp
International Development Studies
Wageningen, March 2014



WAGENINGEN UNIVERSITY
WAGENINGEN UR

ABSTRACT

Development theories have been the focus of attention in economic science from a very early stage. Throughout the years numerous models emerged trying to account for growth rates, each one based on a special theoretical framework. We base our model on the New Institutional Economics (NIE) context, because of two reasons: First of all we consider the above mentioned framework to be the first complete attempt to endogenize the determinants of growth by acknowledging the drawbacks and inefficiencies of previous theories and trying to deal with them. Secondly, we believe that the incorporation of institutions with all their implications is a step that brings the whole analysis a lot closer to modern economic conditions. Convinced about the importance of institutional variables, we employ two factor analysis procedures in order to obtain latent variables both for political and economic institutional entities. The former control for heterogeneous types of governance as well as main forms of social resistance and constitutional change, while the latter are proxies for the macroeconomic and microeconomic environment within which transactions take place and economic measures are implemented. We then incorporate the extracted variables in a Dynamic Panel Data analysis model for 60 countries and test their significance. At a second stage we examine the significance of the indirect effects, that is the combined effects of political and economic institutional variables. The analysis becomes highly specific, since each one of those effects describes a very particular situation of the socioeconomic framework. Nevertheless some of our results are quite clear, pointing to straightforward policy implications for worldwide financial institutions like the World Bank in their ultimate attempt to reduce poverty and promote social equity.

Keywords: Economic, Political Institutions, Development, Democracy

TABLE OF CONTENTS

SECTION I INTRODUCTION – THEORETICAL FRAMEWORK

1. Introduction	07
2. Theoretical Framework	10
2.1 Economic Growth and Institutions	10
2.1.1 Theoretical Background	10
2.1.2 Empirical Evidence for the relationship between Institutions and Economic Performance	15
2.2 Economic Growth and Democracy	17
2.2.1 Theoretical Background	17
2.2.2 Empirical Evidence for the relationship between Democracy and Economic Performance	21
2.3 Democracy and Institutions	24
2.3.1 Theoretical Background	24
2.3.2 Empirical Evidence for the relationship between Democracy and Economic Performance	28

SECTION II FACTOR ANALYSIS

3. Factor Analysis	32
3.1 Introduction	32
3.1.1 Theoretical Background	32
3.1.2 Mechanics	32
3.1.3 Data	34
3.2 Results	37
3.2.1 Democratic Quality	37
3.2.2 Institutional Environment	41

SECTION III – DYNAMIC PANEL DATA ANALYSIS

4. Methodology	44
4.1 Introduction	44
4.2 Model	44
5. Results	49
5.1 Estimation Results	49
5.1.1 Control Variables	51
5.1.2 Institutional Variables – Direct Effects	53
5.1.3 Institutional Variables – Indirect Effects	55
6. Conclusions – Policy Implications	56

References	58
------------	----

SECTION IV - APPENDICES

APPENDIX A. List of Indicators Used To Describe Democratic Quality	65
APPENDIX B. List of Indicators Used To Describe Institutional Quality	71
APPENDIX C. List of Control Variables Used In the Regression Analysis	79
APPENDIX D. Countries Included In the Model	80

APPENDIX E. Stata Commands	81
E.1 Factor Analysis	81
E.1.1 Democracy Indicators	81
E.1.2 Institutional Indicators	84
E.2 Dynamic Panel Data Analysis	86

LIST OF FIGURES:

1. Incorporation of Democracy in the Institutional Framework of Economic Growth	08
2. Relationship Between Institutional Quality and Economic Growth	11
3. Schematic Representation of the of the NIE Framework	14
4. Relationship Between Democracy and Economic Growth	18
5. Relationship Between Democracy and Institutional Quality	25
6. Complete System of Interrelations Between: Democracy, Institutional Quality and Economic Growth	26
7. Schematic Representation of a 3 Factor and 15 Variable Factor Analysis Model	33
8. Screeplot of the Factors Regarding Democratic Quality	37
9. Screeplot of the Factors Modelling for Institutional Environment	42

LIST OF TABLES:

1. Indicators Used for Democratic Quality and their Sources	36
2. Indicators Used for Institutional Environment and their Sources	36
3. Correlation Matrix of Initial Democratic Indicators	39
4. Rotated Factor Loadings Matrix for Democratic Indicators	40
5. Interpretations of the Factors Controlling for Democratic Quality	40
6. Correlation Matrix of the Initial Institutional Variables	41
7. Rotated Factor Loadings Matrix for Institutional Indicators	42
8. Interpretations of the Factors Controlling for Institutional Quality	43
9. Regression Results	50

LIST OF MAPS:

1. Countries Incorporated in the Analysis	09
---	----

SECTION I : INTRODUCTION – THEORETICAL FRAMEWORK

1. Introduction

Among all government policies that affect not only a country's overall trajectory towards growth, but also the citizens' everyday livelihoods, economic policy holds a prominent position. It is a policy that makes it possible to pursue a twofold goal: Firstly the increase in overall GDP, which is very important in helping a country enter the elite group of the developed ones and secondly the accumulation of the necessary funds in order to promote social policies (unemployment benefits, minimum wages etc.), thus raising the standard of living for the general population. Worldwide circumstances in the last decades, such as the diffusion of fiscal crisis among the continents, brought this matter once again into light. What everyone needs to understand though is the fact that the outcomes of any such measures depend on a variety of conditions, including any country – specific circumstances or the time horizon used to evaluate the expected results. Throughout this thesis, special interest will be placed on the political and social environment, as well as their interactions. This is because we believe that the impact of a given policy on economic development is not a straightforward process, but one heavily conditional on both the institutional and the political context within which it is being implemented. In other words, we presume that there are no specific recipes that provide certain results, but the effectiveness of the latter depends on the framework of implementation.

A preliminary definition of the term “institutional context” would refer to the formal rules and regulations that delineate the efficacy of transactions or measure implementation. These are usually set by state legal corporations whose ultimate function is to facilitate transactions among counterparts. Successful ways of achieving this is the reduction not only of the fiscal costs entailed in relationships between individuals and the state but also of the bureaucratic burden (measured by the number of necessary legal documents for a given business transaction). On the other hand, the term “political context” refers to the general social and political environment within which economic decisions are enforced. More specifically, it is closely related to the regime type, which can vary from pure democracy to pure autocracy with all the intermediate possible systems of governance, each one having different implications. It also includes the social acceptance of the political *status quo* and the ways the general population may oppose to government decisions. The latter refers to a possible upheaval and it is quite an heterogeneous notion, since it could involve anything from strikes to generalized conflict that could border to civil war.

A visual representation of all the above can be given by the following diagram (Fig: 1). The term *economic growth* is used to measure the impact of economic measures on overall macroeconomic indices like GDP, consumption etc., while the term *institutional quality* accounts for the success in the functioning of the legal entities that facilitate transactions. Finally *democracy* is used to proxy for the regime type with a direct and an indirect reference

on social acceptance¹. The arrows depict not only one of the two possible ways of interaction between the three pillars of our framework, but also the main research parts of this thesis.

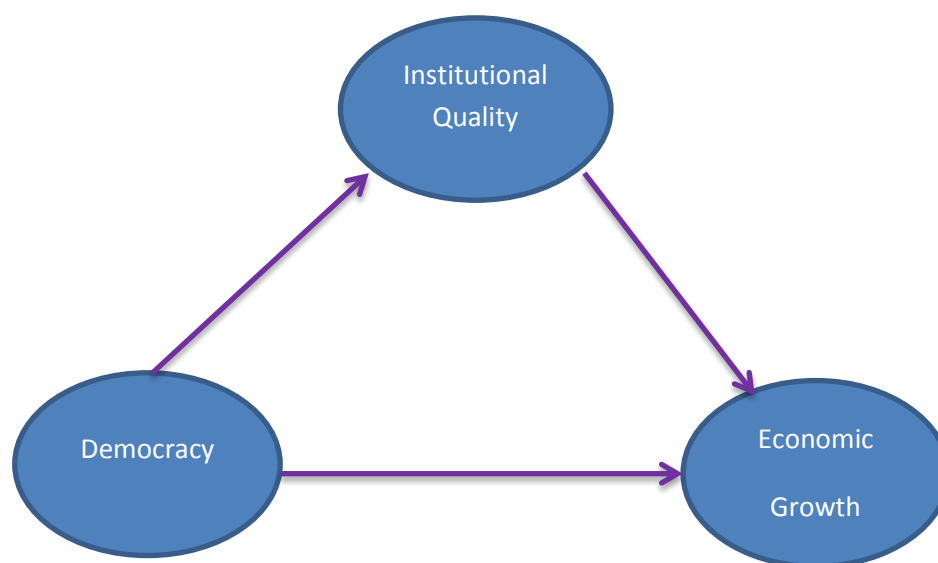


Fig 1 : Incorporation of democracy in the Institutional framework of Economic Growth

In what follows, we will attempt to explain every-one of the arrows in the above figure. Each one of them represents a relationship explained in the respective literature, which we want to test empirically. Towards that cause, we will use extensive data from the 60 countries depicted in red in the following world map. (A detailed list of the specific countries can be found on Appendix D). What may strike the reader concerning the map below is the relative absence of African countries. With few exceptions, Africa is not represented in the dataset, at least to the degree other continents are. This can be explained by the kind of data. We employ democratic and institutional indicators, which need at least a stable regime in order to be collected on a yearly basis. African countries were and in some cases continue to be ravaged by civil wars or heavy internal conflict, which makes the collection of the data required, practically impossible. In most cases, values for the respective indicators were either inexistent or greatly unreliable. Data used covers a wide variety of indicators, controlling for the degree of democracy (Appendix A), as well as institutional quality (Appendix B). Due to the heterogeneity of the data sources, the time horizon finally used, was narrowed from 1984 to 2006.

As far as our main findings are concerned, a brief reference would include the results from the two Factor Analyses and the outcomes of the final Panel Data model. Factor analysis was used to obtain the main aspects (latent variables) that would account for the regime type and the institutional framework. The final variables for the regime type control for two different types of democracy (a very secure one and a simple civilian regime based on popular vote), a constitutional monarchy, two different types of social revolt as well as actions of constitutional reform. Regarding the institutional context, the two obtained latent variables have a significantly different orientation. One of them is more intra – firm oriented,

¹ The direct reference is connected with the inclusion of certain variables in our model (more will be explained in factor analysis results – section 2.2). The indirect effect is related to our intuition that democratic forms of governance are usually more socially accepted than autocratic ones.

controlling for a liberalised environment as far as firing or hiring practices are concerned, while the other one refers to the general business environment and to the easiness of conducting trade, banking or other economic transactions.



Map 1 : Countries Incorporated in the Analysis

The above mentioned latent variables are modelled together with a set of control variables (Appendix C) in a Dynamic Panel Data framework with some interesting outcomes. Although in a model without the indirect effects (the combination of the two categories of latent variables) all the institutional regressors enter the analysis significantly, when the indirect effects are included, only two of the original institutional variables (the one referring to social upheaval and the economic latent variable that controls for a liberalized environment) retain their significance and signs that are accounted for in the respective literature. Finally, a matter of great importance for this thesis is the inclusion in the final model and the interpretation of the indirect effects. The fact that the obtained latent variables control for different types of institutional framework, enables us to test a broad variety of possible interactions and come across some interesting implications regarding the significance and signs of the above effects of institutional variables on economic growth. It is a part of the literature that still needs to be addressed adequately. Towards that direction, extensive discussion will take place in the respective section.

The remainder of the thesis is organised in the following way: Section 2 presents the theoretical background of the above relationships, as well as the major aspects of the empirical evidence. Section 3 consists of the methodology part together with the factor analysis results from which we obtain the final indicators for democracy and institutional quality, while Section 4 contains the model results. Finally the conclusions and the possible issues for further research are given in Section 5.

2. Theoretical Framework

2.1 Economic Growth and Institutions:

2.1.1: Theoretical background

A simple inspection of the economic environment throughout the world reveals great disparity among different economies. Judging by the per capita income index, we can observe countries whose citizen enjoy a relatively high standard of living (Luxembourg² with \$78.000) and at the same time countries for which the respective indices are significantly lower (Greece with \$25.000). While it is perfectly understandable that the standard of living as measured by income cannot be the same in every part of the world, such great disparities as the one presented above, has raised one of the most often discussed issues in the context of economic literature, which is: “what accounts for income disparities among different countries”, or –in simpler words- “why are some countries much poorer than others?” In the process of economic research, several researchers with heterogeneous socioeconomic backgrounds have tried to provide adequate answers to the above questions. As a result, a series of growth models have emerged in the last decades, attributing growth process into various elements of the economic system, mainly dependent on the school of thought each one originates from.

A fundamental growth theory that has its roots in the neoclassical school of economic thought, was originally developed by Robert Solow. In one of the most prominent papers on growth literature (Solow: 1956), Solow tries to account for the factors that are the driving forces of economic development. Following the basic neoclassical assumptions (especially those of a competitive and frictionless economy with full employment), he concludes that the source of economic growth in the basic model is ultimately capital accumulation. It is the formation of capital which occurs through a process involving the savings, the depreciation rate and population growth. Specifically, when the savings rate is greater than the sum of the other two factors, then this ongoing process of capital formation can help a country converge to a state of higher income and consumption per capita. In more scientific terms, this is widely known as the *convergence hypothesis*, a notion in which we will return later on. At a later stage, when the basic model was enhanced with technological change, growth was attributed to technical progress (Solow: 1957). Nevertheless, no matter which model we consider, what is of striking importance is that the factors that actually account for economic development are exogenous, since they remain unaffected in the process of capital formation. Thus, remaining always in the neoclassical side of the coin with assumptions far from reality, leaves little room for implications regarding economic policies.

As new growth theories attempted to fill the blanks of earlier research, Cass and Koopmans -based on the seminar work by Ramsey (Ramsey: 1928) - developed independently a cross country model with which they tried to account for the factors that affect capital accumulation (Cass: 1965, Koopmans: 1963). In their inter-temporal framework, the savings rate which in turn determines the formation of capital depends on consumer

² The data presented refers to the year 2012 and their source is the International Monetary Fund.

preferences. This maybe one step forward in comparison with their predecessors, but once again the driving force of growth is exogenous, therefore their model suffers from the same major issue as the earlier one. Nevertheless their work is very important, not only for providing an intuition regarding how savings are formed, but also because it is often used as a building block for later growth theories.

The first attempts to endogenize the sources of growth were made by Romer (Romer: 1986) as well as Lucas (Lucas: 1988). Both of them followed the neoclassical theoretical tradition, with its' analytical advantages as well as great drawbacks regarding the actual policy implications. Romer concluded that the accumulation of knowledge and the evolution of human capital was the main driving force of development, while Lucas took a step forward, arguing that this accumulation could be obtained through either schooling or a “learning - by - doing” procedure. The point of differentiation with respect to the previous models is that both processes resulting in capital accumulation depend on choices made by economic agents. Therefore their models constitute a small first step towards the direction of making growth an endogenous procedure.

Although their work is thought to provide great insights into the development process as for first time investment in human capital is regarded to have a positive spillover effect on the economy by reducing the diminishing returns to capital accumulation, great controversy emerged as to whether the motivation mechanisms for growth are actually exogenous or not. Many economists argue that knowledge accumulation, as a result of investment in research and development, is still a matter of preferences of economic agents, thus making it difficult to incorporate into a growth model. Moreover, another point of conflict was the common view that knowledge accumulation is not just a cause of growth but a manifestation of growth itself. In other words, the direction of causality between development and the expansion of knowledge was still under serious debate.

The above matters of controversy paved the way for a new branch of neoclassical economics to emerge, widely known as **New Institutional Economics** (NIE). Research on this sprout is directed towards the incorporation of institutions in the growth models. From the early 1990's and onwards, there has been extensive literature on the relationship between economic development and institutional quality (Fig: 2).



Fig 2 : Relationship between Institutional Quality and Economic Growth

Before making a comparison between the new framework and its' predecessors, it is necessary to adequately define *institutions*, since this term can be used to account for different entities in different contexts. According to Douglas North (North: 1989 p 1321), “Institutions are rules, enforcement characteristics of rules and norms of behaviour that structure repeated human interaction”. On the same paper, North acknowledges that the vital part is to

understand the consequences of institutional operation for the choices of individuals. A similar definition is provided by Lin and Nugent (Lin and Nugent: 1995) where institutions are “a set of humanely devised behavioural rules that govern and shape the interactions of human beings, in part by helping them form expectations of what other people do”.

The *institutional quality* term is used to describe how well delineated and how clear to everyone is the political and economic context within which transactions take place and economic measures are implemented. In order to prevent any misinterpretations, it is of vital importance to clarify that the NIE framework does not oppose the neoclassical one. Instead, it attempts to make the analysis more realistic, both by imposing constraints on the agents and by describing the devices created to overcome these constraints. It acknowledges institutions as a vital part of sound economic performance. Specifically, it goes beyond the neoclassical pattern in the following ways:

- a. It rejects the assumption of complete information and perfect rationality. Instead the main assumption used is that of “bounded rationality” according to which, economic agents intend to act perfectly rational, yet limited information prevents them from doing so.
- b. The concept of “transaction costs” is defined for the first time. Nevertheless, this definition raises a lot of contest among economists. R. Coase defined it as “the cost of using the price mechanism” (Coase: 1993) , while D. North defined it as “the costs of defining, protecting and enforcing property rights” (North: 1990). Similar definitions were used by various researchers (Ol. Williamson (Williamson: 1985), St. Cheung (Cheung: 1983), Th. Eggertsson (Eggertsson: 1990). We choose to follow the one by D. North, yet any of the rest has no different implications for the economic analysis.

The major implication of transaction costs in the economic model is that it drives agents away from the neoclassical equilibrium, which was now viewed as a non-realistic possibility by imposing further restrictions on the accumulation of information or the easiness of transactions etc. Towards this direction, institutions are designed to curtail transaction costs whose existence is the one of the driving forces of institutional evolution.

- c. The third building block of NIE is the focus on the distribution and protection of property rights. For a definition, we rely on Furubotn and Richter, who define them as: “the right to use, derive an income from and sell an asset” (Furubotn and Richter: 1991). Their existence is important to the functioning of the economic network, since a well - designed and enforced system of property rights ensures the realization of profit from either investment or trade, both of which are major determinants of growth.

All the previous are indicative of a major acknowledgement on behalf of economists. It is for the first time that researchers admit not only the imperfect structure of markets, but also the fact that this has serious implications regarding the volume and the efficiency of transactions. Towards this, economic research goes one step forward by recommending the

proper functioning of institutions as a possible way of overcoming market imperfections and promoting the goal of economic development. This brings us closer to one of the research questions of this thesis, namely the effect of institutions on growth. The above can be formulated into the following hypothesis:

H_0 : Does the institutional environment have a significant effect on economic growth rates?

According to the NIE context, it is a –properly functioning- institutional environment that contains those reassurances needed on behalf of economic agents so that the latter can look beyond the immediate future and make decisions concerning planning, saving and investing. However, the endogenization of institutions did not come without a price. The whole system is now so integrated that it is difficult to disentangle the web of causality between quality of institutions and economic development. As a direct result, literature on the institutional prerequisites for economic prosperity faces great difficulties in providing solid policy implications.

Following the already mentioned definitions, it becomes obvious that institutions cover a wide variety of social and economic transactions. It is neither possible nor analytically relevant to quantify and measure how institutions influence each one of these interactions. This is the reason we choose to focus primarily on those which affect social and economic life more directly, which can be summarised in the following categories:

- a. Economic Institutions: They regulate the protection of property rights, contract enforcement, the rule of law etc. thus forming the incentives of economic agents. The overall effect can be a significant increase in the volume and the efficiency of transactions, since in an environment where property rights for instance are not sufficiently protected, there will be less intent to invest.
- b. Political Institutions: They shape the forms the governance as well as the limits in the exertion of power from the political elite. Their role is the protection of the weak from injustices on behalf of those who hold positions of power. More generally, political institutions can be seen as promoting the goal of social equity, since they are more related to the allocation, rather than the accumulation of wealth.

Our next step is to try and identify the ways through which a strictly enforced institutional environment promotes growth, or –alternatively expressed- find an answer to the following question: “Why are institutions so important to growth.” Nevertheless, before doing so, we need to stress importance to one of the basic aspects of the new framework, the fact that it is by no means static. It should be clear that the institutional interaction creates more complex ones that influence everyday lives in a lot more different ways. The possible ways of interaction are still vaguely known, since literature on this issue is on its’ infancy.

In identifying the ways through which the new environment promotes economic performance, we will follow the framework proposed by D. Acemoglu, S. Johnson and J. Robinson (Acemoglu, Johnson, Robinson: 2004), presented in Fig: 3. This context incorporates both economic and political institutions into the economic system. As will be

made clear in what follows, the values for the above mentioned legal entities will be determined by the functioning of the whole system. As a result, Acemoglu, Johnson and Robinson attempt to create a system of interdependent variables, where the value for each one is the result of the functional relationships of all the others. The above can be seen as a straightforward movement towards the ultimate goal of endogenizing institutional quality.

The first critical point lies in distinguishing between institutional (*de jure*) and actual (*de facto*) political power. Both of them can be treated as the two sides of the same coin, since they refer to the political sphere of the socioeconomic environment. *De jure* political power originates from the

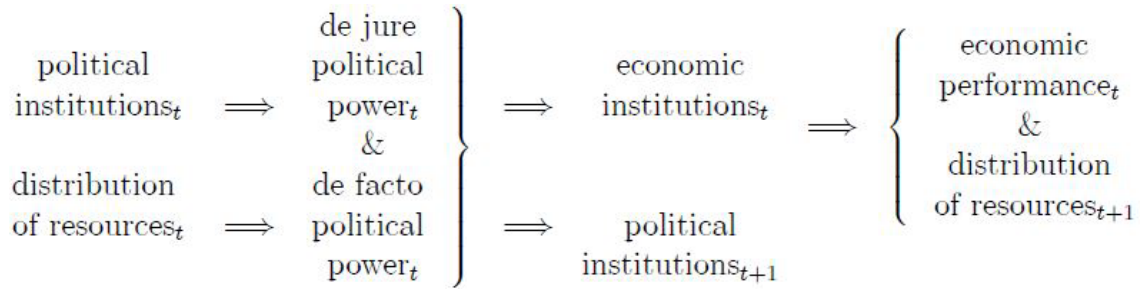


Fig 3 : Schematic Representation of the NIE framework

institutions forming the economic system and refers to the restrictions imposed to the “players of the game”, especially those who hold positions of power and have the potential to misuse them only to their own benefit. For instance different degrees of *de jure* political power are attributed to government officials under democracy or under autocracy. On the other hand, *de facto* political power is the economic or political strength that groups of people may gain not because of the positions they hold in the institutional context, but because of their own ability to use their wealth in a way to exert power over the rest of the society. Acquisition of *de facto* political power rests on the ability to overcome group coordination issues, depends heavily on lobbying force as well as on the availability of resources. Among those prerequisites, the latter is the one of the greatest significance, as possession of the raw materials is always fundamental for acquiring political power.

In order to determine all the variables of the above system, we only need to know how political institutions induce *de jure* political power and how the resource distribution leads to the *de facto* political power for a specific point in time. Simultaneously, *de jure* power is the major factor that decides upon the structure of economic institutions, while *de facto* political power defines the political framework of the next period. Together with the fact that the interaction of political and economic institutions determines not only the current economic performance but also the initial resource distribution for the next period, we can understand the two possible ways through which each type of institutions affects economic growth. There is the *direct effect* of political institutions forming the economic ones (through *de facto* political power) and the *indirect one* which is related to the ways political institutions determine the distribution of resources (through the channel of *de jure* political power) for the next period. Here lies one of the advantages of this framework, namely its dynamic character. Neither the political, nor the economic foundations of the economic system remain unaffected

in the time process. Specifically, economic institutions are not static in the sense that they are the product of political ones, as well as the resource distribution. As a result, according to the above framework, one of the major factors of economic development becomes endogenous, therefore it can be affected by overall policies or the interaction of economic agents. This is one of the major points of distinction between NIE and its' predecessors, which defines the progress made by the new theoretical context.

2.1.2: Empirical Evidence for the relationship between Institutions and Economic Performance

The dilemma as to if and how institutions can promote economic growth started to gain interest among economists from the early 1990's. From that point there have been numerous studies with great disparity not only in the proxies used to account for institutional quality, but also in the instruments used to measure the former and the channels through which institutions may affect economic development. Researchers made the attempt to focus both on economic as well as political ones. Common measures for economic institutions vary from the Business Environment Risk Intelligence³ (BERI) index, used by Knack and Keefer (Knack and Keefer: 1995) and Clague, Keefer, Knack & Olson (Clague, Keefer, Knack & Olson: 1999), to single variables like private credit or bank assets (Aghion, Howitt & Mayer - Foulkes: 2005). On the other hand, the International Country Risk Guide⁴ (ICRG) index seems to hold a position of wide acceptance in the literature as a measure for political institutions (Knack and Keefer: 1995 and Clague, Keefer, Knack & Olson: 1999). Another two measures often used are firstly the rule of law index (Rodrik: 1999, Rodrik, Subramanian & Trebbi: 2004) and secondly the protection against expropriation risk (Acemoglu, Jonhson and Robinson: 2001).

Given the fact that the above measures are –as a rule- qualitative, certain instruments have been applied by researchers to quantify them. An inspection of the respective literature reveals that the one most often used is *settler mortality*, initially proposed by Acemoglu, Jonhson and Robinson and then cited in a number of papers (Aghion, Howitt & Mayer - Foulkes: 2005, Alcalla & Ciccone: 2004, Glaeser, La Porta, Lopez-de-Silanes & Shleifer: 2004, Rodrik, Subramanian & Trebbi: 2004). There is also a number of papers whose authors seem to prefer *ethnolinguistic homogeneity* or *fractionalization* in order to instrument for institutional efficiency (Mauro: 1995, Clague, Keefer, Knack & Olson: 1999, Knack and Keefer: 1997).

In addition to these, there exists great controversy regarding the model through which the overall institutional impact is measured. For instance there are those who use only institutional variables in the model but at the same time there are the researchers who claim that such models are nothing more than the reduced forms of greater ones, which incorporate

³ It is an index created by the BERI SA Institute, which analyses more than 140 countries, considering risks on various industries. It is a firm – oriented index, related to investment friendliness of different countries. (source: Wikipedia)

⁴ ICRG index, created by the Political Risk Services (PRS) Group, uses indicators not only for business conditions, but also to quantify political leadership, military and religion in politics, as well as control of corruption. (source: <http://www.prsgroup.com/>)

many control variables. In case the above factors of disparity are augmented by the different treatments of the possible endogeneity of institutions and the possibly different outcomes for models with data on developed as opposed to models for developing countries, one can expect a variety of conclusions regarding institutional effects on economic growth.

Surprisingly enough, paying closer attention to the respective literature reveals a high degree of consensus on the utility of institutions. More specifically, although there are researchers who claim that literature on institutional framework is still in an early stage of development, there seems to be less and less controversy as to whether institutions are beneficial for economic growth. As far as economic institutions are concerned, Clague, Keefer, Knack and Olson provide useful insight when they find that an increase in contract enforcement rights⁵ can lead to an increase in GDP per capita both in the case of OLS regression and IV one. Towards the same direction, Aghion, Howitt & Mayer - Foulkes (2005) use regression analysis to prove that an increase in private credit can have a beneficial effect on the steady state GDP per capita. Specifically, the magnitude of this effect is greater for countries that have a long way before reaching their steady state growth rate.

Literature seems to be somewhat more extensive when it comes to the usefulness of political institutions. Acemoglu, Johnson and Robinson (2001) use both OLS and IV regressions to find that better protection against risk of expropriation can lead to an increase in GDP per worker. Knack and Keefer incorporate the ICRG index in an OLS model to determine that better political leadership or control of corruption can have a beneficial effect on the per capita annual income growth rate. Moreover, Mauro extends also to IV regression methods with the interesting result that less bureaucracy⁶ leads to a significant growth in GDP per capita. The same methods were also used by Rodrik, Subramanian & Trebbi (2004) in a model where an increase in the rule of law index had positive and significant effect on GDP per capita.

Moreover, in the same aspect of the literature, we find the work by Huang (Huang: 2010), which is a little closer to our analysis, since the polity2 index is used not only to account for institutional quality as a static measure, but also to control for transitions to better institutional quality. In a panel data analysis for 90 economies, using bias – correction techniques like Least Squares Dummy Variables and system GMM estimators, Huang found that better institutional quality can be beneficial for financial development, especially in the case of least developed countries. The latter can be explained since in countries far below their potential steady state income level, even a moderate increase in institutional quality can produce significant payoffs.

Finally, it would be at least improper not to mention the counter arguments regarding the seemingly consensual environment on institutions and growth. The main objection is summarised in the fact that researchers are trying to establish a significant relationship, in order for their paper to have a conclusion that can justify publication. In other words, the

⁵ In order to proxy for contract enforcement, they use their own measure: "Contract Intensive Money", which is defined as the ratio between non-currency M_2 , divided by total M_2 .

⁶ Measured by indices on the effectiveness of the judiciary system, red tape and control of corruption

consensus can be attributed to *publication bias*, thus making it difficult to identify the genuine effect of a proper institutional environment on economic growth (Doucouliagos: 2005). Although the degree of agreement among conclusions reaches the borders of unanimity, it should be noted that the robustness of the results should always be cross-checked, something that can be the initial point of future work.

2.2 Economic Growth and Democracy

2.2.1: Theoretical background

Our next building block in formulating the framework of our analysis is to insert the political regime factor. Common sense may dictate that pure market conditions may have a direct and heavily significant effect on economic transactions, but recent and constantly developing branches in the economic development literature stress the importance of the overall political environment. In identifying the political factors that are crucial for our analysis, we follow a top - down approach. According to this, the first and most important determinant of the general political context is the regime type. The regime pinpoints the main axes which can be followed by the government as well as individual citizens in claiming their demands. But since quantification of regime is far from being easy and straightforward, researchers modify the previous by putting different governing structures on a scale from the most to the least democratic. Sometimes this can be quite tricky, since two different structures may be differentiated only by a few ambiguous items. For instance, a military regime can abolish elections at all, or it can base its' initial election on popular vote (constitutional monarchy) and still maintain a highly autocratic system of governance. If both situations are classified under the same kind of "autocracy" it would be an over-generalization, since we would imply that elections play no significant role in the context whatsoever. In turn, the general context will determine the kind of institutions to emerge, both political and economic. At a second stage, one may try to find the possible effects of different regime and institutional types on proxies for economic growth, like GDP per capita, GDP per worker or the level of basic wage. This is the fundamental idea behind our second research question, which is formulated as follows:

H_0 : Does the regime type have a significant effect on economic growth rates?

We should start this part of the theoretical background by providing a broadly accepted definition of *democracy*. There are many equivalent and quite adequate definitions in the respective literature, some of them being quite extensive, while some others are quite narrow. Nevertheless, they share an important characteristic. All of them refer to forms of governance with "people" or the general population being the focus of attention. One of the most integrated ones is being provided by Navia & Walker (Navia & Walker: 2008). They define democracy as a set of complex rules and procedures, which level off the field of the economic and political interactions. In other words, following Rodrik (Rodrik: 1999), "democracy allows greater predictability and stability". However, the one closer to this analysis, is given later on by Rodrik (Rodrik : 1999 p. 3), who states that: "We can think of democratic regimes as the meta-institutions that build good institutions". In the above definition, we could substitute "good" by the word "efficient". To leave no shadows about that, efficient

institutions are those who function in such a way so that they can carry out their role in facilitating the transactions between individuals as well as between individuals and the government in a sufficient way. The reason behind our choice of the above definition lies not only in its' straightforwardness, but also in the inclusion of a very crucial element, the term "meta-institution". We believe this characterization is very important since it firstly provides insight on the way that democracy interacts with market institutions. Taking the above interaction into account and adding the fact that both the regime type and the economic institutions influence growth rates, it is obvious that a system of interdependent variables is created, like the one we present in Fig. 1. The point we would like to stress in that section is that neither democracy nor the other types of institutions are stable. In fact each one influences the others and this is the only way to make democracy variables endogenous to our new system. Secondly, we follow the definition proposed by Rodrik, because it is helpful in understanding the time frame behind regime and institutional transitions. The last factor is of great importance if we consider that societies have a dynamic structure that changes considerably over time. We need to keep in mind that the changes –although constant- do not happen simultaneously, but there is a certain pattern for them. This pattern is applied in the methodology section with the help of the instruments used, but we will refer to this point in a more detailed manner in the respective part.

The regime type can have an important effect on a country's overall growth trajectory. This overall effect can be split into the direct and the indirect part. The former is depicted in the following figure (Fig: 4), while the latter takes place through the interaction of the regime type and the kind of institutions developed. Detailed information as to the channels of these indirect effects of the general regime on economic development is provided on what follows.



Fig 4 : Relationship between Democracy and Economic Growth

For reasons explained later on, numerous studies have provided us with at least inconclusive results, thus creating a belief among researchers that the relationship between democracy and economic growth is at least ambiguous. There are those who believe that democracy is a pre-requisite for growth, as well as those who regard democracy as a luxury that should be sacrificed in the shrine of economic development. However, such ambiguity is expected if we take into consideration the great number of factors that can have a significant impact on the above relationship and drive the overall result towards any direction. Among those factors, the most important are listed below, following Doucouliagos and Ulubasoglu (Doucouliagos and Ulubasoglu 2008): (i) Country composition of the sample and model specification: It only makes sense that the overall result can be affected to a certain degree by the structural conditions of the countries that constitute the sample. Pre – existent social and political conditions as well as the time frame of democratization (for how many consecutive years has democracy been established) can make the difference in the analysis. In addition,

model specification is very important too, since the choice of the variables to include or the type of the analysis (static or dynamic) is of vital importance for the final result. (ii) The research questions can be stated in a way that depend on the data collected. This ought to be avoided by any cost, but we can anticipate even a small degree of heterogeneity. (iii) Finally, the same issue can be approached from different dimensions, each one based on different assumptions, leading to highly heterogeneous outcomes.

Before making reference to the possible theoretical arguments concerning the outcomes in the democracy – growth literature, we should not neglect to make a distinction between them. There is general consensus among researchers that the effects of democracy on economic development can be either *direct* or *indirect* ones. While the direct effects are quite straightforward and easy to understand, the indirect ones need more attention. In order to understand them, one has to identify the channels through which they take effect. Following once again the meta-analysis carried out by Doucouliagos and Ulubasoglu, together with A.C. Drury, J. Krieckhaus and M. Luszti (Drury, Krieckhaus and Luszti: 2006), we present the most important of them: (i) A democratic regime can be beneficial to GDP per capita by creating an environment of economic freedom. The less restricted an environment is, the more agents participate and more transactions take place, giving everyone the chance to follow the opportunity they believe can be profitable. (ii) Secondly, democracies foster human capital accumulation better than autocracies. The rationale behind this, lies in the arguments of both Acemoglu, Johnson and Robinson (Acemoglu, Johnson and Robinson: 2001) and Baum and Lake (Baum and Lake: 2003) which propose that under a democratic government, the capital invested in health and educational facilities is far greater than the respective capital in autocracies. This is the kind of investment that can lead –in the long run- to human capital formation, which in turn leads to greater growth rates (Sala-i-Martin, Doppelhofer and Miller: 2004). (iii) One more indirect channel can be spotted in the economic stability that democracy can provide. There may be contradictory evidence, but the general view is that there is a negative correlation between inflation and democracy. Taking as a fact the positive effect of price stability on development, one can argue that in most cases, democratic regimes foster growth through protecting the economic environment from inflationary trends. (iii) Finally, operating under a long – lasting democratic regime creates a general environment of political stability that reduces uncertainty in many aspects and is surely beneficial for economic growth.

Regarding the possible outcomes in the relationship between the degree of democracy and economic growth, extensive research has been carried out throughout the last decades. Doucouliagos and Ulubasoglu in their work propose two main results. According to them, democracy can either promote growth, or have an insignificant overall effect. The former takes place by establishing a political environment of liberty and stability, with great flow and dissemination of information as well as government's responsiveness to public demands on health, education, social security etc. Such a regime with controlled state intervention creates the necessary conditions for citizens to produce and direct capital into proper investment plans. In turn, all the previous are bound to promote growth. A significant number of papers seem to agree with the above framework (Baum and Lake: 2003 , Lake and Baum: 2001, Rodrik: 1998). The same point of view can be also found in the work of Qureshi and

Ahmed (Qureshi and Ahmed: 2012) under the *compatibility view* argument, which –in addition to the previous- highlight the importance of economic competition. According to them, democracies foster greater competition among interest groups which leads to more efficient resource allocation. Another significant factor that supports the compatibility between democracy and growth is the fact that under a democratic regime, as Wittman (Wittman: 1989) states, people “have the constitutional right to legally object to every decision of the policy-makers”. The second major outcome that Doucouliagos and Ulubasoglu have identified, is that a democratic regime possibly has no significant effect on economic growth. More specifically, they state that market conditions matter more for development. This is not only equivalent to the *sceptical* view proposed by Qureshi and Ahmed, according to which market oriented policies have a more direct effect on growth than the regime type, but also in accordance to the popular view that market conditions can affect growth more than the institutional framework.

In addition to the two above-mentioned outcomes, Qureshi and Ahmed provide us with another possible result. Under the designation *conflict* view, they propose the argument that democracies can be detrimental to long – run economic growth. In order to support this view, they state that democratic regimes usually redistribute income from investment to immediate consumption since there is a need to follow popular policies. If one also adds the fact that democratic governments can be susceptible to lobbying activities on behalf of certain groups (Comeau: 2003, Gupta et al: 1998) in order to ensure reelection, it is relatively easy to understand that overall investment tends to be less, thus hindering economic growth.

The already mentioned outcomes constitute a great part of the respective literature. Nevertheless, they are not the only ones. A prominent work on the theoretical patterns on development and democracy was carried out by Chen (Chen: 2007). According to this, there are five distinct possibilities. First of all, there is the argument that democracy will follow the development process (Lipset: 1959), also known as *modernization theory*. It is backed by the fact that if we try to account for the regime type of the already developed countries, we will see that in the vast majority it is democratic. But on the other hand, this theory cannot explain the miracles of Singapore or China, countries which score high on development indices but rather low on democratic ones. The second possible theoretical pattern is referred to as *institutionalization*. It was first mentioned by Huntington (Huntington: 1968) who argued that “non-democratic regimes evolve to democracy under economic growth” through a process of creating well operating institutions. The above process may not be a peaceful one, since it usually entails societal disorder or military coups. Therefore there are examples of countries like Taiwan which experienced high growth rates, without having to suffer from political decay or coups. Another possibility on the democracy – development debate dictates that economic growth cannot lead to democracy (Mosquita and Dones: 2005). Mosquita and Dones propose that there is no causality between the processes of economic development and democratization. The fourth argument on the controversy over development and the regime type, was proposed by Siegle, Weinstein and Halperin (Siegle, Weinstein and Halperin: 2004 , 2005), according to which development will be one of the positive side-effects of establishing a democratic regime. More specifically, they suggest that promoting democracy

is one of the vital foundation layers on which development will be able to flourish. But this proposition cannot explain once again the miracles of either China or Taiwan where development and democratic regimes are proven incompatible. Last but not least and in accordance with the skeptical view mentioned earlier, there is the argument proposed by Przeworski and Limongi (Przeworski and Limongi: 1993), according to which the impact of regime type does not have a significant effect on economic growth. Different regime types affect the most prominent patterns of growth like the protection of property rights, investment or public consumption in different ways. The heterogeneity reaches such a degree that the overall result cannot be anything but inconclusive. The same argument can also be found in the paper by Seligson (Seligson: 2003).

2.2.2 Empirical Evidence on the relationship between Democracy and Economic Performance

The political economy aspect of economic growth became quite popular among researchers in the last years, especially after the contradicting signs that were emitted from different countries around the world. Among them, there were those which had established a democratic government but failed to maintain high development rates (Italy, Luxembourg etc.) as opposed to those which achieved above average growth rates but with a less democratic regime (China, Taiwan etc.). As a result, the belief that there could be a trade - off between political democracy and economic growth started to gain ground in the literature and needed to be tested empirically. However, although there is a great deal of work and interest on the subject, few studies have actually produced robust and conclusive results. The spectrum of possible outcomes ranges from either positive or negative but insignificant effects of a democratic regime on growth, to no relationship at all. Intermediate outcomes may be considered the significant effects, no matter whether they consider growth and political democracy being complementary or not. Finally –apart from the linear relationship- the respective literature is enhanced by paper that finds a non-linear relationship between regime type and economic development.

Before presenting the most prominent papers for each result mentioned in the literature, it would be advisable to mention what are considered the main arguments explaining the variety of outcomes. A thorough report was made by Sirowy and Inkeles (Sirowy and Inkeles: 1990), which we are going to adopt in the following. The first reason explaining the heterogeneity of the results is the *model specification*. More specifically, although the usefulness regarding the inclusion of control variables in the model borders on unanimity, the specific set to be incorporated is hardly ever the same. The fact that some of them such as initial GDP per capita or investment availability should be included in the model so that the effect of regime variables can be identified easier is common sense, but there exists great heterogeneity on the composition of this set. Moreover, each one of the studies applies the model on a different group of countries, thus creating heterogeneity regarding the structural conditions of the research units. Different kind of results should be expected when the same model is applied generally on both developed and developing countries, since their characteristics vary greatly. The above becomes even more acute, if one takes into account the heterogeneity among developing countries, with some of them being on their early stages of development and some

others being close to entering the group of developed ones. Another reason that can partly explain the variety of the results is the time period examined. Economic development is not only an internal matter and depends on the relationships (political and economic ones) with the rest of the world. But different time periods are associated with different global conditions (general environment of development or austerity) that can influence the growth trajectory especially for the least developed countries. A very interesting analysis regarding the effect of the time period chosen on the relationship between democracy and growth is carried out by Jonathan Kriekhaus (Kriekhaus: 2004). He uses cross-sectional regressions on different time periods to find out that the same institutional variables⁷ used to proxy for a democratic regime have initially –during the 1960’s- a negative effect on development. During the next century, the same variables are far from significant, while in the 1980’s all of them turn out to be positive and significant at various levels.

Finally there is the subject of the measures used to account for the regime type. We can hardly expect a high degree of homogeneity here, since there is no consensus as to whether democracy is a point or a period estimate, with each kind having major advantages over the other as well as serious drawbacks. A great deal of surveys (Adelman and Morris: 1967, Feierabend and Feierabend: 1972, Russett and Monsen: 1975, Marsh: 1979, Meyer et al: 1979) have applied point estimates for the regime type, while a significant number of papers (Dick: 1974, Huntington and Dominguez: 1975, Kohli: 1986) have used period estimates. Last but not least, the operationalization of democracy is a very important factor. The results are expected to depend heavily on whether a single scale with numerical ratings is created (Jones and Olken: 2005) or discrete values are attributed to every different regime type through a dummy variable methodology (Scully: 1988, 1992).

Among the studies reviewed by Sirowy and Inkeles, together with more recent papers found in the respective branch of the literature, Jones and Olken, Barro (Barro: 1991), as well as Scully belong in the group that have actually succeeded in finding conclusive evidence that a democratic regime is conducive to economic development. All of them defined democracy as the presence and protection of civil and economic rights, rather than a free, multiparty competition for the ascend into governmental positions. Specifically, Jones and Olken use a direct index for democratization⁸ in an OLS regression to find that democratic regimes have a positive contribution to overall growth. Moreover, in the work of Barro, democracy is proxied by political stability, with the incorporation of two variables in the model, one for revolutions and one for assassinations. As a result one could argue that Barro tests an *indirect* effect of democracy on growth, via a general environment of political and social stability. Nevertheless both variables were found to have a negative and significant effect on economic growth. A spectacular result is provided in the papers by Gerald Scully. In his study of 115 countries, not only does he find a significant positive effect of politically open societies, with respect to the rule of law, private property and market allocation of resources on economic development,

⁷ The author uses the Bollen index, Polity IV measures, the Freedom House index as well as the ACLP index. The latter was originally created by Alvarez, Cheibub, Limongi and Przeworski (Alvarez, Cheibub, Limongi and Przeworski: 2000).

⁸ In order to proxy for the regime type, they use the “polity” variable from the Polity IV dataset. Values below zero are attributed to autocracies, while positive ones are attributed to democracies.

but he concludes that such societies grow at almost three times faster than the rest. In addition to this, the above conditions have a positive effect on the efficient allocation of resources, thus contributing to the positive indirect effects of an open and democratic political environment on economic development.

As already stated, the notion of democracy can also be defined as the free, multiparty process in order to ascend to positions of power, something done in a significant number of papers. Although the two definitions are surely not identical, the implications depend more on the way the overall notion is operationalized, rather than defined. The above definition was used by Heliwell (Heliwell: 1994), Alesina et al (Alesina et al: 1994) and Rodrik and Wacziarg (Rodrik and Wacziarg: 2004) all of which attempted to find the consequences of a democratic government on economic development. Heliwell uses OLS and IV regressions in a set of almost 90 countries to test the effect of a democratic regime (proxied by the Bollen index) on economic growth. The coefficient that he comes up with maybe negative, but it is also insignificant. Towards the same direction, Alesina et al (1991) use a Simultaneous Equations Model for a sample of 39 countries in which they control for democracy by accounting for political stability. The latter is addressed by inserting two variables, one for constitutional changes and one for assassinations. Dependent on the model output, the authors finally conclude that: “democracies do not appear to show a different growth path than non-democracies.”

Another research that also contributed to the general idea that market conditions matter more for growth than institutional ones was carried out by Rodrik and Wacziarg, although their methodology was different from their predecessors. They used panel data analysis and dummy variables to test initially for democratic transitions and then for two types of democracy, a new one and an established one, both of them proxied by the Polity IV variables. The difference between them is the time horizon. Specifically, the dummy variable for *new democracy* takes the value of 1 for a period of 5 years after transition, while the dummy for *established democracy* continues to enter the model with the value of 1 until interrupted by another regime change. Their results point to the direction of no effect of democratization on economic growth, since the coefficients both for the new and the established democracy are not significantly different than zero. However we should mention that when the model is enhanced by dummies that control for other regime types (i.e. towards autocracy), then the coefficient for new democracy turns out to be positive and significant, revealing the implication that –under certain circumstances- a democratic transition can have positive short – run effects.

Entering once again the spectrum of significant results, we find the works of Marsh (Marsh: 1979) and Weede (Weede: 1983) with their similarities as well as differences. First of all, both of them find negative association between democracy and economic growth, providing evidence for the point of view that democratic regimes and development can only happen at the expense of each other. A comparison between them reveals that the survey conducted by Marsh ended in the early 1970's for a sample of 80 countries, all belonging to the group of least developed ones, while the one carried out by Weede expands the dataset up to the early 1980's, but for a smaller sample of 50 economies, both developed and developing

ones. The major substance that the above two surveys have in common, is the way they choose to operationalize the notion of political democracy. Both of them use the Bollen⁹ index in cross-country regressions, only to find out significant negative effects of democracy on growth.

Even a short review of the literature would be incomplete without mentioning the most prominent papers that failed to report any significant relationship between democratic regime and growth. In that part, we first find the work of Feierabend and Feierabend, followed by the papers from Meyer et al (1979) as well as that of Kohli (1986). The fact that all the above find no significant relationship is probably one of the few things they share. There are significant differences not only in the number of countries used in the dataset (Kohli uses only 10, while the rest of the authors use approximately 80 economies) but also in the composition of the sample (Feierabend and Feierabend as well as Meyer et al use both developed and developing countries, while Kohli uses only least developed ones.) More importantly, the models used are differentiated in the way each author attempts to proxy for a democratic regime. While in the first two papers the authors employ quantitative measures, Kohli uses a qualitative one. Specifically, Feierabend and Feierabend use an index of regime coerciveness and Meyer et al apply two indices, one of political representation and one of political participation¹⁰. On the other hand, Kohli uses a dichotomous variable with distinct values for two types of regimes, democracy and autocracy.

Finally and not in exact accordance with the above mentioned papers we come across a specific branch of the literature initiated by the work of Barro (Barro: 1997) who has found a hump – shaped relationship between regime type and economic growth. In order to account for democracy, he uses a linear relationship between lagged values of democracy and a set of control variables¹¹. When the variable that controls for democracy enters the final panel data model, some unexpected results are obtained. For a low degree of political liberties, democracy seems to be beneficial for growth (positive and significant coefficient), but when a certain point in political and social freedom is surpassed, then the coefficient for democracy turns out to be negative. If we denote the turning point as a “semi democratic” regime, then we can understand what Barro means with the following words: “semi democratic regimes have higher economic growth than both dictatorial and more democratic regimes.”

2.3 Democratic regime and Institutions:

2.3.1: Theoretical background

In the process of finalizing the framework of this thesis, the last relationship that needs to be accounted for is the one between forms of governance and institutional quality. On one side there is the overall regime type and on the other the political and economic institutions.

⁹ The Bollen index takes into account: political liberties, the right for free and fair elections, as well as freedom of the media.

¹⁰ Meyer et al apply: Cutright’s Formal Political Representation Index and Adelman and Moriss’ Index of political Participation.

¹¹ In the set of control variables, Barro uses several indications regarding the standard of living, the log of real per capita GDP, the log of life expectancy and measures of educational attainment.

The final term encompasses a wide variety of legal entities for the macroeconomic stabilization, the protection of property rights, regulatory as well as social insurance ones, institutions for conflict management etc. For adequately defining *democracy*, we will once again rely on Dani Rodrik¹², since he is pioneer in using the term “meta-institution” when referring to the regime type. This is the crucial point that brings the above definition closer to our analysis. As will be explained in more detail in the methodology part¹³, we also attempt to model democracy as a kind of general or “meta-” institution which has an effect on the other political and economic ones before the latter shape the path towards economic growth.

A visual representation of the above would include the following figure (Fig: 5), which in conjunction with figures 2 and 4 constitute the diagram presented on the first page. As already pointed out, that diagram depicts not only the major axes of our framework, but also the relationships that we attempt to model in what follows on this thesis.



Fig 5 : Relationship between Democracy and Institutional Quality

It should also be mentioned that as is the case in all the major relationships accounted for till now, this one does not stand by itself. Both the two counterparts are members of a greater and more complex system which also includes economic growth as well as interrelations facing the opposite way than the one presented on figure 1. Specifically, regarding the above case, not only democracy affects the type of institutions to emerge, but also the standard of institutional quality is bound to have a significant effect on a country’s type of governance. The same argument is also expressed by Wafa Ghardallou (Ghardallou: 2011) using the following words : “The quality of democracy seems to be shaped by institutions that govern the economy: rule of law and property rights will restrain government action and thus reduce government domination.” This becomes clear if we take into account the wide aspect of social and economic interactions that are outlined and regulated by the political and economic institutions at stake here. But presenting a model in which all interrelations are thoroughly accounted for (Fig. 6), exceeds by far the intentions of this thesis. Moreover, in the ongoing trade – off between simplicity and generalizability of the results, we tend to incline towards simplicity since this is the only way that can conclude into lucid and robust policy prescriptions.

However, keeping in mind that neither democracy nor institutions are homogeneous concepts, several issues arise regarding how the interrelation among them can be modelled.

¹² As was explained in the first attempt to define the term of *democracy* on this thesis (p. 10), Rodrik uses the following term: “We can think of democratic regimes as the meta-institutions that build good institutions” (Rodrik: 2000 p. 3)

¹³ In Section 4 there will be extended explanation as to how we attempt to model the institutional variables, which entails the application of a certain time order of the lags regarding the instruments used, so that the intended cause and effect relationship is realized.

These concerns include -among others- the possible ways of operationalization or the availability of enough longitudinal data in order to model the time frame of cause and effect, issues that partly explain the lack of empirical evidence on the debate between governance types and the building of efficient institutions.

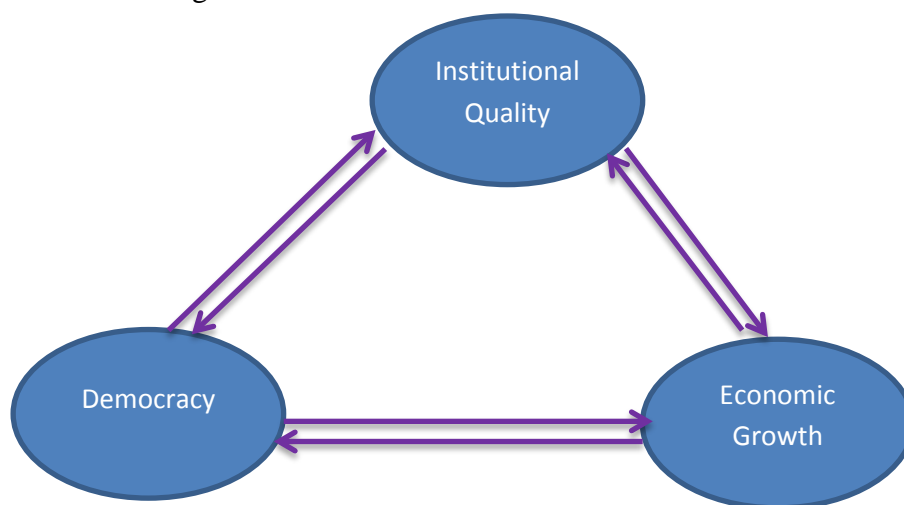


Fig 6 : Complete system of interrelations between: Democracy, Institutional Quality and Economic Growth

The focus of attention in the theoretical literature though is confined into two main aspects. First of all, the necessary preconditions on behalf of governance types in order for the process of institutionalization to be effective and secondly on the possible paths through which the respective type of governance can determine the type of institutions to evolve.

In providing insight for the first subject, we rely on the work by Andreas Schedler (Schedler: 1995), who defines institutions as “*shared patterns of expectation (regarding the prevalent rules of interaction.)*” In other words, institutions are the rules that delineate the general conditions which nobody expects to change each time they interact. It is easily understood from the above that stability in the long run leads to credibility, a necessary requirement for the whole framework to operate sufficiently. Moreover, we should never overlook the fact that institutions are the legal entities that lead agents into the turbulent sea of social and economic interactions with rationality being their compass. Inadequate functioning on behalf of institutions is bound to have adverse and probably catastrophic effects on the crucial process of decision making.

Following Schedler on a rough presentation of the prerequisites of democratic agents, we can distinguish three different categories. At first, institutional reformers should have *proper incentives*. In a second degree, a well - functioning institutional environment can never be created without *moral integrity* on behalf of those suggesting it and finally *material viability* is the last precondition, since without it, even the best institution is bound to gradually die out. By proper incentives, the author means the general principle on which institutions should obey to. These legal entities are created and reformed in order to give a stable environment for everyone, so that certain limitations of the political and economic sphere (like uncertainty for instance) can be surpassed. This is what governance agents should have in mind and not how

to pursue personal goals or targeting towards “punishing” the former regime for their actions. The latter brings us to the second prerequisite, that of moral integrity. The argument for this can be summarized in the type of institutions that evolve when their instigators lack that quality. In that case, the negative effects are double, both stable and dynamic ones. The stable negative effect is the fact that a weak institutional environment is created, so neither in the political nor in the economic interactions do agents have a benchmark point to guide their behavior. But the indirect, dynamic effect is even more detrimental, if one takes into consideration that the weaker the newly created institutions are, the weaker they are bound to be in the future, since they rarely possess the mechanisms for self – purification. In other words, malfunctioning of the institutional framework creates a vicious circle that is doomed to get worse. Finally, material viability is also a necessary precondition, since even the best type of institution created from the best possible incentives will finally succumb to requests from individual groups in order to obtain the necessary funds to maintain their self-preservation.

All the above may seem rather philosophical, straightforward and kind of less relevant to our analysis, but they stem from the fact that although democracy maybe impersonal, positions of power and authority are occupied by humans, with all their imperfections. As a result the preconditions for the implementation of a sound environment for political and economic interactions should not be taken for granted and this is the main reason we took the liberty of making a quick reference, depending on the work by Andreas Schedler.

As far as the second issue is concerned, Dani Rodrik (Rodrik: 1999) makes an extensive reference to the possible ways that institutions can evolve in a developing economy. In what follows we attempt to present the main aspects that Rodrik identifies as crucial. In general, there are two main ways that can shape a country’s institutional environment, each one having their own advantages and drawbacks. At first there is *experimentation* and secondly there is the possibility of *transferring blueprints* from an advanced economy.

Experimentation is actually a bottom – down approach, which involves a local perspective in the evolution of institutions. Policy makers attempt to extract all the necessary information from the local “players of the game” and use it in order to develop the efficiency of economic interactions. The significance of a democratic regime lies in the fact that in such a participatory regime where agents can express themselves and their demands from government officials in a free manner, the information disseminated in the system is by far greater than the respective in an autocratic government. Put differently, in participatory governments there is greater chance that people’s requests will be taken into account. Another straightforward advantage of the above method is the fact that information regarding the specific economy is used, so each decision made is actually tailored to the prevailing circumstances in the respective country. On the other hand, such an approach is bound to require a lot of time and effort. Given the fact that institutional evolution is crucial especially for developing countries, for which it is important to take quick decisions, the bottom – down approach may be rejected. It may also be the case that local government authorities lack the necessary expertise to make the right choices, since the evolution of a properly functioning institutional framework requires extensive knowledge on a variety of political and economic areas.

In contrast, transferring blueprints from an advanced economy or from a worldwide organization like the IMF, is a top – down approach. According to this scenario, foreign technocrats or experts assess the situation in the country that calls for their assistance and make suggestions. The intuition stemming from this line of reasoning is that a general plan is created after careful consideration of all the possible implications by a group of well-renowned experts, that is bound to work in every environment. It is easily understood that – even under this scenario- a democratic local government can be a very important catalyst, not only because democracies are usually more foreign – oriented and so they can attract more experts, but also because even the best plan imported is in direct need of all the available country-specific information and cooperation of the local authorities. Although this approach is quite popular among developing countries that seek to build a sound institutional environment in the fastest possible way, the main drawbacks are summarized in the fact that – at first- less local, hands – on experience is used and secondly nobody can be absolutely certain about the motives of the foreign experts. This may also be true about local authorities, but we should not forget that the latter had to express their motives and political agenda in order to be elected. In turn, this is another significant advantage of democracy, no matter which of the two scenarios is ultimately followed.

To sum up this section of the theoretical background, we may state that there is no conclusive evidence as to which of the above two scenarios is more efficient and yields the quickest results. We tend to agree with the view expressed by D. Rodrik, who finds himself eager to adopt the *experimentalism* process. The reason behind this is that we too believe in the usefulness of the economy – specific information. To analyze this a bit more, we should point out that we share the view that it is better even in ethical manner to instigate local agents in such an important process as that of institution building, rather than employ foreign experts. Nevertheless, both scenarios were implemented in a series of countries throughout the last decades, with mixed results. For instance, there are countries that exhibited successful evolution of institutions following local experimentation (i.e. China), as well as others which succeeded by employing foreign experts (i.e. South Korea). What is highly important to remember is that in the main argument that differentiates the two perspectives (the use of economy – specific information), both democracies and autocracies can be almost equally successful, since as Rodrik points out: “Nothing prevents authoritarian regimes from using local knowledge; the trouble is that nothing compels them to do so either.”

2.3.2 Empirical Evidence on the relationship between Democracy and Institutional Quality

An inspection of the empirical literature on the effect that a democratic regime can have on the quality of institutions reveals a critical issue. For reasons explained later on, rarely do we find papers that model the exact relationship between democratic governance and the quality of political and economic institutions. Instead, there is plenty of research on the effects of democracy on growth *controlling* for institutional quality, something which is not in exact accordance to our research questions. In order to come as close as possible and provide useful

insight on our analysis, we attempt to present the most prominent papers that model the effect of democracy on indirect issues of growth, like the variance of the growth rates.

Before emphasizing on aspects of the literature that are related to our framework, it is our duty to present the basic arguments behind the lack of empirical literature on the effect of democracy on quality of institutions. Our first argument originates from the fact that both notions are highly heterogeneous. Not only democracy but also institutions can be used to convey several meanings. For instance there is not only one type of democratic government, not at least a few. Differences between them (parliamentary vs presidential or centralized vs decentralized) can be really small and distinction really hard to make. Similarly, there are many different kinds of institutions that cover a broad aspect of social interactions. Even if we limit our interest in the political and economic ones, we still come up with a highly differentiated set. The above problem becomes more acute if we take into consideration that even if we are able to conceptualize the dissimilarities involved, what actually needs to be done is the find the right way of quantifying them. The variety of possible indicators is so extensive that every result could be contested on the grounds of the indicators used to proxy for democracy and institutions.

In addition to the previous, nobody should overlook that the process of building and preserving a well - functioning institutional environment not only requires investment in time and effort, but also the payoffs will make themselves visible considerably after the investment is carried out. This is especially true for developing countries with a low degree of institutionalization, where payoffs maybe significant but also time consuming. In turn, the above has a direct adverse effect on data availability since not only does a researcher need to work with panel data for better comparisons, but also the dataset has to be as extensive as possible in order to capture initially the effect of democracy on institutions and at a second stage the effect of the altered institutional quality to economic development. Taking also into account the lack of data regarding some institutional indicators for developing countries, we can understand the reasons for limited research in comparison with other –partly similar- aspects of the theoretical literature.

One branch of the theoretical literature that is in close relationship with our research questions and more importantly there is enough empirical evidence to support the respective results, is the one referring to the effect of democratic governance on the quality of growth. Detailed analysis on the above subject is carried out by Rodrik (Rodrik: 1999) who emphasizes on the following four different dimensions of the notion “higher quality growth”:

- i. Predictability in long – run growth rates
- ii. Stability in short – run growth
- iii. Handling of adverse external shocks
- iv. Income distribution

In order to test the predictability of growth rates, the author uses two different samples (one for autocracies and one for democracies) and firstly attempts to identify the growth rates. The cross – national regression results show no statistical difference in growth rates between the two groups of economies. Nevertheless, the issue of importance to our analysis comes

when Rodrik models democracy on one hand (proxied by the Freedom House Index of political rights and civil liberties) and the variation of growth rates on the other. What Rodrik finds out can be summarized with the phrase “beneficial effects of participatory systems of governance”, since in both the cases of conditional and unconditional¹⁴ regressions, the coefficients of variation are significantly smaller in democratic regimes.

As far as short – run stability is concerned, Rodrik uses data from the Penn World Table on real GDP, real consumption and investment. In a first stage, he identifies a measure for volatility (standard deviation of the above measures) and secondly he applies this measure on regressions, including among other control variables an index of political participation. Output from the previous model points toward the usefulness -with respect to economic growth- of democratic transitions, since movements from autocracies to more participatory regimes were found to produce lower volatility in the growth rates of real GDP, real consumption and investment.

The third of the above aspects that characterizes “higher quality growth” is according to Rodrik the resilience in external economic shocks. History has shown that periodically a wide variety of countries is negatively affected by world economic conditions (oil crisis 1973, energy crisis 1973, economic crisis 2008). But what is at stake, is how each country responds to such shocks. The theoretical idea that Rodrik wants to test empirically is that adjustment to shocks tends to be worse in economies with poor institutional environment, specifically in terms of conflict management. Once again, regression analysis is employed between changes in growth rates due to adverse external shocks and measures of institutions for conflict management, (like the ethno-linguistic fragmentation). The idea behind this rationale is that the better the institutional performance through wider social participation, the less fragmented a society will be. Coefficients were found to be significant, pointing to the conclusion that more political freedom and participation is a step towards the right direction in dissipating the negative internal impact of world crises. This is also the conclusion if we take into account that countries with less participatory regimes (i.e. Syria, Algeria, Panama) handled external shocks in a far worse manner than economies with participatory forms of governance (i.e. India, Botswana, Costa Rica etc.)

Finally, the quality of economic development can be measured by the distribution of income. Rodrik does so in a double manner. Firstly he attempts to find the effect of broader political participation in the wages of the manufacturing sector. Both cross-country and within country regressions show that more participatory regimes are associated with greater wages, when we control for labor productivity, income levels and other economic variables. More importantly, the above results can be broadened to cover the economy as a whole. The inclusion of the Gini¹⁵ coefficient in the above regressions so that the notion of *inequality* can

¹⁴ The difference between the conditional and the unconditional regressions, is that in the latter, there are no control variables used, while in the former, the regression contains variables which attempt to control for various growth factors. The control variables used are: Initial GDP per capita, secondary school enrollment ratio as well as regional dummies for Latin America, East Asia and Sub-Saharan Africa.

¹⁵ The Gini coefficient is a statistical measure intended to measure the distribution of income among a country's residents. It has a range from 0 (point of perfect equality) to 1 (which designates maximal inequality). Source: Wikipedia.

be appropriately operationalized, reveals the positive effect of democracy on income distribution, since the corresponding coefficients are negative and significant.

All the above can corroborate a positive effect of democracy on economic development, not only quantitatively, but also qualitatively. However, if we want to bring Rodrik's pioneering analysis closer to ours, we need to make an extra assumption. The measures used in all the four cases (predictability, stability, external shock dissipation and income distribution) are assumed to heavily depend on the institutional environment. This extra assumption is the crucial one which indicates how institutions are affected by a democratic – or in this case more participatory- regime and then in turn impact significantly the quality of growth, or using the words of Rodrik himself: “the complementary effects that render the economic system sustainable”.

SECTION II : FACTOR ANALYSIS

3. Factor Analysis

3.1 Introduction

3.1.1 Theoretical Background

It is well known that the democratic as well as the institutional environment cover a wide aspect of possible definitions. In other words, they are multidimensional constructs, with numerous ways of quantifying them. As a result, it is virtually impossible to determine a conclusive and robust to all contests way of identifying such notions. This problem has become even more acute in recent years due to the abundance of political indicators, the vast majority of which can be relevant with either democracy or other political institutions under differentiated contexts. On the other hand, we cannot turn our back to this abundance of useful data and use single variables to characterize the above constructs on the shrine of easier interpretable results, since this would entail discarding useful information from our model.

A frequently used solution to the trade – off between the bulk of data used on the one side and the easier handling of them as well as the proper interpretation of the results on the other, is provided by a statistical procedure called *factor analysis*. Following Lattin et al. (Lattin et al.: 2003) factor analysis “is a method for re-expressing multivariate data.” The fundamental idea behind this process is that the first few dimensions (or latent variables) are constructed in such a way to account for as much of the available information as possible. This is successfully carried out by identifying the patterns of association between the initial variables (or items). Therefore we are able to express the greatest part of the total variance with a significant reduction in the dataset, making our lives a lot easier not only in handling the data, but also in interpreting the results.

3.1.2 Mechanics

The intuition underlying factor analysis is to find a linear combination of the initial variables that can explain the maximum possible amount of variation. By applying this method, we attempt to split the variance that each of the initial items incorporates into two distinct parts: The common part, accounted for by the factors on which the items *load* and the unique part, which is the variance of the error term. To be more specific, in the following page we present a diagram of factor analysis for 15 original variables which are assumed to load on three factors (Fig.: 7). As we can see, the variance of each of the initial items (Ω_i) can be expressed as a linear function of the variance of the common factors (F_i) (common part) plus a unique variance (v_i) which is specific to each item. The straight lines from the factors to the items are called *factor loadings* and represent the proportion which each factor contributes to the variance of the original variable. Each factor (also called *latent variable*¹⁶)

¹⁶ They are called *latent variables*, because in this method, as opposed to others like confirmatory factor analysis, the factors do not pre-exist, but they are inferred through the mathematical model from the initial variables which are observed and directly measured.

has its' own variance (denoted as: v_i), while in the case the factors are allowed to covary¹⁷, these covariances are marked as: $c_{i,j}$

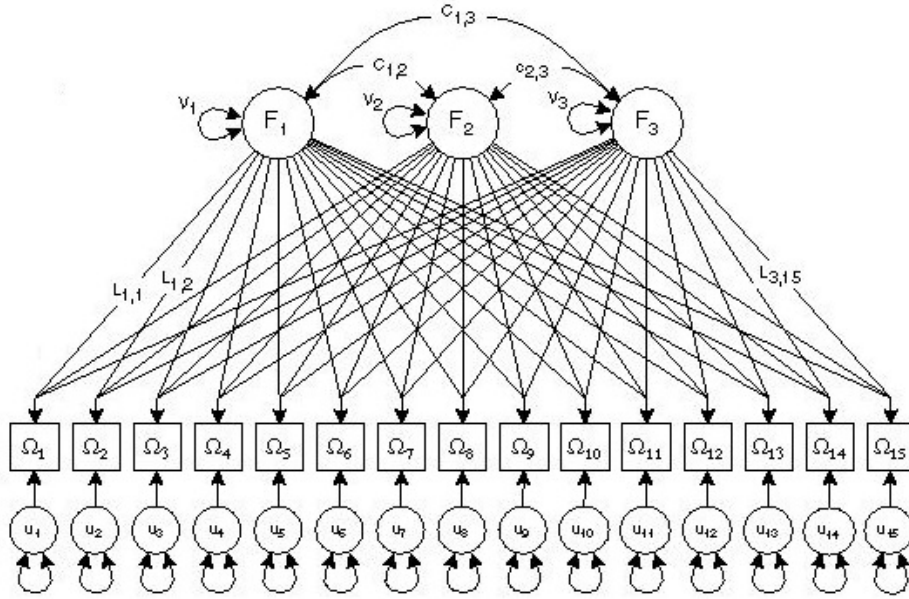


Fig 7: Schematic Representation of a 3 Factor and 15 Variable model

We also attempt to present the above intuition on vector notation, following Bai and Ng (Bai and Ng: 2006). Although it may seem more appropriate to use the dynamic factor analysis, our model employs the static framework, since changes in the latent variables within the dataset are not taken into account. The reason for doing so lies in the interpretation of our factors. They represent aspects of democratic and institutional environment, which –in the 22 years of our dataset- are not supposed to alter significantly.

In a factor model, each case can be represented as:

$$x_{it} = \lambda_i'(L)f_t + e_{it} \quad (1)$$

Where: x_{it} is the set of the initial indicators

$\lambda_i(L)$ are the factor loadings or the correlations between the items and the latent (unobserved) variables, with: $\lambda_i(L) = (1 - \lambda_{i1}L - \lambda_{i12}L^2 - \dots - \lambda_{is}L^s)$

f_t is the vector of the factors

In a dynamic model the, factors would evolve according to the formula:

$$f_t = C(L)\varepsilon_t \quad (2) \quad \text{with: } \varepsilon_t \sim iid$$

From (1) and (2) we can derive the following: $x_{it} = \lambda_i'(L)C(L)\varepsilon_t + e_{it}$

¹⁷ Further details on the preconditions for covariation between the latent variables are given in the: **Rotation** part of the analysis.

From the last formula it is easy to understand that the information (or variance) contained on each item constitutes of two parts, as already mentioned, one common and one unique. The common part: $Var[\lambda_i'(L)C(L)]$ is the part explained by the common factors, while the unique is $Var(e_{it}) = \sigma_{it}^2$ the variance of the error term. Regarding e_{it} , we make the additional assumption that it is uncorrelated with the latent variables, while it is correlated with its' own past terms, according to:

$$e_{it} = \rho e_{it-1} + v_{it}$$

Number of factors: One additional issue that needs to be resolved is related to the number of possible factors to be retained. The main argument is that this depends heavily on any a – priori ideas that the researcher may have considering the structure of the data or the research questions that need to be tested. Nevertheless, given the fact that any such ideas can be highly subjective, there also exist objective criteria on the number of latent variables to keep. Following once again Latin et al. (2003), the two main criteria are *Kaiser's rule* and the *scree plot*. The former is also known as the eigenvalue criterion and dictates that the factors to be retained are those with eigenvalues exceeding unity, since those explain a sufficiently large amount of the overall variance. The latter criterion employs the scree plot (a graphical representation of the eigenvalues of all factors in descending order) and requires from the researcher to find the *inflexion* point (the point after which the eigenvalues decline in an almost linear way, also known as *elbow* point). The number of factors to be retained is one less than the point of inflexion.

Rotation: As a final point in factor analysis, we choose to return to the beginning and remember that one of the advantages of this method is the easier interpretation of the results. It may be the case however that with the factors retained and the items loading on each one, the interpretation is difficult. In other words, the picture of the items loading on the latent variables may be far from clear. In such cases, factor analysis provides the useful solution of *rotation*. When rotating the factors, there can be two distinct options. Firstly, there is the orthogonal rotation where factors are perpendicular to each other, with the intuition being that they are also uncorrelated. The second possibility is that of non-orthogonal, or *oblique* rotation. When making use of this process, the angle between the factors is changed, so that factors are no longer perpendicular. This can provide a more straightforward picture of the items loading on the new variables. After a non – orthogonal rotation we expect for each unique item a high loading to one factor and small ones to all the others. However this clear picture comes only with the cost that we allow the latent variables to be correlated, something with the serious implication of multicollinearity, in case factors are at a later stage used in a regression analysis model. Nevertheless in our case we are going to employ oblimin rotation because the latent variables are constructed to represent various aspects of the institutional environment, which are indeed expected to correlate with each other.

3.1.3 Data

In an attempt to come up with appropriate indicators for the two major pillars of our framework, *democracy* and *institutional environment*, we perform factor analysis on a series of relevant indicators. In a final dataset consisting of 60 countries (Appendix: D) and 22

yearly observations for each one (the dataset starts from 1984 and finishes in 2006), the heterogeneity of the data resulted in some missing values for some of the initial items. From either discarding the indicators with the missing values or finding a way to compute the observations, we chose the second and applied *EM algorithm* to do so. The above method was proposed by Dempster et al. (Dempster et al.: 1997) in order to compute maximum likelihood estimates from incomplete data and consists of two steps. The first step, known as the *expectation* one, involves the construction of a log – likelihood function for the complete dataset, with respect to the unknown data given the observed values. In the second, the *maximization* step, EM algorithm maximizes the function constructed previously and through this process, the missing values are obtained.

Factor analysis is a statistical procedure for reducing the dataset based primarily on the correlations between the original variables. This is the main criterion behind the construction of the latent variables. However, in our case a significant issue arises. The initial indicators used are taken from various datasets, not only for the case of democracy, but also for the institutional environment (Databanks International, ICRG, Heritage Foundation, Freedom House etc.). Therefore, even though we may have had a good idea of what we needed to model for, the initial correlations were in some cases so low that there was no way of preconceiving the output of factor analysis. In other words, we could not prejudge the exact aspects of democracy or institutions that would be represented by the newly obtained factors. In any case, our intention was to incorporate indicators that covered a broad aspect of social and economic life.

As far as democracy is concerned, the first notion we tried to include was the type of regime and the way the effective executive is elected. Towards that purpose, we used items like the following: *Regime Type*, *Type of Effective Executive*, *Selection of Effective Executive* and the *Polity* index, which cover broad aspects of democracy versus autocracy. Being interested in the proper functioning of the regime with respect to public acceptance, we also incorporated the following indicators: *Legislative Effectiveness*, *Parliamentary Responsibility* and *Democratic Accountability*. Moreover, we were interested in controlling for the general environment of freedom that people experience in their everyday lives and this is the reason behind the inclusion of indicators regarding the absence of military intervention (*Military in Politics*), media freedom (*Freedom of the Press*) or the ability to express oneself freely (*Freedom of Assembly and Association*, *Freedom of Religion*). Another aspect we would like to incorporate in our model is the existence of internal crises (*Internal Conflict*, *Assassinations*, *Government Crises*, *Guerrilla Warfare* indicators) and how the general population may respond to those (*Strikes*, *Purges*, *Riots*, *Revolutions*, *Coups*, *Constitutional Changes*).

Regarding the institutional environment, we chose to make our task relatively easier, since –keeping in mind the target of parsimony- we only used 8 indicators. What we attempted in this case is to present items controlling for the general economic environment (*Business*, *Monetary*, *Investment*, *Trade and Financial Freedom*) as well as items referring to the self – preservation of the whole system (*Labor Market Regulations*, *Control of Corruption*, *Investment Profile*). We believe that self-preservation can be attained when the behavior of

counterparts is limited by a set of straightforward regulations and the enforcement of such rules is unobstructed by external pressure or internal corruption.

An extensive presentation of the indicators used in accounting for democracy and institutional quality can be found on Appendices A and B, however a short list of them is given in the tables of the next page (Tables: 1 and 2 respectively), together with their sources:

Democratic Quality	
Type of Regime	Databanks International (2005)
Type of Effective Executive	Databanks International (2005)
Selection of Effective Executive	Databanks International (2005)
Degree of Parliamentary Responsibility	Databanks International (2005)
Legislative Effectiveness	Databanks International (2005)
Legislative Selection	Databanks International (2005)
Assassinations	Databanks International (2005)
General Strikes	Databanks International (2005)
Guerrilla Warfare	Databanks International (2005)
Government Crises	Databanks International (2005)
Purges	Databanks International (2005)
Riots	Databanks International (2005)
Revolutions	Databanks International (2005)
Coups D'Etat	Databanks International (2005)
Major Constitutional Changes	Databanks International (2005)
Military in Politics	International Country Risk Guide (2005)
Democratic Accountability	International Country Risk Guide (2005)
Internal Conflict	International Country Risk Guide (2005)
Polity Index	Polity IV project
Freedom of the Press	Freedom House
Freedom of Assembly and Association	CIRI – Human Rights Data Project
Freedom of Religion	CIRI – Human Rights Data Project

Table 1: Indicators used for Democratic Quality and their sources

Institutional Environment	
Business Freedom	Heritage Foundation
Monetary Freedom	Heritage Foundation
Trade Freedom	Heritage Foundation
Investment Freedom	Heritage Foundation
Financial Freedom	Heritage Foundation
Control of Corruption	International Country Risk Guide
Investment Profile	International Country Risk Guide
Labor Market Regulations	The Fraser Institute

Table 2: Indicators used for Institutional Environment and their sources

3.2 Results

3.2.1 Democratic Quality

Before presenting the results of the factor analysis¹⁸, it would be meaningful to make a quick reference to the assumptions behind this process, since this in turn will determine to a great extent the robustness of the results. First of all, our observations are way more than the minimum amount of 300 ($1340 \gg 300$) and we have no reason to doubt their dependency. In addition to this, the adequacy of the sample needs to be tested. The main measure to perform this, is the Kaiser – Meyer – Olkin (KMO) index. The calculation of such an index yields an overall value of 0.8316, which is greater than the lowest value of acceptance (0.6), so we can conclude that our data is suitable for running factor analysis.

An inspection of the correlation matrix among the original indicators (Table: 3), reveals that many of the correlations between the items are outside the usual limits (smaller than 0.3 and greater than 0.7). Therefore we can deduce that those indicators are not perfect measures of the notion they are being used to account for.

One of the most important issues to decide upon when conducting factor analysis, is the number of factors to retain. According to Kaisers' eigenvalue criterion, we should employ a model with 6 factors, since those are with eigenvalues exceeding unity. Judging by the screeplot though (Fig.: 8), we could decrease the number of factors by one, since the point of inflexion is at factor 6, so the factors to be retained would be five.

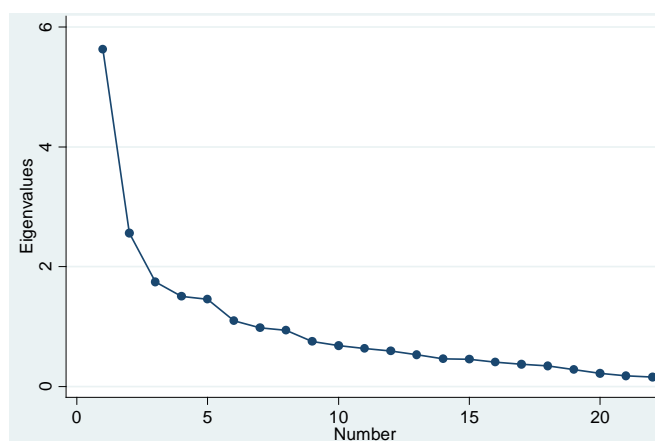


Fig. 8: Screeplot of the factors regarding democratic quality

Nevertheless, we follow the eigenvalue criterion and choose to model democracy by six latent variables. For these six new variables, we ask Stata to provide the scores using the Bartlett method in order to obtain unbiased estimates. As expected, the first one accounts for the greatest part of the explained variance and we anticipate to find that the most indicators will be loading on this factor. Since we conducted an oblimin rotation, we cannot add the proportion of variance that is explained by each of the new variables, so we are unable to present how much variance of the initial variables is accounted for by the new model. Another implication of the oblimin rotation is that in our final model, we will have to test for

¹⁸ For an extensive presentation with the output from Stata, the reader should consult Appendix: E

multicollinearity, since we allowed our independent institutional variables to correlate with each other.

In what follows, we first present the loadings matrix¹⁹ for the rotated solution (Table: 4). This will help us decide which items load on which factor the most and that will be our main criterion in giving names to the new variables. But before doing so, we need to make a reference to the unique variance of each variable, or the variance that is not shared by any other variable in the model. This is shown in the last column of the table below and as we can see, there is no variable with really high item-specific variance. Note that items with high specific variance are considered to have less relevance with the rest of the model. In our case, the items: *crises* and *purges* have the highest values (0.7555 and 0.7077 respectively), but none of these values are worrisome.

As a next step, the above six variables are extracted in order to be incorporated later on in our final model, so we need to know what each one of them stands for. The best possible way of doing that, is by giving them appropriate names. Towards this, we should keep in mind what was mentioned in the introductory part of factor analysis. One of the fundamental assumptions of this procedure is that the first latent variable is constructed in such a way to account for the maximum possible amount of variance in the model. As a result, it is only expected not only that the most items will load on that specific factor, but those items will probably be the ones carrying the general idea of the whole dataset. From what we can infer from the above table (Table: 4), the items loading on the first latent variable are those which control for a general democratic environment with social liberties (*Polity 2, Freedom of the Press, Freedom of Assembly and Association, Freedom of Religion and Military in Politics*) as well as the degree of the regimes' responsiveness (*Legislative Effectiveness and Democratic Accountability*). Proceeding to the next factor, it is obvious that the variables which load on that one are less in number and far more targeted. Specifically this latent variable captures information referring to community's opposition towards governmental activities (*Assassinations, Guerrilla Warfare, Revolutions and Internal Conflict*). A similar more or less picture stands for the fourth factor, which accounts for a heated social environment, since the items that load on this one are: *Strikes, Crises, Purges and Riots*. An intuitive result of this, is the positive correlation that we expect between the second and the fourth factor.

Returning to the third latent variable, we can observe that the items that mainly constitute it (*Type and Selection of Effective Executive, Parliamentary Responsibility*) are closely connected to a type of governance, on which rising to positions of authority does not depend on elections, but remaining to them depends on vote of confidence. Finally, the last two factors account for relatively less amount of information. Depending on the items that load on the fifth latent variable (*Type of Regime and Legislative Selection*), we can deduce that this factor accounts for a civilian regime based on a voting process by a broad electorate. It may be closely related to the first factor, but their main difference lies in the depth of the democratic notion that both capture. The first factor goes in far more depth and controls for many more aspects of a democratic government than the fifth one. As far as the last one, an

¹⁹ The factor loadings matrix presents the correlations between the initial variables and the factors extracted.

Regime Type	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Type of Eff. Executive	1.0000										
Selection of Eff. Executive	-0.0856	1.0000									
Parliamentary Responsibility	0.0113	0.5219	1.0000								
Legislative Effectiveness	-0.1830	0.4172	0.3838	1.0000							
Legislative Selection	-0.2447	0.3820	0.0592	0.4805	1.0000						
Freedom of the Press	-0.4401	0.0700	0.0461	0.1098	0.2075	1.0000					
Freedom of Assembly and Association	0.0970	-0.3957	-0.1820	-0.4572	-0.6612	0.0062	1.0000				
Freedom of Religion	-0.1665	0.1106	-0.1151	0.2249	0.5147	0.0976	-0.5712	1.0000			
Assassinations	-0.1386	0.1662	-0.0621	0.1984	0.5801	0.0279	-0.5941	0.5326	1.0000		
Strikes	-0.0273	-0.1326	-0.2295	-0.1738	0.0008	0.0087	0.1446	0.0351	0.0276	1.0000	
Guerrilla Warfare	0.0095	-0.1224	-0.0422	-0.1344	-0.0837	-0.0740	0.0717	0.0231	-0.1201	0.0710	1.0000
Crises	0.0484	-0.0953	-0.1411	-0.1268	0.0162	-0.0250	0.1627	0.0097	-0.0083	0.5096	0.1236
Purges	-0.0552	-0.0276	-0.0771	0.0102	0.0395	0.0331	0.0716	0.0203	-0.0208	0.1005	0.1638
Riots	0.0105	0.0323	0.1075	-0.0861	-0.1776	-0.0560	0.1313	-0.1398	-0.1383	-0.0397	0.2553
Revolutions	0.0189	-0.1307	0.0361	-0.1047	-0.1687	-0.0250	0.1109	-0.0959	-0.1958	0.0452	0.5394
Coups D'Etat	0.0187	-0.1299	-0.1904	-0.1832	-0.0575	0.0139	0.1795	-0.0004	-0.0491	0.3675	0.0241
Constitutional Changes	0.1066	0.0040	0.0853	-0.0320	-0.0636	-0.1094	0.0432	-0.0302	-0.0010	0.0011	-0.0163
Polity 2	0.0156	-0.1054	0.0014	-0.0758	-0.1425	-0.0335	0.1052	-0.0533	-0.0612	0.0010	0.2073
Military in Politics	-0.1845	0.2874	-0.0509	0.4577	0.8041	0.0994	-0.6963	0.5291	0.6036	0.0316	-0.0953
Democratic Accountability	-0.3254	0.3633	0.2052	0.5023	0.5421	0.1999	-0.5483	0.3822	0.3898	-0.2077	-0.1935
Internal Conflict	-0.1859	0.3254	0.1554	0.4100	0.5715	0.1130	-0.7222	0.5704	0.4435	-0.1293	-0.0542
	-0.2094	0.3165	0.2241	0.3202	0.2191	0.1668	-0.4043	0.2416	0.1936	-0.3496	-0.1836

	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
Guerrilla Warfare	1.0000										
Crises	0.1089	1.0000									
Purges	-0.0319	0.1150	1.0000								
Riots	0.0977	0.1394	0.1289	1.0000							
Revolutions	0.5077	0.1304	0.0228	0.0092	1.0000						
Coups D'Etat	0.0220	0.0126	-0.0082	-0.0156	0.1048	1.0000					
Constitutional Changes	-0.4508	0.0083	0.0753	0.2130	0.0339	0.1474	1.0000				
Polity 2	0.0341	0.0933	-0.2045	-0.1618	-0.0170	-0.0630	-0.1245	1.0000			
Military in Politics	-0.3211	-0.1051	-0.1357	-0.1903	-0.2906	-0.0974	-0.1138	0.4882	1.0000		
Democratic Accountability	-0.1898	-0.0948	-0.1015	-0.0941	-0.1403	-0.0616	-0.0957	0.6026	0.6226	1.0000	
Internal Conflict	-0.5042	-0.1530	0.0493	-0.2021	-0.3193	-0.0754	-0.0375	0.1623	0.6901	0.5050	1.0000

Table 3: Correlation matrix of the Initial Democratic Indicators

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Uniqueness
Regime Type	-0.0254	0.0124	0.0611	-0.0396	-0.8267	0.0020	0.3154
Type of Eff. Executive	0.1789	0.0842	0.7841	-0.0623	-0.0286	-0.0088	0.3138
Selection of Eff. Executive	-0.1633	-0.0434	0.8852	0.0395	-0.0452	0.1223	0.2485
Parliamentary Responsibility	0.3442	-0.0107	0.5497	-0.0242	0.0802	-0.0181	0.4342
Legislative Effectiveness	0.8064	0.1576	0.1341	-0.0133	0.0895	-0.0591	0.2432
Legislative Selection	-0.1391	0.0430	0.0020	-0.0713	0.8537	-0.0135	0.3153
Freedom of the Press	-0.8653	0.1336	-0.1332	-0.0667	0.1895	-0.0047	0.2010
Freedom of Assembly and Association	0.8525	0.0021	-0.2569	0.1092	0.0063	0.0532	0.3424
Freedom of Religion	0.8103	0.0330	-0.1773	-0.0661	-0.0915	0.0699	0.3935
Assassinations	0.0890	0.6992	-0.0883	-0.0195	0.1210	0.0016	0.4881
Strikes	0.1305	0.0206	-0.0576	0.8609	-0.0517	0.0190	0.2751
Guerrilla Warfare	0.0774	0.8737	0.1026	0.0217	-0.0037	-0.0241	0.2912
Crises	0.0670	0.2928	0.0777	0.3545	0.1126	-0.1430	0.7555
Purges	-0.2042	-0.0674	0.2255	0.4395	-0.0025	-0.0715	0.7077
Riots	-0.0089	0.0071	0.0180	0.7860	0.0051	0.0480	0.3750
Revolutions	-0.0031	0.7263	0.0176	-0.0834	0.1271	0.1823	0.4610
Coups D' Etat	0.0013	0.1565	0.2004	-0.1296	-0.1085	0.7833	0.3375
Constitutional Changes	-0.0193	-0.1161	-0.0870	0.3310	0.1261	0.6830	0.3873
Polity 2	0.9176	0.1683	0.0000	0.0090	-0.0256	-0.0569	0.1886
Military in Politics	0.4755	-0.3754	0.1262	-0.1018	0.2503	-0.0207	0.2799
Democratic Accountability	0.7505	-0.2127	0.0658	0.0770	0.0166	0.0223	0.3156
Internal Conflict	0.1754	-0.6391	0.0907	-0.0917	0.2196	0.0356	0.3290

Table 4: Rotated Factor Loadings matrix for Democratic Indicators

inspection of the items that load highly on it (*Coups D' Etat* and *Major Constitutional Changes*) makes the interpretation relatively easy, since it is obvious that it is strongly connected to constitutional changes, either peaceful ones or not.

To summarize the above, taking into account not only the loadings from the above matrix (values in bold indicate the factor on which each item loads the most) but also the scale of each variable²⁰, we came up with the definitions presented in the table below:

Factor	Variables that load high on the respective factor	Interpretation of the factor	Variable Name
Factor 1	1. Legislative Effectiveness (+) 2. Freedom of the press (-) 3. Freedom of Assembly and Association (+) 4. Freedom of Religion (+) 5. Polity 2 (+) 6. Military in Politics (+) 7. Democratic Accountability (+)	Democratic and highly responsive regime, where basic civil liberties are protected and the military has very low participation in the political procedures. Generally, this factor describes a stable and democratic environment.	<i>Stable Democracy</i>
Factor 2	1. Assassinations (+) 2. Guerrilla Warfare (+) 3. Revolutions (+) 4. Internal Conflict (-)	Opposition to the regime by independent groups of civilians. General environment of revolt.	<i>Revolutionary Acts</i>

²⁰ For an extensive reference, consult Appendices A & B.

Factor 3	1. Effective Executive (Type) (+) 2. Effective Executive (Selection) (+) 3. Parliamentary Responsibility (+)	A type of military regime where the effective assumes position not by elections, but is dependent on vote of confidence by the parliament.	<i>Constitutional Monarchy</i>
Factor 4	1. Strikes (+) 2. Crises (+) 3. Purges (+) 4. Riots (+)	Opposition to the regime by the general population together with the government's response.	<i>Political and Social Upheaval</i>
Factor 5	1. Type of Regime (-) 2. Legislative Selection (+)	A civilian regime elected by popular vote	<i>Civilian Regime based on Elections</i>
Factor 6	1. Coups D'Etat (+) 2. Major Constitutional changes (+)	A change in the delegation of power within the state's authorities.	<i>Constitutional Reform</i>

Table 5: Interpretation of the extracted factors controlling for Democratic Quality

3.2.2 Institutional Environment

Following the path of the previous factor analysis, our first task will be to make sure the fundamental assumptions for employing the process, actually hold. Asking STATA for an estimate of the Kaiser – Meyer – Olkin measure of sample adequacy, a value of 0.8386 is returned, which is highly acceptable. Moreover, an inspection of the correlation matrix (Table: 6) reveals a situation significantly better than the one we came across in the democracy indicators. Although there may be some value below the lower limit of 0.3, pinpointing some relatively low correlations among the initial variables, the vast majority of them is within the acceptable limits. The above are enough to erase any possible suspicions about whether factor analysis is suitable or not.

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Business Freedom	(1)	1.0000							
Monetary Freedom	(2)	0.0551	1.0000						
Trade Freedom	(3)	0.2609	0.2440	1.0000					
Investment Freedom	(4)	0.2710	0.6014	0.3258	1.0000				
Financial Freedom	(5)	0.3129	0.3897	0.3863	0.5110	1.0000			
Control of Corruption	(6)	0.0006	0.4996	0.2659	0.5711	0.4108	1.0000		
Investment Profile	(7)	0.1362	0.4683	0.3612	0.6742	0.5280	0.5392	1.0000	
Labor Market Regulations	(8)	0.2919	0.4867	0.3294	0.6371	0.4869	0.5222	0.7310	1.0000

Table 6: Correlation Matrix of the Institutional Variables

As far as the number of factors that can explain sufficiently explain the greatest part of the variance of the above variables is concerned, the two main criteria seem to point to different directions. If we take into account Kaiser's criterion and we retain all the factors with an eigenvalue that exceeds unity, then we would have a model with two latent variables. On the other hand, the screeplot (Fig.: 9) seems a little bit inconclusive. As we can see, the point of inflexion can be on either factor 3 (so a two factor model would seem appropriate) or on factor 2 (pointing at an one-factor model). Keeping in mind that modelling for institutional environment with only one latent variable would probable constitute an over – generalization, we choose to follow the two – factor model.

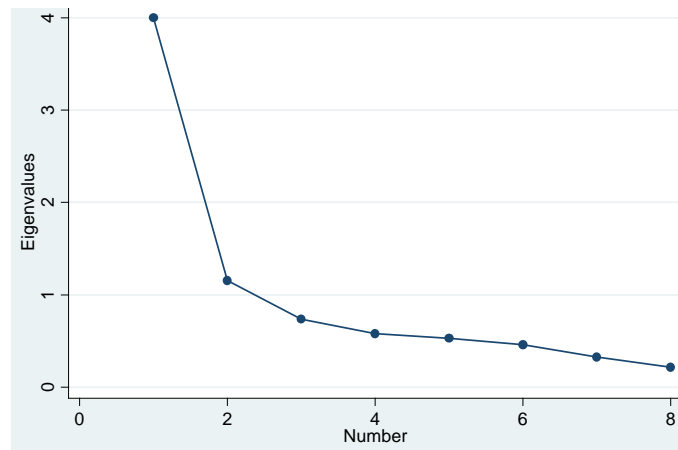


Fig. 9: Screeplot of the factors modelling for Institutional Environment

Although due to the oblimin rotation we chose, so that our results are more straightforward, we cannot add the percentage of variance explained by the two latent variables, we should mention that the first factor explains nearly twice as much variance as the second and this is the reason between the great difference between their respective eigenvalues.

Having decided on the number of factors to retain, a proper interpretation of them is necessary. Towards this, we consult the factor loadings matrix (Table: 7) on which we have marked the factor on which each separate item loads.

	Factor 1	Factor 2	Uniqueness
Business Freedom	0.8141	0.0943	0.2745
Monetary Freedom	0.5237	0.3888	0.4317
Trade Freedom	0.8635	-0.2525	0.3437
Investment Freedom	0.8262	0.0446	0.2896
Financial Freedom	0.7518	0.1718	0.3147
Control of Corruption	0.8135	-0.1975	0.4120
Investment Profile	0.2554	0.5267	0.5629
Labor Market Regulations	-0.1562	0.9265	0.2188

Table 7: Rotated Factor Loadings matrix

As we can see from the above table, the unique variance of all the items is quite low, so there are no issues as to the relevance between the initial variables and the final model. As long as there is great discrepancy among the eigenvalues of the two extracted factors, we expect that most of the items will load on the first one. This is indeed the case, since six (*Business, Monetary, Trade, Investment, Financial Freedom and Control of Corruption*) out of the eight initial variables load on: factor one. Taking into account that all the items are positively correlated with the new latent variable, the extracted factor conveys the meaning of a liberalized institutional environment for carrying out business transactions with very low state participation. The situation described is one outlined by firm government regulations with little but efficient participation from the banking system, leading to a stable macroeconomic environment for interactions between firms as well as between firms and the government. On the other hand, the second latent variable has only two items loading on it (*Investment Profile and Labor Market Regulations*). As easily understood, this factor is

related mostly to the microeconomic conditions rather than the macroeconomic ones. Specifically, it is related to the existence of a reservoir of unemployed, from which the employers can choose the potential employees with the latter having no option for collective bargaining of either wages or any other employee prerogatives. In order to find a proper name, we choose to use the phrase “liberalized microeconomic environment” to characterize this factor.

The above can be summarized in the following table (Table: 8), for which we have taken into account not only the loadings matrix, but also the exact interpretation of the initial variables, presented in Appendix B.

Factor	Variables that load high on the respective factor	Interpretation of the sign	Interpretation of the factor
Factor 1	1. Control of corruption (+) 2. Business Freedom (+) 3. Monetary Freedom (+) 4. Trade Freedom (+) 5. Investment Profile (+) 6. Financial Freedom (+)	1. Low linkages between political and economic environment 2. Efficient government regulations towards businesses 3. Stable economic environment (low inflation) and very few price control measures 4. Free trade environment 5. Low risk of expropriation, repatriation of profits or delay of payments 6. Efficient banking system with low state participation	Efficient, stable and liberalised institutional economic environment in many sectors (investment, trade etc.) with very low state participation.
Factor 2	1. Labour freedom (+) 2. Investment Freedom	1. i. Low difficulty of hiring ii. Employers flexibly determine firing and hiring practices iii. No centralized bargaining process iv. Less rigid work rules v. Low cost of dismissal vi. Smaller periods of conscription 2. Existence of basic infrastructure and relatively free inflow and outflow of capital	Liberalised institutional environment regarding the relationship between employers and employees.

Finalizing this section, the two latent variables are associated to their scores using the Bartlett method (so that we do not worry about efficiency) and are thus ready to be incorporated in the final model where they will be the proxies for the institutional environment on which transactions take place.

SECTION III – DYNAMIC PANEL DATA ANALYSIS

4. Methodology

4.1 Introduction:

A proper understanding of the framework we are attempting to model reveals its' dynamic nature. On one side there is the variable measuring economic development and on the other a set of institutional ones that are bound to change over time. The relationships and interactions among them can be so perplexed so that a simple cross-sectional context would be inadequate in modelling the exact way of causality. In such a case, panel data methodology would appear as a plausible solution. Apart from the main advantages of panel data (i.e. ability to test dynamic hypotheses, modelling short and long – term effects etc.), the main reason for this is that –even in a static context- we are able to treat issues like *unobserved heterogeneity*, that is the variation of parameters across individuals.

However, a static panel data model would fail to convey all the implications that our model proposes. Another condition that needs to be taken into account is the exact way of causality between our variables. Although our intention is to find the direct and indirect effects of democratic quality and institutional environment on economic growth, we cannot disregard the fact that all the above variables are indispensable parts of a more general framework, on which interactions can go either way. This in turn can create endogeneity issues, since economic growth can be the source of higher democratic and institutional quality. In order for the above to be incorporated in our model, we resort to dynamic panel data methodology. One of the main differences between the static and the dynamic framework lies in the inclusion of lagged dependent and institutional variables as instruments. That way, the experimenter can, as Garza et al.(Garza et al.: 2011) point out: “unravel new relationships between experimental variables and highlight new paths in behaviours.” In our case, the inclusion of lagged variables as instruments, is necessary to apply the proper time order of cause and effect. The exact way we attempt to perform this will be explained after the presentation of the model, something in which we proceed right away.

4.2 Model

In presenting the model, the first notion that has to be operationalized is that of economic development. There are no universally agreed sets of characteristics that should be incorporated on a measure for development and at the same time there are many aspects of growth one can take into consideration. As a result, a certain heterogeneity of economic measures used at times (total income, industrialization, income per capita, variation of income etc.) should be expected. On this thesis we employ *income per capita* to be our dependent variable. The reason behind that is not just because it is the one most often used, but its' double nature. First of all, the variation of income per capita is not that great in comparison with other measures of economic development, so changes in our dependent variable can be more directly attributed to the changes in our set of independents. Secondly, by using this indicator, we are able to provide a scent of social justice without incorporating a second index,

like the Gini coefficient. It is obvious that this measure of income dispersion is not perfect, but we feel we could not proxy for economic development without making even a subtle reference to how the outcome of this process is divided among society members.

We estimate the following dynamic panel data model, in which we incorporate lagged variables as instruments to correct for endogeneity issues. In presenting the model, we follow once again the pioneering work of Garza et al. The initial regression equation between income per capita and the set of independent variables, is presented below:

$$y_{it} = \gamma y_{i,t-1} + x'_{i,t-1} \beta + \mu Dem_{i,t-j} + \lambda Inst_{i,t-j} + a_i + v_{it} \quad (1)$$

Where: y_{it} is the income per capita indicator, x_i is the vector of the control variables, Dem_i is the set of institutional variables controlling for democratic quality and $Inst_i$ is the group of variables that monitor the quality and functioning of institutional environment. In addition to these, a_i gives the fixed individual effects and finally v_{it} is the error term with zero mean and constant variance

Since it would be helpful to be able to interpret the coefficients of the control variables (β 's) as elasticities, we choose to create a double-log model, by applying logarithms on our dependent variable as well as on the set of control variables. Thus, equation (1) is transformed into:

$$\ln y_{it} = \gamma \ln y_{i,t-1} + \ln x'_{i,t-1} \beta + \mu Dem_{i,t-j} + \lambda Inst_{i,t-j} + a_i + v_{it} \quad (2)$$

In the above context, y_{it} is correlated with a_i , making both OLS and GLS estimators biased and inconsistent. In order to remove the individual effects, we use the first difference transformation. This is also necessary since we are interested in rates of change and not in variables in levels:

$$\Delta \ln y_{it} = (\gamma - 1) \ln y_{i,t-1} + \ln x'_{i,t-1} \beta + \mu Dem_{i,t-j} + \lambda Inst_{i,t-j} + \Delta v_{it} \quad (3)$$

However, the model in eq. (3) suffers from endogeneity. This is because $\Delta \ln y_{it}$ is correlated with Δv_{it} . In order to overcome this problem, Arrelano and Bond (Arrelano and Bond: 1991) proposed a GMM framework that uses all possible instruments. This is possible by exploiting the orthogonality between lagged values of the dependent variable and the error term. The estimators that we come across are called *Difference GMM* estimators. Nevertheless, the above framework is still incomplete. We need to make an extra assumption regarding our institutional indicators. As already been stated in the factor analysis results, our institutional variables are assumed not to change in time, at least significantly. Their invariance should be taken into account in the model specification. This leads us to an alternative method, initially proposed by Blundell and Bond (Blundell and Bond: 1998), who –apart from the equation in first differences- also used the initial equation (in levels) to create additional instruments for $y_{i,t-1}$, using the difference: $\Delta y_{i,t-1}$. The estimators obtained this way are called *System GMM* estimators and according to Blundell and Bond, they behave in a more preferable way than *Difference GMM* estimators. Their main advantage is that they allow for the incorporation of time-invariant variables as regressors. On the other hand, the disadvantage of this process is the usage of many more instruments, something that raises

questions regarding their joint validity. Therefore, if we want to be certain about the validity of our instruments, we should refer to the Sargan test of overidentifying restrictions and to the test for first and second order of residual autocorrelation.

The vector x_{it} contains the control variables we chose to include in our model. The incorporation of such variables in a model like the above is a necessity, since we need to be as accurate as possible in what we model for. More specifically, when we attempt to investigate the effects of institutional environment on economic development we should control for alternative sources of economic growth. Only if we exclude other well – known sources of growth can we be positive that the source of growth we found can actually be attributed to the institutional environment. A possible way of achieving that is the incorporation of a complete set of control variables in the model specification. In other words, this is a proper way of minimizing what is commonly known as “omitted variable bias”.

Regarding the specific variables to enter the above set, our criteria were as simple as possible. We relied firstly upon our intuition as to which economic variables can possibly have a significant effect on economic development and secondly on an inspection of the respective literature. The latter criterion revealed a large set of control variables proposed in a number of papers, but data limitations for the countries and the specific time period of our model, directed us towards the inclusion of the ones presented in Appendix C. In what follows, we attempt to point out the intuition behind the incorporation of each one of them, as well as the expected sign, based on the existing literature.

The first group of control variables can be categorized under the broad name: *Demographics*. It contains variables that are concerned with population growth, life expectancy, fertility rate as well as enrolment in secondary school. As far as the first three are concerned, we believe that there is close connection between them, since higher life expectancy or fertility rate, directly contribute to higher population growth. The basic intuition behind the incorporation of these variables lies in the fact that the higher the growth rate of the population, the lower the amount of capital per worker. Given the fact that – according to enhanced Solow model- capital accumulation is the source of economic development, positive population change can lead to decline in the overall growth rates. Nevertheless, neoclassical school of thought brings the analysis to a further step, arguing that less capital per worker (with respect to long-run capital per worker) is bound to exert a positive effect on growth rates, due to higher rates of return. But this is in direct relationship with the acceptance of the *convergence hypothesis*, a crucial notion for our model in which we will return a little later. An inspection of the empirical evidence, based on the prominent work of Levine and Renelt (Levine and Renelt: 1992), reveals no conclusive evidence, since population growth enters the regressions on economic development with various signs, dependent on the exact model specification.

As for secondary school enrolment, our intuition is in accordance with the empirical findings. Both criteria underline the positive effect of school enrolment on development rates. The idea is that increased rates of school enrolment will lead to higher human capital accumulation, which in turn can be treated as a determinant of development. The above

rationale is actually corroborated by the outcomes of growth models. Both Levine and Renelt as well as Barro (Barro: 1991) countersign the positive indirect returns of education by finding positive and significant effects of school enrolment on growth rates.

The second major category of control variables are the *macroeconomic* ones, which include inflation rate, trade openness, government consumption, level of domestic credit and gross fixed investment. Their significance lies in the fact that these are the outcomes of direct or indirect macroeconomic policies, thus they can be manipulated according to the beliefs of the policy makers.

We embark on our comments on the variables of this category, by *inflation*. We believe that countries with high inflation rates will experience lower pace of growth. The reason behind that lies in the negative effects of inflation not only on the absolute rate of development, but also on its' variation. Given the fact that greater variance is a negative aspect in an economy, since it reduces the feeling of general stability, higher inflation rates can be detrimental in a twofold way to a country's trajectory towards growth. The above seems to be the conclusion of Levine and Renelt, who conclude that "countries with lower inflation rate, tend to grow faster."

Levine and Renelt also provide the necessary empirical evidence on the next variable we employ, namely *gross fixed investment* as a share of GDP. We expect a positive effect of investment on overall growth through the channel of capital accumulation, something consistent not only with the findings of the above researchers, but also in accordance with a great number of studies. The same rationale applies also in the case of *trade openness*, the next of the control variables we choose to include in our model. Openness to trade is bound to create more production activities, since any country can exploit the chances of a possible relative advantage in production, thus boosting the respective economic sectors. This positive effect on the overall GDP per capita is pinpointed also in the robust findings of Levine and Renelt.

Continuing on the macroeconomic control variables, we employ *government consumption*, which we consider to have negative effect on growth rates. Higher spending on behalf of the government has negative influence on the budget balance, usually resulting in budget deficits. With proper investment policies, government spending can be a positive aspect of the overall economy in the long run, but at least in the short – run, we expect to find a negative effect on economic development. The above is not what Levine and Renelt conclude in their paper, since the negative coefficient that accompanies government consumption is not always significant, resulting in overall inconclusive evidence. Closely connected to fiscal policy is the next indicator we use, specifically *domestic credit* as a share of GDP. Although our rationale dictated that –since credit contributes to budget deficits- a high domestic credit will exert negative influence to economic growth, we cannot disregard the recent survey by I. Banu (Banu:2013) which makes the crucial distinction between credit given to private sector and credit for public administration. This paper concludes that the first category has a positive effect on overall growth, possibly because of the investment nature it

has. On the other hand, credit allocated to public administration is usually spent on public consumption, with negative effects on the economy's development rates.

In addition to the previous, we also incorporate *agricultural sector* share in the economy as one of our control variables. It is of vital importance, since most underdeveloped economies seem to rely mainly on that part of the economy. Taking into account that the respective sector is considered to have lower productivity²¹ with respect to other, more "modern" ones, we believe that economies which depend heavily on agriculture will experience slower growth rate than industrialized ones. Empirical proof regarding the above case is provided by the *Peterson Institute for International Economics*, which proves that a movement of workforce from agriculture to the rest of the formal economy has beneficial effects to the overall growth rates.

Finally, we make use of *initial GDP per capita* as one of the fundamental control variables, so that we are also able to test the *conditional convergence hypothesis*. The latter is known to economists from the basic Solow model and dictates that the greater the distance between the initial per capita GDP and the steady state level of per capita GDP, the higher will the economy's growth rate be. According to the above, we expect a negative sign on the respective coefficient. The conditional convergence hypothesis is already tested on a number of papers. We choose to follow the works of both Levine and Renelt, as well as Barro who find robust evidence to support our fundamental idea expressed above.

²¹ The reasons for that lie in the fact that not only application of modern techniques is slow in the agriculture but also in the fact that returns usually have a more gradual pace than in other sectors.

5. Results

5.1 Estimation Results

We employed a dynamic panel data model to investigate the direct and indirect effects of various regime and institutional variables on economic development, for which the results are presented on Table 9²². At first we estimated a model without including the interaction effects, that is only with the control and institutional variables we extracted from factor analysis (Model I). At a second stage, we also incorporated the interaction effects among the political and economic institutions (Model II) and attempted to come up with the practical relevance for each indicator that enters the model significantly.

Before talking in detail about the significance of specific variables, or providing the economic intuition of the respective signs, we should test the consistency of the whole model. As explained in the methodology part, we are using system GMM estimators, with lagged variables as instruments. Here lies a significant issue of the whole model, which is the application of the correct time frame. The use of panel data allows us to go back in history and control the ways of interaction between the different sets of variables. Specifically, we choose to employ earlier instruments for our control variables in comparison to the ones we use for the institutional indicators. This results in the control variables influencing the institutional ones and not vice versa. In turn, the already affected latent variables exert their power in the growth rate of GDP per capita, which is our dependent variable.

Returning to the issue of consistency for the model as a whole, we ask Stata to carry out the two step analysis, so that we can perform the validity tests, even though the provided standard errors might be somewhat biased. The first way we choose to test the validity of our estimators is the Sargan-Hansen test of over-identifying restrictions. This test assumes that the instruments used in the regression are created via a priori restrictions on the model parameters and tests the validity of these restrictions. From what we can see in Table 9, for both the *reduced*²³ and the *full* model, the obtained p-values are such that the null hypothesis of valid restrictions cannot be rejected in all levels of significance.

Another test we need to carry out is related to the serial correlation of the error term. However, in order for the interpretation to be correct, we should bear in mind that our model is constructed in first differences, not in levels. So it would be only natural to expect some first order autocorrelation in our transformed model, something which is reflected in the results, since the p-values for AR(1) tests are almost equal to zero in both cases. Nevertheless, in order for our lagged variables to constitute valid instruments, we assumed no first order autocorrelation in the untransformed model. Due to our first – difference transformation, first order autocorrelation in the original model becomes second order autocorrelation in the transformed one. But while in the full model, the test concludes that there is no second order autocorrelation for every significance level, in the reduced one this is not the case.

²² It should be noted that the table in the main part of this thesis, presents only the significant variables. For a full presentation of the model, the reader should consult Appendix E, Section III.

²³ Hereafter, the *reduced* model will be the one without the interaction effects, while the *full* model will be the one with the interaction effects included.

Specifically the assumption of no first order autocorrelation in the untransformed model holds for $\alpha=5\%$ but not for $\alpha=10\%$. The implication behind this is that in the reduced model, we can be positive about the validity of the instruments only in the 5% significance level.

Finally, we should mention that because of multicollinearity in the estimation of the final model, not all sample countries were included. Six of them were dropped, decreasing the sample size to 54 countries and 734 observations as a whole.

Variables	Exp. Sign	Model I	Model II
<u>Control Variables</u>			
Initial GDP Per Capita	-	-0.0612 [-2.31]**	-0.1495 [-3.07]**
Gross Fixed Investment	+	-0.1908 [-3.02]**	-0.1765 [-3.49]**
Credit to GDP	-/+	-0.0766 [-2.89]**	
Government Consumption	-	-0.1427 [-2.12]**	
Fertility Rate	-	-0.3492 [3.13]**	
Inflation	-	0.0318 [4.12]**	
Secondary School Enrolment	+		0.1066 [1.96]**
<u>Regime Type Variables</u>			
Stable Democracy		-0.0616 [-2.31]**	
Revolutionary Activity		0.0282 [3.29]**	
Constitutional Monarchy		0.0501 [2.98]**	
Political and Social Upheaval		0.0373 [2.31]**	0.0616 [1.79]*
Basic Civilian Regime		0.0131 [1.84]*	
Constitutional Reform		-0.0197 [-2.55]**	
<u>Institutional Variables</u>			
Liberalised Economic Environment		0.0956 [4.51]**	
Stable Microeconomic Conditions		0.1218 [3.86]**	0.1057 [3.00]**

Indirect Effects

Stable Democracy * Liberalised Economic Environment		0.0936 [2.83]**
Constitutional Monarchy * Liberalised Economic Environment		-0.0693 [-1.74]*
Basic Civilian Regime * Liberalised Economic Environment		0.0810 [1.96]**
Stable Democracy * Stable Microeconomic Conditions		-0.0382 [-1.72]*
Constitutional Monarchy * Stable Microeconomic Conditions		0.0291 [1.79]*
Constitutional Reform * Stable Microeconomic Conditions		0.0561 [2.71]**
Number of Countries	54	54
Number of Observations	734	734
First Order Autocorrelation (AR(1)) p-value	0.000	0.001
Second Order Autocorrelation (AR(2)) p-value	0.084	0.172
Sargan – Hansen test of Overidentifying Restrictions p- value	0.147	0.132

*/** In the last two columns indicate significance in the 5% and 10% level respectively

Table 9: Regression Results

Having concluded about the validity of the model, our discussion of the results will be divided into three parts. The first will have to do with the set of control variables, while in the second we will refer to the regime type and economic institutions ones. The third part will be dedicated to the interaction effects, which are part only of the full model and how these may influence the process of economic development.

5.1.1 Control Variables

We begin commenting on the two control variables that enter both two models significantly. The first one is initial GDP per capita, which has a negative sign, in both the reduced and the full model, implying a negative relationship with our dependent variable. Intuitively –in our model formulation- this means that countries with a low level of initial wealth are supposed to grow faster than their already richer counterparts, thus providing evidence for the support of the conditional convergence hypothesis, as far as the speed of convergence is concerned. Our results for this specific variable are in line with Levine and Renelt as well as Barro, who also corroborate the conditional convergence hypothesis. Although the coefficient is significant in the same level in both models, the incorporation of the indirect effects in the full one makes the coefficient more than twice in absolute value

(0.0612 in the reduced model and 0.1495 in the full one), indicating that in a model with more information, the conditional convergence hypothesis is highlighted even more.

Our next control variable is that of gross fixed investment, where we experience our first inconsistency with our intuition and the majority of the published literature. We believe investment to influence economic development in a positive way. In contrast, we came up with a negative sign –and more or less with the same magnitude– in both our regression results. This comes in direct contradiction with Levine and Renelt, as well as Barro. One possible explanation may be attributed to data limitations, or the distribution of countries in our dataset. Specifically, out of the 54 different economies that constitute our dataset, 34 are the OECD members, so we could argue that the majority of our data is relevant to developed economies. Here may lie the reason for the difference between the sign we have found and the sign predicted by the respective literature. What we came across is possibly the within country effect, rather than the overall effect of credit. The latter is expected to be positive, since we are all aware of the beneficial effect of investment in the development rates. On the other hand, our sample is biased towards already developed economies, for which the above effects of investment have already made themselves visible. If there is a “turning point” after which investment loses its’ good qualities with respect to development, it is only expected that developed economies are closer to that point. Keeping all these in mind, it can be possible that due to the distribution of economies in our dataset, our model fails to corroborate the beneficial influence of investment to growth rates.

We continue our discussion regarding control variables that enter either of the two models significantly, with another variable for which our results are in opposition with our rationale. We refer to credit as a share of GDP, which is significant only in the reduced model. As far as this indicator is concerned, we have to make a distinction between credit provided to private sector and credit provided to public administration. Following I. Banu (Banu:2013), we can see that the first category has a positive effect on GDP per capita, while the second has a negative effect, something quite expected since credit allocated to the private sector is more directly oriented towards investment. Given the fact that our definition of credit corresponds to the first case, we expect a positive sign. Nevertheless, our results provide an intuition of negative influence on growth rates. Once again we resort to our specific dataset for a possible explanation. Although we anticipate positive effect of credit to development rates, it is only logical that the growth rate of this effect will be negative. The latter is explained by the fact that profitable investment possibilities are not infinite within the limits of a specific economy. So, in the case of developed countries –where a number of profitable investment plans are already being carried out– the provision of extra credit may lead the private sector to risky and ultimately non-profitable investment opportunities. The above has the power to change the overall effect of credit regarding development rates, especially in a dataset biased towards developed economies.

The following set of three variables also enters significantly only the reduced model and not the full one. Specifically, we refer to government consumption, fertility rate and inflation. All of them are found to influence growth rates in a negative way, which is in accordance both with what we anticipate and the respective literature. As far as government

consumption is concerned, we consider such expenditure as being counter-productive compared with investment expenditure, which is supposed to influence GDP positively. Regarding fertility rate, it is a factor that contributes positively to the increase of the total population. This in turn affects negatively the development rates, when the latter are measured by GDP per capita. Finally, inflation is a well-known disadvantage in modern economies (Levine and Renelt: 1992, Barro: 1991), something pointed also in our results, since we found a negative effect of the respective variable on the development process.

Our last control variable that has a significant influence on growth but only in the full model is that of secondary school enrolment. The positive sign that we found agrees with our rationale that school enrolment is a major determinant for building human capital and as such it can only influence growth positively. The significance of human capital for the development process was outlined from the early days of the augmented Solow growth model (Mankiw, Weil and Romer: 1992).

5.1.2 Institutional Variables – Direct Effects

We now turn to the regression results for the institutional variables, which are divided into two categories, the political and the economic ones. As far as the political ones are concerned, factor analysis came up with six latent variables, each one controlling for different aspects of the sociopolitical framework. Half of them –specifically *Stable Democracy*, *Basic Civilian Regime* and *Constitutional monarchy*- directly refer to forms of governance. It should be noted that all of them are significant in the reduced model, while none are in the full one. What may strike as odd though, is that the coefficient for stable democracy enters the model negatively, while the one referring to basic civilian regime seems to have a positive effect on development. The emergence of the negative sign is not counter-intuitive, since there is a whole branch in the literature explaining the possible negative effects of democracy on economic growth²⁴. On the other hand, the difference in the above two signs is indeed a matter worth investigating. The reason behind that may lie in the definition of the two latent variables. Stable democracy covers a lot more aspects of the social and political life in comparison with a fundamental civilian regime based on popular vote. As a result, a far more “strict” variable is created, with the possibility that negative aspects of democratic governance with respect to growth rates are brought into surface.

Regarding the third latent variable, constitutional monarchy is found to affect growth positively. Once again, this is not in direct opposition with our rationale, since lenient forms of dictatorship may still possess characteristics favorable to growth. We refer to constitutional monarchies being able to take necessary economic decisions in a faster way, without taking into account the direct political cost. When such decisions –irrespective of issues regarding bureaucracy or counteraction from certain social groups- are directed towards the promotion of economic development, a monarchy can be compatible with growth. However, we believe the explanation can be found on the structure of the dataset. More than half the countries are developing ones with considerable structural reforms in the period of the survey. Given that it

²⁴ As indicative papers, we refer to: Qureshi and Ahmed (2012), Comeau (2003) or Gupta et al (1998). For a more extensive reference, the reader should consult section 2.2.

is possible that we found proof for the assumption that structural transformations may take place in a quicker and more effective manner under a non-democratic regime. We should never forget though the fact that our definition of monarchy refers to a governance system where the executive assumes power based on elections. As a result, strict autocracies and prolonged military regimes that have abolished free and fair elections are not included in our definition of constitutional monarchy.

An interesting implication can be derived from the variable coefficients if we also take into account the form of the model. As we can see in the methodology part²⁵, our dependent variable is in logarithms, while the institutional ones are in levels. This constitutes a *semi-log* model, for which the coefficients represent the percentage change in the growth rates when the independent variables change by one unit. An inspection of table 9 reveals that the coefficient for *constitutional monarchy* is about 4 times greater than that of *basic civilian regime*, while *stable democracy* has a negative effect on growth rates, with the respective coefficient being the greater of all (0.0501, 0.0131 and -0.0616 respectively). These would have little significance if interpreted as point estimates, but it would be interesting to find out the implications of maintaining certain regimes for time periods such as a decade. From a similar point of view, due to the nature of our latent variables, it makes sense to try and find their long-term effects on growth rates. Being more specific it is only logical since, on one hand, institutional variables are considered difficult to change and on the other, their main disadvantage is that it takes time for any beneficial effects of investments on the institutional framework to emerge.

Towards this point, we attempt to simulate the effect on the growth rate for a country with a “normal” initial growth rate of 4% of a maintaining either a basic civilian regime or constitutional monarchy for a period of 10 years. A decade of a lenient form of an autocratic regime with constitutional limitations to the exertion of power would result in an overall growth rate of: $0.04(1+0.0501)^{10} = 0.04*1.6304 = 0.0652 \approx 6.52\%$ At the same time, a decade with the political environment being close to a democratic one would result in an overall change in the growth rate of: $0.04(1+0.0131)^{10} = 0.04*1.139 = 0.0456 \approx 4.56\%$. Finally, a stable democratic regime with the highly restrictive definition of our model would decrease the initial growth rate of 4% to nearly half in just a decade:

$$0.04(1-0.0616)^{10} = 0.04*0.5295 = 0.0211 \approx 2.11\%$$

The above underlies the superiority of constitutional monarchy with respect to democratic regimes as defined in our model. However, there is a dangerous trap regarding this implication. We should not disregard the fact that while a democratic regime is supposed to be maintained for great periods in time, this is not the case for autocracies, even lenient ones. Maintaining a constitutional monarchy for a decade or more, may loosen the limitations to the ruling party, resulting in corruption and people ultimately losing their confidence on the social, political and economic environment. Since confidence is a vital ingredient for smooth economic development, losing it is bound to have detrimental effects on growth rates, not captured by our model specification.

²⁵ P. 55, equation: 03

The remaining regime type latent variables all refer to different forms of heated social and political environment and enter only the reduced model significantly. They cover a wide spectrum of possible events, from revolution and anti-government protests to peaceful changes in the constitution as far as the delegation of power is concerned. Only one of them (i.e. *political and social upheaval*) enters significantly the full model and in the 10% significance level. To be more specific, *revolutionary activity*, which is directly related to conditions of revolt, seems to have a small but significant impact on growth. This does not necessarily constitute bad behavior on behalf of our model. It may be contradictory to our intuition that assassinations or guerrilla warfare may be beneficial to growth, since the previous create a sense of insecurity, usually detrimental for development. Our findings can be explained only in the case that economic life is absolutely separated from the political one. We understand that the above is a very rare occasion and again we refer to data limitations²⁶. Under these circumstances, the positive sign of *political and social upheaval* (in both models) seems even less surprising. In such cases of “softer” or more lenient government opposition, the uninterrupted functioning of the economic environment is unlikely but more possible. Moreover, in case we incorporate the indirect effects on our model, thus making it more realistic, we observe that the size of the coefficient almost doubles (0.0373 in comparison with 0.616), reinforcing our previous statement.

On the other hand, *constitutional reform* exerts negative influence on growth rates. An active change in the delegation of power seems to be too much of a shock for the economic world which contributes more to the sense of insecurity which affects negatively economic transactions. Constitutional reform always incorporates the possibility of a coup, with the negative effects on growth in such case, fully anticipated.

As far as the institutional variables that delineate the economic framework are concerned, both of them are significant in the reduced model, while only *stable microeconomic conditions* enter the full model. The above is more intra-firm oriented, since it mainly has to do with practices and interactions within the company (firing and hiring policies, labour rights etc.) Stability has a positive effect on development which is verified by the positive sign by which the variable enters both models. This effect seems to be more or less the same in the two contexts, since the absolute values of the coefficients are close enough (0.1218 and 0.1057 respectively). In addition to this, an efficient and with low state participation business environment is bound to affect growth in a positive way, something corroborated by the positive sign for our reduced model. The above relationship can also be pinpointed in many cases of the modern world that liberalization of the economic transactions led to an increase in growth rates (i.e. India and the four Asian tigers, Hong Kong, Singapore, South Korea and Taiwan).

²⁶ In the countries for which institutional data were enough to enter the dataset, the African nations –where there exist several cases of severe civil conflict together with a decline in the growth rates- are underrepresented.

5.1.3 Institutional Variables – Indirect Effects

The interaction between the regime type and the economic institutions variables resulted in six significant interaction terms, which describe different combinations of political and economic conditions. As we can see in Table 9, the first three are actually the combinations of the *liberalised economic environment* variable with the three regime latent variables that are more directly related to forms of governance²⁷. From the results presented above, we can easily derive the following double conclusion. First of all democratic regimes may have the ability to create better functioning institutions and the latter can promote the goal of an economic environment with low state participation. Secondly, if we assume that the level of services provided by such institutions is constant, we can conclude that a liberalised economic environment, as defined by our latent variable, is more compatible with both our two democratic forms of governance rather than with constitutional monarchy. For the latter, the sign of the respective interaction effect is negative (but significant only in the 10% level) while for the former, the respective coefficients are positive. What we actually come across here is an argument in favour of those who believe that the political environment may actually matter for growth and that democratic forms of governance may have an advantage over dictatorships, even when there is some kind of dependence on popular vote.

On the other hand, the economic latent variable that is oriented towards the within-company environment, is surpassed by our definition of a *stable democracy* with the result being the negative sign of their interaction term, indicative of a negative effect on development. It seems that the overall type of regime exerts more influence to the growth rates than intra-firm conditions, something that we are keen to believe. For a possible interpretation of the sign, once again we refer to the particular and possibly restrictive definition of the notion: stable democracy. The interaction of intra – firm stability seems compatible with *constitutional monarchy* resulting in a positive effect on economic growth, although it should be noted that we cannot distinguish which part determined that sign in a greater manner, since they both have positive direct effects. Finally, the above mentioned stability in the functioning of firms –as controlled by *stable microeconomic* conditions- is able to overcome the negative effect of *constitutional reform* on growth rates. The respective interaction term enters the model significantly and with the positive sign, reversing the negative direct effect of constitutional reform on economic development.

²⁷ According to the distinction made in part 4.1.2

6. Conclusions – Policy Implications

In the last decades that globalization has made a dominant appearance on the ways different countries interrelate with one another, significant issues have been raised as to the compatibility of international integration and the goals of preserving a democratic environment with respect to civil liberties as well as the independency of market conditions. Throughout this thesis we attempted to test the above issues by establishing a model following the New Institutional Economics context, which –as opposed to its predecessors– incorporates political institutions in the economic process and investigates their significance. Within this framework, we made an attempt to decrease the ambiguity regarding the importance of political indicators relative to the economic ones. This is the reason we chose to incorporate in our full model and interpret the interaction terms. Their nature allows us to distinguish between different compositions of the socioeconomic environment and derive useful results. Moreover, their comparison makes it possible to test the compatibility between different conditions of the social framework. During this part, we will make a short reference to what we consider to be the most important outcomes and the policy implications that originate from them.

Before focusing our attention in the indirect effects, we would like to provide the obtained results on the importance of institutions for growth rates, thus providing a sufficient answer to our first hypothesis²⁸. Judging by the fact that all the institutional variables (both the regime type as well as the economic ones) are significant before the incorporation of the indirect effects, we can state that –even in a restricted environment– institutions are a vital part of the socioeconomic framework and their evolution should not be disregarded in the application of any economic transformation.

The fact that we found a difference in the effect of a liberalized economic environment combined with democratic regimes on one side and together with constitutional monarchy on the other, can be considered as proof that political institutions and more specifically different forms of governance, do matter for growth rates. We choose to view this point as a result to the hypothesis presented in the first part of this thesis²⁹ regarding the possible effects of regime type on development. Our results pinpoint to the direction of superiority on behalf of democratic governments together with free economic conditions, relatively to non-democratic ones, since the former combination is the only one that affects growth rates in a positive manner. Given the fact that what we describe as *liberalized economic environment* delineates economic conditions that prevail in a constantly rising number of countries in the recent decades, the above conclusion provides useful implications. To be more accurate, we proved that such economic conditions are compatible with positive growth rates when they are implemented within democratic governance. If this is studied in comparison with the increasing number of countries that resort to international foundations such as the World Bank or the International Monetary Fund for help in conducting the necessary structural changes in their economies, we highlighted the importance of these changes taking place under a

²⁸ Section 2.1.1, page: 07

²⁹ Section 2.2.1, page: 11

democratic regime and not an authoritarian one. In addition to these, given the fact that economic changes usually take place in the same time with political ones due to the integration of political and economic life, our conclusion provides a hint for the correct time order of these changes. We suggest that special attention should firstly be paid on the creation of a functional and efficient political environment with all the advantages that democratic regimes are associated, like the protection of people's rights or the limitations in the exertion of power on behalf of the ruling party. Only when the above environment is established and reaches the stage of maturity can we be optimistic about the results of our economic transformations.

The second indirect effect that we consider worth mentioning on this part stresses the importance of stability in the microeconomic part of the economy, specifically the functioning of firms. While this variable is not able to change the negative effect that a -strictly defined- democratic government can have on growth rates, it seems able to reverse the negative influence of a constitutional reform. While constitutional reform is considered a heavy change with negative and significant effects on development, long – term stability in the functioning of firms can surpass the above negativity and provide an overall positive effect. It is another confirmation of the widely accepted belief that certain favorable economic conditions can be more important than the insecurity with which a change in constitution –even without a coup- is associated. This could be a significant contribution to the debate regarding the degree of state intervention in the political system. Even in a turbulent political environment with the possibility of a constitutional change more than visible in the short-term horizon, an efficient economic environment with low state intervention can help the economy overcome negative effects stemming from the political life.

A final contribution of this thesis can be considered our conclusion that the exact definition even regarding quite similar notions can make an actual difference. We were able to do that because of the results of factor analysis on political institutions. Although our intention was to apply one political variable to control for democratic governance, the above statistical procedure provided us with two, which may look similar, but a closer inspection reveals that one is far more detailed than the other. As a result, the fact that we came across two different signs might be indicative of the fact that the respective two latent variables ended up carrying more differentiated meanings than similar ones.

Conclusively, an overview of the whole thesis is indicative of the fact that *New Institutional Economics* has made important contributions to the theory on economic development. The incorporation of institutional variables seems to be a vital part of all modern economic growth models. Such variables, together with their interaction terms are possible ways to delineate the complex co-existence and interdependence of political, social and economic conditions. Not all possible combinations provide favorable results for the growth rates and knowing at least which situations are detrimental and should be avoided is a powerful tool to the hands of every policy-maker.

REFERENCES

- Acemoglu D, Johnson S. and Robinson J (2001) "The Colonial Origins of Comparative Development: An Empirical Investigation" *The American Economic Review*, Vol. 91, No. 5 , pp. 1369-1401
- _____ (2004) "Institutions as the Fundamental Cause of Long – Run Growth" , *National Bureau of Economic Research*, Working Paper 10481
- Adelman, Irma & Morris Cynthia (1967) "*Society, Politics and Economic Development: A Quantitative Approach*" Baltimore, Johns Hopkins University Press
- Aghion Ph., Howitt P. & Mayer – Foulkes D. (2005) "The Effect of Financial Development on Convergence: Theory and Evidence" *National Bureau of Economic Research*, Working Paper 10358
- Alesina, A. & Londregan, J.A. & Rosenthal, H., (1991) "A Model Of The Political Economy Of The United States," GSIA Working Papers 1990-27, *Carnegie Mellon University, Tepper School of Business*.
- Alesina et al (1994) "Political Instability and Economic Growth" NBER Working Paper, *National Bureau of Economic Research*
- Alcalá Fr. & Ciccone Ant., (2004) "Trade and Productivity," *The Quarterly Journal of Economics*, MIT Press, vol. 119 (2), pages 612 – 645
- Arellano, M. and S. Bond. (1991) "Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations" *The Review of Economic Studies*, Vol: 58, pp.: 277 – 297
- Bai, Jushan & Ng, Serena, 2006. "Evaluating latent and observed factors in macroeconomics and finance" *Journal of Econometrics*, Elsevier, Vol. 131, pp.: 507-537.
- Banu (2013) "The Impact of Credit on Economic Growth in the Global Crisis Context", *Procedia Economics and Finance*, Vol: 6, pp.: 25 – 30
- Barro, Robert J. (1991) "Economic Growth in a Cross – Section of Countries" *The Quarterly Journal of Economics*, Vol. 106, No. 2, pp. 407-443.
- _____ (1997) "Determinants of Economic Growth: A Cross-Country Empirical Study," NBER Working Papers 5698, *National Bureau of Economic Research*, Inc.
- Baum, Matthew and Lake, David (2003) "The Political Economy of Growth: Democracy and Human Capital" *American Journal of Political Science*, Vol. 47, No. 2 (Apr., 2003), pp. 333-347
- Blundell, R. and Bond, St. (1998) "Initial Conditions and Moment Restrictions in Dynamic Panel Data Models", *Journal of Econometrics*, Vol: 87, pp.: 115 - 143

Cass, David (1965) "Optimum Growth in an Aggregative Model of Capital Accumulation" *The Review of Economic Studies*, Vol: 32, No 3 (Jul, 1965), pp. 233 – 240

Chen, L. E. , (2007) "Development First, Democracy Later? Or Democracy First, Development Later? The Controversy over Development and Democracy" Paper presented at the annual meeting of the Southern Political Science Association, Hotel InterContinental, New Orleans, LA

Cheung S.N.S. (1983) "The Contractual Nature of the Firm", *Journal of Law and Economics*, Vol: 26

Clague Chr., Keefer Ph., Knack St. and Olson M. (1999) "Contract Intensive Money" *Journal of Economic Growth* Vol: 2: pp. 185-212

Coase R. (1993) "The Theory of the Firm" in Williamson and Winter "The Nature of the Firm: Origins, Evolution and Development", Oxford University Press, Oxford

Comeau L. (2003) "Democracy and Growth: A Relationship Revisited" *Eastern Economic Journal*, Vol. 29, No. 1

Dempster, A.P. , Laird N.M., & Rubin D.B. (1977) "Maximum Likelihood from Incomplete Data via the EM Algorithm" *Journal of the Royal Statistical Society, Series B* (Methodological), Vol. 39, No. 1, pp. 1-38

Dick, Williams G. (1974) "Authoritarian versus non-authoritarian Approaches to Economic Development" *Journal of Political Economy* , Vol: 82, pp.: 817 - 827

Doucouliafos , Chris (2005) "Publication Bias In The Economic Freedom and Economic Growth Literature" *Journal of Economic Surveys* , Vol: 19 , No: 03

Doucouliafos , Chris & Ulubasoglu Mehmet Ali (2008) "Democracy and Economic Growth: A Meta – Analysis" *American Journal of Political Science*, Vol. 52, No. 1, pp. 61–83

Drury, Kriekhaus and Lusztig (2006) "Corruption, Democracy and Economic Growth" *International Political Science Review / Revue internationale de science politique*, Vol: 27, No: 2 (Apr., 2006), pp. 121-136

Eggertsson T. (1990) *Economic Behavior and Institutions*, Cambridge University Press, Cambridge

Feierabend, Ivo & Feierabend Rosalind (1972) "Coerciveness and Change: Cross National Trends" *American Behavioral Scientist*, Vol: 15, pp.: 911 - 928.

Furuboth E.G. and Richter R. (1991) "The New Institutional Economics: An Assessment" in Furuboth and Richter (ed.) *The New Institutional Economics*, Texas A&M University Press, College Station

Garza, Pablo & Bucheli Marisca & Garcia-Muñoz, Tereza (2011) "*Dynamic panel data: A useful technique in experiments*," ThE Papers 10/22, Department of Economic Theory and Economic History of the University of Granada

Glaeser, Edward L., Rafael La Porta, Florencio Lopez-de-Silanes and Andrei Shleifer "Do Institutions Cause Growth?" *Journal of Economic Growth*, 2004, v 9, 271-303

Ghardallou, Wafa (2011) "*Financial Development and Democracy*" , First Draft

Helliwell, John (1994) "Empirical Linkages Between Democracy and Economic Growth" *NBER Working Paper, National Bureau of Economic Research*

Huang, Yongfu (2010) "Political Institutions and Financial Development : An Empirical Study" *World Development* Vol. 38, No. 12, pp. 1667–1677, 2010

Huntington, S. (1968) "*Political Order In Changing Societies*" New Haven and London, Yale University Press

Huntington, S. & Dominguez, J (1975) "Political Development" *Handbook of Political Science*, Vol: 03 , pp.: 1 – 114

Jones, Benjamin & Olken, Benjamin (2005) "Do Leaders Matter? National Leadership and Growth Since World War II" *The Quarterly Journal of Economics* , Forthcoming

Knack St. and Keefer Ph. (1995) "Institutions and Economic Performance: Cross Country Tests Using Alternative Institutional Measures" *Economics and Politics*, Vol: 07 , No 03, November 1995

_____ (1997) "Does Social Capital Have An Economic Payoff? A Cross – Country Investigation" *The Quarterly Journal of Economics*, Vol. 112, No. 4 (Nov., 1997), pp. 1251 - 1288

Kohli, Atul (1986) "Democracy and Development" *Development Strategies Reconsidered*, pp.: 153 - 182

Koopmans ,Tjalling C., 1963. "On the Concept of Optimal Economic Growth,"Cowles Foundation Discussion Papers 163, Cowles Foundation for Research in Economics, Yale University.

Krieckhaus, J. (2004) "The Regime Debate Revisited: A Sensitivity Analysis of Democracy's Economic Effect" *British Journal of Political Science*, Vol. 34, No. 4 (Oct., 2004), pp. 635 - 655

Lake, David and Baum, Matthew (2001) "The Invisible Hand of Democracy : Political Control And The Provision of Public Services" *Comparative Political Studies*, Vol: 34, pp: 587 - 621

Lattin, James, Carroll, Douglas & Green, Paul (2003) "*Analysing Multivariate Data*", Cengage, ISBN-13: 9780534349745

- Levine, Ross & Renelt, Dani (1992) "A Sensitivity Analysis of Cross – Country Growth Regressions", *The American Economic Review*, Vol. 82, No. 4, pp.: 942 - 963
- Lin Justin Yifu and Nugent Jeffrey (1995) "Institutions and Economic Development", *Handbook of Development Economics*, Volume III, © Elsevier Science B.V., 1995
- Lipset S.M. (1959) "Some Social Requisites For Democracy. Economic Development and Political Legitimacy" *American Political Science Review*, Vol: 53 pp.: 69–105
- Lucas, Robert E. (1988) "On the Mechanics of Economic Development" *Journal of Monetary Economics*, Vol:22, pp.: 3-42.
- Marsh, Robert M. (1979) "Does Democracy Hinder Economic Development in Latecomer Developing Nations?" *Comparative Social Research* , Vol: 2, pp.: 215 - 248
- Mankiw, Gregory N., Romer, David. and Weil, David "A Contribution to the Empirics of Economic Growth", *The Quarterly Journal of Economics*, Vol: 107, Issue: 02, pp.: 407 - 437
- Mauro, Paolo, 1995 "Corruption and Growth," *The Quarterly Journal of Economics*, MIT Press, vol. 110, Issue:3, pp.: 681-712
- Meyer, John, Hannan, Michael, Robinson, Richard & Thomas, George (1979) "National Economic Development 1950-1970: Social and Political Factors" in *National Development and the World System*, Chap: 6, Chicago, University of Chicago Press
- Navia Patricio and Walker Ignacio (2008) "*Political Institutions, Populism and Democracy in Latin America*"
- North, Douglas C. (1989) "Institutions and Economic Growth : A Historical Introduction" *World Development*, Vol. 17, No. 9, pp. 1319-1332
- _____ (1990) "*Institutions, Institutional Change and Economic Performance*", Cambridge University Press, Cambridge
- Przeworski A. and Limongi F. (1993) "Political Regimes and Economic Growth" *The Journal of Economic Perspectives*, Vol. 7, No. 3, pp. 51-69
- Qureshi, M.G. and Ahmed E. (2012) "The Inter – Linkages Between Democracy and Per Capita GDP Growth: A Cross – Country Analysis" *Pakistan Institute Of Development Economics* , Working Paper: 85
- Ramsey F.P. (1928), "A Mathematical Theory of Saving," *Economic Journal*, Vol. 38, No 152, pp. 543 559
- Rodrik, D., (1998) "Why Do More Open Economies Have Bigger Governments?," *Journal of Political Economy*, University of Chicago Press, vol. 106 (5), pp 997-1032

_____ (1999) "Institutions for High Quality Growth: What they Are and How to Acquire Them" *Studies in Comparative International Development*, Fall 2000, Vol. 35, No. 3, pp. 3-31

Rodrik D. & Subramanian Ar. & Trebbi Fr., (2004) "Institutions Rule: The Primacy of Institutions Over Geography and Integration in Economic Development," *Journal of Economic Growth*, Springer, vol. 9(2), pages 131-165, 06

Rodrik, D. & Wacziarg, R. (2004) "Do Democratic Transitions Produce Bad Economic Outcomes?" *American Economic Review* Vol: 95, No: 2, pp.: 50-55

Romer, Paul M. (1986) "Increasing Returns and Long-Run Growth" *The Journal of Political Economy*, Vol. 94, No. 5. (Oct., 1986), pp. 1002-1037

Russett, Bruce M. & Monsen Joseph (1975) "Bureaucracy and Polyarchy as Predictors of Performance: A Cross National Exam" *Comparative Political Studies*, Vol: 8, pp.: 5 - 31

Sala-i-Martin, Doppelhofer and Miller (2004) "Determinants of Long – Term Growth: A Bayesian Averaging of Classical Estimates" *American Economic Review*: Vol. 94 No. 4

Schedler, Andreas (1995) "*Under-and overinstitutionalization: some ideal typical propositions concerning new and old party systems*", Helen Kellogg Institute for International Studies

Scully, Gerald (1988) "The Institutional Framework and Economic Development" *Journal of Political Economy*, Vol. 96, No. 3, pp. 652-662

_____ (1992) "*Constitutional Environments and Economic Growth*" Princeton, Princeton University Press

Seligson, Mitchell A. 2003. "The Dual Gaps: An Overview of Theory and Research" In *Development and Underdevelopment: The Political Economy of Global Inequality*, 3rd ed., Mitchell A. Seligson and John T. Passe-Smith, eds. Boulder: Lynne Rienner Publishers

Siegle, Joseph T., Michael M. Weinstein, and Morton H. Halperin. 2004. "Why Democracies Excel," *Foreign Affairs* Vol: 83(5) pp.: 57-71.

Sirowy, L. and Inkeles A. (1990) "The Effects of Democracy on Economic Growth and Inequality : A Review" *Studies in Comparative International Development*, Vol. 25, no. 1, pp.: 126 - 157

Solow, Robert (1956). "A Contribution to the Theory of Economic Growth" *The Quarterly Journal of Economics*, Vol. 70, No. 1, pp.: 65 - 94

_____ (1957). "Technical Change and the Aggregate Production Function" *The Review of Economics and Statistics*, Vol. 39, No. 3 (Aug., 1957), pp. 312-320

Weede, Erich (1983) "The Impact of Democracy on Economic Growth. Some Evidence from a Cross – National Analysis" *Kyklos*, Vol: 36, pp.: 21 - 39

Williamson Oliver (1985) "*The Economic Institutions of Capitalism*", Free Press, New York

Wittman D. (1989) "Why Democracies Produce Efficient Results" *The Journal of Political Economy*, Vol. 97, No. 6, pp.: 1395 - 1424

SECTION IV - APPENDICES

APPENDIX A. List of Indicators used to describe Democratic Quality:

1. Type of Regime

Source: Databanks International

This indicator takes values from 1 to 4, according to the following table:

Value	Prevalent Conditions
1	Civilian : The government is controlled by a non – military component of a nation’s population
2	Military – Civilian : Seemingly civilian government which is effectively controlled by the military. Civilians only hold those positions for which their services are deemed as necessary.
3	Military : Government applies military law, usually followed by a successful coup d’ etat.
4	Other : All possible regimes that cannot be incorporated in any of the above categories, even cases that a country lacks an effective national government

2. Type of Effective Executive.

Source: Databanks International

The above variable refers to the individual that exerts the primary power in the formation of a country’s internal and external policy. Values vary from 1 to 5, according to the following conditions:

Value	Prevalent Conditions
1	Monarch
2	President
3	Premier
4	Military
5	Other

The final category refers to situations where the individual who forms the nation’s policy holds no formal position or a national executive does not exist.

3. Selection of Effective Executive

Source : Databanks International

Values from 1 to 3 are attributed to this indicator, according to the following:

Value	Prevalent Conditions
1	Direct Elections : Effective executive is directly elected by the general population by popular vote
2	Indirect Elections : Effective executive is elected by an elected but

	uncommitted electoral college
3	Non – Elective : Effective executive is selected by any other method, not involving direct or indirect elections

4. Degree of Parliamentary Responsibility

Source: Databanks International

This indicator refers to the degree that the premier is dependent on the support of the majority of a legislature in order to retain their position. It takes values from 0 to 3 according to the following criteria:

Value	Criteria
0	Irrelevant : Premier does not exist
1	Absent : Premier exists, but does not have to rely on parliamentary support
2	Incomplete : There is a small degree of parliamentary responsibility, but in effect it is very limited
3	Complete : The premier is effectively dependent on parliamentary support in order to remain in position

5. Legislative Effectiveness

Source: Databanks International

This variable measures how effective the legislative authority can be and takes values from 0 to 3, according to the following table:

Value	Criteria
0	None : Legislature is inexistent
1	Ineffective : Legislature authority cannot be implemented due to internal turmoil or the premier prevents the legislature from meeting. Finally legislative activity may be of a “rubber – stamp” character.
2	Partially effective : The power that the legislative authority has is seriously hindered or out-weighted by the power of the effective executive
3	Effective : Legislature possesses significant power over very important issues, like taxation or disbursement or even power to override vetoes from the effective executive

6. Legislative Selection

Source: Databanks International

The above indicator is closely related to the way that legislative is formed. It takes values from 0 to 2, depending on the following:

Value	Criteria
0	None : Legislature is inexistent
1	Non – Elective : Members of the legislature are selected either by the effective executive or by means of heredity.
2	Elective : Popular vote is the means by which members of the legislature are assigned their positions

7. Assassinations

Source: Databanks International

The number of all politically-motivated assassinations or attempts to assassinate government officials.

8. General Strikes

Source: Databanks International

All the strikes that involve more than one employer and more than 1000 workers. Usually such strikes are characterised “general” because they are oriented towards the general economic or labor policy.

9. Guerrilla Warfare

Source: Databanks International

All armed activities carried out by independent groups of civilians targeted against the current regime.

10. Government Crises

Source: Databanks International

All situations –revolts excluded- that may result in the downfall of the existing government.

11. Purges

Source: Databanks International

Any situations of elimination of the political opposition –either by jailing or execution- that takes place according to a well designated plan.

12. Riots

Source: Databanks International

All the demonstrations of more than 1000 civilians that include the use of physical force.

13. Revolutions

Source: Databanks International

This variable includes all –successful or not- attempts to forcibly and illegally change the governmental elite. It also incorporates all attempts of independence from the central government by population minorities.

14. Coups D Etat

Source: Databanks International

This variable includes only the successful extra-constitutional or forced changes in the governmental elite and the latter's control over the structure of power. Since the term “coup” carries the meaning of the “successful revolution”, the above variable does not include all unsuccessful attempts to change the governmental elite.

15. Number of major constitutional changes

Source: Databanks International

The number of all changes in a country's constitutional structure. In extremis, this can include the adoption of a new constitution that alters significantly the delegation of power within the state's authorities.

16. Military in Politics

Source: International Country Risk Guide

In a completely free and accountable government, military should not be involved at all. However, military involvement may be due to an internal or external risk. In such cases, the degree of involvement may be small, since it may entail only the distortion of government policy (ie by changing the budget allocation among ministries). The greater risk is posed by a full-scale military regime. History has shown that in such cases, the regime becomes ultimately corrupt, resulting in internal instability, which in turn drives away any capital or cash inflow.

The index is created to measure the degree of military involvement and takes values from 0 to 6, with small values indicating a greater risk of military involvement, thus a higher risk of political risk.

17. Democratic Accountability

Source: International Country Risk Guide

This indicator is a measure of the response rate of the government. In general, the less responsive a government is, the more possible it is to fall either through peaceful elections or violently. Which one of the above two will happen, depends on the type of governance the country has enjoyed till then. The authors of the index make a distinction between five types

of governance, listed from the more to the least democratic: Alternating Democracy – Dominated Democracy – De Facto One Party State – De Jure One Party State – Autarky. This classification is crucial for the attribution of the risk points. The index was constructed so that democratic regimes face the lower risk and thus more risk points are assigned to them (close to 6). The least democratic regimes face higher risk, so less risk points (close to 0) are assigned to them.

18. Internal Conflict

Source: International Country Risk Guide

The above, is an indicator of the political violence in a country as well as of the effect that this violence has on governance. The overall index is a sum of three components: Civil War – Terrorism or Political Violence and Civil Disorder. Each of these components takes a value from 0 to 4. The rationale is that higher values (close to 4 for each sub-component) are attributed to situations of very low risk. In contrast, small values (close to 0) are attributed to countries facing high risk of political and social disorder.

19. Polity Index

Source: Polity IV Project

The Polity variable is computed by subtracting the Autocracy score from the Democracy one. Both these scores are computed in a scale from 0 to 10 and as a result the polity score has a scale from -10 to 10.

By Democracy, the authors define a regime with the following three distinct characteristics:

- The presence of institutions and procedures through which citizens can express their preferences regarding the existent leaders or policies implemented
- The presence of institutional constraints on the exercise of power by the effective executive
- Civil liberties are guaranteed for all citizens in every act of political participation.

On the other hand, autocracy is a regime with the following characteristics:

- Restricted and suppressed political participation
- Chief executives are chosen by means of selection and not election. Moreover, once in authority, they can exercise their power with few institutional constraints

It is straightforward from the above that democratic regimes have positive values for the above index (in a perfect democracy, the polity index would have a value close to 10), while autocratic regimes have negative ones (perfect autocracies have values close to -10).

20. Freedom of the Press

Source: Freedom House

The Freedom of the Press index is an assessment of the degree of print, broadcast and internet freedom. It is constructed by taking into account and quantifying the events of each calendar year for each country. The final values vary from 0 to 100, with the respective ranking for each value, according to the next table:

Value	Ranking
0 – 30	Free
31 – 60	Partly Free
61 – 100	Not Free

21. Freedom of Assembly and Association

Source: The Cingranelli – Richards (CIRI) Human Rights Data Project

The right to freely assemble and associate publicly should be fundamental and protected under any circumstances. However in many countries citizens may be prohibited from taking part in peaceful anti-governmental protests. Moreover, it may be the case that organizations with a critical towards the government agenda watch their activities seriously obstructed and monitored by the regime's armed forces.

The “Freedom of Assembly and Association” index is a measure of the degree to which the right to protest and demonstrate is protected within a country. The coding scheme follows the next pattern:

Value	Conditions
0	The right to assemble and associate is either severely restricted or denied at all to all citizens
1	The right to assemble and associate is either severely restricted or denied at all for selected groups
2	The right to assemble and associate is virtually unrestricted to all citizens
-999	Not mentioned

22. Freedom of Religion

Source: The Cingranelli – Richards (CIRI) Human Rights Data Project

In a free and democratic environment, everyone should be allowed to practice their religion unobstructed from governmental interference. In addition, the choice of holding no religion should also be respected.

The above index is created to measure the extent of governments' interventions on religious practices. These interventions are measured based on actual practices and not the legal context, since there may be a law protecting the freedom of religion but actual practices can differ greatly. Values are attributed according to the following:

Value	Conditions
0	Government restrictions ³⁰ are severe and widespread
1	There are moderate government restrictions
2	Government restrictions are practically absent
-999	Not mentioned

APPENDIX B. List of Indicators used to describe Institutional Quality:

1. Business Freedom

Source: Heritage Foundation

This indicator is used to account for the general efficiency of the governments' regulation of business. It takes into account factors like the difficulty of starting, operating and closing an enterprise. The overall score is based on the factors mentioned below:

Starting a Business:

- ✓ Number of procedures necessary
- ✓ Time (calculated in days) needed
- ✓ Cost required (as a percentage of income per capita)
- ✓ Minimum capital (as a percentage of income per capita)

Obtaining a License:

- ✓ Number of procedures necessary
- ✓ Time (calculated in days) needed
- ✓ Cost required (as a percentage of income per capita)

Closing a business:

- ✓ Time (calculated in years) needed
- ✓ Cost required (as a percentage of the estate)
- ✓ Recovery Rate (cents on the dollar)

Each of the above factors is converted to a scale of 0 to 100, using the next formula:

$$FactorScore = 50 \frac{Factor_{average}}{Factor}$$

Where: $Factor_{average}$ = Relative world average

Factor = Score for the respective country

The overall index is the average of the above 10 indices and as a result ranges from 0 to 100 with 0 being the least free and 100 being the freest state.

³⁰ On what constitutes a "government restriction" on religious practices, the reader may want to consult ref [11]

Sources: Business freedom index relies on the following sources: World Bank *Doing Business 2013*, Economist Intelligence Unit, *Country Commerce*, 2009–2012, U.S. Department of Commerce, *Country Commercial Guide*, 2009–2012 as well as official government publications of each country.

2. Monetary Freedom:

Source: Heritage Foundation

Monetary Freedom score is based on two separate components: The *weighted average inflation rate for the three most recent years* and *price control measures*. This way, both inflation and price controls, which are known to distort market activity, are taken into consideration.

The inflation rate serves as the basis into the equation that produces the monetary freedom index as its output. Upon that a penalty of up to 20 points is subtracted, depending on the degree of price controls. The two equations are presented below in detail:

$$Avg.Inflation_i = \theta_1 Inflation_{it} + \theta_2 Inflation_{it-1} + \theta_3 Inflation_{it-2}$$

$$MonetaryFreedom = 100 - a\sqrt{Avg.Inflation_i} - PCpenalty_i$$

Where: θ are coefficients that are summed to unity and are exponentially smaller in sequence

$Inflation_i$ is the annual rate of inflation for country I in year t (measured by the Consumer Price index)

a is the coefficient that stabilizes the variance of scores

$PCpenalty_i$ is given a value between 0 and 20 according to the price control measures

Sources: International Monetary Fund *International Finance Statistics Online*, International Monetary Fund *World Economic Outlook 2012*, Economist Intelligence Unit *ViewsWire* and official government publications of each country.

3. Trade Freedom

Source: Heritage Foundation

Trade freedom index measures the degree that tariff as well as non-tariff barriers affect traded goods. Since different imports face different tariff rates, a weighted average is necessary. This is carried out by the share of imports for each good. The overall index is calculated by the following equation:

$$TradeFreedom_i = \left[\left((Tariff_{max} - Tariff_i) / (Tariff_{min} - Tariff_i) \right) * 100 \right] - NTB_i$$

Where: TradeFreedom_i represents trade freedom in country i

Tariff_{max} and Tariff_{min} are the upper and lower bounds of the tariff rate

Tariff_{max} represents the average tariff rate

NTB_i is the penalty of 5 , 10 , 15 or 20 points subtracted due to non-tariff barriers, according to the following table:

Points	Condition
20	NTB's are used extensively and affect the traded quantities heavily
15	NTB's are used in a wide variety of goods and services and result in a major distortion in the traded quantities
10	NTB's are used only to protect certain goods
5	NTB's are used to protect only a few goods or services and have a limited impact on traded quantities

The variable used to describe Non – Trade Barriers includes quantity and price restrictions, regulatory, investment and custom restrictions as well as direct government interventions.

Sources: World Bank, World Development Indicators 2012, World Trade Organization, Trade Policy Review, 1995–2012, Office of the U.S. Trade Representative, 2012 National Trade Estimate Report on Foreign Trade Barriers; World Bank, Doing Business 2011 and 2012, U.S. Department of Commerce, Country Commercial Guide, 2008–2012, Economist Intelligence Unit, Country Commerce, 2009–2012, World Bank, Data on Trade and Import Barriers: Trends in Average Applied Tariff Rates in Developing and Industrial Countries, 1981–2010, and official government publications of each country.

4. Investment Freedom

Source: Heritage Foundation

The index that quantifies the environment for the inflow and outflow of investment capital varies from 0 (highly restricted environment) to 100 (free environment). From the maximum value of 100, points are deducted depending on the restrictions imposed by the government, according to the next table. It is worth mentioning that since there is great variety not only in the kinds of measures but also in the degree of their implementation, even a slight imposition of the listed restriction, results in the deduction of the respective points. Finally, for countries with heavy restrictions that the final index is negative, its value is set equal to zero.

<u>Restrictions on investment environment</u>	<u>Points deducted</u>
1) National treatment of foreign investment	
a) No national treatment, prescreening	25 points
b) Some national treatment, some prescreening	15 points

c) Some national treatment or prescreening	05 points
2) Foreign investment code	
a) No transparency and burdensome bureaucracy	25 points
b) Inefficient policy implementation and bureaucracy	10 points
c) Some investment laws and practices non-transparent or inefficiently implemented	05 points
3) Restrictions on land ownership	
a) All real estate purchases restricted	15 points
b) No foreign purchases of real estate	10 points
c) Some restrictions on purchases of real estate	05 points
4) Sectoral Investment Restrictions	
a) Multiple sectors restricted	20 points
b) Few sectors restricted	10 points
c) One or two sectors restricted	5 points
5) Expropriation of investments without fair compensation	
a) Common with no legal recourse	25 points
b) Common with some legal recourse	15 points
c) Uncommon but occurs	05 points
6) Foreign Exchange controls	
a) No access by foreigners or residents	25 points
b) Access available but heavily restricted	15 points
c) Access available with few restrictions	05 points
7) Capital controls	
a) No repatriation of profits, all transactions require government approval	25 points
b) Inward and outward capital movements require approval and face some restrictions	15 points
c) Most transfers approved with some restrictions	05 points

In addition to the above categories of restrictions, a maximum number of 20 points is deducted in cases of security problems, lack of basic investment infrastructure or government policies that impede investment freedom.

Sources: The above index relies on the following sources: Economist Intelligence Unit Country Commerce 2009-2012, Office for the US trade representative 2012 National Trade Estimate Report on Foreign Trade Barriers, US Department of Commerce Country Commercial Guide 2009 – 2012 and official government publications of each country.

5. Financial Freedom

Source: Heritage Foundation

In an ideal banking system there is limited state interference, the central bank is independent of any political group and carries out the task of supervision of financial institutions. Under such conditions, banks –not only domestic, but also foreign ones- are able to provide a variety of financial services both to individuals and companies.

The two major components that this indicator is intended to measure are: government intervention in the financial sector and banking efficiency. This is attempted by inspecting the following areas of financial activity:

- I. The degree of government regulation of financial services
- II. The extent of state intervention in the ownership –direct or indirect- of financial institutions
- III. The degree of financial and capital market development
- IV. Government interference in the allocation of credit
- V. Openness to foreign competition

Financial freedom index is attributed a score varying from 0 (least free environment) to 100 (freest conditions), by deducting points from the ideal score of 100, according to the next table:

<u>Points Deducted</u>	<u>Prevalent Conditions</u>
0	Negligible government interference
10	Minimal interference (Regulation is extended beyond the absolutely necessary duties of enforcing contractual obligations and fraud prevention)
20	Nominal interference (There is a small state participation in the ownership of financial institutions. Nevertheless, there is no restriction in the latters' ability to offer financial services)
30	Limited interference (State participation in the ownership of banks is greater than before and also government is responsible for allocating state credit. Moreover, foreign financial institutions are subject to a few restrictions)
40	Significant interference (Government exercises active ownership and control of financial institutions, central bank is not fully independent and there are restrictions in the ability of banks to offer financial services uncontrolled.)
50	Considerable interference (The government strongly influences credit allocation and the ability of banks to offer major financial services like credit allocation is hindered significantly.)
60	Strong interference (The central bank is heavily influenced by the state and has limited power in contractual enforcement as well as in fraud prevention.)
70	Extensive interference (The majority of the financial institutions are owned by the government and financial institutions are heavily

	restricted.)
80	Heavy interference (Completely state-dependent central bank)
90	Near repressive (Credit allocation is controlled by the government)
100	Repressive (State supervision and regulation are both designed in a way to prevent and prohibit private financial institutions.)

Sources: Financial freedom index is based on data from the following sources: Economist Intelligence Unit *Country Commerce and Country Finance 2009–2012*, International Monetary Fund *Staff Country Report*, Organization for Economic Co-Operation and Development *Economic Survey*, US Department of Commerce *Country Commercial Guide 2009-2012*, Office of the U.S. Trade Representative *2011 National Trade Estimate Report on Foreign Trade Barriers*, U.S. Department of State Investment Climate Statements 2009–2012, World Bank *World Development Indicators 2012*, as well as several official government publications of each country and various magazine articles on banking and finance.

6. Control of Corruption

Source: International Country Risk Guide

Corruption results –among others- in people assuming positions of power by means of patronage, rather than ability. This can result in an unstable political environment, with adverse effects on economic and financial conditions.

The above index is created in a way to take into consideration several forms of corruption, like excessive patronage, nepotism, job reservations, secret party funding etc. All the previous reveal suspiciously close ties between the economic and the political environment. Such forms of corruption are a great risk in the inflow of foreign capital. In extreme cases of corruption, when scandals are revealed consecutively, popular backlash may even result in the overthrow of the government, rendering the country in a state of chaos.

The “control of corruption” attributes values from 0 to 6, with 6 being the “Very low” point of risk because of corruption and 0 being the “Very High” risk situation.

7. Investment Profile

Source: International Country Risk Guide

“Investment Profile” indicator is constructed in a residual manner. Specifically it attempts to include factors affecting the inflow of domestic and foreign capital that are not covered in any other political or economic component. In detail, what the above variable is intended to cover can be summed in the following three categories:

- a. Contract Viability / Expropriation
- b. Repatriation of Profits
- c. Payment Delays

For each of the above categories, a score between 0 (very high risk) and 4 (very low risk) is attributed. The final score of the overall index is the sum of the three sub-scores.

8. Labor Market Regulations

Source: The Fraser Institute

The above index is the sum of six sub-components, described in detail in the following table:

Subcomponent	Description	Source
Hiring regulations and minimum wage	It is used to take into account: the ratio of the minimum wage of a trainee to the value added per worker (more or less than 0.75), the prohibition of fixed-term contracts for permanent tasks or the maximum duration of the fixed term contracts (longer than 3 years) . Values of 0, 0.5 or 1 are assigned according to the above benchmark values.	World Bank <i>Doing Business</i> “Difficulty of hiring” index
Hiring and firing regulations	In the cases that hiring and firing of workers is prohibited by regulations, the subcomponent takes the value of 1. In cases that it is flexibly determined by employers, the subcomponent takes the value of 7.	World Economic Forum, <i>Global Competitiveness Report</i>
Centralized Collective Bargaining	Whenever wages are the product of a centralized bargaining process, the value of 1 is attributed to the subcomponent. In all other cases (wages are set by each individual company), the value of 7 is attributed.	World Economic Forum, <i>Global Competitiveness Report</i>
Hours Regulations	This subcomponent takes into account restrictions on night or weekly holiday work, whether a work-week can consist of more than 5 days, or can extend to more than 50 hours for more than 2 months per year and finally whether paid annual vacation is less than 21 days. Values between 0 and 1 are given to each one of these categories. The sub-index is constructed in a way that countries with less rigid work rules, receive better scores.	World Bank, <i>Doing Business</i> (various issues)
Mandated Costs of Worker Dismissal	This sub-index is based on the existence of conditions like the cost of advance notice requirements on dismissal, severance payments and penalties for dismissing a redundant worker. It takes values from 0 to 10, according to the following formula:	World Bank, <i>Doing Business</i> (various issues)

$$\frac{(V_{\max} - V_i)}{(V_{\max} - V_{\min})}$$

The values of V_{\max} and V_{\min} were set to 108 weeks and 0 weeks respectively

Conscription	<p>This sub-component attributes values between 0 and 10 depending on the length of conscription on each country, according to the following:</p> <p>Less than 6 months => Rating of 5</p> <p>Between 6 and 12 months => Rating of 3</p> <p>More than 12 months => Rating of 1</p> <p>More than 18 months => Rating of 0</p> <p>Conscription is not strictly enforced => Rating of 3</p> <p>Conscription is never used => Rating of 10</p> <p>Clear non – military options => Rating of 5</p>	<p>International Institute for Strategic Studies <i>The Military Balance</i> (various issues) and War Resisters International <i>World Survey of Conscription and Conscientious Obligation to Military Service</i></p>
--------------	--	--

APPENDIX C. List of Control Variables Used In the Regression Analysis:

Variable	Definition	Source
Secondary School Enrolment	Percentage of the total population that has successfully completed secondary school	Barro and Lee (2011)
Agriculture as a share of GDP	Value added in the agricultural sector as a share of GDP	World Bank Indicators (2007)
Inflation	Change of GDP deflator	World Bank Indicators (2007)
Population Growth	Annual percentage of population change	World Bank Indicators (2007)
Openness to trade	Imports plus exports as a share of GDP	World Bank Indicators (2007)
Life Expectancy	The number of years a newborn infant would live if prevailing patterns of mortality at the time of birth were to stay the same throughout the whole life.	World Bank Indicators (2007)
Fertility Rate	Number of children that would be born to a woman if she were to live to the end of her child-bearing years and give birth in accordance to current age-specific fertility rates.	World Bank Indicators (2007)
General government final consumption expenditure	The percentage of the GDP of all the current government expenditure for purchases of goods and services as a share of GDP	World Bank Indicators (2007)
Credit to GDP	Domestic credit provided to the private sector as a share of GDP	World Bank Indicators (2007)
Gross Fixed Investment	All capital, land, machinery improvements, as well as net acquisition of valuables as a share of GDP	World Bank Indicators (2007)

APPENDIX D. Countries Included

Argentina	Egypt	Kazakhstan	Singapore
Armenia	Estonia	Latvia	Slovakia
Australia	Finland	Lithuania	Slovenia
Austria	France	Luxembourg	South Africa
Azerbaijan	Germany	Malaysia	South Korea
Belarus	Greece	Mexico	Spain
Belgium	Hungary	Moldova	Sweden
Brazil	Iceland	Netherlands	Switzerland
Canada	India	New Zealand	Thailand
Chile	Indonesia	Norway	Turkey
China	Ireland	Peru	Ukraine
Colombia	Israel	Philippines	United Kingdom
Croatia	Italy	Poland	United States
Czech Republic	Japan	Portugal	Venezuela
Denmark	Jordan	Russia	Zimbabwe

APPENDIX E – STATA COMMANDS

E.1 Factor Analysis

E.1.1 Democracy Indicators

Assumptions:

Kaiser Meyer Olkin measure of sample adequacy:

estat KMO (after factor analysis is carried out)

Kaiser-Meyer-Olkin measure of sampling adequacy

Variable	kmo
DI_RegimeT-e	0.7468
DI_EffExec-e	0.8245
DI_EffExSe-t	0.6396
DI_Parliam-s	0.8881
DI_LegislE-t	0.8786
DI_LegislS-n	0.5965
Freedom_of-s	0.8957
CIRI_AssAs-n	0.9039
CIRI_Freed-n	0.8964
DI_Assasin-s	0.8247
DI_Strikes	0.6304
DI_GuerrWa-e	0.7543
DI_Crises	0.6759
DI_Purges	0.6829
DI_Riots	0.6770
DI_Revolut-s	0.7867
DI_Coups	0.6028
DI_Const_C-s	0.7275
Polity2	0.8522
ICRG_Milit-s	0.8666
ICRG_DemAc-t	0.9132
ICRG_Inter-t	0.7813
Overall	0.8316

Correlation matrix of the initial items:

correlate DI_RegimeType DI_EffExecutive DI_EffExSelect DI_ParliamRespons
DI_LegislEffect DI_LegislSelection Freedom_of_the_Press CIRI_AssAssociation
CIRI_FreedomOfReligion DI_Assassinations DI_Strikes DI_GuerrWarfare DI_Crises
DI_Purges DI_Riots DI_Revolutions DI_Coups DI_Const_Changes Polity2
ICRG_Military_In_Politics ICRG_DemAccount ICRG_Internal_Conflict

	DI_Reg-e	DI_Eff-e	DI_Eff-t	DI_Par-s	DI_Leg-t	DI_Leg-n	Freedoms	CIRI_A-n	CIRI_F-n	DI_Ass-s	DI_Str-s	DI_Gue-e	DI_Cri-s	DI_Pur-s	DI_Riots	DI_Rev-s	DI_Coups	DI_Con-s	Polity2	ICRG_M-s
DI_Regime	1.0000																			
DI_EffExec-e	-0.0856	1.0000																		
DI_EffExec-t	0.0113	0.5219	1.0000																	
DI_Parliament-s	-0.1830	0.4172	0.3838	1.0000																
DI_LegislE-t	-0.2447	0.3820	0.0592	0.4805	1.0000															
DI_LegislS-n	-0.4401	0.0700	0.0461	0.1098	0.2075	1.0000														
Freedom_of-s	0.0970	-0.3957	-0.1820	-0.4572	-0.6612	0.0662	1.0000													
CIRI_Assass-n	-0.1685	0.1106	-0.1151	0.2249	0.5147	0.0976	-0.5712	1.0000												
CIRI_Freed-n	-0.1386	0.1682	-0.0621	0.1984	0.5801	0.0279	-0.5941	0.5326	1.0000											
DI_Assassin-s	-0.0273	-0.1326	-0.2295	-0.1738	0.0008	0.0087	0.1446	0.0351	0.0276	1.0000										
DI_Strikes	0.0095	-0.1224	-0.0422	-0.1344	-0.0837	-0.0740	0.0717	0.0231	-0.1201	0.0710	1.0000									
DI_Guerrilla-e	0.0484	-0.0953	-0.1411	-0.1268	0.0162	-0.0250	0.1627	0.0097	-0.0083	0.5096	0.1236	1.0000								
DI_Crises	-0.0552	-0.0276	-0.0771	0.0102	0.0395	0.0331	0.0716	0.0203	-0.0208	0.1005	0.1638	0.1089	1.0000							
DI_Purges	0.0105	0.0323	0.1075	-0.0861	-0.1776	-0.0560	0.1313	-0.1398	-0.1383	-0.0397	0.2553	-0.0319	0.1150	1.0000						
DI_Riots	0.0189	-0.1307	0.0361	-0.1047	-0.1687	-0.0250	0.1109	-0.0959	-0.1958	0.0452	0.5394	0.0977	0.1394	0.1289	1.0000					
DI_Revolut-s	0.0187	-0.1299	-0.1904	-0.1832	-0.0575	0.0139	0.1795	-0.0004	-0.0491	0.3675	0.0241	0.5077	0.1304	0.0228	0.0092	1.0000				
DI_Coups	0.1066	0.0040	0.0853	-0.0320	-0.0636	-0.1094	0.0432	-0.0302	-0.0010	0.0011	-0.0163	0.0220	0.0126	-0.0082	-0.0156	0.1048	1.0000			
DI_Const_C-s	0.0156	-0.1054	0.0014	-0.0758	-0.1425	-0.0335	0.1052	-0.0533	-0.0612	0.0010	0.2073	-0.0450	0.0083	0.0753	0.2130	0.0339	0.1474	1.0000		
Polity2	-0.1845	0.2874	-0.0509	0.4577	0.8041	0.0994	-0.6963	0.6229	0.6036	0.0316	-0.0953	0.0341	0.0933	-0.2045	-0.1618	-0.0170	-0.0630	-0.1245	1.0000	
ICRG_Milit-s	-0.3254	0.3633	0.2052	0.5023	0.5421	0.1999	-0.5483	0.3822	0.3898	-0.2077	-0.1935	-0.3211	-0.1051	-0.1357	-0.1903	-0.2906	-0.0974	-0.1138	0.4882	1.0000
ICRG_Democr-t	-0.1859	0.3254	0.1554	0.4100	0.5715	0.1130	-0.7222	0.5704	0.4435	-0.1293	-0.0542	-0.1898	-0.0948	-0.1015	-0.0941	-0.1403	-0.0616	-0.0957	0.6026	0.6226
ICRG_Inter-t	-0.2094	0.3165	0.2241	0.3202	0.2191	0.1688	-0.4043	0.2416	0.1936	-0.3496	-0.1836	-0.5042	-0.1530	0.0493	-0.2021	-0.3193	-0.0754	-0.0375	0.1623	0.6901
ICRG_D-t ICRG_I-t																				
ICRG_Democr-t	1.0000																			
ICRG_Inter-t	0.5050	1.0000																		

Eigenvalues, Variance explained in the rotated solution:

**factor DI_RegimeType DI_EffExecutive DI_EffExSelect DI_ParliamRespons DI_LegisEffect
DI_LegisSelection Freedom_of_the_Press CIRI_AssAssociation CIRI_FreedomOfReligion
DI_Assassinations DI_Strikes DI_GuerrWarfare DI_Crises DI_Purges DI_Riots DI_Revolutions
DI_Coups DI_Const_Changes Polity2 ICRG_Military_In_Politics ICRG_DemAccount
ICRG_Internal_Conflict, pcf**

rotate, oblique promax(3)

Factor analysis/correlation
Method: principal-component factors
Rotation: oblique promax (Kaiser off)

Number of obs = **1340**
Retained factors = **6**
Number of params = **117**

Factor	Variance	Proportion	Rotated factors are correlated
Factor1	5.18489	0.2357	
Factor2	3.04095	0.1382	
Factor3	2.63425	0.1197	
Factor4	2.18222	0.0983	
Factor5	2.10646	0.0957	
Factor6	1.25897	0.0571	

LR test: independent vs. saturated: $\chi^2(231) = 1.2e+04$ Prob> $\chi^2 = 0.0000$

Loadings matrix:

Rotated factor loadings (pattern matrix) and unique variances

Variable	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	Uniqueness
DI_RegimeT-e	-0.0254	0.0124	0.0611	-0.0396	-0.8267	0.0020	0.3154
DI_EffExec-e	0.1789	0.0842	0.7841	-0.0623	-0.0286	-0.0088	0.3138
DI_EffExSe-t	-0.1633	-0.0434	0.8852	0.0395	-0.0452	0.1223	0.2485
DI_Parliam-s	0.3442	-0.0107	0.5497	-0.0242	0.0802	-0.0181	0.4342
DI_LegisE-t	0.8064	0.1576	0.1341	-0.0133	0.0895	-0.0591	0.2432
DI_LegisS-n	-0.1391	0.0430	0.0020	-0.0713	0.8537	-0.0135	0.3153
Freedom_of-s	-0.8653	0.1336	-0.1332	-0.0667	0.1895	-0.0047	0.2010
CIRI_AssAs-n	0.8525	0.0021	-0.2569	0.1092	0.0063	0.0532	0.3424
CIRI_Freed-n	0.8103	0.0330	-0.1773	-0.0661	-0.0915	0.0699	0.3935
DI_Assasin-s	0.0890	0.6992	-0.0883	-0.0195	0.1210	0.0016	0.4881
DI_Strikes	0.1305	0.0208	-0.0576	0.8609	-0.0517	0.0190	0.2751
DI_GuerrWa-e	0.0774	0.8737	0.1026	0.0217	-0.0037	-0.0241	0.2912
DI_Cri ses	0.0670	0.2928	0.0777	0.3545	0.1126	-0.1430	0.7555
DI_Purges	-0.2042	-0.0674	0.2255	0.4395	-0.0025	-0.0715	0.7077
DI_Riots	-0.0089	0.0071	0.0180	0.7860	0.0051	0.0480	0.3750
DI_Revolut-s	-0.0031	0.7263	0.0176	-0.0834	0.1271	0.1823	0.4610
DI_Coups	0.0013	0.1565	0.2004	-0.1296	-0.1085	0.7833	0.3375
DI_Const_C-s	-0.0193	-0.1161	-0.0870	0.3310	0.1261	0.6830	0.3873
Polity2	0.9176	0.1683	0.0000	0.0090	-0.0256	-0.0569	0.1886
ICRG_Milit-s	0.4755	-0.3754	0.1262	-0.1018	0.2503	-0.0207	0.2799
ICRG_DemAc-t	0.7505	-0.2127	0.0658	0.0770	0.0166	0.0223	0.3156
ICRG_Inter-t	0.1754	-0.6391	0.0907	-0.0917	0.2196	0.0356	0.3290

Factor rotation matrix:

Factor rotation matrix

	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6
Factor1	0.9290	-0.4543	0.4761	-0.3343	0.3879	-0.1539
Factor2	0.3393	0.8076	-0.4383	0.0715	0.0459	-0.0259
Factor3	0.0470	-0.0264	0.2449	0.9118	0.1088	0.1284
Factor4	0.0876	0.0525	0.1964	-0.0539	-0.8601	0.2951
Factor5	-0.1089	0.3713	0.6917	-0.1703	0.2066	-0.1058
Factor6	0.0059	-0.0125	-0.0652	-0.1405	0.2304	0.9279

Saving the scores for the factors using the Bartlett method:

predict f1 f2 f3 f4 f5 f6, Bartlett

Scoring coefficients (method = Bartlett; based on promax(3) rotated factors)

Variable	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6
DI_RegimeT-e	-0.01654	-0.00947	0.01222	-0.04594	-0.50030	-0.01108
DI_EffExec-e	0.01774	0.04089	0.38068	-0.01882	0.00086	-0.07340
DI_EffExSe-t	-0.05795	-0.02548	0.54000	0.05713	-0.01251	0.04776
DI_Parliam-s	0.03756	0.00072	0.19225	-0.00144	0.04617	-0.04180
DI_LegislE-t	0.18405	0.09879	0.07406	-0.02100	0.09112	-0.07304
DI_LegislS-n	-0.01107	0.03462	0.02030	-0.01442	0.51354	-0.00259
Freedom_of-s	-0.22992	0.09094	-0.07134	-0.03182	0.15698	-0.00952
CIRI_AssAs-n	0.14311	0.00204	-0.13234	0.03326	0.01343	0.07878
CIRI_Freed-n	0.11961	0.01189	-0.09022	-0.05681	-0.03841	0.08363
DI_Assasi-n-s	0.01485	0.19927	-0.02624	-0.01128	0.05492	-0.00038
DI_Strikes	0.00578	0.00297	-0.00844	0.58880	-0.00551	-0.03717
DI_GuerrWa-e	0.01602	0.41529	0.05923	0.01135	0.01882	-0.05563
DI_Crises	0.00113	0.05492	0.02653	0.09458	0.03540	-0.07392
DI_Purges	-0.02326	-0.01379	0.05957	0.12596	0.00489	-0.05519
DI_Rlots	-0.01534	-0.00232	0.02407	0.39825	0.02274	-0.00591
DI_Revolut-s	0.00665	0.21689	-0.00330	-0.04317	0.06175	0.11788
DI_Coups	0.01293	0.04838	0.02115	-0.12096	-0.04993	0.71794
DI_Const_C-s	0.00467	-0.05312	-0.07407	0.12750	0.07304	0.54607
Polity2	0.27138	0.13140	-0.02091	-0.02142	0.00055	-0.07202
ICRG_Milit-s	0.09663	-0.17573	0.06189	-0.06448	0.16986	-0.00552
ICRG_DemAc-t	0.13006	-0.08995	0.01737	0.03236	0.02069	0.03068
ICRG_Inter-t	0.03097	-0.26329	0.03556	-0.04655	0.11814	0.05077

Asking for the correlation coefficients between the rotated factors

correlate f1 f2 f3 f4 f5 f6

	f1	f2	f3	f4	f5	f6
f1	1.0000					
f2	-0.1810	1.0000				
f3	0.2419	-0.3041	1.0000			
f4	-0.2296	0.1233	-0.0722	1.0000		
f5	0.2831	-0.1075	0.1507	-0.0430	1.0000	
f6	-0.1021	0.0056	-0.1109	0.0250	-0.1105	1.0000

E.1.2 Institutional Indicators:

Correlation Matrix of initial variables

**correlate EFW_Labor_Market_Regulations ICRG_Corruption ICRG_Investment_Profile
HF_Business_Freedom HF_Monetary_Freedom HF_Trade_Freedom HF_Investment_Freedom
HF_Financial_Freedom**

	EFW_La~s	ICRG_C~n	ICRG_I~e	HF_Bus~m	HF_Mon~m	HF_Tra~m	HF_Inv~m	HF_Fin~m
EFW_Labor~s	1.0000							
ICRG_Corru~n	0.0551	1.0000						
ICRG_Inves~e	0.2609	0.2440	1.0000					
HF_Busi nes~m	0.2710	0.6014	0.3258	1.0000				
HF_Monetar~m	0.3129	0.3897	0.3863	0.5110	1.0000			
HF_Trade_F~m	0.0006	0.4996	0.2659	0.5711	0.4108	1.0000		
HF_Investm~m	0.1362	0.4683	0.3612	0.6742	0.5280	0.5392	1.0000	
HF_Fi nanci ~m	0.2919	0.4867	0.3294	0.6371	0.4869	0.5222	0.7310	1.0000

Assumptions:

Kaiser Meyer Olkin measure of sample adequacy:

estat KMO (after factor analysis is carried out)

Kaiser-Meyer-Olkin measure of sampling adequacy

Variable	kmo
EFW_Labor_~s	0. 5141
ICRG_Corru~n	0. 8637
ICRG_Inves~e	0. 8978
HF_Busines~m	0. 8534
HF_Monetar~m	0. 9022
HF_Trade_F~m	0. 8871
HF_Investm~m	0. 8100
HF_Financi~m	0. 8384
Overall	0. 8386

Factor analysis

**factor EFW_Labor_Market_Regulations ICRG_Corruption ICRG_Investment_Profile
HF_Business_Freedom HF_Monetary_Freedom HF_Trade_Freedom
HF_Investment_Freedom HF_Financial_Freedom, pcf**

Factor analysis/correlation
Method: principal-component factors
Rotation: (unrotated)

Number of obs = **1380**
Retained factors = **2**
Number of params = **15**

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor1	3. 99824	2. 84426	0. 4998	0. 4998
Factor2	1. 15398	0. 41884	0. 1442	0. 6440
Factor3	0. 73514	0. 15610	0. 0919	0. 7359
Factor4	0. 57904	0. 04881	0. 0724	0. 8083
Factor5	0. 53023	0. 06843	0. 0663	0. 8746
Factor6	0. 46179	0. 13566	0. 0577	0. 9323
Factor7	0. 32613	0. 11070	0. 0408	0. 9731
Factor8	0. 21544	.	0. 0269	1. 0000

LR test: independent vs. saturated: $\chi^2(28) = 4663.07$ Prob> $\chi^2 = 0.0000$

Factor loadings (pattern matrix) and unique variances

Variable	Factor1	Factor2	Uniqueness
EFW_Labor_~s	0. 3286	0. 8205	0. 2188
ICRG_Corru~n	0. 6963	-0. 3212	0. 4120
ICRG_Inves~e	0. 5249	0. 4019	0. 5629
HF_Busines~m	0. 8487	-0. 0721	0. 2745
HF_Monetar~m	0. 7167	0. 2339	0. 4317
HF_Trade_F~m	0. 7168	-0. 3776	0. 3437
HF_Investm~m	0. 8347	-0. 1168	0. 2896
HF_Financi~m	0. 8278	0. 0058	0. 3147

Conduct an oblique rotation

rotate, oblique promax(3)

Factor analysis/correlation Number of obs = **1380**
 Method: principal-component factors Retained factors = **2**
 Rotation: oblique promax (Kaiser off) Number of params = **15**

Factor	Variance	Proportion	Rotated factors are correlated
Factor1	3.89826	0.4873	
Factor2	1.92392	0.2405	

LR test: independent vs. saturated: $\chi^2(28) = 4663.07$ Prob> $\chi^2 = 0.0000$

Rotated factor loadings (pattern matrix) and unique variances

Variable	Factor1	Factor2	Uniqueness
EFW_Labor_~s	-0.1562	0.9265	0.2188
ICRG_Corru~n	0.8135	-0.1975	0.4120
ICRG_Inves~e	0.2554	0.5267	0.5629
HF_Busi nes~m	0.8141	0.0943	0.2745
HF_Monetar~m	0.5237	0.3888	0.4317
HF_Trade_F~m	0.8635	-0.2525	0.3437
HF_Investm~m	0.8262	0.0446	0.2896
HF_Financi ~m	0.7518	0.1718	0.3147

Factor rotation matrix

	Factor1	Factor2
Factor1	0.9823	0.5203
Factor2	-0.1875	0.8540

Saving the factor scores

predict f1 f2 , Bartlett

Scoring coefficients (method = Bartlett; based on promax(3) rotated factors)

Variable	Factor1	Factor2
EFW_Labor_~s	-0.05220	0.81595
ICRG_Corru~n	0.17499	-0.08722
ICRG_Inves~e	0.04304	0.18197
HF_Busi nes~m	0.26570	0.07445
HF_Monetar~m	0.11076	0.17730
HF_Trade_F~m	0.22232	-0.13512
HF_Investm~m	0.25511	0.03748
HF_Financi ~m	0.21476	0.11195

Correlation between the two extracted factors

Correlate f1 f2

	f1	f2
f1	1.0000	
f2	0.3458	1.0000

E.2 Dynamic Panel Data Analysis

Declaration of panel data:

Xtset cid year

```
panel variable:  cid (strongly balanced)
time variable:  year, 1984 to 2006
delta:         1 year
```

Estimation of the full model:

```
xtabond2 fdlogGDP L5.logGDP L1.(dem_f1 dem_f2 dem_f3 dem_f4 dem_f5 dem_f6 inst_f1
inst_f2 dem1inst1 dem2inst1 dem3inst1 dem4inst1 dem5inst1 dem6inst1 dem1inst2 dem2inst2
dem3inst2 dem4inst2 dem5inst2 dem6inst2) L4.(logGFIInv logCreditGDP logGovCons
logFertility logLifeExpect logTradeOpeness logPopGrowth logAgrSector logInfl logSchoolEnr ),
gmm(logGDP logGFIInv logCreditGDP logGovCons logTradeOpeness logAgrSector logInfl
logSchoolEnr dem_f1 dem_f2 dem_f3 dem_f4 dem_f5 dem_f6 inst_f1 inst_f2 dem1inst1
dem2inst1 dem3inst1 dem4inst1 dem5inst1 dem6inst1 dem1inst2 dem2inst2 dem3inst2
dem4inst2 dem5inst2 dem6inst2, lag(7 9) collapse) iv(L.( logFertility logLifeExpect
logPopGrowth )) twostep
```

Favoring space over speed. To switch, type or click on `mata: mata set matafavor speed, perm`.

Warning: Number of instruments may be large relative to number of observations.

Warning: Two-step estimated covariance matrix of moments is singular.

Using a generalized inverse to calculate optimal weighting matrix for two-step estimation.

Difference-in-Sargan statistics may be negative.

Dynamic panel-data estimation, two-step system GMM

Group variable: cid	Number of obs	=	734
Time variable : year	Number of groups	=	54
Number of instruments = 116	Obs per group: min	=	0
Wald chi2(31) = 1029.98	avg	=	13.59
Prob > chi2 = 0.000	max	=	18

fdlogGDP	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
logGDP						
L5.	-.1495867	.0486738	-3.07	0.002	-.2449856	-.0541877
dem_f1						
L1.	.123841	.0805031	1.54	0.124	-.0339422	.2816242
dem_f2						
L1.	-.0046656	.0328187	-0.14	0.887	-.0689891	.0596578
dem_f3						
L1.	-.0144455	.0512554	-0.28	0.778	-.1149043	.0860132
dem_f4						
L1.	.0616627	.0344841	1.79	0.074	-.0059248	.1292503
dem_f5						
L1.	.0002865	.0168321	0.02	0.986	-.0327038	.0332768
dem_f6						
L1.	-.0168727	.024119	-0.70	0.484	-.064145	.0303995
inst_f1						
L1.	.026098	.0459004	0.57	0.570	-.0638651	.1160611
inst_f2						
L1.	.1057372	.0352932	3.00	0.003	.0365638	.1749106
dem1inst1						
L1.	.0936387	.0331221	2.83	0.005	.0287206	.1585568
dem2inst1						
L1.	-.0240413	.0267695	-0.90	0.369	-.0765086	.028426
dem3inst1						
L1.	-.0693054	.0398476	-1.74	0.082	-.1474051	.0087944
dem4inst1						
L1.	.0054062	.0278973	0.19	0.846	-.0492716	.0600839
dem5inst1						
L1.	.0810146	.0413466	1.96	0.050	-.0000232	.1620524
dem6inst1						
L1.	-.0583649	.0460894	-1.27	0.205	-.1486985	.0319687
dem1inst2						
L1.	-.0382585	.0222347	-1.72	0.085	-.0818377	.0053207
dem2inst2						
L1.	-.0169522	.0240181	-0.71	0.480	-.0640268	.0301225
dem3inst2						
L1.	.0291563	.0163313	1.79	0.074	-.0028526	.0611651
dem4inst2						
L1.	.0075023	.0192708	0.39	0.697	-.0302678	.0452723
dem5inst2						
L1.	-.022502	.090957	-0.25	0.805	-.2007745	.1557705
dem6inst2						
L1.	.0561562	.0206973	2.71	0.007	.0155902	.0967222

logGFIInv						
L4.	-.1785278	.050575	-3.49	0.000	-.275653	-.0774027
logCreditGDP						
L4.	.0270663	.0448109	0.60	0.546	-.0607615	.1148941
logGovCons						
L4.	-.0998212	.098755	-1.01	0.312	-.2933775	.093735
logFertility						
L4.	.0520177	.1683306	0.31	0.757	-.2779042	.3819396
logLifeExp-t						
L4.	1.305736	1.003672	1.30	0.193	-.6614253	3.272897
logTradeOp-s						
L4.	.1084494	.0830609	1.31	0.192	-.054347	.2712459
logPopGrowth						
L4.	-.0340884	.0399405	-0.85	0.393	-.1123704	.0441935
logAgrSector						
L4.	.0483049	.0732327	0.66	0.510	-.0952285	.1918383
logInfl						
L4.	.0116247	.0151318	0.77	0.442	-.018033	.0412825
logSchoolEnr						
L4.	.1066284	.0544561	1.96	0.050	-.0001035	.2133604
_cons	-4.512193	4.407254	-1.02	0.306	-13.15025	4.125867

Warning: Uncorrected two-step standard errors are unreliable.

Instruments for first differences equation

Standard

D. (L.logFertility L.logLifeExpect L.logPopGrowth)

GMM-type (missing=0, separate instruments for each period unless collapsed)

L(7/9). (logGDP logGFIInv logCreditGDP logGovCons logTradeOpeness

logAgrSector logInfl logSchoolEnr dem_f1 dem_f2 dem_f3 dem_f4 dem_f5

dem_f6 inst_f1 inst_f2 dem1inst1 dem2inst1 dem3inst1 dem4inst1 dem5inst1

dem6inst1 dem1inst2 dem2inst2 dem3inst2 dem4inst2 dem5inst2 dem6inst2)

collapsed

Instruments for levels equation

Standard

_cons

L.logFertility L.logLifeExpect L.logPopGrowth

GMM-type (missing=0, separate instruments for each period unless collapsed)

DL6. (logGDP logGFIInv logCreditGDP logGovCons logTradeOpeness logAgrSector

logInfl logSchoolEnr dem_f1 dem_f2 dem_f3 dem_f4 dem_f5 dem_f6 inst_f1

inst_f2 dem1inst1 dem2inst1 dem3inst1 dem4inst1 dem5inst1 dem6inst1

dem1inst2 dem2inst2 dem3inst2 dem4inst2 dem5inst2 dem6inst2) collapsed

Arellano-Bond test for AR(1) in first differences: z = -3.47 Pr > z = 0.001

Arellano-Bond test for AR(2) in first differences: z = -1.37 Pr > z = 0.172

Sargan test of overid. restrictions: chi2(84) = 98.62 Prob > chi2 = 0.132
(Not robust, but not weakened by many instruments.)

Hansen test of overid. restrictions: chi2(84) = 23.97 Prob > chi2 = 1.000
(Robust, but can be weakened by many instruments.)

Difference-in-Hansen tests of exogeneity of instrument subsets:

GMM instruments for levels

Hansen test excluding group: chi2(56) = 26.41 Prob > chi2 = 1.000

Difference (null H = exogenous): chi2(28) = -2.44 Prob > chi2 = 1.000

iv(L.logFertility L.logLifeExpect L.logPopGrowth)

Hansen test excluding group: chi2(81) = 22.98 Prob > chi2 = 1.000

Difference (null H = exogenous): chi2(3) = 0.99 Prob > chi2 = 0.804

Estimation of the reduced model:

xtabond2 fdlogGDP L5.logGDP L1.(dem_f1 dem_f2 dem_f3 dem_f4 dem_f5 dem_f6 inst_f1
inst_f2) L4.(logGFIInv logCreditGDP logGovCons logFertility logLifeExpect logTradeOpeness
logPopGrowth logAgrSector logInfl logSchoolEnr), gmm(logGDP logGFIInv logCreditGDP
logGovCons logTradeOpeness logAgrSector logInfl logSchoolEnr dem_f1 dem_f2 dem_f3
dem_f4 dem_f5 dem_f6 inst_f1 inst_f2, lag(7 9) collapse) iv(L.(logFertility logLifeExpect
logPopGrowth)) twostep

Favoring space over speed. To switch, type or click on mata: mata set matafavor speed, perm.

Warning: Number of instruments may be large relative to number of observations.

Warning: Two-step estimated covariance matrix of moments is singular.

Using a generalized inverse to calculate optimal weighting matrix for two-step estimation.

Difference-in-Sargan statistics may be negative.

Dynamic panel-data estimation, two-step system GMM

Group variable: cid	Number of obs	=	734
Time variable: year	Number of groups	=	54
Number of instruments = 68	Obs per group: min	=	0
Wald chi2(19) = 6834.29	avg	=	13.59
Prob > chi2 = 0.000	max	=	18

fdl logGDP	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
logGDP						
L5.	-.0612352	.0265454	-2.31	0.021	-.1132633	-.009207
dem_f1						
L1.	-.0616287	.0304307	-2.03	0.043	-.1212718	-.0019855
dem_f2						
L1.	.0282262	.0085738	3.29	0.001	.0114219	.0450305
dem_f3						
L1.	.0501216	.0168369	2.98	0.003	.0171219	.0831214
dem_f4						
L1.	.0373876	.0162075	2.31	0.021	.0056215	.0691538
dem_f5						
L1.	.0131641	.0071379	1.84	0.065	-.0008259	.0271541
dem_f6						
L1.	-.0197279	.0077289	-2.55	0.011	-.0348762	-.0045795
inst_f1						
L1.	.0956249	.0211972	4.51	0.000	.0540791	.1371707
inst_f2						
L1.	.1218483	.0315798	3.86	0.000	.059953	.1837436
logGFIInv						
L4.	-.1908686	.0632427	-3.02	0.003	-.3148221	-.0669151
logCreditGDP						
L4.	-.076655	.0264939	-2.89	0.004	-.1285821	-.024728
logGovCons						
L4.	-.1427703	.0673821	-2.12	0.034	-.2748368	-.0107038
logFertility						
L4.	-.3492236	.1115398	-3.13	0.002	-.5678376	-.1306095
logLifeExp~t						
L4.	.4579532	.8599859	0.53	0.594	-1.227588	2.143495
logTradeOp~s						
L4.	-.0176018	.0407341	-0.43	0.666	-.0974391	.0622356
logPopGrowth						
L4.	.0049804	.016731	0.30	0.766	-.0278118	.0377726
logAgrSector						
L4.	.0593874	.0407662	1.46	0.145	-.0205128	.1392875
logInfl						
L4.	.0318192	.0077241	4.12	0.000	.0166803	.0469582
logSchoolEnr						
L4.	.0009671	.0334263	0.03	0.977	-.0645472	.0664815
_cons	.0538891	3.830578	0.01	0.989	-7.453906	7.561684

Warning: Uncorrected two-step standard errors are unreliable.

Instruments for first differences equation

Standard

D. (L.logFertility L.logLifeExpect L.logPopGrowth)

GMM-type (missing=0, separate instruments for each period unless collapsed)

L(7/9). (logGDP logGFIInv logCreditGDP logGovCons logTradeOpeness

logAgrSector logInfl logSchoolEnr dem_f1 dem_f2 dem_f3 dem_f4 dem_f5

dem_f6 inst_f1 inst_f2) collapsed

Instruments for levels equation

Standard

_cons

L.logFertility L.logLifeExpect L.logPopGrowth

GMM-type (missing=0, separate instruments for each period unless collapsed)

DL6. (logGDP logGFIInv logCreditGDP logGovCons logTradeOpeness logAgrSector

logInfl logSchoolEnr dem_f1 dem_f2 dem_f3 dem_f4 dem_f5 dem_f6 inst_f1

inst_f2) collapsed

Arellano-Bond test for AR(1) in first differences: z = **-3.97** Pr > z = **0.000**
 Arellano-Bond test for AR(2) in first differences: z = **-1.73** Pr > z = **0.084**

Sargan test of overid. restrictions: chi2(48) = **58.27** Prob > chi2 = **0.147**
 (Not robust, but not weakened by many instruments.)

Hansen test of overid. restrictions: chi2(48) = **36.88** Prob > chi2 = **0.879**
 (Robust, but can be weakened by many instruments.)

Difference-in-Hansen tests of exogeneity of instrument subsets:

GMM instruments for levels

Hansen test excluding group: chi2(32) = **36.16** Prob > chi2 = **0.280**

Difference (null H = exogenous): chi2(16) = **0.71** Prob > chi2 = **1.000**

iv(L.logFertility L.logLifeExpect L.logPopGrowth)

Hansen test excluding group: chi2(45) = **32.37** Prob > chi2 = **0.921**

Difference (null H = exogenous): chi2(3) = **4.51** Prob > chi2 = **0.211**