Fundamental Variables in the Analysis of Economic Growth in Latin America

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Abstract

This thesis analyses the fundamental causes of economic growth in Latin America. Growth determinants can be distinguished between *proximate* and *fundamental*. Variables such as technology, investments in human and physical capital are considered to be proximate growth determinants. Better technology and greater accumulation of capital are related to greater growth, but in order to fully understand what causes growth, we need to explain why some countries invest more in technology and capital than others. This requires the analysis of more fundamental sources of growth. The focus of this thesis lies on *institutions* as fundamental cause of Latin American growth. The reasons for this are provided in Chapter 2. In particular, three different analyses show the relevance of institutions for the region's growth. First, a qualitative analysis that replicates Glaeser et al.'s work [2004] shows that institutions are more fundamental than human capital. Second, in a Barro-regression applied to a Latin American panel data, institutional variables are statistically significant. Finally, institutions are also crucial in explaining episodes of rapid growth in the region. However, even if *fundamental*, institutions are *endogenous* to the growth process (i.e. these improve with higher levels of income), and we need to explain what determines the character of these institutions. The rest of the thesis unveils how Latin American institutions originate and evolve. Chapter 3 analyses the colonial origins of institutions. The results show that, although some colonial factors have affected the evolution of institutions in Latin America, they are not the ones typically highlighted in the literature (e.g. European settler mortality). The origins of Latin American institutions are better explained by British colonial rule and colonial resource endowments. There is also no evidence that current institutions reflect early ones (there is weak correlation between early and current institutions). Chapter 4 takes up this challenge by examining how institutions have evolved since independence. The evolution of Latin American institutions is explained by using a two equation model for the interrelationship between inequality and institutions. The results show that inequality is an outcome of the colonial resource endowment, and that the discovery of oil and gas negatively affects the evolution of political institutions in the region. Finally, there is a bilateral causality between inequality and institutions in Latin America: poor institutional quality results in higher degree of inequality and institutions are negatively affected by inequality so that these two variables reinforce each other.

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1. Introduction

This thesis is concerned with what explains growth in Latin America and the Caribbean[1]. Economic growth has important implications on a country's development (e.g. helps to reduce poverty, improves living standards), therefore understanding its determinants has been an important part of the research agenda in economics.

The literature distinguishes between *proximate* and *fundamental* causes of growth. Proximate causes are immediate factors responsible for the functioning of the growth process and can be seen as mechanisms that enable growth. Fundamental (or ultimate) causes refer to the conditions that led to a given growth outcome and explain why certain mechanisms are favoured. Early studies on growth find that technological progress and accumulation of human and physical capital are the main variables to explain differences in growth paths across countries. However, these are considered only proximate causes of growth. Although improvements in technology and greater accumulation of capital foster economic growth, in order to fully understand what causes growth, we need to explain why some countries invest more in technology and capital. This requires the study of more fundamental variables.

Economic policies, institutions, and geographical features are the favourite candidates for fundamental variables. This thesis focusses on institutions as fundamental cause of

[1]Economic growth in Latin America and the Caribbean has been low in the period 1960-2010. The region grew at a rate of 1.32% below the world average of 1.83% but also below other developing areas of the world.

Latin American and Caribbean growth. The reason for this is found in the evidence shown in Chapter 2 which reviews the region's growth since 1960 using three different analyses. First, it engages with the contrary argument from Glaeser et al. [2004] for which human capital is more fundamental than institutions for explaining growth. While the authors' qualitative analysis shows that initial human capital explains better than institutions the different growth paths in developing countries, the same analysis for Latin America shows that low initial levels of institutions are detrimental for the region's growth. The second analysis is based on a Barro-regression for a panel data of Latin American and Caribbean countries in which institutional variables are statistically significant. Finally, following the works of Hausmann, Pritchett, and Rodrik [2005] and Sen [2013], Chapter 2 shows that institutions matter for explaining growth accelerations (episodes of rapid growth) in Latin America and the Caribbean.

Even if institutions are fundamental for the growth of Latin American economies, it does not mean they are *exogenous* to the growth process. Exogenous variables are not systematically affected by changes in the other variables in the model, including the dependent variable. Therefore, in a model, a variable is *endogenous* if it is at least partly function of other parameters and variables within the model. Most of the variables used as causes of growth suffer from *endogeneity* issues (e.g. higher economic growth increases investments in technology and in physical and human capital). In the case of institutions, these are a function of the levels of growth and development of a country so that *richer countries can afford better institutions.*

The presence of endogenous variables as explanatory variables in economic models creates significant difficulties for the empirical estimation of these models. While instrumental variable (IV) estimations are a very popular tool to deal with endogeneity issues in Barro-regressions, to find good instruments for institutions is not an easy task and wrong instruments make the estimates inconsistent and biased. The analysis in

Chapter 2 uses system generalised method of moments estimators (GMM). Given the milder initial assumptions, this method provides consistent estimators while it deals with endogeneity.

To know that institutions are fundamental for growth and endogenous to the process leaves an open question: what are the origins of Latin American and Caribbean institutions? Many scholars argue that, for former colonies, current institutions are an outcome of the colonial times. This literature is based on two hypotheses. One is that the character of the early institutions (institutions in the first years after independence) depends on some aspects of the colonial experience. The second hypothesis is that the quality of current institutions depends on their character at the time of the independence.

Chapter 3 investigates whether these two hypothesis apply for Latin America and the Caribbean. With respect to the first hypothesis, neither the specific features that Acemoglu et al. [2001] (European settlements) nor Mahoney [2010] (native populations) identify appear to explain differences in institutions at the time of independence in Latin America. However, quality of institutions at the time of independence is indeed affected by two colonial features: the coloniser power and the natural resources of the country at the time. Furthermore, although institutions in general tend to be highly persistent, early and current institutions are not highly correlated in Latin America, i.e. the Latin American evidence counts against the second of these hypotheses.

Thus, while the character of institutions at the time of independence is not such a puzzle, their evolution since independence is. This reflects the endogeneity of institutions: they change with the process so the evolution of institutions is affected by other parameters within the model.

Chapter 4 proposes a theory of how to explain the evolution of institutions in Latin America since independence, focussing on three distinctive features of these economies:

political instability, high levels of inequality, and the dependency of natural resources. This chapter proposes a two equation model for inequality and political institutions. These equations are jointly estimated using a panel data over the period 1905-2010. Building on the insights of the previous chapters, the analysis uses variables that explain the impact of British Empire in the early 20th century through investments and international trade, and the discovery of natural resources (e.g. oil) after independence. The results confirm that bilateral causality exist between political institutions and inequality in Latin America. There is strong evidence that poor institutional quality results in a higher degree of inequality that in turn negatively affects institutions, so that the two variables reinforce each other.

Chapter 5 concludes the thesis and offers a summary of the main findings of this work. There are three appendices where the data and variables used for the empirical analyses are explained more in detail.

2. An Empirical Analysis of Latin American and Caribbean Economic Growth

This chapter investigates the causes of Latin American and Caribbean growth. The countries in the region exhibit a good variety of economic experiences over time and determining the causes of economic growth in Latin America and the Caribbean remains an important task. Modern growth patterns can be distinguished in three sub-periods. The period between 1960 and 1980 features positive growth across most countries in the region; however, this period ends with the growth collapses experiences in the 1980s and 1990s, known in fact as the *lost decades*. Despite differences in current economic conditions across countries, Latin America has experienced a period of solid economic growth since early 2000s. Section 2.1 shows some basic facts of growth in the region in the three different sub-periods.

Literature on the determinants of economic growth is vast. There is a still open debate on the causes growth which has brought scholars to distinguish between *proximate* and *fundamental* causes. The former are immediate factors responsible for the functioning of the growth process and can be seen as mechanisms that enable growth, while the latter refer to the conditions that led to a given growth outcome and explain why certain mechanisms are favoured.

Section 2.2 summarises this literature. Early growth theory finds that technical progress and investments in physical and human capital are the key determinants of a country's growth. Nonetheless, these are considered to be only *proximate* causes. Better technology and higher accumulation of capital foster economic growth, but we do not know *why poor countries fail in investing more in physical and human capital and in technological improvement?* This requires the study of more *fundamental* causes. Empirical literature prompts policies, institutions and geographical conditions as fundamental causes of growth.

This thesis focuses on institutions. This is due to the evidence of this chapter which shows that institutions are fundamental for growth in Latin America and the Caribbean. As matter of fact, the relevance of institutions comes from three different analyses. First, Section 2.3 considers the contrary argument from Glaeser et al. [2004] who argue that human capital is more fundamental than institutions for explaining growth. They conclude that countries needs to invest in increasing their human capital in order to get out of poverty. As result, more educated people with higher income will demand better institutions. However, the results of replicating the same analysis show that, in the case of Latin America and the Caribbean, initial levels of institutions in 1960 are a better candidate for explaining the growth path of these countries between 1960 and 2010.

The empirical analysis of Section 2.4 confirms the importance of institutions. This section uses a Barro-regression for a panel data of Latin America and Caribbean countries in which growth is the dependent variable and various measures of proximate and fundamental causes are used as explanatory variables. The results show that institutions are always statistically significant in explaining average growth rates in the region, while human capital loses significance once fundamental variables are included in the regression. In order to deal with the endogeneity issues, a system generalised

method of moments estimation (GMM) is considered. This estimation offers few advantages on the alternative techniques (IV regressions). For instance, the estimation relies on mild, plausible assumptions which do not require the residuals to be uncorrelated with past specifications of the independent variables and provides consistent parameter estimates in panel data models with lagged dependent variables and unobserved time-invariant individual-specific effects. Even in presence of measurement error and endogenous right-hand-side variables, with the right choice of moments conditions, we can obtain consistent parameter estimates.

Finally, the analysis in Section 2.5 shows that institutions matter also for explaining the episodes of growth acceleration in the region. Pritchett [2000] shows that developing countries have distinct patterns of growth characterised by several rapid episodes of growth (growth accelerations) followed by periods of stagnation, decline or even catastrophic falls. Rapid episodes of growth are important for these economies because they allow to close the development gap with advanced economies. The discussion of stylised facts of Latin American and Caribbean growth in Section 2.1 shows that the greatest improvements in general welfare in the region occur during periods of growth acceleration, mainly in late 1960s and 1970s and more recently in 2000s. Section 2.5 shows that favourable terms of trade promotes growth accelerations in Latin America, but that political instability have negative effects on the probability of observing these episodes.

This chapter offers thus evidence that institutions are fundamental for growth in Latin America. However, the three different analysis do not explain how these institutions were created and how these evolved since early times. These aspects of institutions are going to be studied in the rest of the thesis.

2.1. Some Facts on the Economic Growth of Latin America and the Caribbean in the Last Five Decades

Latin America and the Caribbean grew at an average rate of 1.32% in the period 1960-2010, below the world average growth of 1.83%. There is a high degree of heterogeneity in growth experiences across countries in the region and over the time. In fact, the region of Latin America and the Caribbean shows a high variety and volatility of economic experience in the twentieth century. It started the century as a relatively poor, peripherical region of the world economy and it ended even further behind the world leaders [Taylor, 1999; Solimano and Soto, 2004].

In terms of modern growth patterns, we can distinguish three sub-periods: 1960-1979 (period of positive growth), 1980-1999 (known as lost decades), and 2000-2013 (slow recovery). To have a better idea of the geographical patterns of growth in the region, it is useful to distinguish between Latin American[1] countries and Caribbean[2] ones. Figures (2.1) and (2.2) show the disaggregate data for Latin American and Caribbean countries in the different decades since 1960.

The period of 1960s saw a good growth performance especially for those countries that adopted new strategies of export diversification (leaving behind policies of import substitution). In fact, from the mid-1960s, export promotion policies became a pillar of foreign economic policy in larger Latin American economies such as Argentina, Brazil, Colombia and Mexico [Paiva de Abreu, 2006]. On average, Caribbean countries grew at a higher rate than Latin American ones (3.64% against 2.22%). In fact, with the exception of Dominican Republic and St. Vincent and the Grenadines, all Caribbean

[1] Continental South and Central America: Argentina, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, Venezuela.

[2] Antigua and Barbuda, Bahamas, Barbados, Cuba, Dominica, Dominican Republic, Grenada, Haiti, Jamaica, St. Kittis and Nevis, St. Lucia, St. Vincent and the Grenadines, Trinidad and Tobago.

countries experienced a growth rate above 3 percent. In continental Latin America, only Panama, Nicaragua, Mexico and Brazil reached the same levels of growth.

This trend was maintained in 1970s when Caribbean countries grew on average at a rate of 3.29% against the 2.41% of Latin America. All countries in the region were experiencing a period of economic boom, with few exceptions. In particular Nicaragua, a rapid grower in 1960s, experienced a period of economic slump in 1970s (and 1980s) due to the civil conflict following the Sandinista Revolution and the 1972's earthquake that created several damages in the country. On the Caribbean side, Jamaica also experienced a period of slowdown (that continued into the mid-1980s) after a strong economic growth in 1960s. This growth was fuelled by foreign investments in the main industries of tourism and manufacturing which were heavily affected by the global economy's slowdown in 1970s.

Economic growth in 1960s and mainly in 1970s was driven by the high prices of oil and other commodities of which Latin American countries are producers. The drop in oil prices and the following debt crisis in Latin America at the beginning of 1980s halved the period of economic growth in these countries. Bulmer-Thomas [2006] explain the causes of the crisis as being the small and insufficiently dynamic export sector which was unable to finance the increase in debt service payments, and the rise in the world interest rates that pushed up the cost of servicing the debt. Average growth in Latin America was -0.73% in 1980s this is in sharp contrast with Caribbean countries which experienced a rapid growth spurt in the 1970s that continued in the 1980s (3.38%) fuelled by the expansion of tourism and banana and sugar production under preferential trade arrangements [Acevedo et al., 2013], and large aid inflows that followed independence from the United Kingdom [Thacker et al., 2012].

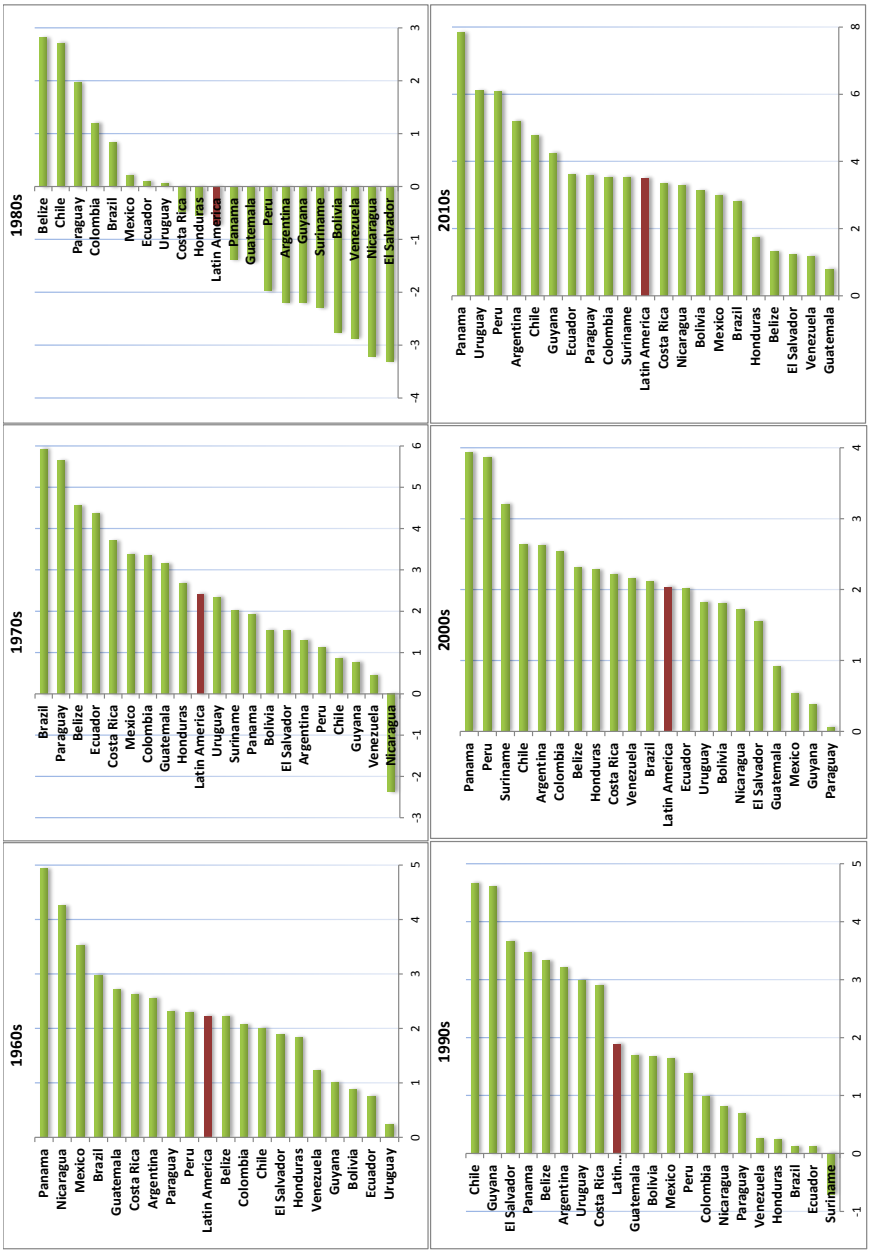
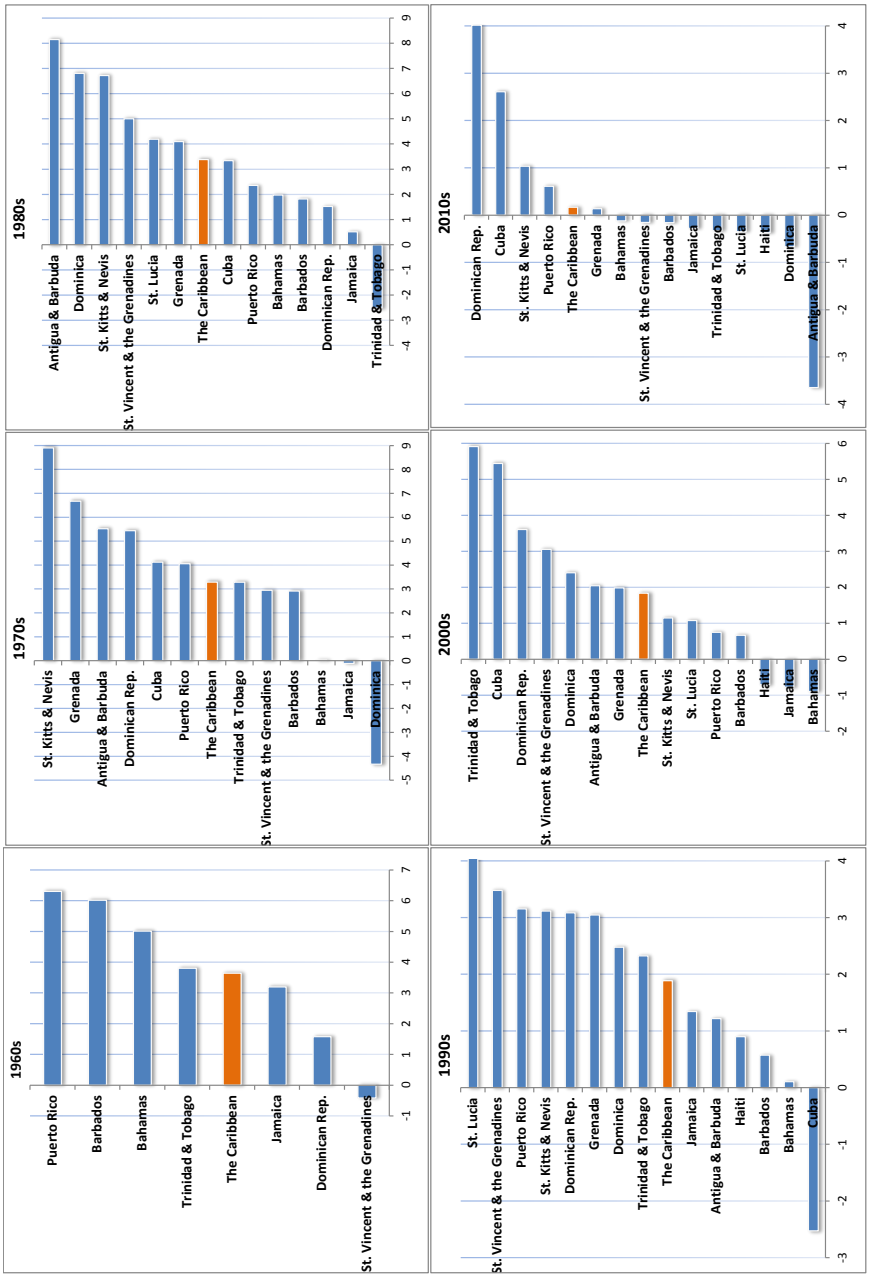


Figure 2.1.: Latin American Economic Growth

Source: World Bank, 2013. Elaborated by the author

Figure 2.2.: Caribbean Economic Growth



Source: World Bank, 2013. Elaborated by the author

The structural economic reforms that took place in Latin America in the late 1980s and early 1990s aimed at exploiting the opportunities provided by international markets were instrumental in putting an end to macroeconomic instability and gave rise to positive rates of growth in 1990s [Ocampo, 2004]. However, the rate of growth of GDP per capita was lower than those which characterised the decades before the debt crisis (1.8%). Although, the economic reforms aimed to steadily increase the inflow of external capital, these were very volatile[3] negatively affecting the region's growth. These effects were magnified by the tendency of adopting pro-cyclical fiscal and monetary policies. About half of the Latin American countries experienced domestic financial crises during the 1990s absorbing considerable fiscal resources and affecting the functioning of the financial systems [Ocampo, 2002; Stiglitz, 2003].

On the other hand, Caribbean countries experienced an economic slowdown in 1990s. This was triggered by the loss of trade preferences to European markets and the deterioration of the terms of trade. Recurring natural disasters also contributed to lower growth and increased fiscal vulnerability [Acevedo et al., 2013].

Despite important differences in current economic conditions within the region, Latin America has experienced a period of solid economic growth since early 2000s. The boom in global demand for commodities (minerals, hydrocarbons, soy and other farm commodities) has been key to the improvement in the macroeconomic performance of the region's exporting countries [ECLAC, 2013]. This demand has allowed commodity exporters to use fiscal savings to stimulate their economies during the 2008's financial crisis. However since 2011, the prices of several export commodities have trended

[3] In early 1990s there was a positive net resource transfers through the capital account and in the second half of the 1990s, foreign direct investment became the leading source of net resource flows to Latin America. The Asian financial crisis of 1997-1998 results in a negative financial flow to Latin America which was exacerbated by the sharp fall foreign direct investment in early 2000s [see Ocampo [2004] for an analysis of the effects of external capital in Latin America]

downwards[4], which has generated a decline in the region terms of trade and in the growth rates.

After reviewing the relevant literature on economic growth, this chapter offers three different analyses that deal with (i) what are the fundamental causes of growth in the region, (ii) what determines long-run average growth rates and, (iii) what are the mechanisms that allow for growth accelerations.

2.2. What Do We Know About What Causes Growth?

Which factors cause countries to grow economically and achieve different levels of wealth is one of the oldest research agendas in Economics. The first relevant work can be attributed to Adam Smith with *"An Inquiry into the Nature and Causes of the Wealth of Nations"* in which Smith emphasises the improvement of efficiency in the use of capital by division of labour and technical progress as a source of growth. David Ricardo also recognises the importance of these factors for growth, but he emphasises the role of the land-labour ratio.

The neo-classical models of economic growth, pioneered by Solow [1956] and Swan [1956] focus on how capital formation and technology could overcome the declining output due to the increasing population and limited land resources emphasised by the classical models. The Solow-type models of growth became the workhorse for the development of this literature. The model is consistent with a number of stylised facts related to economic growth (i.e. the relative constancy over time of capital-output ratio and factor income shares) and emphasises the accumulation of physical capital as major force behind growth. The major innovation introduced was to allow for factor substitutability so that stable equilibrium growth could be obtained [Renelt,

[4]This is due, in part, to the moderate growth in China, the main destination for several of the region's primary products.

1991]. In the long run, the Solow model converges to a steady state with balanced economic growth, where total output, consumption, investment and the capital stock all grow at the same rate (i.e. the sum of the exogenous growth rates of population and productivity). For this reason growth is affected only in the short-run as the economy converges to the new steady state output level.

One of the main sources of criticism of the basic Solow model is the sources of growth are found on exogenous factors (i.e. unexplained technical progress). Developments of this literature attempted to endogenise the key determinants of growth. Romer [1986]; Lucas [1988] extent growth models and find that investments in human capital have positive spillover effects on the economy and reduce the diminishing return to capital accumulation fostering economic growth.

2.2.1. From Proximate to Fundamental Causes of Growth

> "The factors we have listed (innovation, economies of scale, education, capital accumulation, etc) are not causes of growth; they *are* growth" [North and Thomas, 1973].

While technological progress and investments in physical and human capital have found a large support amongst scholars, there is an ongoing debate on whether these can be recognised as *causes* of growth. Although Solow-type and endogenous growth models explain why there is a wide variation in the wealth of nations, they do not explain the economic problems in developing countries such as, why these countries invest less in capital formation than rich ones or, why rich countries attain higher levels of technology.

As a result, theorists and economists distinguish between *proximate* and *ultimate* causes of growth [North and Thomas, 1973; Diamond, 1997; Acemoglu et al., 2005; Weil, 2009].

Investments in physical and human capital and technological progress are considered proximate causes of growth and the Solow model and growth accounting frameworks are useful to understand the correlation between these variables and growth. Fundamental causes of growth are factors that enable us to link the questions of economic growth to the concerns of the rest of the social sciences, such as why do societies fail to improve their technologies, invest more in physical capital and accumulate more human capital? The main fundamental causes considered in literature are policies, institutions, and exogenous environmental factors.

When considering policy choices there are many open debates. The main ones are based on the links between government size, inflation, trade and growth. In a cross country analysis Barro [1991] shows that low levels of government expenditure foster growth. Nonetheless, this evidence is not strong and Levine and Renelt [1992] identify a fragile correlation between government consumption and growth. In general, is difficult to reach a conclusion on the role of government size at the aggregate level [Temple, 1999]. The role of government expenditure is likely to be crucial for explaining the impact of welfare state on growth, but cross-section studies will not reveal these effects [Atkinson, 1995; Easterly and Rebelo, 1993].

The role of inflation and foreign trade are also common among the investigated policies. Empirical studies show that high inflation negatively affect economic growth [Barro, 1991] however, these results can be distorted by few outliers [Temple, 1999]. Bruno and Easterly [1998] do not find a long-term relationship between inflation and growth. Grossman and Helpman [1989, 1990] argue that foreign trade affects economic growth. Trade distortions (through tariffs or quota barriers) are considered to generate inefficient allocation of investments and resources; however, finding some way of quantifying trade regimes is a difficult task and empirical works are mainly based on proxies. The

direction of causality also challenges these studies. It is easy to see that trade might be affected by fast growth.

All economic activity takes place within a given institutional environment. Economic and political institutions can facilitate, or impede, productive economic activities. The importance of institutions for economic growth is largely accepted and there is a vast literature on the topic. In "The Mistery of Economic Growth" Elhanan Helpman recognises the increasing role of institutions: *"a recent surge of research on the effects of institutions and politics on economic growth has convincingly shown the importance of these elements of social structures... If I were to write this book five years from today, I probably would write the same book except for the chapter on institutions and politics, because I believe that much progress will be made in this area in the next few years"* [Helpman, 2004].

While the literature on institutions have certainly expanded, it has also set some further questions. For instance, one of the main issues is to identify which institutions matter and how they matter. The new institutionalist economists focus on the coordination role of institutions for making social interaction possible and support market development and transactions, and protect property rights from a potential authoritarian government [North, 1990; Greif, 1993, 1997; Keefer and Knack, 1997; Rodrik et al., 2004]. Nonetheless, this literature is accused to neglect the political aspects of institutions. Attempts to incorporate the analysis of political institutions in economics are pioneered by the analysis of the regime type (autocracy vs democracy) on economic performance [Rao, 1985; Haggard, 1990; Acemoglu et al., 2001; Collier and Rohner, 2008; Przeworski et al., 2000; Przeworski, 2004]. Furthermore, the instability of political institutions in some countries has called for studies on the effects of this instability on growth. Alesina and Perotti [1994] offer evidence for a strong negative effect of instability on growth. Another political aspect investigated is the role of power.

Economic institutions are largely politically determined and ultimately reflect choices made by the groups in power. What determines the concentration of power and how this affects institutional choices has ben subject of research in other areas of social sciences [Knight, 1992; Khan, 2010].

Finally, specific environmental factors are also considered to be fundamental in determining growth. Countries are characterised by intrinsic geographical features that can limit economic activities and therefore harm economic growth. For instance, the study of the effects of natural resource endowments considers how the exploitation and production of these resources affect economic growth. There is evidence for both negative and positive effects of resource wealth on growth. (see Arezki and van der Ploeg [2011]; van der Ploeg [2011] for a detail review of this literature). In general, cross-country analyses emphasise a negative correlation between exploitation of natural resources and economic growth known as *resource curse* [Auty, 1993; Sachs and Warner, 1995, 2001]; however, more recent contributions argue that bad performances in resource-rich countries cannot be attributed to the resource itself but rather to the types of arrangements which have developed around its exploitation, making the *curse* inevitable.

One of the greatest risks with the exploitation of natural resources is the unproductive rent-seeking behaviour that can originate from the rents arising from the difference between the value of that resource and the costs of extracting it. Rents from natural resources tend to be large, geographically concentrated, and controlled by the government. This may put a country's institutional arrangements to a test. Mehlum et al. [2006] and Robinson et al. [2006] argue that resource curse only appears in countries with inferior institutions where politicians engage in corrupted behaviours. However, after a discovery of a resource, governments may become predatory, especially where resource rents can be captured and pressure to realign the interests of the state with the majority is less urgent [Auty and Gelb, 2001].

Governments in resource-rich countries have also less incentives to develop the governance mechanisms that enable general taxation. Much of a government's fiscal strength comes from its capacity to extract taxes from the population, a capacity that often takes decades to develop [Addison et al., 2002; Di John, 2006, 2008]; hence, a government that fails to develop this ability may also be unable to establish the type of bureaucracy that can provide effective public goods, and ameliorate social conflicts [Mahdavy, 1970; Beblawi, 1987; Lynn, 1997; Ross, 2003; Fearon and Laitin, 2003]. Arezki and Bruckner [2010] provide evidence that commodity-rich countries often have poor records of fiscal discipline. Sound fiscal policy encourages savings during boom phases and spending during busts, however in these countries fiscal policy is pro-cyclical in nature, which damages macroeconomic stability [Polterovich et al., 2008; López, 2010]. Therefore, when governments are funded through natural resource revenues rather than taxation, countries are left with weaker political and economic institutions.

2.2.2. Are Fundamental Causes Exogenous to the Growth Process?

One of the single most controversial issues in the economic growth literature is related to *endogeneity*. A variable is considered endogenous when it is affected by changes of other variables within the model. Proximate determinants of growth are considered to be endogenous to the growth process because, although investments in human and physical capital seem to positively affect growth, changes in income per capita are also likely to affect investments. Fundamental (or ultimate) causes of growth could be considered better candidates to explain what causes growth (and what impedes countries to invest more in human and physical capital), but the debate on whether these variables are truly exogenous, i.e. with no causal links leading to them from other variables in the model, is still open.

Endogeneity makes very difficult to discriminate which variables explain better what generates growth on *a priori* basis. A reason for the differing results is the intensive interaction between the variables considered. For example, good institutions are more likely to adopt sound policies that benefit growth and some policies may be limited by some geographical characteristics. At the same time, good policies that foster economic growth benefit the creation of good institutions. Kenny and Williams [2001] argue that due to the endogeneity issues many economic growth models fail in finding the true determinants of growth.

Some authors tend to favour some variables over others. For instance, institutionalists take the view that institutions rule over geography, and of course, supporters of the geography-hypothesis argue the supremacy of geography over institutions[5]. This debate was triggered by the results of empirical studies in which geographical variables lose explanatory power once institutional variables are introduced into the empirical estimations [Rodrik et al., 2004; Easterly and Levine, 2002]. However, authors that advocates for the geographical hypothesis criticise the use of geographical characteristics as instruments for the analysis of the impact of institutions on economic growth [Sachs, 2003].

Both institutional- and geographical-hypothesis are challenged by supporters of the policy-hypothesis who argue that all institutional and geographical limitations can be overcome by the adoption of good policies (see for example Frankel and Romer [1999] and Rodriguez and Rodrik [2001]; Irwin and Tervio [2002] on trade policies and geography).

[5]That there is a hot debate between institutions- and geography-supporters is clear from the titles of the published studies: "Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution" [Acemoglu et al., 2002], "Institutions Rule: The Primacy of Institutions over Geography and Integration in Economic Development" [Rodrik et al., 2004]; "Institutions Don't Rule: Direct Effects of Geography on Per Capita income" [Sachs, 2003].

On the policy vs institutions debate, Glaeser et al. [2004] find evidence that policies rule over political institutions, and in particular, that investments in human capital is a more fundamental source of growth than institutions. The authors provide a very good argument on the problems of using institutions as a fundamental determinant of growth and try to dig deeper into these issues. Because of the objective of this thesis is to shed light on how these fundamental variables affect economic growth in Latin America, Section 2.3 replicates this analysis for Latin America and the Caribbean.

2.2.3. Beyond the Analysis of Long-Run Average Growth?

Developing countries have a lower average long-run growth compared to developed ones and research on *what causes growth* looks for the determinants of the long-run average growth in order to explain this discrepancy. However, it has also been observed that developing countries have a higher growth volatility. Some studies have found that volatility negatively affect long-run growth [Ramey and Ramey, 1995; Easterly et al., 2000], however there is little empirical or theoretical work on what might determine volatility in growth rates.

Pritchett [2000] observes that economic performance in developing countries is based on stop-go growth episodes: growth accelerations (episodes of rapid growth) followed by growth decelerations (slow growth) or even growth collapses (negative growth) which generate large fluctuations in growth of per capita income. A study of these episodes could reveal important facts to explain the determinants of growth in the long-run. This view is shared by Sen [2013] who argues that understanding the political drivers of economic growth needs an explanation of the political dynamics around the transition from one growth phase to another. [Rodrik, 1999] finds that the determinants of growth accelerations and growth collapses are based on social conflicts and domestic institutions. Hausmann, Pritchett and Rodrik [2005] focus explicitly on moments

of growth take-off and identify 83 such episodes in the developing world. In order to explain what causes these episodes they use different economic and political variables. Similar exercise is carried out by Imam and Salinas [2008] for Sub-Saharan Africa. In both these studies, the driving forces of growth turnaround are found in external shocks, economic liberalisation, and political stability.

Latin American and Caribbean growth story shows frequent and large fluctuations in growth rates and low correlation between current and past growth rates [Hakura, 2007; Sahay and Goyal, 2006]. Growth accelerations and decelerations have dominated the region's growth in the period 1960-2010 with very few stable periods being observed. The frequency of growth accelerations (and decelerations) is illustrated by the fact that, the region as a whole, experienced a total of nine growth transitions in the considered period: five accelerations followed by two decelerations, and two stable periods [Gutierrez, 2007]. The story is similar at the level of individual countries with most episodes of growth accelerations concentrated in the 1970s and more recently in 2000s and the analysis of what causes these episodes seem only relevant.

The literature on economic growth helps to set the basis of the analyses in this chapter. Determining the causes of economic growth in Latin America and the Caribbean remains an important theoretical and empirical task. Formal empirical studies of economic growth in Latin America are relatively few and they are mainly focused on the idea that cross-section differences in technological progress (Solow residual or total factor productivity) could explain the differences in growth outcomes in the region [De-Gregorio, 1992; Fernandez-Arias et al., 2005; Cole et al., 2005; Chumacero and Fuentes, 2006; Sawyer, 2010]. Very little research has been done on the causes of episodes of rapid growth in the region. Political economy studies into the long-run patterns of

growth in Latin America focus on historical aspects to explain the causes and consequences of the region's economic backwardness. These studies emphasise the role of natural resources [Engerman and Sokoloff, 1997, 2002], colonisers and colonial regimes [Acemoglu et al., 2001, 2002], and the external institutional and political constraints in the colonies arising from institutional differences in colonisers [Lange et al., 2007; Mahoney, 2010; Coatsworth and Tortella, 2002].

The next sections propose three complementary analyses that evidence the role of institutions as fundamental for growth in Latin America. The first analysis follows the argument in Glaeser et al. [2004] to show that institutions are more fundamental that human capital for explaining growth in Latin America. The second analysis shows the importance of institutions for long-run average growth in the region. Finally the third analysis shows the effects of institutions on growth accelerations.

2.3. Human Capital or Institutions?

Based on the observation that current measures of institutions fail in reflecting two key aspects (a) constraints on government, and (b) permanent or at least durable features of the environment Glaeser et al. [2004] conclude that: (i) human capital is a more fundamental source of growth than institutions; (ii) poor countries get out of poverty through good policies, often pursued by dictators, and (iii) subsequently improve their political institutions.

In order to show that current measures of institutions do not represent constraints on the government and/or durable features of the environment, Glaeser et al. [2004] compare the average within-country deviations of measures of institutions and human capital. Table 2.1 shows these deviations for a sample of Latin American and Caribbean countries. Human capital is measured by average years of schooling from the Barro-Lee

data set, while measures of institutions come from the Polity IV database[6]. In effect, democracy, autocracy, and constraints on the executive have higher within-country average deviation than years of schooling[7]. However, this can arguably be considered enough evidence for supporting the view that human capital is more fundamental than institutions in explaining economic growth.

Table 2.1.: Institutions and Human Capital: Within-Country Deviations

Polity IV			Barro-Lee	
Democracy	Autocracy	Constraints on the Exec.	years of Schooling 25+	years of Schooling 15+
0.288	0.251	0.297	0.130	0.138

The high within-country deviation of institutional variables can be considered as a characterisation of institutions per se. Institutions in developing countries are well-known for their instability which harms growth. Of course, considering that institutions are endogenous (and therefore affected by the growth process), lower growth will in turn affect the stability of institutions.

The fact that growth affects institutions is another point of discussion in Glaeser et al. [2004]. They argue that the high correlation of GDP levels and institutional variables shows the reverse causality between growth and institutions, that is, growth *causes* institutions. Table 2.2 shows the correlations between the institutional variables and the levels of initial GDP. We can indeed observe a strong correlation between GDP and democracy, autocracy and constraints on the executive, however, a strong correlation is also observed between human capital and GDP. The issue with this analysis is that we

[6] Glaeser et al. [2004] discuss the shortcomings of three commonly used databases for institutions: the Governance Indicators from the World Bank, the International Country Risk Guide and Polity. While the first two are considered to be merely measures of economic and political outcomes in a country and therefore are not used in their analysis, Polity IV makes the greatest attempt at measuring the political environment; however, according to Glaeser et al. [2004], the database still reflects the results of recent experiences such as the last elections, and to the extent that rich countries are more likely to hold regular elections, Polity IV variables are considered a consequence of development rather than the other way around.

[7] All variables are normalised between 0 and 1 and are measured every 5 years following data availability

cannot deduct reverse causality or simultaneity issues by just looking at correlations. In order to conclude whether institutions, human capital, or both are causes of growth we need to consider more sophisticated analyses.

Table 2.2.: Correlations of measures of Institutions and Human Capital

	Log GDP per capita 2010	Years of Schooling 25+ (1960-2010)	Years of Schooling 15+ (1960-2010)	Democracy (1960-2010)	Autocracy (1960-2010)	Constraints on the Exec. (1960-2010)
Schooling 25+	0.6017**					
Schooling 15+	0.5858**	0.9970***				
Democracy	0.5230*	0.2504	0.2298			
Autocracy	-0.4587*	-0.1123	-0.1079	-0.8803***		
Constraints on the Exec.	0.5037*	0.2468	0.2325	0.9745***	-0.9139***	1

Notes:
*,**,*** significant at 10, 5 and 1% respectively

Glaeser et al. [2004] consider two analyses. One analysis is based on a qualitative study of the effects of initial institutions and human capital on the economic growth of developing countries. The second analysis uses a Barro-type regression to quantify the effects of institutions and human capital on average growth. In order to deal with the endogeneity problems, they use IV regressions. This section replicates Glaeser et al.'s qualitative analysis, while a study of Barro regressions is considered in the next section.

2.3.1. Institutions Matter: A Qualitative Analysis

Glaeser et al. directly assess the effects of institutions and human capital on economic growth using a sample of 89 developing countries for the period 1960-2000. The sample is independently divided into three levels of human capital and types of political regimes, *low, intermediate, high*, both measured in 1960[8]. Initial human capital is considered to be *low* in those countries with average years of schooling below 2.68 years

[8]Glaeser et. al use the period 1960-2000 for institutions, however, if we want to analyse the effects of institutions on growth, we need to look at the initial levels. This study considers the average score in the period 1955-1960

per capita (median value); *intermediate* if schooling is between 2.68 and 5.01; and *high* if schooling is above 5.01 (75th percentile value). Institutions are measured by the democracy index from the Polity IV database (it ranges between 0 and 10). Initial institutions are considered *low* for those countries that score under 2, *intermediate* if the index is between 2 and 7, and *high* if the country scores above 7.

Table 2.3.: Political Regimes and Growth

Democracy	Growth (1961-2010)			
(1960)	>2.5%	1.5 - 2.5%	0 - 1.5%	<0%
Low *(<=2)*	Dominican Rep.	Mexico Paraguay Cuba	Bolivia El Salvador Guatemala Honduras Nicaragua	Haiti
Intermediate *(2, 7]*	Chile Panama	Argentina Brazil Colombia Ecuador Peru	Venezuela	
High *(>7)*		Costa Rica Uruguay	Jamaica	

Notes:
Data from PolityIV, World Bank Indicators, and Penn World Tables elaborated by the author

Table 2.4.: Human Capital and Growth

Human Capital	Growth (1960-2010)			
(1960)	>2.5%	1.5 - 2.5%	0 - 1.5%	<0%
Low *(<2.6785)*	Dominican Rep.	Mexico Brazil	Bolivia El Salvador Guatemala Honduras Nicaragua Venezuela	Haiti
Intermediate *[2.6785, 5.0115]*	Chile Panama	Costa Rica Uruguay Colombia Ecuador Paraguay Peru	Jamaica	
High *(>5.0115)*	Belize	Argentina Barbados Trinidad & Tobago		

Notes:
Data from Barro-Lee dataset, World Bank Indicators, and Penn World Tables elaborated by the author

We can then classify Latin American and Caribbean countries according to the initial levels of human capital and institutions (measured in 1960) and subsequent economic growth (1961-2010). Table 2.3 shows that the majority of countries with low initial democracy scores have low growth rates in 1961-2010 (or negative in the case of Haiti). Exceptions to this are Dominican Republic, Chile and Panama that experienced very high average growth rates even with low initial levels of democracy. Table 2.4 shows the same classification for human capital. Countries with low levels of human capital in 1960 experience slow growth rates afterwards (with the same exceptions Dominican Republic, Chile and Panama). Haiti seems to be trapped into a vicious circle of low human capital, poor institutions and bad economic performance.

Table 2.5 puts together these results and looks into the *immediate* effects of initial institutions and human capital (measured in 1960) on economic growth (between 1961 and 1970). Panel A shows that in 1960 nearly all Latin American and Caribbean countries that score low in democracy are also poorly educated. Only Jamaica scores high in both human capital and democracy. There is more dispersion among those countries with intermediate levels of human capital: Ecuador and Paraguay started with low democracy while Chile, Colombia, Panama and Peru had reached an intermediate level. Costa Rica and Uruguay score high in democracy even with intermediate levels of human capital.

Panel B presents the within-average growth rates for the period 1961-1970 (the results for Glaeser et al. are reported in green squared brackets). For Latin America and the Caribbean, there are no significant differences in average growth rates across the different levels of human capital. Countries that started with low human capital grew at a similar rate as countries starting with high levels of human capital (around 2%). This contrasts the results in Glaeser et al., where those countries with low human capital grew at a rate of 1.2%: over one percentage point below those countries with

Table 2.5.: Political Regimes, Human Capital, and Growth

	Democracy (1960)			
Years of Schooling (1960)	Low ≤ 2	Intermediate $2 <$Democracy ≤ 7	High >7	Totals
Panel A: Countries				
Low ($<$2.6785)	Bolivia (0.009), Haiti (-0.014), Dominican Rep. (0.014), Honduras (0.007), El Salvador (0.022), Mexico (0.034), Guatemala (0.031), Nicaragua (0.043)	Brazil (0.030), Venezuela (0.012)		
Intermediate [2.6785, 5.0115]	Ecuador (0.008), Paraguay (0.023)	Chile (0.021), Colombia (0.021), Panama (0.049), Peru (0.023)	Costa Rica (0.026), Uruguay (0.002)	
High ($>$5.0115)		Argentina (0.026)	Jamaica (0.018)	
Panel B: Average within-country 10-year growth rate				
Low	0.018	0.021	-	0.019
	[0.029]	[0.019]	[0.008]	[0.012]
Intermediate	0.016	0.029	0.014	0.022
	[0.022]	[0.027]	[0.026]	[0.026]
High	-	0.026	0.018	0.022
	[0.022]	[0.024]	[0.020]	[0.025]
Total	0.018	0.023	0.015	0.020
	[0.024]	[0.023]	[0.014]	[0.020]
Panel C: Mean Standard Deviation of the 10-year growth rates across countries				
Low	0.044	0.035	-	0.040
	[0.030]	[0.022]	[0.030]	[0.029]
Intermediate	0.022	0.021	0.030	0.023
	[0.020]	[0.021]	[0.032]	[0.025]
High	-	0.055	0.047	0.039
	[0.012]	[0.008]	[0.012]	[0.015]
Total	0.036	0.030	0.038	0.034
	[0.023]	[0.021]	[0.032]	[0.025]

Notes:
Panel A: 1961-1970 growth rates reported in parenthesis
Panel B and C: The green squared-brackets report the results for Glaeser et al. [2004]

intermediate and high levels of human capital that grew at around 2.5%. More marked differences in Latin American and Caribbean countries can be seen at the institutional level: countries with low initial levels of democracy grew at a lower rate (1.8%) than those countries with intermediate levels of democracy (2.3%). In Glaeser, there is no difference between countries with low and intermediate democracy (which grew at 2.4% and 2.3% respectively)[9].

Finally, Panel C shows the dispersion of growth rates among the different groups (measured by the within-country average standard deviation of growth rates for the period 1961-1970). We can observe that the dispersion across human capital classification is higher than the one observed across the institutions classification: countries with high levels of human capital in 1960 show a higher average standard deviation in growth rates (5.5% and 4.7% for intermediate and high levels of democracy respectively) while the average dispersion for across the democracy levels is very close to the total average dispersion (3.4%).

The analysis of this section shows that there is no evidence that human capital is a *more fundamental* determinant of growth in Latin America and the Caribbean than institutions. The observations made by Glaeser et al. [2004] that (a) the measures of institutions used in literature are highly volatile; and (b) these are correlated with economic development, are valid when we observe political institutions in Latin America and the Caribbean, however, given the previous discussion, we need to revisit the main conclusions.

First, we cannot rule out institutions as fundamental determinant of growth on the basis of the high volatility of these measures. The experiences of Dominican Republic and Haiti offer interesting evidence for this. Both countries had low levels of human capital

[9]Countries with high initial levels of democracy show a slow growth between 1960 and 1970 (in both Latin American and Glaeser et al.'s sample). In the case of Latin America, only Costa Rica, Uruguay and Jamaica started with high levels of democracy, and despite the low average growth in this period, currently these are all high income countries.

and democracy in 1960; however, Dominican Republic experienced a rapid average growth rate in the following decades, while Haitian GDP per capita has contracted since 1960. Looking at differences in political institutions and human capital in the two countries, we can observe a marked contrast in terms of political instability (but not real change in levels of human capital which are still low). Haiti's political instability is the highest in the whole region, with several democratically-elected regimes quickly turned over by coups or authoritarian leaders. Dominican Republic lived under Rafael Trujillo dictatorship for more than three decades between 1930 and 1961 and the period between Trujillo's assassination in 1961 and the civil war in 1965 was chaotic economically as well as politically. However since 1970, the country has been one of the most politically stable in the region, and the Dominican Republic's growth began to outpace that of Latin America. This suggests an alternative interpretation of the high within-country deviation of political institutions as a sign of high political instability which, as Alesina and Perotti [1994] suggest, may harm economic growth. This suggests a need for further research on the sources of political instability in Latin America.

Second, the conclusion that poor countries get out of poverty through investments in human capital (even if these investments are pursued by dictators) does not hold for Latin America and the Caribbean. The evidence in Table 2.5 favours institutions over human capital. Panel B shows that countries with high initial levels of human capital did not grow faster than those ones with low initial human capital. On the contrary, given similar starting levels in human capital, some countries did better than other in terms of growth (there is a high dispersion in growth rates). Of course, those countries with low initial levels of both human capital and democracy struggle their way out of poverty (in fact they are still classified as low or lower-middle income countries[10]),

[10]The current World Bank income classification is based on the GNI per capita (constant $US\$$ 2005). Countries are considered to be low-income if the GNI per capita is $US\$1,035$ or less. Lower-middle income countries have a GNI per capita between $US\$1,036$ and $US\$4,085$. Upper-middle income countries fall in the interval $US\$4,086$-$US\$12,615$ and high income countries have per capita GNI higher than $US\$12,615$.

but this is also the case for countries such as Paraguay and Ecuador that started with intermediate levels of human capital but low democracy.

Finally, the debate on whether growth causes democratisation (and not the way around) is still open. In the last decades, Latin America and the Caribbean has experienced an increase in growth rates, higher levels of democratisation and greater human capital accumulation and we observe high correlation rates between these variables. Most Latin American and Caribbean countries are currently upper middle income or high income countries which is a net improvement since 1960 when most of these countries were classified as low or low-middle income. There has also been a democratisation process in the period, with only Venezuela and Haiti scoring low in democracy in 2010. The level of human capital has also increased, reaching a regional average of 8.20 years of schooling (of population aged 25 and over). Different country experiences show the difficulties in explaining the causation process among these three variables. For instance, Paraguay started with low level of democracy and intermediate level of human capital in 1960 and has not managed to leave the status of lower-middle income in the last 50 years. Trinidad and Tobago on the other hand, started with high levels of both human capital and institutions and we may argue that this favoured the economic performance of this country that currently is classified as high income economy. Also Chile and Uruguay have reached a high-income status having different initial institutional experiences.

The study of causation needs to go beyond the observed correlations and include a regression analysis that incorporates other variables that may affect growth (but also institutions and human capital) and deals with the issues of endogeneity discussed earlier in this section. We cannot rule out that higher growth, better institutions, and improvements in human capital are all outcomes of the economic system (and not just institutions as argued by Glaeser et al.) and we need to look a more exogenous variables

that explain these processes. For instance, the analysis of Dominican Republic and Haiti shows that geographical characteristics might have had a crucial role in the different growth paths in these regions.Diamond [2005] points out that Haiti has a semi-arid climate which makes cultivation more challenging and the ongoing deforestation only exacerbates the problem. In addition, Haiti's high population growth and increase in rural labour force has led to an expansion of subsistence food crops to the detriment of export crops [Lundahl, 2001]. Very likely these geographical characteristics might affect the political instability of this country, that in turn harms economic growth.

2.4. Barro-regressions for Latin America and the Caribbean

The starting point for a growth regression considers the following function for a country's per capita growth rate:

$$DY_t = F(Y_{t'}, e_{t'}, h_{t'}; ...) \tag{2.1}$$

where DY_t is real GDP per capita growth in the interval t, $Y_{t'}$ is initial per capita GDP[11], $e_{t'}$ is initial schooling per person, $h_{t'}$ is a measure of the typical person's health (measured by life expectancy), and '...' denotes the array of other variables considered relevant for growth.

The vast empirical literature on economic growth has predominantly used simple linear cross-country regressions to analyse the relationship shown in Equation 2.1. These regressions are commonly known as *Barro regressions* after the work of Barro [1991]. To the conventional Solow-type human capital augmented growth models, Barro regressions add other variables to include the fundamental causes.

[11] t' indicates that the variables is observed at the beginning of the period. For instance, if the period is 2000-2005, the initial real GDP per capita is observed in 2000.

The general Barro regressions use cross-sectional data for their analysis. A key drawback is the problem of unobservable heterogeneity. In cross-country regressions, we can never be sure whether we are controlling for all possible ways in which countries might differ [Rajan and Subramanian, 2008]. Furthermore, cross-country growth regressions lack a time dimension which may cause substantial bias due to the correlation of unobserved country-specific factors and the variables of interest.

Due to the recent availability of longer-term series for several variables for developing countries, scholars have switch to longitudinal data analysis. Panel estimations have the virtue of (partially) addressing the problem of unobservable heterogeneity by incorporating country fixed effects. Essentially, by adding fixed effects, we consider whether changes in the independent variables over time for a country contemporaneously affect its growth [see Hansen and Tarp, 2000].

The equation used for the panel estimation of 2.1 can be written as:

$$Dy_{i,t} = \alpha + \beta y_{i,t'} + \delta' \mathbf{X}_{i,t} + \mu_t + \eta_i + \epsilon_{i,t} \tag{2.2}$$

where i denotes the country, and t denotes the time period ($t = 1, ..., 9$), $y_{i,t'}$ is the initial real per capita GDP (in logs)[12], $\mathbf{X}_{i,t}$ is the matrix of conditioning variables which includes variables for both proximate and fundamental causes. μ_t is the time effect, it varies over time but it is constant within a country. η_i is a country fixed effect that captures all unobserved, time-constant factors that affect growth (it varies between countries), and $\epsilon_{i,t}$ is the residual.

In the basic neoclassical model, the growth rate tends to be inversely related to the level of initial per capita GDP, that is, countries with lower levels of initial income tend to grow at a faster rate [Barro and Sala-i Martin, 2004][13]. Empirically, the initial level

[12] the regressions consider the log of these variables. Therefore, $y_t = log(Y_t)$

[13] The neo-classical growth model predicts *absolute* convergence: poorer economies should grow faster and tend to catch up to the richer economies, however empirical evidence shows that the proposition

of per capita GDP is introduced into the growth equation in the form of $log(Y)$ so that the coefficient on this variable represents the responsiveness of the growth rate to a proportional change in initial income known as the *rate of convergence*. This variable has been found significant in most cross-country analysis providing empirical evidence to the hypothesis of convergence [Barro, 1991; Barro and Sala-i Martin, 2004]. Nonetheless, Putterman [2000] suggests that long-run geographical and institutional measures have a deeper role than simple convergence in determining growth rates. This is supported by the works of Burkett et al. [1999]; Chanda and Putterman [2007] who using cross-country data, show that initial GDP per capita loses significance when measures for some historical facts (i.e. pre-modern economic conditions) are included.

The identification of which variables should be included in the matrix of conditioning variables ($\mathbf{X}_{i,t}$) represents one of the main areas of research in economic growth. $\mathbf{X}_{i,t}$ generally includes measures for both proximate and fundamental causes of growth (see Durlauf et al. [2005] for a survey of different regressors proposed in the growth literature). Although this literature has made important advances in uncovering the determinants of economic growth, there are still several concerns with the econometric approach. In fact, cross-country empirical studies have been challenged on the grounds of model uncertainty and endogeneity caused by omitted variable bias, unobserved heterogeneity, simultaneity or reverse causation.

The debate between human capital and institutions introduced by Glaeser et al. [2004] is a clear example of model uncertainty. There is no doubt that supporters of both hypotheses can provide good arguments how each of these variables cause growth. However, growth theories are *open-ended*, that is, growth theories are typically com-

of absolute convergence fares badly in terms of cross-country data. For this reason, the relation between the GDP growth rate and the starting position of a country has to be examined after holding constant some variables that distinguish the countries [Barro, 1991; Barro and Sala-i Martin, 2004].

patible with one another and for this reason is difficult to rule out a variable in favour of another [Brock and Durlauf, 2001].

The most famous attempts to address the problems of model uncertainty are made by Levine and Renelt [1992] and Sala-i-Martin [1997a,b]. Levine and Renelt [1992] use extreme bounds analysis to assess the robustness of the various variables found relevant to explain growth. These include variables that proxy those suggested by the Solow model: initial income, investment share of GDP, secondary school enrolment rates, and population growth. They found that the only robust growth determinants are initial income and the share of investment in GDP; these findings are confirmed in Kalaitzidakis et al. [2000] who also find inflation volatility and exchange rate distortions to be robust. The limitations of the extreme bounds approach are discussed in Brock and Durlauf [2001]; Brock et al. [2003]. Sala-i-Martin [1997a,b] proposes an alternative way of evaluating regressors in growth regressions by using weights determined by the likelihoods of each model as well as employing equal weighting. As Levine and Renelt, he also finds that initial income and investment to GDP ratio are robust determinant of growth, as well as some measures for education and institutional characteristics.

The problem of endogeneity is also a common source of criticism in growth literature. In a regression equation, an explanatory variable is endogenous if it is correlated with the error term. Endogeneity is often described as having three sources: omitted variables, unobserved heterogeneity, and reverse causality. Endogeneity may arise from omitted variable when we do not include all the variables that may affect growth into the regression, therefore the impact of these variables is captured by the error term.

We have omitted variable bias if (i) the omitted variables are determinants of the dependent variable (growth), and (ii) the omitted variable is correlated with one or more of the included independent variables. This violates the Gauss-Markov theorem's

assumption that error term is uncorrelated with the regressors and causes the OLS estimator to be biased and inconsistent [Greene, 2002].

When our unit of analysis is country, there may specific country's characteristics (in general not observed) that affect both the dependent and independent variables that are not included in the estimation. This unobserved heterogeneity can cause omitted variable bias and be a source of endogeneity. Fixed effects estimators in panel data help to address this problem, by introducing country specific dummies that capture this unobserved heterogeneity. [see Islam, 1995; Caselli et al., 1996; Temple, 1999; Hansen and Tarp, 2000]. A problem with fixed effects is that some variables of interest may be measured at only one point in time (e.g. geographic characteristics), or they are highly persistent (e.g. education, institutions). Here the only variation is *between-country* and empirical work needs to be based on cross-sections or pooled cross-section time series.

Growth regressions are often accused of not taking into account problems of reverse causality. The high correlation of human capital and institutions with economic development shows that both these variables may cause growth, but when countries become richer they can afford better institutions and greater investments in human capital. In general, reverse causality problems apply to the debate of fundamental and proximate causes of growth. The fundamental reason why a correlation between any variable and level of per capita income may not allow any inference over causation, is the observed data does not come from a randomised experiment. We cannot assign different institutions to different countries and check the effects that these institutions have on the countries in the treatment group. Therefore, we cannot eliminate the problem that unobserved factors might be driving any correlation between independent and dependent variables.

If reverse causality is not taken into account, it can lead to serious inaccuracies in research results. Not only are the parameter estimates inconsistent, but the magnitude and the meaning of the parameter is altered as well. Additionally, the error term in a given model may include factors that both affect growth and are correlated with other explanatory variables, thus rendering the parameter estimates inconsistent.

One way of addressing the potential for endogeneity bias is to use instrumental variables [Acemoglu et al., 2001, 2002; Glaeser et al., 2004]. This is an alternative to attempting to identify and control for all possible factors that might be correlated with both the dependent and explanatory variables. However, to identify valid instrumental variables is not an easy task. An invalid instrument (one that is not uncorrelated with the error term) makes the estimates inconsistent, and many of the instrumental variables proposed have also been used by other studies as determinants of growth. Since growth theories are mutually compatible, the instruments used may not be always valid.

Panel data allows for a further way to obviate endogeneity. Given that the variables are observed at various points in time, lagged values of the independent variables could be used as instruments. Nonetheless, some variables tend to be highly persistent and therefore, past realisations of the independent variable may still be correlated with current values of the dependent variable making the instrument weak.

Recent contributions have employed dynamic panel system generalised method of moments (GMM) estimators in growth econometrics developed by Arellano and Bover [1995]; Blundell and Bond [1998]. These estimators are designed for situations with few time periods for many countries, with a dynamic dependent variable (which depends on its own past realisations), with independent variables that are not strictly exogenous (they are correlated with the past and possibly current realisations of the error), and heteroskedasticity and autocorrelation within individuals [Roodman, 2009]. This method ensures that lagged first difference of the dependent variable is a valid

instrument since it is uncorrelated with the composite error term in the levels equation. This builds in some insurance against weak identification.

The advantages of GMM panel methods in the context of growth regressions are threefold. They (i) account for unit-level fixed effects, (ii) incorporate internal methods for dealing with endogenous regressors, and (iii) avoid the bias of standard panel estimators in dynamic settings. The last characteristic is important as any panel regression of growth on lagged income arithmetically derives from an autoregressive specification, which introduces substantial bias in the presence of unobserved unit-specific heterogeneity especially where the number of time periods is small. The use of transformations of lagged variables as internal instruments for the endogenous variables may also seem to be an attractive alternative to finding external instruments that remain valid and robust across all panels [Arndt et al., 2009].

Although empirical studies have made a fair effort in improving the econometric techniques in order to deal with challenges pose by endogeneity and model uncertainty, growth is a very complex process and the research of growth determinants seems to be inconclusive. This reason has led some authors to step away from empirical analysis in favour of most case studies narratives. For instance, given that country growth experiences have been extremely heterogenous and that this heterogeneity is difficult to capture by any econometric model, Kenny and Williams [2001] advocates for historical accounts over cross-country empirical analyses. Historical narratives should allow to shed light on the complex and varied inner workings of actual economies.

Despite the many difficulties with the empirical analysis, growth econometrics can provide signposts to interesting patterns and partial correlations. Mankiw [1995]; Wacziarg [2002] suggest that, although we need to accept that reliable causal statements are almost impossible to make, the use of partial correlations of the growth literature is useful to rule out some possible hypotheses about the world's growth. Seen in terms of es-

tablishing stylised facts, empirical studies help to broaden the demands made of future theories. In addition, when considering the limitations of panel data methods, it is clear that the prospects for informative work should improve over time due to the addition of further time periods, but also the development of economic and political events in developing countries for which panel data can be used to investigate their consequences on growth. In addition, the shift to case study analysis is not free of concerns. We need to be cautious on interpreting the results from these analyses. Case studies in general require the *treatments* to be exogenously assigned, when analysing growth processes, the events under study are themselves endogenous to the system [Durlauf et al., 2005]. The ability to quantify even an average treatment effect is strongly circumscribed and it may be possible to identify only the direction of effects. At the very least, this offers a complement to regression-based methods.

2.4.1. Data

A panel data set of up to 34 countries[14] for the period 1960-2010 (divided in 5-years intervals[15], so $T = 10$) is used in this analysis. The independent and explanatory variables are from the most common databases used in growth literature. (Appendix **??** shows some basic statistics and data sources).

The dependent variable is the growth rate of real per capita GDP (from Penn World Tables, version 8). All the regressions include the initial real GDP per capita as independent variable to account for (conditional) convergence. Proximate causes of growth consider measures of physical, human, and health capital. Physical capital is measured by the *investment share of real GDP per capita . Average years of schooling (aged 25+)*

[14] to the best of my knowledge, this is the largest sample considered in literature

[15] When using panel data in growth regressions, we need to decide the length of the time span. Islam [1995] argues that yearly time spans are too short to be appropriate for studying growth because short-term disturbances may loom large in brief time spans. Five-years time intervals are the most common choice. We could use 10-years time spans, but this would drastically reduce the number of observations.

is used as measure of human capital (from Barro-Lee data-set) and *life expectancy* and *mortality rates of children under-5* are indicators of health capital.

Fundamental variables such as policies, institutions, and geographical characteristics are also included as regressors. Government consumption and expenditure, rates of inflation and trade openness (from the the Penn World Tables) are considered as policy variables. Democracy (PolityIV) and Government Stability (from World Bank Governance Indicators) measure institutions and the dependence on natural resource rents is used as geographical feature.

2.4.2. GMM Results

Table 2.6 shows the results of using GMM estimators in a panel-data of Latin American and Caribbean countries. These results mostly confirm the findings of previous empirical literature. Column (a) shows the results for a basic Solow growth model using as regressors initial GDP per capita and investments in physical capital. The coefficient for *initial GDP per capita* is negative and statistically significant, which offers evidence for convergence towards a steady growth among countries in the region (at a rate of nearly 0.6% - lower than in the one found when analysing larger panels). *Investments in physical capital* is statistically significant and positively related to growth, confirming previous results in literature.

Column (b) and (c) includes the measures for human and health capital respectively. Human capital, measured by *average years of schooling* is statistically significant and positively related to economic growth. The measures for health capital, *life expectancy* and *child mortality* are both statistically significant with a positive sign. While we would expect that an increase in life expectancy fosters growth, the sign of the child mortality coefficient is not expected. According to this result, an increase in child mortality positively affects growth in Latin America. We should not read too much into

this result. Mortality rate (as all proximate determinants of growth) is not exogenous to the process, in fact, better economic performance should reduce the rate of mortality. However the mechanism through which this happens are various and very likely this result depends on which variables we include in the regression. These controversial results are also find in more broad literature on the impact of health on growth. For instance, Bloom and Sachs [1998]; Gallup and Sachs [2001] argue on a positive effect of health on growth in large samples, while Mayer [2001] shows a long-term effect of health on income for the specific case of Latin America. On the other hand, Acemoglu and Johnson [2007] challenge this evidence and argue that an increase in life expectancy has a negative impact on economic growth due to its effect on increase in population so that there is no evidence on a first-order impact of health on economic growth. A common view is generally that these effects may take a long time to come into full effect or may be conditional on other economic factors and therefore not being observable in simple linear regressions.

In column (d), policy variables are added to the regression. Government size, measured by *government consumption*, is negatively related to growth. By decreasing the government consumption-GDP ratio of 1%, we can expect an increase of the growth rate of 0.1% (this result holds even when other variables are added). The results show evidence that large governments which are very common in Latin America and the Caribbean are less efficient in promoting growth in the area. This is also the case for high *rates of inflation* that negatively affect GDP per capita growth – an increase of inflation by 1% will cause a decrease in growth of 0.02%. The study does not find evidence on the importance of *trade openness* for economic growth in Latin America and the Caribbean; in fact, the variable that measures the level of openness of the regions is not statistically significant.

Most of Latin American and Caribbean countries are producers and net exporters of natural resources. Columns (e) and (f) add variables for *natural resources* and *oil rents* as percentage of GDP, respectively. We can observe that these two variables negatively affect GDP per capita growth (an increase in resources rents provoke a decrease of growth of 0.01%).

Finally, columns (g) and (h) include the measures of institutions. Both *democracy* and *government stability* are positive and statistically significant. In specific, an increase of these measures by 1 index point represent an increase in growth of 14% and 20% respectively. These results show evidence that good institutions facilitate a good economic environment that enhances productive activities and growth and support the hypothesis that institutions are fundamental determinant of growth in the region.

The results of this analysis show that the commonly considered fundamental variables in literature do explain long-run average growth in Latin America and the Caribbean. With particular reference to the debate human capital vs institutions, unlike Glaeser et al. [2004] argue, when fundamental variables are added in the regression, the coefficient for years of schooling (the measure for human capital) loses significance. This does not mean that human capital is not important for growth, but it is just stating that human capital is not more "fundamental" than institutions.

Table 2.6.: Economic Growth in Latin America and the Caribbean

Independent Variables	Dependent variable: GDP per capita growth							
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
lag growth	.196***	.204***	.161***	.027	.026	.028	.019	.009
	(.063)	(.060)	(.048)	(.070)	(.078)	(.070)	(.074)	(.069)
(log) initial real GDP per capita	-.057**	-.042	-.033	-.017	-.009	-.019	.012	.019
	(.025)	(.032)	(.035)	(.032)	(.032)	(.037)	(.037)	(.028)
(log) Investments	.111**	.133**	.143***	.138***	.143***	.141***	.131***	.127***
	(.050)	(.064)	(.054)	(.042)	(.036)	(.041)	(.040)	(.041)
years of total schooling (25+)		.010**	.023**	-.003	0.15	-.004	-.015	-.017
		(.005)	(.010)	(.010)	(.011)	(.011)	(.010)	(.011)
Life Expectancy			.014*	-.004	-.030**	-.006	-.008	-.004
			(.008)	(.007)	(.012)	(.008)	(.010)	(.008)
Mortality rate (under 5)			.003***	-.000	-.004**	-.000	-.001	-.000
			(.001)	(.001)	(.002)	(.001)	(.001)	(.001)
(log) Gov. Consumption				-.087**	-.116**	-.096**	-.099**	-.096**
				(.040)	(.063)	(.040)	(.041)	(.040)
(log) inflation				-.025***	-.025***	-.026***	-.021***	-.020***
				(.006)	(.007)	(.006)	(.006)	(.007)
(log) openness				.053	.005	.052	.051	.056
				(.034)	(.038)	(.039)	(.038)	(.037)
(log) oil rents					-.011**			
					(.005)			
(log) nat. resources rents						-.012**	-.014*	-.009
						(.005)	(.005)	(.007)
Democracy							.132**	
							(.007)	
Government stability								.192**
								(.075)
constant	.22	-.035**	-1.33***	.016	1.99**	.186	.122	-.312
	(.229)	(.286)	(.452)	(.490)	(.800)	(.526)	(.590)	(.523)
N	34	25	25	24	12	24	22	22
T	9	9	9	9	9	9	9	9
n	284	219	219	181	85	175	161	161
Wald χ^2	30.13***	35.33***	71.19***	161.14***	396.65***	132.65***	117.08***	132.84***
Arellano-Bond autocorrelation test	.697	.693	.634	.117	.484	.151	.239	.179

Notes:

1. Robust standard errors in parentheses. *,**,*** significant at 10, 5 and 1% respectively

2. Instruments used for differenced equations are $Dy_{i,t-2}$, $Y_{i,t'-2}$ $Invest_{i,t-2}$, $Schooling_{i,t-2}$ $Life\ expect_{i,t-2}$, $Child\ mort_{i,t-2}$, $Gov.\ expenditure_{i,t-2}$, $Openness_{i,t-2}$, $Inflation_{i,t-2}$, $Oil\ rents_{i,t-2}$, $Nat.\ resource\ rents_{i,t-2}$, $Democracy_{i,t-2}$, $Gov.\ stability_{i,t-2}$ and all further lags

3. Instruments used for levels equations are $\Delta Dy_{i,t-1}$, $\Delta Y_{i,t'-1}$ $\Delta Invest_{i,t-1}$ $\Delta Schooling_{i,t-1}$ $\Delta Life\ expect_{i,t-1}$, $\Delta Child\ mort_{i,t-1}$, $\Delta Gov.\ expenditure_{i,t-1}$, $\Delta Openness_{i,t-1}$, $\Delta Inflation_{i,t-1}$, $\Delta Oil\ rents_{i,t-1}$, $\Delta Nat.\ resource\ rents_{i,t-1}$, $\Delta Democracy_{i,t-1}$, $\Delta Gov.\ stability_{i,t-1}$

2.5. Growth Accelerations in Latin America and the Caribbean

Following the work of Hausmann, Pritchett, and Rodrik, [2005], this section offers an analysis of the episodes of growth acceleration in Latin America and the Caribbean between 1960 and 2010. Growth acceleration episodes are identified by looking for rapid growth episodes that satisfy the following conditions (as specified by Hausmann, Pritchett, and Rodrik, [2005]):

1. $g_{t,t+7} \geq 3.5\%$ *Growth is rapid*
2. $\Delta g_t \geq 2.0\%$ *Growth accelerates*
3. $y_{t+7} \geq max(y_i), i \leq t$ *Post-growth output exceeds pre-episode peak*

Where $g_{t,t+7}$ is the growth rate over a 8-year period, Δg_t is the change in the growth rate at time t defined as $\Delta g_t = g_{t,t+7} - g_{t-7,t}$, and y_t is the GDP per capita in a given period.

As baseline data source, this study uses both the Penn World Tables 8.0 and the World Development Indicators. The results from both these datasets are very similar and they lead to find 27 episodes of growth in Latin America and the Caribbean between 1960 and 2010. Table 2.7 shows these episodes by country and period. The third column shows the average growth during the period of acceleration, followed by the growth before and after the event.

The episodes of growth identified mostly coincide with those episodes identified by Hausmann et al. [2005] for Latin America. In addition to the ones observed in Table 2.7, Hausmann et al. [2005] identify another eight episodes: Argentina (1963), Dominican Republic (1969), Nicaragua (1960), Haiti (1990), Panama (1975), Trinidad and Tobago (1975), Uruguay (1974, 1989); however, the data available does not support these episodes and these were therefore excluded from this analysis (either growth is below

the threshold or it is not sustained for the number of years required to satisfy the criteria). These episodes are also compared with the ones considered by Solimano and Soto [2004]. These authors identify eight growth episodes in Latin America in the period 1960-2000. All these episodes are included in this analysis with the exception of Bolivia (1965). This is due to the different definition of growth acceleration used by Solimano and Soto [2004] (six-years of growth over 2%).

We can observe that the growth episodes are concentrated in the 1960s and 1970s (8 episodes), and more recently in 2000s (9 episodes). Episodes of growth in 1980s are more common in the Caribbean (6 episodes) with only one Latin American country experiencing growth acceleration after 1980 (Chile).

Table 2.7.: Episodes of Rapid Growth

Country	Years	Growth	Growth before	Growth after	Hausmann, et al.	Solimano & Soto
Antigua & Barbuda	1983-1989	8.3	-0.1	1.2	n.a.	n.a.
Argentina	1991-1997	4.1	0.1	2.8	yes	no
	2003-2008	6.4	-4.2	3.7	n.a.	n.a.
Brazil	1967-1974	7.3	2.4	6.2	yes	yes
	2004-2008	3.5	-0.5	1.8	n.a.	n.a.
Chile	1986-1994	6.2	-0.3	6.6	yes	yes
	2003-2008	4.3	0.9	3.7	n.a.	n.a.
Colombia	1968-1974	3.9	0.2	2.6	yes	yes
	2003-2008	3.5	1.1	2.6	n.a.	n.a.
Costa Rica	1965-1972	3.6	1.2	3.9	no	yes
Cuba	1999-2006	5.5	0.8	3.5	no	n.a.
Dominica	1980-1987	6.0	1.8	4.3	n.a.	n.a.
Dominican Rep.	1992-1999	5.3	-1.0	3.8	yes	yes
	2005-2010	6.5	0.1	3.1	n.a.	n.a.
Ecuador	1970-1977	6.7	-0.1	4.6	yes	yes
Mexico	1963-1970	4.2	0.0	3.4	no	yes
Panama	1961-1968	5.6	1.5	2.1	yes	no
	2002-2008	5.9	-1.5	6.4	n.a.	n.a.
Paraguay	1972-1979	6.5	1.8	5.2	yes	no
Peru	1961-1967	4.3	0.8	1.9	yes	no
	2002-2008	5.6	-0.1	4.5	n.a.	n.a.
Puerto Rico	1983-1990	5.4	-2.2	2.5	n.a.	n.a.
St. Kitts & Nevis	1984-1991	7.6	-2.2	4.4	n.a.	n.a.
St. Lucia	1984-1991	6.7	-0.9	5.6	n.a.	n.a.
St. Vincent and the Gren.	1976-1983	4.9	-0.8	6.4	n.a.	n.a.
Suriname	2002-2008	6.5	0.7	4.1	n.a.	n.a.
Uruguay	2004-2011	6.2	-2.1	-	n.a.	n.a.

Notes:

1. yes - the episode of growth acceleration is considered in the study
2. no - the country is included in the analysis, but the episode of growth acceleration is not considered in the study
3. n.a - the country is not considered in the sample

2.5.1. Variables and Empirical Results

The dependent variable for the empirical analysis of what causes growth accelerations is a dummy that takes the value of 1 around the time of the growth acceleration (0 otherwise). Those countries with no episodes of growth acceleration, but for which data are available, are also included (with a value of 0).

Hausmann et al. [2005] consider that growth accelerations can be triggered by favourable external conditions, changes in the underlying political balance, and changes in economic policies. The authors therefore use measures of external shocks (captured by *terms of trade*), political changes (represented by changes in the Polity index), and *economic reforms* measured by the Sachs and Warner index. In this analysis, as measures of external shocks, I use *changes in terms of trade* (difference between trade of trade this period from the previous period) and, considering that most of these countries are net-exporters of natural resources, the changes in rents arising from natural resources.

Two variables are used to measure political change, one is a dummy that takes the value of 1 in the year when there was a positive change in the Polity Index and in the two following years (0 otherwise), the second is a dummy that measures the negative changes in the Polity Index estimated in a similar way. The data availability of the Sachs and Warner index for Latin America and the Caribbean is limited, so this has been replaced by changes in government expenditure. Government expenditure can be seen as an internal economic policy and several studies have shown that too large governments hurt economic growth in a country.

Table 2.8 shows the results of this analysis. It uses a probit regression considering the nature of the dependent variable (dummy). Column (a) shows the regression of growth-accelerating periods on *changes in terms of trade*, *positive changes in the Polity index*

Table 2.8.: Probit for Growth Accelerations

Dependent Variable: Dummy for Growth Acceleration episodes	(a)	(b)	(c)	(d)
External Shocks				
Changes in Terms of trade	.021***	.021***		
	(008)	(008)		
Changes in natural			.633***	.612***
resouces rents			(.233)	(.229)
Political Changes				
Positive changes in Polity	-6.39		-4.88	
	(10689)		(148.84)	
Negative changes in Polity		-1.25*		-.455*
		(.733)		(.267)
Economic Policies				
Changes in Gov. Expenditure	-1.69*	-2.15*	-.676	-.695
	(1.01)	(1.149)	(.614)	(.616)
constant	-2.83***	-2.75***	-1.99***	-1.95***
	(.477)	(.486)	(.334)	(.331)
n	599	599	893	893
T	23	23	23	23
log likelihood	-136.56	-136.32	-241.06	-243.43
Wald χ^2	9.87**	11.41**	8.74**	11.27**

Notes:

1. Standard errors in parentheses.

2. *,**,*** significant at 10, 5 and 1% respectively

and *changes in government expenditure*. Changes in terms of trade and in government expenditure are both statistically significant: a favourable change in terms of trade increases the probability of experiencing a growth acceleration, while an increase (positive change) in government expenditure decreases this probability. Positive changes in the Polity index are not statistically significant.

Column (b) shows the results for the same regression, but using *negative changes in Polity index* as a measure for political changes (i.e. countries becoming more autocratic). The results confirm those ones of column (a), in particular an increase in terms of trade increases the probability of a growth acceleration episode, while an increase in government expenditure decreases this probability. However, in this case, *negative changes in the Polity index* decreases the probability of having one of these episodes and this coefficient is statistically significant.

Columns (c) and (d) use *changes in natural resource rents* instead of terms of trade to measure external shocks. The reason for this is that most of the growth accelerations happen around episodes of commodity booms, considering that a large proportion of trade of Latin American and Caribbean countries is given by commodity exports, this helps to explain the effects of terms of trade on accelerating growth. The results confirm the previous findings that external shocks increase the probability of growth accelerating episodes. Political changes show a similar result too: negative changes have a negative and statistically significant effect, while positive changes don't.

These results are in line with the previous findings that institutions and natural resources do play a fundamental role in explaining growth in the region. The results in this section offer further support to the discussion that political instability has negatively affected Latin American and Caribbean growth: shifts towards more autocratic regimes reduce the probability of experiencing growth accelerations in the countries of the region. These results suggest the need to research on how institutions are created

in first place in order to understand the origins of the political instability that affects growth in the region.

2.6. Final Remarks to Chapter 2

The discouraging growth of Latin America and the Caribbean in the last decades motivates the research of the determinants of growth in the region. Economic growth is a complex process and finding real sources of exogeneity (which variables are *more fundamental*) that explain this process is an arduous task. This chapter argues that institutions are crucial for explaining growth in the region.

The qualitative analysis in section 2.2 shows that Latin American and Caribbean countries with low initial levels of democracy had, in average, a lower average growth afterwards. This contrasts with the findings in Glaeser et al. [2004] that low human capital is a better predictor of poor growth than poor institutions, and therefore human capital is the fundamental determinant of growth. An interesting outcome of this analysis is that the high political instability in Latin America and the Caribbean has harmed the economic growth in the region. The case of Dominican Republic and Haiti provides us with a good example of this. Dominican Republic has one of the highest growth rates in 1960-2010, while Haiti exhibits the worst performance in the region. A key difference between the two countries is the high political instability in Haiti that contrasts with the stable political environment in Dominican Republic.

The empirical analysis in Section 2.4 supports these findings. A Barro-regression used to explain long-run economic growth in Latin America and the Caribbean shows that fundamental variables such as institutions and natural resources are key determinants of growth in the region. Once fundamental variables are added to the regression, the variable for human capital (years of schooling) loses statistical significance.

The high volatility in growth rates has driven the attention to the analysis of what causes episodes of rapid growth (growth accelerations). The analysis of Section 2.3 finds 27 of these episodes in Latin American and the Caribbean which reflect the periods of sustained growth highlighted in Section 2.1. The probability of observing these episodes increases with changes in terms of trade which, for the region, are mainly due to changes in commodity prices. Commodities make up 60% of the region's exports and periods of prosperous growth in Latin America coincided with booming prices of natural resources. For instance, the 2000s commodity boom was for the region the longest lasting and most comprehensive, in terms of number of commodities affected and countries benefiting. Around half the increase in the value of Latin American exports in the 2000s was a result of commodity price rises [Sinnot et al., 2010]. However, due to the lack of diversification of the production structure, these countries tend to experience long periods of stagnation (and even collapses) once the terms of trade become less favourable.

It is not surprising that while a commodity boom (changes in terms of trade or in resource rents) increases the probability of rapid growth episode, natural resource rents decreases long-run growth. Changes in the price of commodities are closely related to external shocks that, in countries with a heavy concentration on commodity exports, increase growth volatility which in turn decreases growth (see Ramey and Ramey [1995]; Easterly et al. [2000] for the effects of volatility on growth, and Sachs and Warner [2001]; Auty [1993, 2001]; Birdsall et al. [2001]; Ortega and de Gregorio [2007] for the consequences of resource-specialisation on economic performance). These problems can be obviated by a change in the productive structure, from commodity-based to a more diversified economy, but this requires effective policies supported by good-quality institutions. Latin American and Caribbean countries however, lack good governance and political stability which may affect how these rents are managed and therefore increase corruption and rent-seeking behaviours.

The exact mechanisms through which natural resources and institutions affect development are still subject of debate in literature and the rest of this thesis contributes to this debate. The economic history of Latin America and the Caribbean emphasises the crucial role of natural resources since the discovery and colonisation of these territories. Differences in initial conditioning sets of a country can have a strong impact on a country's trajectory and the exploitation of the region's natural resources has influenced policies and institutions since early times. Several authors emphasise the importance of considering historical events in order to understand the fundamental determinants of development [see Easterly and Levine, 1997; Acemoglu et al., 2001; Kenny and Williams, 2001]. The next two chapters aim to shed light on the main unanswered question of this chapter is how and why *good* institutions arise.

3. The Origins of Institutions in Latin America and the Caribbean

According to the results from the previous chapter, it would appear that institutions play a key role in explaining the economic growth of Latin America and the Caribbean and also that political instability harms growth and reduces the probability of observing episodes of growth acceleration.

The literature on institutions has seen a significant revival in recent years and has made good attempts to answer some basic questions, particularly relevant to the analysis of development issues, such as *what is the origin of current institutions in developing countries? Why only few countries have been able to set good institutions and how can we explain the persistence of bad institutions in these countries? How do institutions change with changes in the political and economic environment?*

In order to fully understand what is affecting economic growth, we need to answer these questions. We have said that institutions are endogenous to growth, and although statistical methods that deal with endogeneity show that institutions are a fundamental cause, we do not know why Latin American countries adopted or inherited specific institutional settings. We need to find a source of exogeneity to explain what originates institutions in first place.

One of the main characteristics of institutions is their persistence over time. As result, in a series of influential and to an extent, convergent works, various scholars argue that problems in former colonies are deeply rooted in colonial times and in the institutional setting that was established during this period. There are, in effect, two hypotheses in this literature. The first is that the character of the independence institutions depends on a variety of sometimes disputed aspects of the colonial experience. The second is that, given institutional persistence, the quality of current institutions depends on their character at the time of independence. The evidence in support of these hypotheses typically comes from the analysis of a wide range of countries. In this chapter, I examine to what extent these hypotheses regarding the colonial experience hold for Latin American countries in particular (Section 3.2).

Although institutions in general tend to be highly persistent, by comparing the econometric results of previous literature that uses a world-wide cross country sample with an analysis for only Latin American countries, Section 3.3.3 shows that the correlation between early and current institutions[1] in Latin America is less strong that hypothesised in literature. This result is perhaps not so surprising: most Latin American countries obtained independence in the first half of the 19th century while most other colonies only became independent in the second half of the 20th century. The greater passage of time in Latin America has given, in effect, greater scope for non colonial factors to influence the character of current institutions.

This does not mean that the colonial experience is unimportant for the region and I examine its possible influence. The main colonial aspects analysed by this literature are (i) identity of the coloniser power, (ii) size of European settlements during the colonial period, (iii) native population, (iv) mineral and agricultural resources. In

[1] *Early institutions* are the institutions set immediately after independence (the first 10 years after a country's independence was declared and recognised). *Current institutions* are institutions in contemporary times, generally the period 2000-2010.

Section 3.3.4, I consider whether these colonial aspects appear to have influenced the quality of institutions at the time of independence and whether they appear to have had an enduring influence in the sense that they continue to explain the character of current institutions.

This chapter is organised as follows. Section 3.1 offers an review of the literature on how institutions have been used to explain growth. Section 3.2 describes the possible colonial origins of institutions in Latin America and set four hypotheses on how colonial aspects may affect institutions. These hypotheses are empirically tested in section 3.3.4. Section 3.4 summarises and concludes.

3.1. An Overview of the Literature on Institutions

Recent years have seen a remarkable revival in the study of the role of institutions on economic development. The roots of this literature can be found in the works of Oliver Williamson [1981] and Douglass North [1990][2]. This literature highlights that institutions matter because rules are essential to make social interaction possible, therefore the facilitating role of institutions is often described in terms of transaction costs [North and Thomas, 1973; North, 1990; Greif, 1993, 1997]. Institutions in this view are basically norms or rules that foster exchange by the enforcement of contracts designed to support market development and transactions, and protect property rights from a potential authoritarian government [Shirley, 2008]. In absence of rules, the costs of organising economic activities may be so high that coordination and cooperation may be precluded.

[2]That institutions matter for economic performance is an old and inherently plausible position, however during the first half of the 20th century, as the neoclassical theory progressed, institutional phenomena received less attention and played almost no role in the early neo-classical models. That is why this literature is widely know as the *New Institutional Economics*.

This literature offers a large body of historical and cross-country empirical evidence that institutions matter for economic outcomes. The historical narratives implemented have produced appealing results for the understanding of long-run socio-economic development. Econometric studies on contemporary cross-sections show that a great bundle of institutional factors have a large influence on a large set of economic outcomes. The institutions considered by both these strands of literature are those that enforce property rights, reduce transaction costs and promote formal contracts and business rules. These are known as *good* institutions.

Historical narratives attempt to explore the role of history in institutional emergence, perpetuation and change [Greif, 1997]. This literature evidences both virtuous and vicious mechanisms on how institutions affect economic development. On one hand, *good* institutions have been linked to the East Asian miracle between 1960s and early 1990s. Ahrens [2002] and Gonzalez and Mendoza [2002] argue that strong governments and well-functioning public institutions are basic to explain the rapid growth of these economies. On the other hand, some scholars list a series of explanations for the inability of most African and Latin American countries to set up institutions that enhance growth and progress [Shirley, 2008]. The most common explanation invoked by this literature lies on the legacy inherited from colonial rules [North, 1990; Djankov et al., 2002; Engerman and Sokoloff, 1997].

A second strand of this literature has implemented econometric estimations on cross-country analyses including measures of institutional quality [La Porta et al., 1997, 1998, 1999] or another factors inherited from colonial legacies [Acemoglu et al., 2001, 2002]. Most of these studies try to assess to what extent various measures of institutions explain the differences in economic performance across countries by adding institutional measures as regressors in Barro-type regressions and use instrumental variable analyses to deal with endogeneity problems.

Although, this literature has offered good insights in the role of institutions on economic performance, its approach is not free of criticisms. The definition of *good* institutions as solving the issue of transaction costs is criticised as being too narrow and it has been accused of not recognising the importance of understanding power dynamics and bureaucratic costs in organisations and therefore do not addressing the role of politics and governments. This gave rise to a more comprehensive analysis that includes political institutions. Economic institutions are largely politically determined and ultimately reflect choices made by powerful groups in the society [Sen, 2013]. Therefore, the study of which institutions matter for growth needs to include more political features in order to understand why, in certain contexts, *growth-enhancing* institutions emerge and why certain institutions that harm growth – *growth impeding* institutions – are highly persistent, especially in developing countries.

The first attempt to combine economic and political analyses to account for the determinants of economic growth studied the effect of political regimes on growth. According to Rodrik [1997] there are very few questions in social sciences more fundamental than the relationship between political regimes and economic prosperity. Do dictatorships or democracies better promote economic growth? The answers to this question vary. For instance, Galenson [1959]; Huntington [1968]; Rao [1985] argue that dictatorships are more effective than democracies in mobilising resources for investment. This is supported by Haggard [1990] who argues that dictatorships force firms to invest and export and therefore, avoid unproductive uses of resources. Hewlett [1980] finds evidence that the military regime in Brazil in 1960s prevented social unrest and stabilised the economy. Typically the advocators of the conflict school used the cases of some East Asian countries, such as South Korea and Taiwan, as evidence that "good-for-growth" dictatorships could create the right conditions for growth [Feng, 2005].

However, these views have been strongly contrasted by authors that argue that economic and political freedoms foster economic growth [Sen, 2000], and that only democracies produce long-lasting economic successes [Olson, 2000]. In his seminal contribution, Przeworski et al. [2000] examine the experience of 135 countries from 1950 to 1990 and provide a insightful investigation on the role of democracy on development. The main conclusions emphasise that the per capita income do grow faster in democracies (independently of the level of income) however, the level of a country's wealth is crucial for the survival of democracy; that is, even when a democracy is settled, a return to autocratic regimes is not unlikely in poor countries.

Another aspect of the political institutions considered by this literature is the distribution of power. Power is considered crucial for institutional analysis because it can obstruct rules that are against their interest of those holding it. Knight [1992]; Moe [2005]; Khan [2010] consider institutions as a *distributional* instrument that allocates resources based on the pre-existing distribution of power in the society and contrast this to the *coordination* role given in more economic contexts. These authors argue that, although institutions are used as coordination devices to solve collective action and facilitate transaction in the economy, the main role of institutions is to shape distributional outcomes. Individuals and groups enter into the society with different resource endowments, and these differences ensure that the subsequent allocation have unequal implications that favour those with initial greater power

Khan [2010] explains the relationship between distribution of power and institutions. The distribution of power is based on income and wealth and on the capacity of powerful groups to organise themselves. This drives the creation of institutions that sustain a distribution of benefits for different classes and groups in line with their relative power and therefore sustain the holding power distribution. If a particular institution imposes a distribution of benefits that is not accepted by the holding power groups,

these will oppose to the introduction or enforcement of this institution, even if this is *growth-enhancing*. In fact, Knight [1992] explains that institutions may not be socially efficient. The efficiency of institutions also depend on the distribution of power. When power is concentrated on the hands of few, it is likely that *growth impeding* institutions are created. In order to achieve self-gain, authors may destroy *growth enhancing* institutions that promote coordination, and replace them with institutions that reduce coordination and collective benefits.

The main problem with this literature, is the failure to explain the origins of the initial distribution of power. In order to understand the origins of Latin American institutions, we need to learn what affected initial power distribution. The challenge is thus to identify how collective actors are likely to take possession of the resources which allow them a greater slice of the power distribution.

The criticisms to the econometric analysis on the role of institutions, come mainly from the endogeneity issues discussed in the previous chapter and the limitations of the econometric techniques in dealing with endogenous regressors [for an extent discussion on the limitations of econometric techniques in the analysis of institutions see Pande and Udry, 2005]. Despite the criticisms, the empirical analysis has uncovered important correlations across countries between growth and the nature and quality of a core set of economic, political and social institutions. With the use of both historical narratives and econometric analysis, this literature has emphasised that problems in former colonies are deeply rooted in colonial times and in the institutional setting that was established during this period [David, 1994; Greif, 1997; Acemoglu et al., 2001, 2002; Banerjee and Iyer, 2003; Engerman and Sokoloff, 1997, 2008; Baker et al., 2008; Easterly and Levine, 2012]. The rest of this chapter analyses the colonial origins of Latin American and Caribbean institutions on the light of this literature.

3.2. Do Latin American and Caribbean Institutions have Colonial Origins?

In order to find what originates institutions, we may need to look back into past events. Colonialism is one of the single most salient facts in the modern era. Several studies argue that the institutions established during the colonial period exhibited over-time effects through both their own persistence and the actors and processes that they brought into being. For this reason, institutions should have colonial origins.

This literature is based on two hypotheses. One is that a series of colonial aspects shaped the character of those institutions created after the independence. The second one is that the current institutions strongly reflect early ones due to institutional persistence. This section analyses how these theories apply to the case of Latin America and the Caribbean.

One of the problems with the hypothesis that current institutions depend on early ones is that it does not take into account the differences in decolonisation times in former colonies. One of the outstanding features of Spanish and Portuguese colonies in Latin America is their early independence. Table 3.1 shows that the bulk of these countries acquired their independence in early nineteenth century; this is almost a century before the main decolonisation process of 1960s in the rest of the colonial world.

Even when institutions tend to be highly persistent, if we consider only Latin America (instead of all former colonies in the world) the effects of early institutions on current ones may differ. Figure 3.1 plots the correlation between early and current institutions in early independent countries in Latin America. Sub-figure (a) uses an index of democracy [from Vanhanen, 2000], while sub-figure (b) uses the political constraints index [from Henisz, 2010]. Both graphs show a weak correlation between early and current Latin American institutions (the correlation coefficients are 0.15 and -0.18,

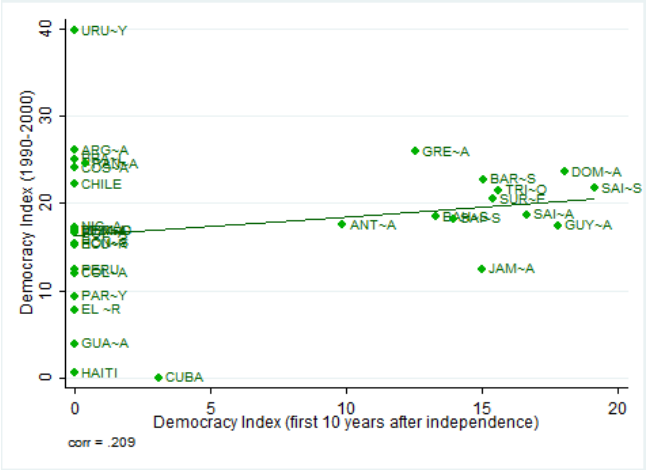
Table 3.1.: Independence of Latin America and the Caribbean

Independence from	Period of Independence: Early (before1830)	Late (after 1960)	Overseas territories (no independent)
Spain/ Portugal	Argentina Bolivia Brazil Chile Colombia Costa Rica Cuba[a] Dominican Rep. Ecuador El Salvador Guatemala Honduras Mexico Nicaragua Panama Paraguay Peru Puerto Rico Uruguay Venezuela		
France	Haiti		French Guiana Guadeloupe Martinique St. Martin St. Barthélemy
Netherlands		Netherlands Antilles[b] Aruba Curacao Sint Maarten Suriname	Bonaire Sint Eustatius Saba
Britain		Antigua & Barbuda Bahamas Barbados Belize Dominica Grenada Guyana Jamaica St. Kitts and Nevis St. Vincent and the Gren. Trinidad and Tobago	Anguilla British Virgin Islands Cayman Islands Monserrat Turks and Caicos Is.

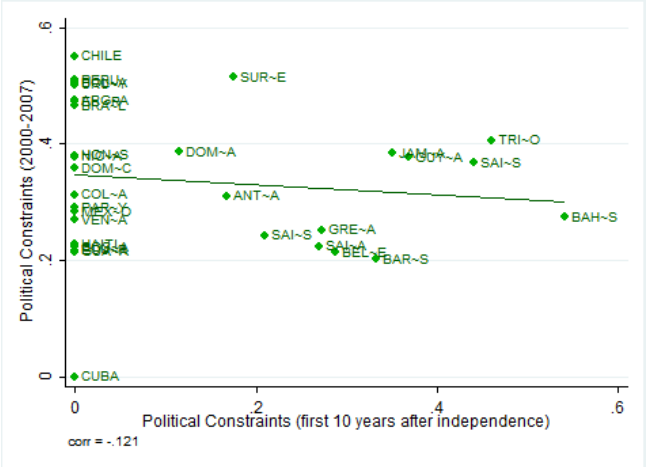
Notes:
a. Cuba obtained its independence in 1902
b. Netherlands Antilles dissolved in 2010. After dissolution, Bonaire, Sint Eustatius and Saba became special municipalities of the Netherlands, while Curacao and Sint Maarten became constituent countries within the Kingdom of the Netherlands, along the lines of Aruba, which separated from the Netherlands Antilles in 1986.

respectively). Therefore, we cannot assume for Latin America that colonial factors affect current institutions in the same way they affected early ones (at the time of independence).

Figure 3.1.: Current vs Early Institutions in Latin America



(a) Index of Democracy



(b) Political Constraints

The most recurrent colonial factors consider to have shaped institutions in former colonies are: coloniser identity, European settlements, native population, and natural resources. In order to analyse the effects of these on institutions, this chapter proposes four hypotheses that can be described as:

Hypothesis 1. *British did better*

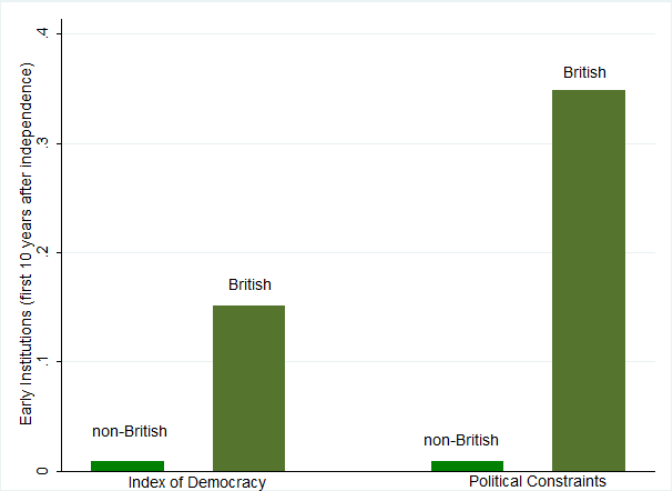
The main European countries active in colonisation processes were Spain and Portugal in the first period, followed by France, Great Britain and the Netherlands. The role of the coloniser identity is one of the most discussed sources of institutions. Most of these studies conclude that *British did better*. La Porta et al. [1998, 1999] argue that former British colonies have better institutions due to the inheritance of common law legal systems. The authors see legal systems as indicators of the relative power of the State vis-á-vis property owners. While common law developed in England as a defence of Parliament and property owners against the attempts by the sovereign to regulate and expropriate them; civil law developed more as an instrument used by the sovereign for State building and controlling economic life.

The supremacy of British legacy has also been related to tax policy [Thirsk, 1997] labour market regulation [Stotsky and WoldeMariam, 1997; Botero et al., 2004], contract enforcement [Djankov et al., 2003], investments on education and school enrolment [Grier, 1999; Bertocchi and Canova, 2002].

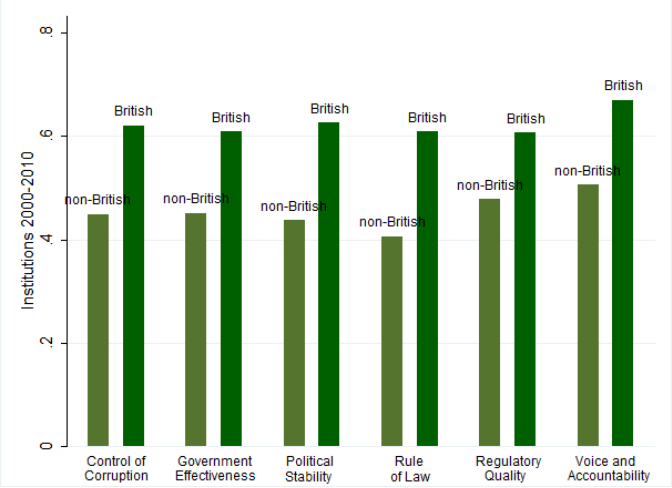
Looking at a simple comparison between institutions in former British and non-British colonies (Figure 3.2) there seem to be some evidence that British ones had better institutions. The first hypothesis investigates this.

It is worth of notice that British and non-British colonies differ also for the period of decolonisation (see Table 3.1). While British territories left their status of colonies only in the 20th century, Spanish colonies acquired their independence in the first half of the 19th century. In fact, another question that has arisen when attempting to assess the impact of colonial rule is whether a longer period of colonial rule was better or worse for economic development. Some studies provide evidence that longer colonial rule is related to higher economic development within colonised territories, nonetheless, for the case of Latin America, it is difficult to disentangle the relationship between Britain

Figure 3.2.: Institutions in British Colonies vs Non-British Colonies



(a) Early Institutions



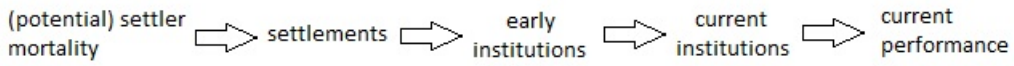
(b) Current Institutions

colonies and late independence. So to find that former British colonies have better institutions may also mean that a longer period of colonisation favoured the creation of better institutions.

Hypothesis 2. *Larger early European settlements were better for institutions*

During colonial times, many European colonisers settled the conquered territories. In their famous contribution, Acemoglu et al. [2001] propose a theory of colonial origins of institutions based on colonial European settlements. The hypothesis behind this theory is illustrated in Figure 3.3. According to this theory, Europeans settled and replicated their institutions (*good* institutions) in those colonised territories with climate conditions similar to the ones in their home country. These *good* institutions protect private property from possible government expropriation. Due to the high persistence of institutions, highly settled territories still enjoy the inheritance of *good* institutions. On the other hand, those territories with no favourable climate conditions for settlement inherited *bad* institutions. The institutions set in these territories (the authors call them *extractive*) aimed to transfer as much of the colony's resources to the coloniser, so they provide neither protection for private property nor checks and balances against government expropriation.

Figure 3.3.: Acemoglu, Johnson, Robinson's hypothesis

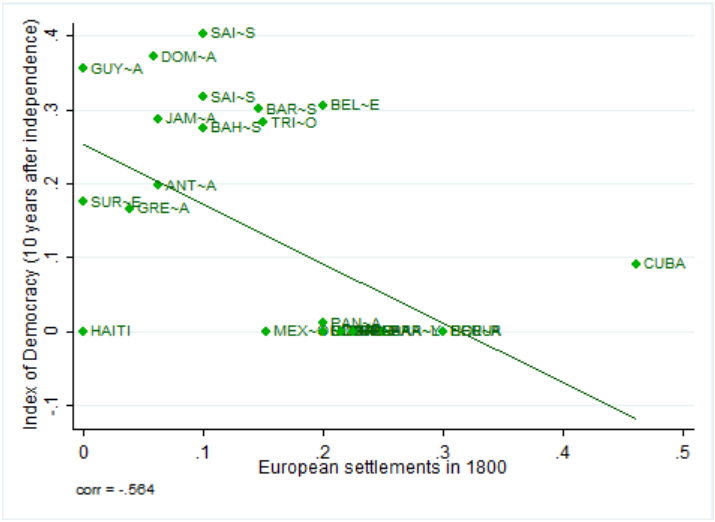


Source: Acemoglu, Johnson, and Robinson [2001]

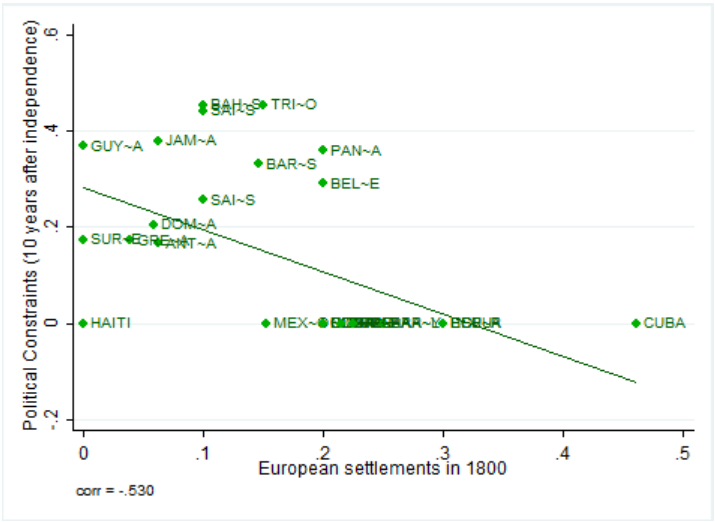
According to this theory, we should observe that large European settlements during colonial times are related to better early and current institutions in Latin America. Figures 3.4 and 3.5 plots institutions against European settlements in the colonised territories in 1800. We observed that, unlike the theory hypothesises, it seems to be a negative relationship between European settlements in 1800 and early institutions in the region (Figures 3.5a and 3.5b). In the case of current institutions the relationship

is less marked (Figures 3.6a and 3.6b), but it still seems to be negative[3]. The second hypothesis of this study tests the effects of European settlements in the institutional setting of the area.

Figure 3.4.: Early Institutions and European Settlements



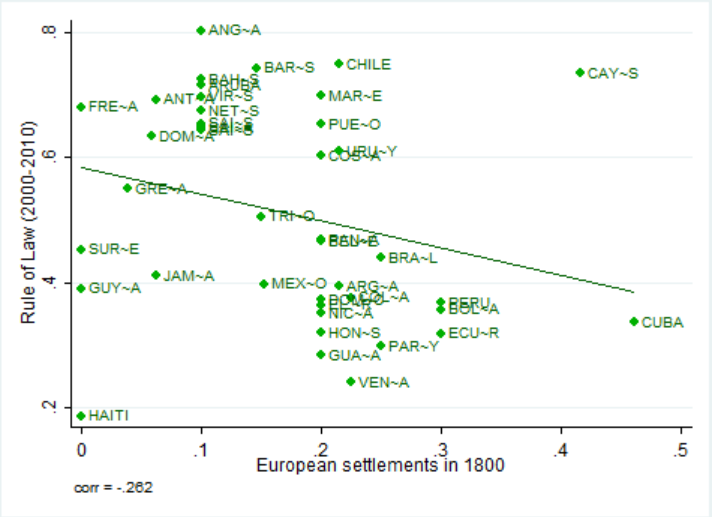
(a) Index of Democracy



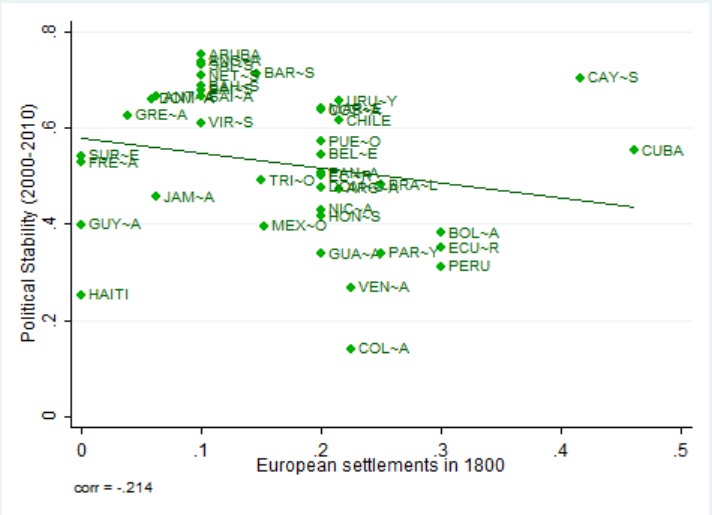
(b) Political Constraints

[3]Section B.2 in Appendix B shows the analysis of the relationship between institutions and European settlements for various samples, using the same dataset as in Acemoglu, Johnson and Robinson [2001]

Figure 3.5.: Current Institutions and European Settlements



(a) Rule of Law



(b) Political Stability

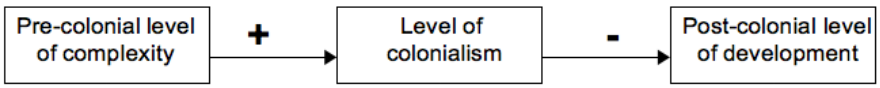
Hypothesis 3. *Territories with larger native populations inherited bad institutions*

While coloniser identity and European settlements focus on the coloniser power, some features of the colonised territories have also been considered. Some of these territories were already inhabited at the time of the first contact with Europeans and how the organisation of pre-colonial societies may have also played a role in the further institutional setting created by the colonisers. In general, large native populations have been related to poor institutional settings and lower levels of development [Acemoglu et al., 2002; Baker et al., 2008; Mahoney, 2010].

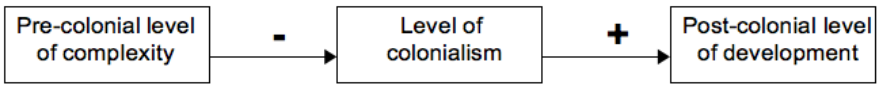
Mahoney [2010] offers an interesting discussion on the negative impact of native populations on the quality of current institutions. An implicit assumption in Acemoglu, Johnson, and Robinson's works, is that all European institutions were good. Mahoney disagrees with this view and distinguishes European colonisers in *mercantilists* and *liberal*. During the colonial period, European institutions were mostly based on mercantilist principles. However, this was also the period when liberalism started as major doctrine and intellectual endeavour in Europe and some countries approached this doctrine earlier than others. Mahoney argues that these differences impacted the type of institutions that colonisers set in their colonies. Mercantilist coloniser powers settled and implanted their institutions in territories with large populations where they could find possibilities for labour exploitation. The institutions that they implanted were bad for economic development and this is reflected in the post-colonial levels of development. On the other hand, more liberal colonisers preferred less complex societies, where they sought possibilities for capitalist accumulation (without the problem of dealing with local populations). These institutions promoted post-colonial development.

According to Mahoney, British colonisers were driven by more liberal principles than the rest of European crowns. However, the Spanish change from the Habsburg dynasty (that ended in 1700 with the death of the King Charles II) to the rise of the Bourbon

Figure 3.6.: Coloniser's Institutional Background and Development



(a) Mercantilist colonial power



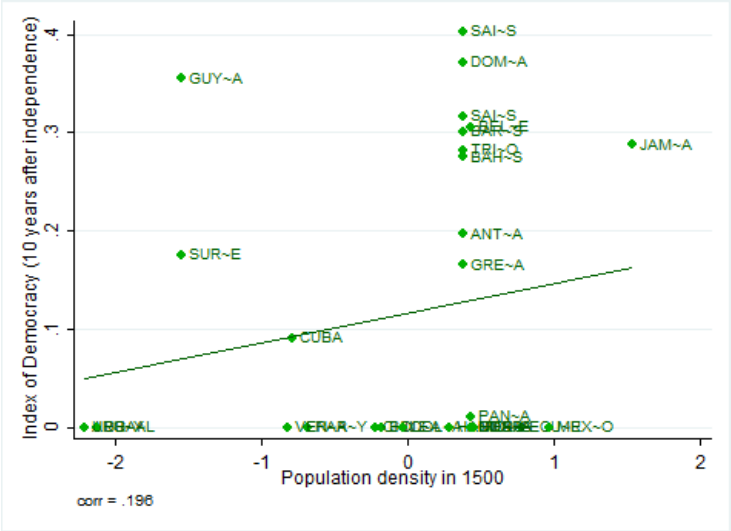
(b) Liberal colonial power
Source: Mahoney, 2010 p. 255

monarchy, had large consequences on Spanish-America. Specifically, Mahoney argues that Bourbon monarchy established more *liberal* institutions. So, in the second part of the colonial period Spanish colonisers shift their attention towards those territories with smaller populations in Spanish America.

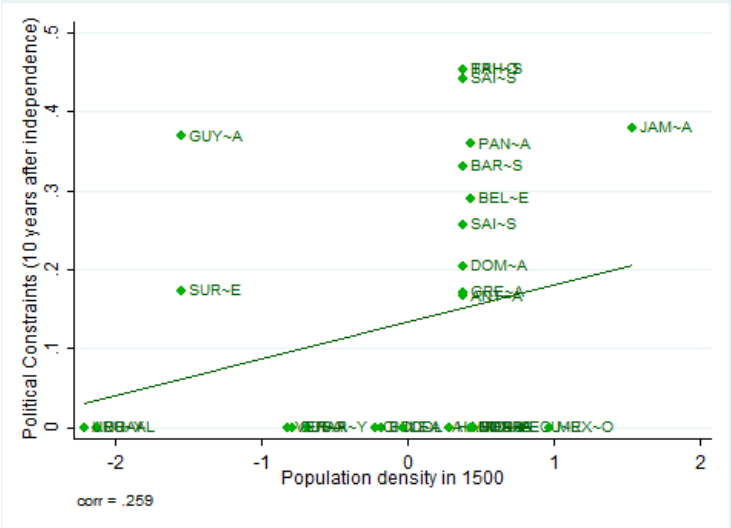
Mahoney's theory is depicted in Figure 3.6. Territories with large pre-colonial populations tended to attract the attention of the Habsburg monarchy, but they were largely neglected by the Bourbon system, the institutions are a result of mercantilist coloniser powers and are related to lower levels of current development. In the case that a territory was not relevant for Habsburg, but becomes a centre of economic activity during the Bourbon monarchy (mainly areas with no complex pre-colonial societies), it inherited only liberal institutions that bring high levels of post-colonial development. Finally, if a territory was central for the Habsburg and the Bourbon monarchy, this inherited both institutions, reaching an intermediate level of development (this is the case of Mexico).

Figures 3.7 and 3.8 plot the population density of the territory in 1500 against early and current institutions respectively. These figures show a weak (positive) correlation between institutions and native populations. This does not support Mahoney's theory for which we should observe a negative correlation between institutions and pre-colonial populations. Hypothesis 3 investigates this.

Figure 3.7.: Early Institutions and Pre-colonial populations

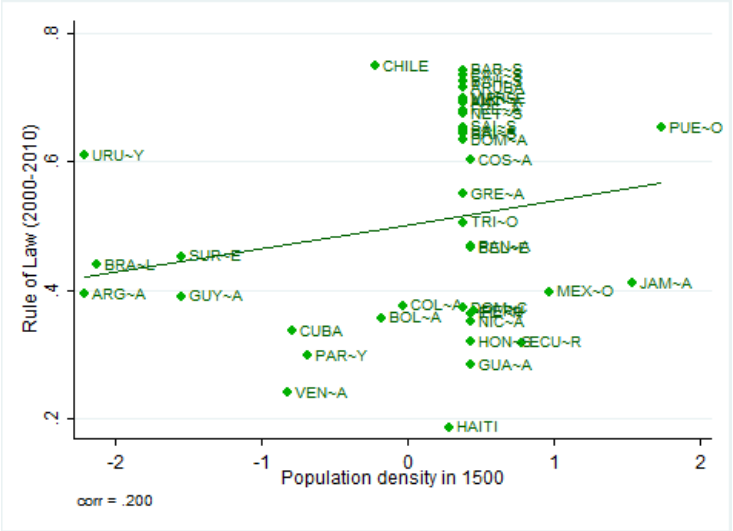


(a) Index of Democracy

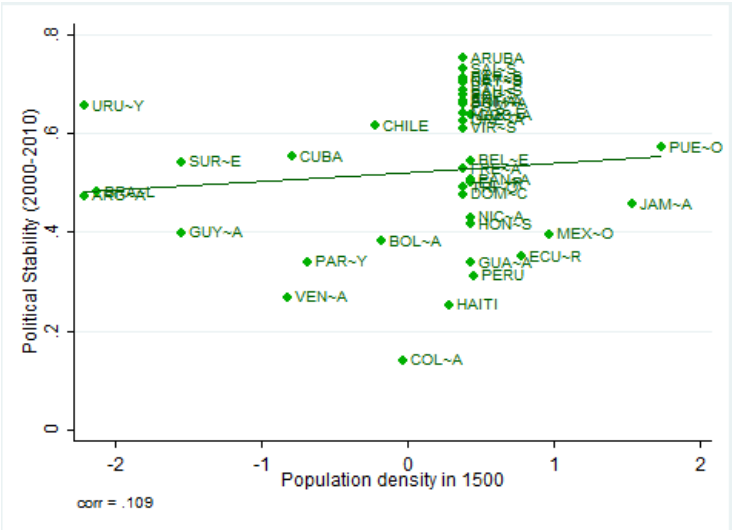


(b) Political Constraints

Figure 3.8.: Current Institutions and Pre-colonial populations



(a) Rule of Law



(b) Political Stability

Hypothesis 4. *Natural resources had a negative effect on institutions*

One thing that we should take into account when explaining the colonial heritage of Latin America is that the exploration and further colonisation of these territories was driven by the search of mineral wealth first and profitable cash-crops after. The search for sources of gold and silver carried the Spaniards far and wide across the Americas, contributing much to the amazing rapidity to which they explored and settled their portion of the continent: on the promise of gold Spaniards settled the Caribbean; finding little in the islands, they moved to the Isthmus, then to New Spain (Mexico), then to Peru.

The presence of mineral resources was in fact the key determinant of the level of colonisation, at least in a first phase. Mexico, Peru and Bolivia (where large deposits of silver were found) were initially the crucial centres of the colonial power. Nonetheless, following the increase of demand of tropical crops in Europe, agriculture plantation for export became very profitable. In fact, it was in the context of plantation agriculture and sugar that the Brazilian colonial society was formed and sugar production emerges in the Caribbean as an alternative to the rapidly depleted mining industry.

The role of colonial mining and cash-crop production have been largely neglected in economics, but it has been subject of debate for several economic historians and other social scientists. While in first instance, these studies were mainly focused on the effects that colonial mining had on the European economies (e.g. European inflation in the sixteenth century); further studies have focused on the impact of these resources on the economic development of former colonies [Tandeter et al., 2005]. Based on these studies, Hypothesis four considers the role of natural resources on the institutional setting of these countries.

Different natural resources (mining or plantation agriculture) required different ways of organisation and this reflected in how labour was structured and land was divided.

Mineral resources were found in areas with large native populations (such as Aztecs in Mexico and Incas in Peru), but when areas were less populated American natives were moved into the place under different systems (the case of the mine of Potosi in Bolivia). Plantation agriculture was mainly supported by the import of African slaves. The discovery of gold or silver in a territory translated into several direct state interventions in favour of the mining sector. On the same way, cash-crop production such as sugar (but also coffee and cocoa) are most efficiently produced on large estates[4] and require a high initial investment.

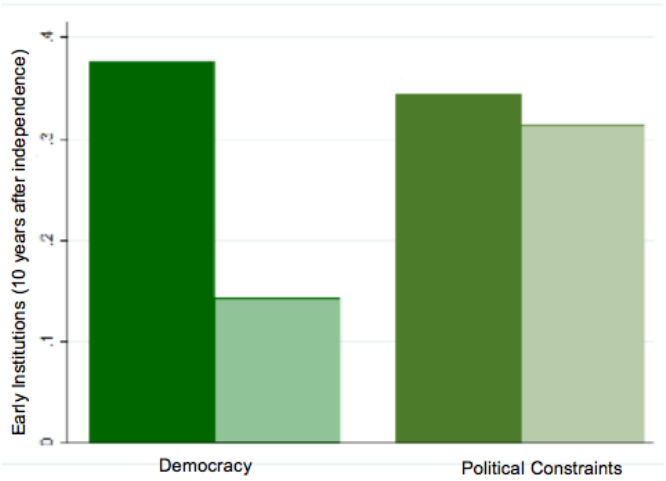
The institutions created were thus used to systematically extract surplus from indigenous and African slaves, even if this labour force (indigenous or Africans) was prevented from partaking in the benefits and possibilities from that economic wealth. Furthermore, the policies adopted during the colonial period were the instruments through which economic and political actors were built. The resource allocation that arises from this facilitates the creations of different endowed and motivated groups that could steer the mode of accumulation within the society as a whole. Landowning elite tends to develop coercive labour market institutions such as serfdom, slavery or permanent debt peonage [Domar, 1970; Engerman and Sokoloff, 1997, 2002]. The great wealthy merchants were born out of trade restrictions and monopolistic structures. They were often tied via investment to large estate owners, who arose in response to colonial institutions regulating the control of land and labour. This merchant-landed elite trapped capital, stifled investment and entrepreneurial activity, and thus blocked development.

Figure 3.9 shows that in average, those Latin American and Caribbean countries that did not exploit mineral resources during the colonial times perform better in both early and current institutions. The relationship between the exploitation of cash-crops and institutions is shown in Figure 3.10. Those areas with more suitable lands for the

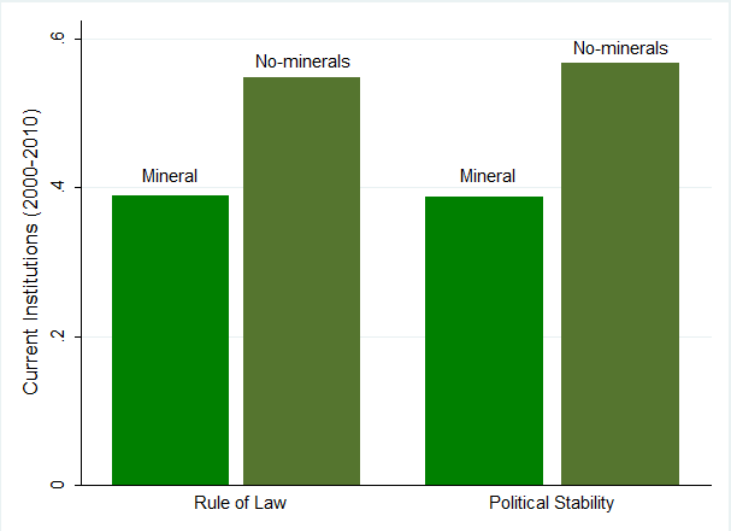
[4]Scale-neutral food crops such as wheat, rice and maize are historically produced on modes size plots [Kawagoe et al., 1985]

production of sugar are correlated with worse early and current institutions (correlation ratio equal to -0.06 and -0.23 respectively).

Figure 3.9.: Institutions and Minerals

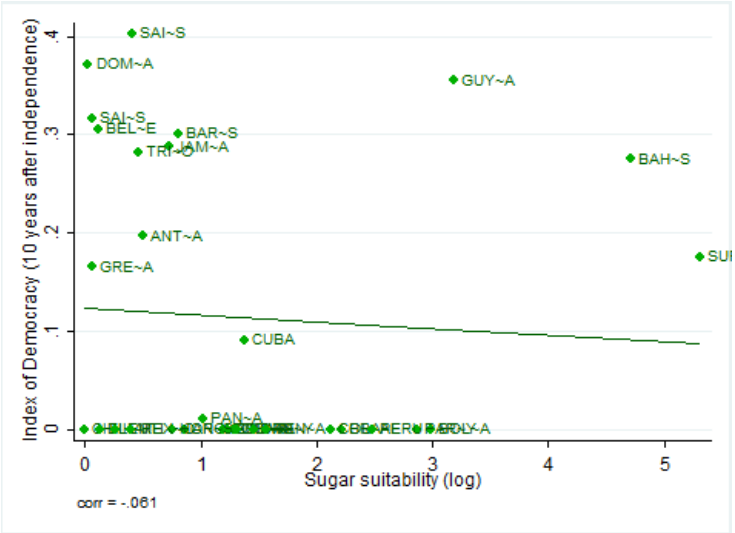


(a) Early Institutions

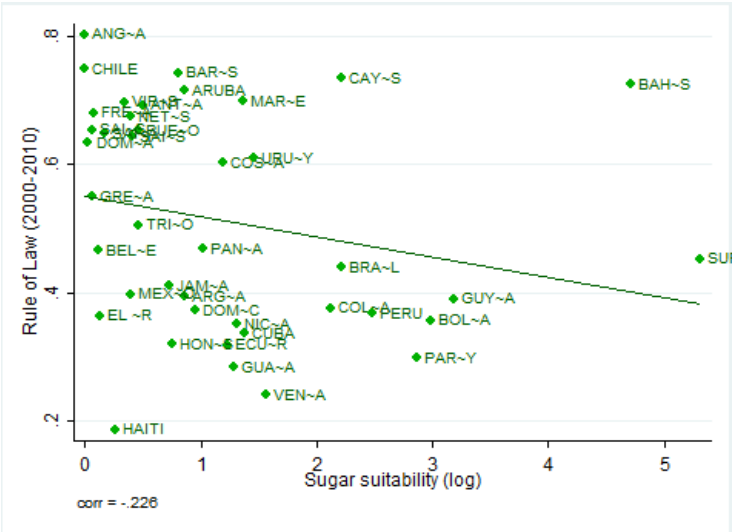


(b) Current Institutions

Figure 3.10.: Institutions and Cash-Crops



(a) Early Institutions



(b) Current Institutions

3.3. Empirical Analysis

This section introduces an empirical analysis of how colonial origins affect institutions in Latin America. First, it investigates the relationship between current and early institutions, and then tests the four hypotheses introduced in the previous section for a sample of Latin American and Caribbean countries.

The analysis is based on a cross-country data set for up to 31 countries in the region. The data sources are summarised in Appendix B. The dependent variable is a measure of political institutions. There are several datasets offering measures of institutions. Next section describes the data sets used in this analysis.

3.3.1. A Description of the Measures of Institutions

Four different data sets are used to measure political institutions in this analysis. One is the index of democracy from *Polyarchy data set* which covers 187 countries over the period 1810-2000 created by Vanhanen [2000]. A second data set is the *Political constraint index* by Henisz [2010] which aims to identify underlying political structures and measure their ability to support credible policy commitments. It covers 226 present and historical countries from 1800 to 2007. The third data set is the *Polity IV Project* which offer measures for democracy, autocracy and constraints on the executive power [Gurr, 1999]. This covers the period 1800-2011. Finally, as measure of current political institutions this study uses the Rule of Law and Political Stability from the *Worldwide Governance Indicators* [Kaufmann et al., 2009] mainly because this database offers a larger number of observations for current institutions than the previous ones.

The Index of Democracy from the Polyarchy dataset [Vanhanen, 2000] is based on two dimensions *competition* and *participation* which the author addresses as the "two basic indicators of democratisation". Competition is defined as "the percentage share of the

smaller parties and independent of the votes cast in parliamentary elections, or of the seats in parliament", while Participation is "the percentage of the adult population that voted in elections". These two measures are used for calculating an aggregated index of democratisation.

The Political Constraint Index [Henisz, 2010] is an endeavour to measure political constraints. This is not an index of democracy and this index does not aim to provide a measure of the political regime. The index uses quantitative data on the number of independent branches of administrative government with veto power, over policy change, and the distribution of preferences within those veto players. The dataset contains around 90 variables that measure various features of the legislative, executive and judicial branches of government. The data are analysed in a simple spatial model of political interaction to assess the feasibility with which any one actor (eg. the executive or a chamber of the legislature) is constrained their choice of future policies. The results range from 0 (no checks and balances) to 1 (extensive checks and balances).

The Polity IV Project by Gurr [1999] focuses on "concomitant qualities of democratic and autocratic authority in governing institutions". The polity scheme consists of six component measures that refer to key qualities of executive recruitment, executive constraints, and political participation. These components are aggregated into two composite indicators, *Democracy* and *Autocracy*. Democracy is conceived as an "outcome of three essential and interdependent elements. One is the presence of institutions and procedures through which citizens can express effective preference about alternative policies and leaders. Second is the existence of institutionalised constraints on the exercise of power by the executive. Third is the guarantee of civil liberties to all citizens in their daily lives and in acts of political participation" [Marshall et al., 2014]. Autocracy on the other hand is defined "in terms of the presence of a distinctive set of political characteristics. In mature form, autocracies sharply restrict or suppress competitive

political participation" [Marshall et al., 2014]. Finally, constraints on the executive, refer to "the extent of institutionalised constraints on the decision-making powers of chief executives, whether individuals or collectivities". Democracy and Autocracy both take values from 0 to 10 while Constraints on the Executive ranges between 1 and 7. All these variables have been normalised to vary between 0 and 1.

The Worldwide Governance Indicators are composite governance indicators based on 32 underlying data sources for 215 countries over the period 1996-2012. Two indicators are used in this study. *Rule of Law* "captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence" while *Political Stability* "measures perceptions of the likelihood that the government will be destabilised or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism" [Kaufmann et al., 2009].

3.3.2. Limitations of the Quantitative Measures of Political Institutions

There are no few criticisms to the attempts to quantitatively measure political institutions, and in particular the degree of democracy. All the measures used in this thesis have been contested in a way or another. In fact, all political indicators have been challenged for the way they define and measure political concepts. The main addressed criticisms are grounded in issues related to conceptualisation (how democracy is defined), measurement, and aggregation [Rydland et al., 2007; Gutiérrez Sanin, 2011; Coppedge et al., 2011].

What is the notion of democracy that underlies existing measures? There are some core definitional elements in the definitions used for democracy but the debate is still open. Some conceptions of democracy are more *encompassing* than others considered more

minimal [Munck and Verkuilen, 2002; Coppedge et al., 2011]. Both approaches have their limitations. Too many attributes may limit the analytical usefulness of the index but minimalist approaches could omit attributes that are generally considered to be intrinsic to the concept of democracy [Rydland et al., 2007]. Polity IV and Polyarchy index both fall in the latter approach. For example, Polity IV does not include universal suffrage as an attribute of democracy [Munck and Verkuilen, 2002] and both Polity IV and Polyarchy index do not consider whether elections are free and fair [Rydland et al., 2007]. Gutiérrez Sanin [2011] observes that there is a good correlation between the quantity of missing data and GDP per capita; data will be scarcer, and poorer, relative to contexts for which it is more needed.

The components that make up a definition of democracy are in general unobservable variables. Several indices are based on indicators that are, at best, poor approximations of the underlying concepts they attempt to measure [Rydland et al., 2007]. Mistakes in the way these concepts are coded can create serious problems related to measurement. For instance, although Vanhanen argues in favour of using *objective* indicators for competition and participation to measure the main attributes of its index of democracy, Hadenius and Teorell [2005] find several flaws in the measures used for competition and participation. Furthermore, miscoding based on limited knowledge of cases may affect the validity of these indices [Bowman et al., 2005]. In addition, if the availability of sources is biased and for instance, sources are more reliable for some countries than for others, the indices may not be directly comparable[Bollen and Paxton, 2000].

Considering that democracy is a multi-faced concept, all the considered indices have to deal with the aggregation problem. Existing measures of political institutions frequently fail to offer any justification for their aggregation procedure or they do not provide theoretical justification for the weighting scheme [Munck and Verkuilen, 2002].

Alternative aggregation rules can produce markedly different scores on the index. In order for any aggregation scheme to be successful, rules must be clear and must reflect an accepted definition of democracy. All current indices of democracy have some problems with their aggregation procedure. For instance, Coppedge et al. [2011] argues that it is not clear how the Polity Index codes its components in particular instances, or how the stated aggregation principles lead to an overall score for a given country or year. However, an arguably strength of the Polity index is that its components are displayed in a disaggregated fashion, country by country, so these can be re-processed with other methods of aggregation if needed [Hadenius and Teorell, 2005]. The Worldwide Governance Indicators have taken more seriously the problem of setting weights and these are the estimated parameters of a statistical model, in which each of the observed indicators of governance is taken to be a linear function of an unobserved true governance measure with common parameters across countries for each indicator [Kaufmann et al., 2009; Ravallion, 2012]. There are no many studies on the comparability and data quality of the Political Constraint index, however considering that the index measures political characteristics (i.e. number of independent branches of government, veto power over policy change, party composition of the executive and legislative branches, preference heterogeneity within each legislative) it can be subjected to similar criticisms.

3.3.3. Early and Current Institutions

It is often assumed that institutions for former colonies at the time of independence are strongly correlated with current ones. Empirical studies on large cross-country data sets show that institutions are highly persistent. These studies are based on regressions such as the one described by Equation 3.1. This equation considers current institutions

as a function of early ones.

$$Current\ Institutions_i = \beta_1 + \beta_2 Early\ Institutions_i + \epsilon \tag{3.1}$$

Table 3.2 shows the results of regressing current institutions on early ones in Latin America but also in a larger data-set of all former colonies in the world (for which data is available). Panel A uses the Index of Democracy (from Vanhanen [2000] and the Political Constraints Index (from Henisz [2010]). Panel B shows the results for the measures of democracy, autocracy and constraints on the executive from the Polity IV Project. All these data sets confirm the initial hypothesis: while there is statistical evidence that current and early institutions are correlated if we consider a sample of all former colonies, we cannot assume the same for institutions in Latin America. The regressions show that the coefficients for early institutions are not statistically significant in any of the specifications.

Therefore, even if institutions are highly persistent, the hypothesis that early institutions cause current ones does not hold in the case of Latin America.

Table 3.2.: Early vs Current institutions

Panel A: Democracy (Vanhanen, 2010) and Political Constraints (Henisz, 2010)

	Latin America		Former colonies	
	Current Democracy	Current Political Constraints	Current Democracy	Current Political Constraints
Early Democracy	.220		800***	
	(.144)		(.112)	
Early Political Constraints		-.087		.371***
		(.107)		(.095)
constant	16.275***	.348***	7.755***	.203***
	(2.090)	(.031)	(1.001)	(.019)
n	32	32	118	138
adj R^2	.044	.015	.282	.116
F	2.32	.067	50.64***	15.31***

Panel B: Democracy, Autocracy and Constraints on the Executive from Polity IV Project

	Latin America			Former colonies		
	Current Democracy	Current Autocracy	Current Constraints on the Executive	Current Democracy	Current Autocracy	Current Constraints on the Executive
Early Democracy	.125			.467***		
	(.136)			(.092)		
Early Autocracy		-.167			.330***	
		(.166)			(.090)	
Early Constraints			.039			.333***
on the executive			(.085)			(.079)
constant	.706***	.106	.794***	.347***	.077**	.450***
	(.061)	(.082)	(.063)	(.044)	(.035)	(.050)
n	24	24	24	114	114	114
adj R^2	.021	.056	.007	.175	.129	.143
F	.85	1.01	.21	25.91***	13.44***	17.93***

notes: Robust standard errors in parentheses
***, **, *; significance at 1, 5 and 10 percent respectively

3.3.4. Colonial Origins of Institutions

What follows tests the four hypotheses on the colonial origins of institutions in Latin America described in Section 3.2. Since, as we have just seen, we cannot assume that Latin American early and current institutions are strongly correlated, this study will analyse the effects of colonial factors on both, early and current institutions. Equations (3.2) and (3.3) summarise the econometric analysis to be carried out:

$$Early\ Institutions_i = \alpha_1 + \boldsymbol{\beta} Colonial\ Origins_i + \epsilon \tag{3.2}$$

$$Current\ Institutions_i = \alpha_2 + \boldsymbol{\delta} Colonial\ Origins_i + \upsilon \tag{3.3}$$

These regressions are going to be estimated in a cross-country framework using OLS estimators with robust standard errors using Democracy and Political constraints from Vanhanen [2000] and Henisz [2010] respectively. The Polity IV data set is one of the most comprehensive data sets on measures of political institutions and offer the longest time-series (1800-2012) however, one of the shortcoming of this data-set is the limited number of countries for Latin America. While Vanhanen [2000] and Henisz [2010] offer data for 32 of the countries in the region, the Polity Project database only has 24.

Testing the Hypotheses on Colonial Origins: Independent variables explained

What follows describes the independent variables used to test the hypotheses on colonial origins of both early and current institutions in Latin America. Appendix B lists the data sources and definitions.

Hypothesis 1: British did better A dummy variable that takes the value of 1 if the country was a former British colony (0 otherwise) is used;

Hypothesis 2: Larger early European settlements were better for institutions

European settlements is a measure of the percentage of Europeans in these countries in 1800;

Hypothesis 3: Territories with larger native populations inherited bad institutions

Two variables are used. One is the population density in 1500 as a proxy of pre-colonial native population. The second one is a variable to allow for Mahoney's theory on the relevance of the change in the Spanish dynasty from Habsburg to Bourbon. This variable is equal 1 if the country is considered mercantilist by Mahoney, 0 if this is liberal. In the case of Spanish colonies, it assumes the value of 1 if the country was an important centre during the Habsburg dynasty, 0 if this was a centre during the Bourbon period (this is the case of Argentina, Uruguay, Paraguay);

Hypothesis 4: Natural resources had a negative effect on institutions Again, two variables are used. One captures those countries endowed with gold and silver mines by using a dummy variable that assumes the value of 1 if the country's economic activity at the time of the colonial period was based on the exploitation of either gold or silver and 0 otherwise. The second variable considers those countries that were specialised in the production of cash-crops. For this purpose I use a measure of the land suitability for the production of sugar from the FAO database.

Empirical Results

Table 3.3 shows the results for the test of the hypotheses on early institutions (in the first 10 years after independence). Panel A shows the results using the index of democracy from Vanhanen [2000] as dependent variable, and Panel B shows the ones using political constraints Henisz [2010]. These two are preferred due to the larger

number of countries for which data is available (in Latin America), nonetheless, the results using Polity IV Project database are replicated in Table 3.4.

The hypothesis that former British colonies inherited better institutions cannot be rejected. Regression (a) in Table 3.3 (in both panels) tests hypothesis 1. The coefficient of the British dummy is positive and statistically significant so we cannot reject this hypothesis. The result does not change when using Polity IV data in Table 3.4.

Regression (b) tests hypothesis 2. The coefficient for European settlements in 1800 is negative and statistically significant for both measures of early institutions; thus, contrary to the Acemoglu et al. [2001] argument, there is statistical evidence that larger Europeans settlements during the colonial period in Latin America and the Caribbean are correlated with *worse* institutions (rather than *better* as argued by the authors). When using Polity data, the variable for European settlements is still negative, but loses significant for the case of democracy and autocracy measures (it is still statistically significant when the dependent variable is constraints on the executive).

Hypothesis 3 is tested by regression (c). The variable for pre-colonial native population is not statistically significant for the Vanhanen's index of democracy or for political constraints (Table 3.3). In the case of Polity, this is statistically significant only in the case of Autocracy and Constraints on the Executive, but unlike discussed by Mahoney, the larger native populations seem to be related to better institutions. The variable for mercantilist coloniser is negative and statistically significant. The lack of statistical evidence on the negative effect of native populations on institutions makes me conclude that we can reject the Mahoney's theory. In addition, even if "mercantilism" negatively affects institutions (as argued by Mahoney), this variable is highly correlated with British colony (Britain was the only *liberal* country in that period) and this may be capturing the effect of being a non-British colony.

Finally, Regression (d) tests hypothesis 4. The coefficient for mineral resources is negative and statistically significant when explaining most of the measures of early institutions used. The variable for sugar suitability is not statistically significant. Therefore, we partially fail to reject hypothesis 4: there is statistical evidence that minerals did play a role in the creation of institutions at the time of independence.

Regressions (e)-(g) in Table 3.3 include those variables that turn to be significant in the analysis of hypotheses in Regressions (a)-(d). Regression (e) for both measures of early institutions includes British coloniser dummy, European settlements and the measures for the initial resource endowment. Former British colonies have in average higher index of democracy (0.28 higher than non British ones), while for colonial mineral centres this index is 0.03 lower than in non-mineral centres (Panel A). The index for political constraints is also in average higher for British colonies than from non British ones. However, the dummy for mineral centres loses significance in this specification while sugar suitability turns to be statistically significant and with positive sign. An increase in the proportion of soil suitable for the production of sugar of 10% is associated to an increase in the political constraints index of near 0.03 index points (Panel B).

At this point it is important to emphasise few facts about the process of colonisation in the region. In the early period of colonisation (16th and 17th centuries), the colonisation process was mainly an Iberian matter. British history of colonisation starts in the early 18th century but this rule out British access to mineral-rich colonies. Due to this status of second-comers in the colonisation and exploration of America and the lack of access to rich-mineral regions, we can observe a high (negative) correlation between British colonies and colonial mineral centres ($\rho = -0.437$). Regression (f) considers this, so it excludes the British dummy but includes European settlements and natural resources. European settlements are statistically significant and negative related to both measures of early institutions: an increase of 10% of the size of European

settlements in 1800, is related to lower levels of both indexes (-0.65 for democracy and -0.69 for political constraints). Both measures of early institutions are, in average, lower for colonial mineral centres than for non colonial ones (of -0.10 and -0.13 respectively). Sugar in this case is not statistically (or quantitatively in the case of democracy) significant. Regression (g) confirms the results of Regression (e) for both measures of institutions.

Table 3.3.: Early Institutions

Panel A:
Dependent Variable - Democracy in the first 10 years of independence

	Hp1	Hp2	Hp3	Hp4		Controls	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)
British colony	.283***				.278***		.279***
	(.023)				(.026)		(.024)
European Settlements in 1800		-.801***			-.011	-.651**	
		(.272)			(.140)	(.263)	
Pre-colonial Native Population			.028				
			(.030)				
Mercantilist coloniser			-.169***				
			(.045)				
Minerals				-.155***	-.027*	-.101***	-.028*
				(.032)	(.015)	(.015)	(.015)
(log) sugar suitability				.002	.014	-.000**	.014
				(.016)	(.010)	(.015)	(.011)
constant	.014	.252***	.220***	.152***	.005	.253***	.003
	(.010)	(.055)	(.035)	(.042)	(.029)	(.061)	(.013)
n	31	31	31	31	31	31	31
adj R^2	.871	.318	.361	.216	.891	.401	.891
F	151.92***	8.69***	7.49***	11.65***	47.13***	10.91***	60.03***

Panel B:
Dependent Variable - Political Constraints in the first 10 years after independence

	Hp1	Hp2	Hp3	Hp4		Controls	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)
British colony	.293***				.282***		.286***
	(.038)				(.044)		(.043)
European Settlements in 1800		-.873***			-.039	-.689***	
		(.240)			(.096)	(.230)	
Pre-colonial Native Population			.044				
			(.031)				
Mercantilist coloniser			-.151**				
			(.053)				
Minerals				-.183***	-.052	-.126***	-.053
				(.040)	(.032)	(.037)	(.032)
(log) Sugar suitability				.014	.027***	.012	.027***
				(.022)	(.007)	(.022)	(.007)
constant	.027	.280***	.226***	.159***	.015	.266***	.006
	(.020)	(.057)	(.038)	(.045)	(.044)	(.061)	(.035)
n	31	31	31	31	31	31	31
adj R^2	.697	.281	.258	.222	.751	.375	.750
F	59.21***	13.21***	5.09**	10.86***	66.01***	9.45***	82.56***

notes: Robust standard errors in parentheses
***, **, *; significance at 1, 5 and 10 percent respectively

Table 3.4.: Early Institutions: Polity IV

	Dependent Variable: Democracy				Autocracy				Constraints on the Executive			
	Hp1 (a)	Hp2 (b)	Hp3 (c)	Hp4 (d)	Hp1 (a)	Hp2 (b)	Hp3 (c)	Hp4 (d)	Hp1 (a)	Hp2 (b)	Hp3 (c)	Hp4 (d)
British colony	.598***				-.224**				.798***			
	(.091)				(.082)				(.046)			
European settlements in 1800		-.985				.354				-1.711*		
		(.718)				(.453)				(.857)		
Pre-colonial Native population			.035				-.098***				.067***	
			(.023)				(.025)				(.019)	
Mercantilist Coloniser			-.601***				.233***				-.804***	
			(.078)				(.061)				(.051)	
Minerals				-.077*				.018*				-.194*
				(.089)				(.109)				(.120)
(log) Sugar suitability				.001				.074				.006
				(.058)				(.058)				(.141)
constant	.131***	.440**	.738***	.267**	.398***	.285***	.147***	.250***	.175***	.664***	.992***	.373**
	(.026)	(.163)	(.073)	(.120)	(.048)	(.081)	(.045)	(.074)	(.038)	(.194)	(.038)	(.141)
n	25	25	25	25	25	25	25	25	25	25	25	25
R^2	.768	.134	.787	.015	.177	.028	.411	.101	.822	.243	.862	.054
F	43.02***	1.88	31.09***	0.38	7.53**	0.61	10.93***	1.29	305.68***	3.99**	181.38***	1.42

notes: Robust standard errors in parentheses
***, **, *; significance at 1, 5 and 10 percent respectively

Table 3.5 shows the results of the test of our hypotheses on the quality of more contemporary institutions (2000-2010). Panel A shows the results using *Rule of Law* as dependent variable, while *Political Stability* is used in Panel B. Even when considering current institutions, there is statistical evidence that former British colonies have better institutions than non-British ones (Regression (a)). In average, former British colonies have higher measures of rule of law and political stability in the order of 0.15 index points.

Regression (b) shows that while European settlements have a negative effect when explaining early institutions, there is no evidence of impact on current ones (the coefficient is not statistically significant in any of the specifications). Pre-colonial populations also have no statistically significant effect on current institutions (Regression (c)). The effect of mineral exploitation during the colonial times is still negative for current institutions, while the variable for sugar suitability has no statistically significant effect in this equation (Regression (d)). These results hold when including more than one variable (Regressions (e), (f), and (g)).

Table 3.5.: Current Institutions

	Hp1	Hp2	Hp3	Hp4		Controls	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)
Panel A: Dependent Variable - Rule of Law (2000-2010)							
British colony	.155***				.109*		.116**
	(.047)				(.064)		(.056)
European Settlements in 1800		-.430			-.130	-.261	
		(.297)			(.304)	(.314)	
Pre-colonial Native Population			.030				
			(.023)				
Mercantilist coloniser			-.166***				
			(.048)				
Minerals				-.147**	-.093	-.131**	-.097*
				(.056)	(.062)	(.062)	(.061)
(log) Sugar suitability				-.022	-.018	-.020	-.020
				(.022)	(.019)	(.021)	(.019)
constant	.460***	.584***	.586***	.571***	.539***	.608	.518***
	(.033)	(.057)	(.036)	(.036)	(.083)	(.061)	(.051)
n	41	41	36	41	41	41	41
adj R^2	.188	.069	.279	.174	.269	.198	.264
F	10.75***	2.09	7.19***	5.85***	6.14***	4.43***	7.90***
Panel B: Dependent Variable - Political Stability (2000-2010)							
British colony	.149***				.1017**		.101**
	(.041)				(.047)		(.042)
European Settlements in 1800		-.314			.009	-.115	
		(.262)			(.236)	(.245)	
Pre-colonial Native Population			.014				
			(.020)				
Mercantilist coloniser			-.169***				
			(.043)				
Minerals				-.169***	-.127*	-.162**	-.126**
				(.060)	(.066)	(.065)	(.063)
(log) Sugar suitability				-.019	-.017	-.018	-.017
				(.018)	(.01)	(.017)	(.016)
constant	.476	.580***	.614***	.587***	.539***	.604***	.541***
	(.029)	(.049)	(.031)	(.027)	(.062)	(.051)	(.035)
n	41	41	36	41	41	41	41
adj R^2	.217	.046	.299	.265	.350	.270	.350
F	13.30***	1.43	8.19***	6.23***	5.67***	4.32**	7.52***

notes: Robust standard errors in parentheses
***, **, *; significance at 1, 5 and 10 percent respectively

3.4. Final Remarks to Chapter 3

This chapter analyses the origins of Latin American institutions. Based on the characteristic of high persistence of institutions, many scholars argue that current institutions in former colonies reflect the early institutions inherited from the colonial experience. A crucial finding in this chapter is that, this is not the case for Latin America. The correlation between early and current institutions in the region is not as strong as the one observed in large samples containing all former colonies. This can be a surprising result, but the early decolonisation history of these countries provides a source of explanation. The bulk of Latin American countries became independent in the first half of the nineteenth century, this is around a century before the rest of the colonies.

To understand what originates institutions in Latin America, the empirical analysis tests four hypotheses on how colonial history affect both early and current institutions in the region. The first hypothesis tests whether former British colonies have better institutions than non-British ones as argued by La Porta et al. [1998, 1999]. Considering the work of Acemoglu, Johnson, and Robinson [2001], the second hypothesis tests whether territories with large European settlements during the colonial period inherited better institutions. The third hypothesis investigates the role of pre-colonial populations on institutions and whether more liberal colonisers help to establish better institutions than mercantilists ones (this follows the contribution from Mahoney [2010]). Finally, Hypothesis 4 considers the historical narratives of how colonial resource endowment affected the creation of institutions in Latin America [Engerman and Sokoloff, 1997] and investigates the effects of the exploitation of minerals (mainly silver and gold) and cash crops (such as sugar) during colonial times. Considering that we cannot assume that current and early institutions in the area are correlated, these hypotheses are tested on measures of both institutions at the time of independence and contemporary ones.

The analysis shows that former British colonies seem to have performed better in terms of institutions. Former British colonies have better institutions around their independence and in current times. The difficulty with this result is that we cannot disentangle which specific features of the British Empire is the main cause of this positive effect. In many aspects, British and Spanish colonisers were very similar, especially during the first period of colonisation. The British set up monopolies in order to control the trade with the colonies and, in the case of sugar plantations, they divided land and organised labour as Spain and Portugal did in continental America (e.g. by using slavery and other forms a forced labour).

However, there are some aspects that are strictly correlated with the British Empire that are different to Spanish ones such as law systems, forms of government, and the length of colonial period. Therefore, once it has been established that some aspects of the British colonisation still play a positive impact on current institutions, more work needs to be done in understanding which are the specific factors that matter. The next chapter considers not only the role of Britain in Latin America as a direct coloniser, but it also includes an analysis of the indirect ways of British colonial presence in the region. It does this by introducing more specific variables of the impact of Britain in Latin America.

A further finding of the analysis in this chapter is that, unlike Acemoglu et al. (but also Easterly and Levine [2012]), where the results show that European settlements left behind a good institutional setting, large European settlements during the colonial period in Latin America are related to poor quality of early institutions. We can explain this by looking at the reasons why Europeans settled these territories. The engine of colonisation was the search for minerals and other sources of wealth. Once these resources were found (or developed as in the case of plantations), Europeans settled the territory and set up a complex institutional system that did not take into

account the welfare of the local population and territories but they were oriented to the benefit of the coloniser crown and few local authorities.

The analysis also rejects the hypothesis based on Mahoney's work. Pre-colonial populations have no significant role on the region's institutions. In addition, the impact of the coloniser's institutional background (mercantilist rather than liberal) is difficult to disentangle from the effect of being a British colony. Britain is assumed to be *liberal* during the whole period of colonial rule, while the main difference is in the Spanish legacy.

The series of important changes occurring in Spanish America in the eighteenth century is often associated with changes in Spanish dynasty. The perception that Mexico and Peru formed the centre was still valid, but by the last decades of the century things were moving quickly in a different direction favouring the Atlantic seaboard. European demand for tropical crops and even for temperate products (especially hides) increased substantially in this period. At the same time, ships grew larger and faster so transatlantic shipment of bulk products became more viable, and trade routes shifted. According to Mahoney, this is due to the more *liberal* policies adopted by the Bourbon monarchy in the Americas and he offers a persuasive discussion on this, however his argument depends upon the assumption that the Bourbon reforms did usher liberalism. Fisher [2012] shows that what these reforms really did was to push mercantilism to a new level of efficiency but without opening up to genuine economic liberalism.

Finally, the exploitation of mineral resources (gold and silver) seem to have a negative long term impact on institutions. Mineral resources negatively affect early and current institutions. Mineral resources provide a source of wealth until they are exhausted generating little incentive to invest more than is strictly necessary for the extraction of this resource from the land, and once this resource is exhausted the area was generally abandoned by the coloniser power (e.g. Potosi in Bolivia). This effect is less clear

when controlling for other variables, but we need to keep in mind potential problems of correlation among variables. First, some of the possible effects of these resources may be already caught by other variables. As mentioned, British pursued a later process of colonisation in Latin American focusing mainly in the Caribbean; therefore, those areas rich in mineral resources were already under Spanish and, to a less extent, Portuguese control, which means that the British variable may be also capturing the lack of minerals in these areas. Moreover, mineral centres were preferred by Europeans for settlements in the area, therefore, the negative relationship between European settlements and early institutions may be capturing the effects of mineral exploitation.

In summary, institutions in Latin America show some specific traits that have not been fully investigated and that cannot easily be accounted for by the dominant arguments in the literature on the colonial origins of contemporary institutions. Colonial factors such as the coloniser identity and the resource endowment during colonial times do have some effects on current institutions, however we cannot consider these institutions as a pure outcome of the colonial period. In fact, there is no correlation between these and the institutions inherited from the colonial legacy. In order to understand the origins of poor institutions in Latin America today and in the recent past, we need to look at post-colonial events.

4. The Evolution of Institutions in Latin America: Colonial and Post-Colonial Factors

The previous chapter explains how Latin American political institutions at the time of independence (early institutions) can be traced back to factors in the colonial era: coloniser identity and resource endowments. It also shows that the character of contemporary political institutions in Latin America is typically, and unlike most other regions of the world, not well explained by their state at the time of independence.

This chapter is concerned with how to explain the evolution of institutions since independence. For this purpose, it focuses on three features that are frequently regarded as distinguishing Latin America in this period and that have been considered to affect economic development: high levels of political instability, high levels of inequality, and the dependency on the production of natural resources. Section 4.1 reviews the literature on how these aspects interact. There is no agreement in literature on the causal relationship between institutions and inequality. While it is plausible that inequality plays a part in blocking the adoption of good institutions, the reverse holds as well, so that poor institutional quality results in higher degree of inequality.

Section 4.2 proposes an empirical analysis that models the relationship between institutions and inequality in Latin America. The analysis estimates a two-equation model, one for institutions and the other one for inequality, in a panel data over the period 1905-2010. These equations are jointly estimated to take into account the possible simultaneity between institutions and inequality. This relationship is explained using both colonial and post-colonial factors. The colonial factors are those found relevant for explaining the origins of institutions in the previous chapter. The post-colonial aspect are historical events that may have had a role in shaping the evolution of institutions in the region. A broad literature considers British intervention to be a key factor in the post-independence development of Latin American countries. This intervention took place through investments and the expansion of Latin American exports into the British market, and measures of both British investments and Latin American trade with Britain are included as explanatory variables. British intervention was generally linked to the exploitation of natural resources of which Latin American countries were well-endowed. In fact, the region's participation to the international market has been largely based on the exploitation of the primary sector of the economies. This is another aspect considered by the empirical analysis as possible explanatory variable.

There are three main conclusions from this empirical analysis. First, institutions and inequality are highly correlated and their relationship is characterised by high persistence which makes difficult to establish clear causal effects. Second, the colonial factors investigated in the previous chapter as important for institutions, also affect inequality in Latin America. Finally, British intervention and natural resource discoveries both have influenced the post-independence evolution of the region's institutions.

These conclusions are supported by the historical narrative of four Latin American country-experiences illustrated in Section 4.3. The experiences of Costa Rica and Uruguay which are considered consolidated democracies in the region, contrast with

the realities of Peru and Bolivia which history is marked by political instability with continuous break-downs of democracy help to explain the specific mechanisms of how these variables interact and influence the evolution of institutions to current times. Section 4.4 summarises these findings and concludes.

4.1. Beyond Colonial Origins: Literature Review on How Institutions Evolve

From chapter 2 we know that institutions are a fundamental cause of growth in Latin America. Chapter 3 shows that, even if there are some colonial aspects that still affect current institutions, the character of these is not well explained by their state at the time of independence. The reality is that our knowledge about the complex process of creation, evolution, and consolidation of institutions is still limited. While colonial factors are useful for explaining the origins of institutions, we need to consider which other factors may have influenced the way these institutions evolve.

We need to look at post-independence events to explain the transition from early to current institutions. Various authors have emphasised the role of British intervention in the development of newly independent Latin American countries. The previous chapter shows that British colonial legacy has a positive effect on early and current institutions in the region. However, the British intervention in the region was not limited to the colonial period and it extended (through investments and trade) into the early post-independence period. A more detail analysis of how British capital and Latin American trade with Britain may help to shed light on the *British dummy*. Moreover, Latin American development has been characterised by other distinct features such as high inequality and dependency on natural resources and these characteristics may also play a role in explaining what shaped current institutions in Latin America.

4.1.1. Post-colonial Latin America: British Intervention

Although most of the Latin American countries were Iberian colonies, Britain did show interest on these territories and this interest developed and expanded after the independence wars in the nineteenth and early twentieth century through trade and investments [Gallagher and Robinson, 1953; Miller, 1993; Brown, 2008]. The growth of industrial production in Britain makes the Latin American market crucial for British growing textile exports. While in 1804-1806 only 2% of the British exports went to Latin America, in the period 1824-26 this number rose to 13% [Miller, 1993]. In the same way, Latin America was essential to Britain as supplier of food and other raw materials (mainly silver and gold)[1]. However, until 1860, the volume of Britain's trade with Latin America remained relatively low. The 1870s and 1880s saw a sharp increase in trade between Britain and Latin America, as the region became fully incorporated into the Atlantic economy [Platt, 1972].

In the late nineteenth century however, the centre of dynamism within the British economy moved from the manufacturing areas towards the commercial and financial interests, Latin American governments tapped the London bond markets, the flow of portfolio capital was followed by direct foreign investment, with Britain leading the field among the industrial countries [Victor Bulmer-Thomas, 1998].

First, Latin American economies approached the international capital markets in order to finance independence wars. Once freed from Iberian rule, Latin American countries rapidly embraced the use of global capital markets to finance their public debt. Following the high political instability during the post-independence period a wave of defaults ensued, with all bond issues in default by 1827 [Rippy, 1959]. Most countries remained in default for decades, and new flows of capital started to circulate only dur-

[1] After the independence, these countries were free from the obligation to sell their primary products through Iberian outlets and were able to expand their exports to other markets.

ing 1850s[2]. The macroeconomic and financial crisis produced a second wave of defaults that spread over the region in the 1870s. With the recovery of trade in the 1880s a new and bigger borrowing boom began. Capital inflows were mostly concentrated in favour of those countries with new booming trade sectors [della Paolera and Taylor, 2012]. This once again ended with an economic crisis in 1890s (which affected mainly the greater economies of Brazil and Argentina).

Therefore, the British impact in Latin America went through two channels. First, Britain was one of the main destiny markets of Latin American goods in the nineteenth century. Second, the massive growth in British investment which occurred after the 1860s totally redefined the nature of Britain's relations with Latin America. On the eve of World War I, British investments in Argentina were the second largest group of investments made by British investors in a foreign country (US being the largest).

4.1.2. On the Role of Inequality

Conventional economic wisdom on inequality and growth has been dominated by two arguments. The first is based on the trade-off between inequality and efficiency and in particular on the belief that inequality is needed in order to offer incentives to economic actors [Okun, 1975; Forbes, 2000; Li and Zou, 1998]. The second argument suggests that the impact of inequality on the process of growth depends on the stage of development. The conjecture is that inequality should necessarily increase during the early stages of development due to urbanisation and industrialisation and decrease later on as industries attract a large fraction of the rural labour force [Galor and Moav, 2004; Galor and Zeira, 1993]. Alesina and Rodrik [1994]; Persson and Tabellini [1994] add a third argument on the relationship between inequality and development: inequality harms development. In particular, land and income inequality is negatively

[2]First, Brazil, Argentina, Paraguay, Uruguay, Chile accessed to new loans, followed by Costa Rica, Guatemala, Honduras, Bolivia, Peru.

correlated with subsequent economic growth. In societies where a large section of the population does not have access to the productive resources of the economy, there will be a strong demand for redistribution which generates conflict over distribution that harms growth.

In order to fully address the impact of inequality on growth, we need to consider how inequality interacts with the other determinants of growth. For instance, Sonin [2003] suggests that inequality has a negative effect on growth, but that this effect goes through institutions. Poor institutions, that negatively affect growth, are associated with a more unequal redistribution. There is in fact an extent literature on the relationship between inequality and institutions which largely agree that poor institutions are correlated with higher inequality; however, the causality direction raises several concerns. Several authors suggest that the quality of institutions in a country depends on the income and wealth distribution. For instance, Hoff and Stiglitz [2004] suggest that an equal distribution of income is a more fertile ground for good institutions; while Easterly [2001]; Keefer and Knack [2002] empirically show that social polarisation negatively affects institutional quality (and thereby slows growth). Haber et al. [2003] propose a theory on how political institutions may affect redistribution through *selective* property rights. This theory argues that in developing countries (the authors focus on Mexico during the *Porfiriato* period between 1876 and 1929) governments may enforce property rights as private goods so that only an elite group integrated into the government benefit from them.

Theoretical research has also found that inequality affects the genesis and consolidation of political regimes. Lipset [1959] emphasises the positive role of wealth redistribution on the democratisation of a country. Rubinson and Quinlan [1977]; Muller [1988] argue that an egalitarian distribution on income indicates a strong middle class that supports democracy makes dictatorships less likely. More recently, Boix [2003] argues

that increasing levels of economic equality bolster the chances of democracy. The link between inequality and democracy is redistribution. With a simple model, Boix shows that, in societies with high levels of asset specificity (e.g. with big landowners), the demand for redistribution increases and the potential level of transfers becomes larger (which would make the elites worse off), this fosters the authoritarian inclinations of the wealthy and declines thus the probability of democratisation. Therefore, if the political power in hands of few, the small wealthy elite refuses the implementation of any change that redistributes economic power. High inequality will also affect the survival of democracy. Friedman [2002] argues that democracy survives only if it narrows the gap between rich and poor. Houle [2009] argues that equal democracies are unlikely to collapse and in fact, the greater challenge for unequal countries is to sustain democracy once it is established.

Researchers that argue that the causality direction goes from institutions to inequality (i.e. institutions affect inequality), focus on the effects of electoral systems on income distribution. Powell [2002] shows that majoritarian regimes redistribute less than those chosen with a proportional system[3]. Iversen and Soskice [2006] develop a three-party model and show that proportional systems systematically choose governments that favour redistributive policies. Other authors, look at the role of political parties on redistribution policies. Political parties can be expected to pursue policies that serve the economic interests of their chief constituencies [Kenworthy, 2010]. For left-wing parties this may mean the working class, while for right-wing this means owners of capital. Therefore, Hibbs [1977, 1987]; Boix [1999] argue that left parties are more likely to implement macroeconomic policy strategies that aim for a more equal redistribution of wealth. This is supported by a long line of research that demonstrates a link between

[3]Majoritarian regimes gives a majority of seats to the party with a plurality of votes while proportional systems give a number of seats that are proportional to the number of voters.

left governments and the generosity of welfare states [Korpi, 1983; Hicks, 1999; Swank, 2002; Kwon and Pontusson, 2010].

It is thus by no means clear what the specific dynamics between institutions and inequality are and, consequently, what is the resulting causal relationship between them. While it is plausible that inequality plays a part in blocking the adoption of good institutions, the reverse holds as well, so that poor institutional quality results in higher degree of inequality. The analysis in this chapter suggests in fact that income inequality and poor institutional quality may reinforce each other, indicating double feedback between the two.

4.1.3. On the Role of Natural Resources

Much has been written on the relationship between natural resources and economic development. While natural resources are an important source of wealth, scholars argue that resource-rich countries are not necessarily better-off than those with scarce resource endowment and some empirical work shows a negative correlation between resource abundance and economic growth known as *resource curse* [Auty, 1993, 2001; Sachs and Warner, 1995, 2001; Soysa, 2005; Caselli, 2006]. There is no reason for natural resources to be negative for growth *per se*, but the exploitation of these resources may affect other variables that interact with growth causing the *curse*.

A large and growing literature emphasises the effects of natural resources on the levels of democracy of producer countries. This literature mostly agrees that the link between natural resources and political regimes lies on the political incentives associated with the rents arising from the exploitation of these resources. These rents tend to be large, volatile, geographically concentrated, and controlled by the government. Together these features have important consequences on basic functions of the government. For instance, rentier effects are associated with a high proportion of government

revenue originating from resource rents. The consequent fiscal volatility may create an unfortunate political dynamic that ratchets up expenditures in booms to levels that cannot be efficiently absorbed or sustained over time, with a stop-go pattern of public expenditure that reduces the quality of public investment and services and thus limits growth potential. In addition, much of a government's fiscal strength comes from its capacity to extract taxes from the population, a capacity that often takes decades to develop. A government that fails to develop this ability may also be unable to establish the type of bureaucracy that can provide effective public goods, and ameliorate social conflicts [Mahdavy, 1970; Beblawi, 1987; Ross, 2003; Fearon and Laitin, 2003].

Moreover, a windfall of resource rents can generate conflicts over redistribution which may provide incentives for politicians and/or ruling elites to suppress democracy in order to take possession of these rents. This will thus affect the foundations of political regimes in favour of more authoritarian regimes [Sachs and Warner, 1995; Ross, 2001; Boix, 2003; Jensen and Wantchekon, 2004]. Engerman and Sokoloff set the origins of these conflicts back in colonial times. In a series of papers focusing on the divergent developmental experiences of the New World, these authors explain how the exploitation of natural resources during colonial times led to high levels of inequality. Mineral-rich territories and those with soils and climate suitable for cash crops inherited a political elite that favoured unequal wealth distribution and created extractive institutions [Engerman and Sokoloff, 1997, 2002, 2003].

However, these theories have been challenged by arguments that that either disagree with any role of natural resources on growth or that support a positive impact of these resources on economic development. [Hausmann and Rigobon, 2002; Brunnschweiler and Bulte, 2008; Lederman and Maloney, 2007, 2009]. Of particular interest, is the work of Haber and Menaldo [2011] that proposes an empirical investigation on whether fiscal reliance on natural resource wealth is associated with authoritarian regimes. The

authors argue that previous studies are tainted by reverse causality and omitted variable bias and using a series of econometric techniques on a historical data going back to 1800, conclude that resource wealth is not associated with authoritarianism, in fact, it *promotes* democracy.

Ross and Andersen [2012] explain why Haber and Menaldo's results differ so much from previous studies. By using the same dataset but allowing a structural break in the late 1970s, they show that from 1800 to 1970s there is no strong evidence for the negative relationship between resource wealth and democracy; however, since late 1970s, oil wealth has strongly inhibited democratisation. This is explained by the possible change in the causal relationship of oil wealth on democracy between 1960s and 1980s as the global distribution of oil rents shifted from firms to governments.

Many scholars offer a more nuanced view of the role of natural resources on political regimes. For instance, Herb [2005] does accept that resource rents incentivise autocracy, however, these resources also increase GDP which leads to an indirect positive effect on democracy. Goldberg et al. [2008] find that resource abundance has a range of different indirect effects working through taxation and asset specificity where weak tax efforts and increased inequality contribute to more competitive politics while asset specificity decreases it. Nugent and Robinson [2010] suggest that the equilibrium institutional structure is not uniquely determined by factor endowments, but it depends crucially on the nature of political cleavages and competition in society. Therefore, the pre-existing nature of politics determines the role of the natural resources in an economy.

The best attempt to date to address the possibility of conditional effects of resources on political regimes is perhaps offered by Dunning [2008] who claims that resource may have both democratic and authoritarian effects and the key task is to understand variables or structural factors that tend to privilege the one or the other effect of rents. The conflict over the redistribution of the resource rents does foster authoritarian desires,

but this is only one way how resources may affect the political regime. In societies with substantial inequality of (non-natural resources) assets, a resource boom may help to mitigate the negative impact of inequality and therefore strengthens democracy.

Institutions, inequality and natural resources are all considered to influence economic development. However, the exact mechanisms through which these work are not clear. Political instability, high inequality, and large resource endowments characterised many Latin American economies. Therefore, understanding how these variables interact may benefit the explanation on how institutions evolve.

4.1.4. Institutions, Inequality and Natural Resources in Latin America

Political instability has been regarded as a structural trait of Latin American societies where revolutions and major social conflicts are very frequent [Marshall and Cole, 2011]. Between 1900 and 2006 there were 327 coup d'etat in 25 Latin American countries and long periods of military dictatorships that gave these regimes little constraints on the executive power, marking very low in democracy (and high in autocracy) indexes during these regimes [Guerrero, 2006].

Even if the level of inequality in Latin America has decreased since 2000, inequality is still very high. In fact, the region has the highest level of inequality in the world. The richest one-tenth of the population in Latin America earns 50% of total income, while the poorest tenth earns only 2.5 percent. Using the Gini index, the inequality in the region measures 50 percent in the period 2000-09, this is higher than all other developed and developing areas of the world [World Bank, 2011].

Abundance of land and natural resources is an intrinsic characteristic of these countries. Resource wealth has been crucial in the participation of these economies on the international market from their colonisation until recent times. In the past decade,

commodities accounted for 52 percent of the region's exports according to the World Bank. This is down from 86% in the 1970s, but over the same period the figure in East Asia and the Pacific fell from 94 to 30% [Sinnot et al., 2010].

However, none of these features on their own can explain the problems of the region. The social structures, the distribution of power and wealth, the role and strength of its elites, and the complex, often painful process of state-building, in combination with the legacy of colonial times and the economic and political difficulties that the newly independent states have in positioning themselves on the world stage, have all been decisive factors and all have something to do with the successes and failures of Latin American economies. This chapter proposes an empirical analysis on how institutions, inequality and natural resources interact and the effects of colonial and post-colonial factors on these interactions in Latin America and the Caribbean.

4.2. Empirical Analysis

This section offers an empirical analysis of the relationship between institutions and inequality. This analysis uses two equations that test how different colonial and post-colonial factors affect institutions and inequality in Latin America. Equation 4.1 considers institutions as function of inequality, post-independence British intervention, discovery of natural resources, and colonial origins. Equation 4.2 considers inequality as a function of the same variables previously mentioned and institutions. Therefore, these two equations, by considering each variable as function of the other, explore the double relationship between inequality and institutional quality discussed in literature. It is indeed very likely that institutions and inequality affect each other, making very

difficult to identify a one-way causation.

$$Inst_{i,t} = \alpha_1 + \alpha_2 Ineq_{i,t} + \alpha_3 BR_i + \alpha_4 Nat\ Res_{i,t} + \alpha_5 \mathbf{COL}_i + \epsilon_{it} \tag{4.1}$$

$$Ineq_{i,t} = \beta_1 + \beta_2 Inst_{i,t} + \beta_3 BR_i + \beta_4 Nat\ Res_{i,t} + \beta_5 \mathbf{COL}_i + \upsilon_{it} \tag{4.2}$$

Where BR is a variable for the impact of Britain on Latin America between the end of 19th and early 20th century. This follows the results of the previous chapter that *British did better*, and the literature discussed in Section 4.1.1 on how British intervention in Latin America extended into the after-independence period through British capital invested in Latin American economic activities and trade. $Nat\ Res$ is a variable for the discovery of natural resources in the post-independence period, and COL represents the different variables used to capture the effects of colonial times on institutions.

The methodology consist of estimating these two regressions in a panel setting for up to 20 Latin America countries[4] for the period 1906-2005.

4.2.1. Data

Data and sources are described in detail in Appendix C. The dependent variables in this analysis are institutions and inequality. Institutions are measured as in Chapter 3 using the variables for Democracy, Autocracy and Constraints on the Executive Power from the Polity IV Project. Inequality is measured by the *percentage of family farms* from Vanhanen [2003] defined as *the area of family farms as a percentage of the total area of holdings – a family farm employs no more than four people and the family owns and cultivates the land.* More family farms thus represent a better distribution of these resources and therefore higher values of this variable are related to lower inequality.

[4] Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, and Venezuela.

Therefore this is a measure of wealth *equality*. Several measures of inequality have been proposed, however the share of family farms is the only measure of inequality that is consistently available through time for a large sample of the countries considered and in the period analysed. Moreover, given the key role that land distribution have had since colonial times in Latin America, this is the most adequate measure to study how inequality affects institutions in the region.

The impact of British intervention in Latin America after the independence is measured by the level of trade of these countries with Britain [Statistical Office, 1906], and the British investments at the beginning of the century [Paish, 1909]. *Trade with Britain* is given by the average exports of Latin American economies to Britain weighted for the total exports for the period 1898-1906. This variable is constructed using data from the Annual Statement of Trade of the United Kingdom with Foreign Countries and British Possessions for various years. *British investments in Latin America* considers the average of these investments in the period 1905-1911 (data from Paish [1909]).

The analysis also includes the variables for colonial factors considered in Chapter 3. In particular, it controls for whether the country was a colonial or sugar centre, the size of European settlements in 1800 and the pre-colonial population.

The effects of natural resource shocks are measured by a binary variable for the discoveries of oil and natural gas. It assumes the value of 1 if there has been a discovery in the 5-year period considered, 0 otherwise (constructed from the data provided by Lujala et al. [2007] on oil discoveries on- and off-shore). The advantages of this variable are two-fold, (i) there is a larger number of observations (across country and time), and (ii) it is not subject to the common endogeneity issues. Several variables have been used to measure natural resources and in particular to investigate whether resource-rich countries are actually *cursed*. Based on the work of Sachs and Warner [1995]commonly used variables are the *ratio of resource exports to GDP* and the *ratio of resource ex-*

ports to total exports. Brunnschweiler and Bulte [2008]; Ross [2006] and Dunning [2008] argue that these variables measure *dependence* rather than *abundance* therefore they are not independent of economic policies and institutions (i.e. they are endogenous). Ross [2006] and Dunning [2008] use a measure of *oil rents per capita* based on the work of Hamilton and Clemens [1999]. This measure provides an estimate of the value of a wide range of natural resources, net of production costs and a return to capital, giving an approximation of the size of the rents available for public spending. Although this variable provides a better measure of resource abundance, it is not without problems. Extraction costs are based on estimates for a single observation in 1990s, and costs for other years are obtained using a GDP deflator, when no data on extraction costs are available for a country, the extraction costs for a neighbour country are used [Ross, 2006].

In addition, the effects of natural resources on institutions may start well before these resources start producing rents. The mere discovery of a mineral resource might be a source of rent-seeking behaviour from the governing elites in order to guarantee an early appropriation of future rents (e.g. guaranteeing exploration and extraction rights under the promises of future economic favours).

4.2.2. Results

Institutions and inequality are simultaneously determined by the economic and political process. We can expect that those countries with a more efficient institutional system would also have lower levels of inequality, and that at the same time a better distribution of resources will be translated into better division of power and therefore better political institutions. In Table 4.1 the relationship between institutions and inequality is investigated. In Panel A, a GLS estimation is used to explain institutions (i.e. democracy, autocracy and constraints on the executive) as function of land redistribu-

tion (*family farms*). There is statistical evidence that a better land redistribution has a positive effect on the quality of institutions. In Panel B land redistribution is considered as function of institutions. There is again statistical evidence that institutions have a positive effect on the distribution of land. These results suggest a bilateral causality between institutions and inequality. However, this causality can only be confirmed by estimating a simultaneous equation model, to which we turn next.

Table 4.1.: GLS - Institutions and Inequality

Panel A - Institutions as dependent variable			
Explanatory Variable	Democracy	Autocracy	Contraints on the Executive
Family Farms	.683***	-.598***	.805***
	(.131)	(.123)	(.121)
constant	.190***	.401***	.249***
	(.026)	(.025)	(.026)
n	20	20	20
T	20	20	20
Wald χ^2	27.34***	23.79***	43.88***
Panel B - Family Farms as dependent variable			
Explanatory Variables	(a)	(b)	(c)
Democracy	.098***		
	(.011)		
Autocracy		-.086***	
		(.014)	
Contraints on the Executive			.110***
			(.012)
constant	.138***	.200***	.126***
	(.005)	(.006)	(.006)
n	20	20	20
T	20	20	20
Wald χ^2	73.53***	36.74***	.87.16***
notes:	Robust standard errors in parentheses		
	***, **, *; significance at 1, 5 and 10 percent respectively		

This section deals with the endogeneity problems caused by the relationship between inequality and institutions. A first approach that could consider the lags of the endogenous variables into Equations (4.1) and (4.2). Nonetheless, the validity of the lag

variables as instruments is questionable due to the high persistence of these variables. In particular, we need to assume that $E[\epsilon_{it}|Ineq_{is}] = 0$ and $E[\upsilon_{it}|Inst_{is}] = 0$ for all $t > s$ (but not otherwise) in order for second- and higher-order lags of the endogenous variables to be good instruments in the estimation of our model. Nonetheless, if our endogenous variables display persistence over time (as is the case for institutions and inequality), their lagged levels will be poor instruments[5].

A second approach could be to find strictly exogenous instruments. Our colonial variables could be considered as good instruments because they are not subject to reverse causality, nonetheless, they suffer from the drawback that they do not vary over time, so these cannot be used in a panel framework. The preferred estimation for this study is a Hausman-Taylor estimator (a transformed random effect model with instrument variables) that deals with endogeneity issues while distinguishes between time-varying and time-invariant regressors.

Table 4.2 shows the results of the Hausman-Taylor estimator for institutions (as dependent variable). Column (a) in Table 4.2 shows the basic regression (column (a), (a'), (a") show the results using democracy, autocracy, and constraints on the executive as dependent variables respectively). We observe that a higher percentage of family farms is related to better quality of institutions: an increase of 1% of family farms increases democracy and constraint of the executive of 1.32 and 1.35 percent respectively and lowers autocracy of -0.08 percent.

The analysis offers evidence for the hypotheses put forward in the previous section on the possible impact of Britain on the development of early independent countries. The hypothesised positive impact of trade with Britain on Latin American institutions is statistically significant. Moreover, there is a statistically significant negative effect of

[5]Section C.2 in Appendix C shows the results estimating Equations (4.1) and (4.2) using GLS estimates with the lags of the endogenous variables as regressors (Tables C.5 and C.6). We can observed that the results are very similar to the ones in Tables C.3 and C.4 in which equations (4.1) and (4.2) have been estimated without dealing with the endogeneity problems

British investments on the quality of institutions. An increase in British investments in early 20th century decreases democracy and constraints on the executive, while is related to more autocracy.

The evidence in Table 4.2 also suggests that the impact of a resource shock (due to a new oil or gas discovery) is negative. A discovery of the natural resource decreases the quality of institutions (i.e. negative for democracy and constraints on the executive and positive for autocracy). These results thus support the hypotheses of *resource curse* in Latin American economies that we first observed in Chapter 2. In fact, now it is clearer how natural resources negatively affect economic growth: this effect goes through institutions. For Latin America we can observe a negative effect of natural resources on institutions which in turn affect economic growth.

The results also show that there is no direct effect of colonial natural resources on institutions. Regressions (b), (b') and (b") in Table 4.2 control the results for European settlements during colonial times and pre-colonial indigenous populations. These variables are not statistically significant and do not change the previous conclusions.

Finally, considering that institutions tend to improve with income, and therefore, richer countries can afford better institutions, Regression (c), (c'), and (c") include GDP per capita at the beginning of the period as explanatory variable. The results remain mostly unchanged, and therefore all the previous conclusions still hold.

Table 4.2.: Hausman-Taylor Estimator for Institutions

Explanatory Variables	Dependent Variables: Institutions								
	Democracy			Autocracy			Constraints on the Exec.		
	(a)	(b)	(c)	(a')	(b')	(c')	(a")	(b")	(c")
Time variant Endogenous									
Family Farms	1.32***	1.31***	.483**	-.750***	-.745***	-.333*	1.35***	1.34***	.849***
	(.164)	(.165)	(.221)	(.165)	(.166)	(.230)	(.168)	(.168)	(.239)
(initial) GDP per capita			.070***			-.045***			.049***
			(.011)			(.012)			(.012)
Time variant Exogenous									
Oil and gas discoveries	-.087**	-.089**	-.051*	.099**	.099**	.091**	-.085**	-.087**	-.069*
	(.043)	(.043)	(.044)	(.042)	(.043)	(.045)	(.043)	(.044)	(.047)
Time invariant Exogenous									
(log) Trade with Britain late 19th	.040**	.040**	.051**	-.032**	-.032**	-.046***	.022	.025	.036*
	(.020)	(.020)	(.023)	(.014)	(.014)	(.017)	(.018)	(.017)	(.021)
(log) British Invest. early 20th	-.110***	-.107***	-.070**	.059***	.059***	.035*	-.097***	-.095***	-.069**
	(.282)	(.028)	(.032)	(.019)	(.019)	(.023)	(.026)	(.024)	(.029)
Mineral colonial centre	.011	.021	-.089	-.045	-.046	-.006	.055	.036	.004
	(.076)	(.079)	(.086)	(.052)	(.056)	(.064)	(.069)	(.068)	(.078)
Sugar suitability	.103**	.107**	.108**	-.049	-.049	-.053	.037	.065	.051
	(.044)	(.048)	(.049)	(.030)	(.034)	(.036)	(.040)	(.041)	(.044)
Early European settlements		-.355			.010			-.790*	
		(.532)			(.374)			(.456)	
native population		-.026			.002			-.001	
		(.035)			(.025)			(.030)	
constant	.040	.002	-.047	.531***	.528***	.548***	.058	.230*	.046
	(.089)	(.151)	(.109)	(.073)	(.025)	(.086)	(.090)	(.133)	(.102)
n	320	320	276	320	320	276	320	320	276
T	16	16	16	16	16	16	16	16	16
Wald χ^2	93.08***	95.06***	122.88***	47.99***	47.92***	63.52***	93.01***	102.07***	100.23***

notes: Robust standard errors in parentheses
***, **, *; significance at 1, 5 and 10 percent respectively

Table 4.3.: Hausman-Taylor Estimator for Land-Redistribution

Explanatory Variables	Dependent Variable: Family Farms (a)	(b)	(c)	(a')	(b')	(c')	(a")	(b")	(c")
Time variant Endogenous									
Democracy	.135***	.134***	.037**						
	(.017)	(.017)	(.017)						
Autocracy				-.086**	-.086**	-.023			
				(.019)	(.019)	(.017)			
Constraints on the Executive						.	133***	.132***	.054***
							(.016)	(.016)	(.016)
(initial) GDP per capita			.029***			.031***			.028***
			(.003)			(.003)			(.003)
Time variant Exogenous									
Oil and gas discoveries	-.021	-.021	-.010	-.026*	-.025*	-.010	-.019	-.018	-.008
	(.014)	(.014)	(.012)	(.015)	(.015)	(.013)	(.014)	(.014)	(.012)
Time invariant Exogenous									
(log) Trade with Britain late 19th	.004	.005	.011	-.008	-.009	.012	.006	.007	.010
	(.007)	(.006)	(.011)	(.007)	(.006)	(.011)	(.007)	(.006)	(.011)
(log) British Invest. early 20th	.021**	.026*	.020**	.012	.011	.025	.019**	.018**	.027*
	(.010)	(.009)	(.015)	(.010)	(.009)	(.016)	(.009)	(.009)	(.015)
Mineral colonial centre	-.037	-.052**	-.073 **	-.044*	-.060**	-.077*	-.043*	-.054**	-.074*
	(.076)	(.026)	(.041)	(.025)	(.025)	(.042)	(.025)	(.025)	(.040)
Sugar suitability	-.037**	-.027*	-0.14	-.031**	-.018	-.012	-.028**	-.022**	-.013
	(.015)	(.016)	(.024)	(.015)	(.015)	(.024)	(.014)	(.015)	(.023)
Early European settlements		-.139			-.211			-.082	
		(.173)			(.167)			(.170)	
native population		-.017			.015			.013	
		(.011)			(.011)			(.011)	
constant	.224***	.256***	.179***	.290***	.337***	.191***	.206***	.256***	.169***
	(.030)	(.047)	(.048)	(.030)	(.045)	(.050)	(.029)	(.047)	(.047)
n	320	320	276	320	320	276	320	320	276
T	16	16	16	16	16	16	16	16	16
Wald χ^2	86.64***	92.10***	185.97***	42.57***	49.60***	181.31***	89.03***	93.97***	199.01***

notes: Robust standard errors in parentheses
***, **, *; significance at 1, 5 and 10 percent respectively

Similar analysis is carried out for inequality. In Table 4.3 we can see the results of the estimation of Equation (4.2) using the Hausman-Taylor estimator and land distribution (family farms) as dependent variable. The relationship between institutions and inequality holds; in particular, higher values of democracy (regressions (a), (b), and (c)) and constraints on the executive (regressions (a"), (b"), and (c")) are statistically significant for explaining a better redistribution of land (higher percentage of family farms).

The discovery of oil has a statistically significant effect only if we consider autocracy as institutional variable (regressions (a'), (b'), and (c')). A possible explanation is that the resource shock affects redistribution only under autocratic regimes. Under more democratic rulers, the effects of a resource on inequality is not significant.

British investments in early 20th century are statistically significant for explaining inequality. When democracy or constraints on the executive are used as institutional variables, British investments increase the percentage of family farms (i.e. inequality decreases). Therefore, there is a positive indirect effect of British investments on institutions through inequality. This contrasts with the direct negative effect on institutions observed in Table 4.2.

As explained in the previous section, the large inflows of British capital in Latin America were followed by various waves of defaults that ended in various economic crisis. The largest recipients of these resources were also those ones that suffer the worse crises (see for example Argentina and Brazil). This may explain the observed negative direct effect of British investments on institutions. However, those countries that invested these capitals in more efficient projects that improved various sectors of the economy which in turn increased employment opportunities, may have seen a reduction of wealth inequality. Therefore, these countries benefited of a positive indirect impact on institutions (less inequality is related to better institutions). Which effect dominates depend

on the initial quality of institutions. In strongly autocratic regimes (as in the case of Bolivia and Peru), the indirect effect may be reduced to a minimum. According to Miller [1993], external loans and direct investments in Latin America contributed to put off taxation reforms and undermined local political institutions as more politicians became beholden to their links with the British companies. This affected the adoption of redistribution policies, and therefore the negative direct effect of British investments on institutions dominated.

The colonial resource endowment (minerals and sugar) has a statistically significant and negative impact on family farms: specialisation on resource production (either mineral or cash-crop) during colonial times is related to the higher levels of inequality in the region. These results hold when controlling for colonial European settlements and native populations which are not statistically significant. This results shed light on the previous findings. Chapter 3 shows mineral resources to be statistically significant for explaining both early and current institutions. However, in the empirical analysis of this chapter these variables lose significance for institutions. The significant effect of colonial mineral resources observed in the previous chapter may be capturing the effect of these resources on inequality which is correlated with institutions. Once we introduce a variable for inequality, this direct effect disappears.

In general, the statistical analysis supports the bilateral causality that exists between political institutions and inequality in Latin America. As argued by various authors (such as Easterly [2001]; Keefer and Knack [2002]; Hoff and Stiglitz [2004]), a better distribution of wealth offers a good ground for the development of good institutions. In particular, a better distribution of wealth (measured by land distribution) had a positive effect on the democratisation of a country. There is also strong evidence that poor institutional quality results in higher degree of inequality. Those countries with lower levels of democracy (or higher levels of autocracy) have higher levels of

inequality. However, there is not just a one-way causality. The dynamics between these two variables are more complex and we cannot exclude a bilateral causation. The analysis does not consider the effects of electoral systems on inequality as argued by those authors who argue that institutions cause inequality (e.g. Powell [2002]; Iversen and Soskice [2006]; Kenworthy [2010]). Once we know that democracy and autocracy matters for inequality, further research could investigate the specific dynamics between inequality and electoral systems and political parties.

This result holds even when we consider the other independent variables that may affect both these variables. Institutions are negatively affected by the high levels of external debt that these countries acquired in the first years after the independence in the British markets, even if the effects of a greater trade with Britain had a positive effect (although this is less than the investments so that the total effect is negative). The discoveries of natural resources negatively affect the quality of these institutions, while there is no relevant effect on institutions of any of the other colonial variables used. However, these variables have affected the levels of inequality in the region. Those areas that were colonial mineral centres and cash-crop producers have higher levels of inequality (less family farms).

4.3. Evolution of Institutions in Latin America: Historical Evidence

This section looks at four country experiences in the region that help to explain and illustrate the results of the previous empirical analysis. The good development experiences of Costa Rica and Uruguay contrast with the poor economic, social and political scenarios observed in Bolivia and Peru. The history of these four countries show the

specific mechanisms through which the variables considered in the analysis work and how these interactions affect Latin American institutions.

4.3.1. Costa Rica

Costa Rica is one of the most stable, prosperous, and progressive nations in Latin America. Nonetheless, it was a poor, isolated, backwater territory during colonial experience. Costa Rica had no gold or silver and few opportunities to promote sugar plantations which made this territory of little attraction to colonial settlement [Monge Alfaro, 1974; Quirós Vargas, 1990]. Quirós Vargas [1990] emphasises another factor behind Costa Rica's colonial poverty: the lack of a significant indigenous population available for forced labour. Costa Rican settlers were forced to work their own land and this prevented the establishment of large *latifundios*. The lack of natural and human resources has been considered to constitute the basis for a successful *rural democracy* [Thorning, 1945]. As a matter of fact, at the time of independence, Costa Rica had the highest level of land redistribution compared to the rest of the region [based on data of land distribution from Vanhanen, 2003].

After independence in 1821, and with the introduction of coffee, there were clear attempts to stimulate export agriculture. By late 1830s coffee exports began to reach important levels and the main destiny was Great Britain. In fact, British merchants played a key role in financing the coffee expansion[6] [Gudmundson, 1986]. The specialisation and export-dependence in coffee was accompanied by high political instability; the 1860s were marred by power struggles among the coffee elite. As the Costa Rican economy moved to monoculture and declining returns[7], the coffee-based peasantry and the growing urban middle-class increasingly protested for a greater wealth distribution

[6] the first bank founded in Costa Rica was the *Banco Anglo-Costarricense* in 1862.

[7] The declining returns on coffee production were due to the ageing of the groves, soil exhaustion, and the infrequent use of fertilisers (as explained in Hall [1976] cited in Gudmundson [1986, p. 5]).

and taxation of the coffee-oligarchy. This culminated in the 1948's Revolution which is seen as the beginning of the new process of democratisation in Costa Rica[8]. Social and economic progress since 1948 helped the return of the country to stability, and though post-civil war politics reflected the play of old loyalties and antagonisms, elections have been free and fair since then.

4.3.2. Uruguay

As Costa Rica, the colonial history of Uruguay is also characterised by no gold, silver, and sugar plantations, making this territory unattractive for colonisation (especially in early times). In fact, the current Uruguayan territories were little inhabited during the colonial times, at least until the establishment of *Colonia del Sacramento* by the Portuguese in 1680 [Bértola, 2003]. Unlike Costa Rica, Uruguay had a quite unstable transition to independence. Uruguay was on the border between the Spanish and Portuguese empires, and was the subject of several disputes between the two crowns; this was decisive for the creation, with strong British involvement, of an independent state in 1828-1830 [Bértola, 2003].

The mid-19th century was characterised by the growth of the Uruguayan agricultural sector based on the production of meat and livestock production in general. The main destiny of Uruguayan production was Britain which attracted British investments in the country [Winn, 1976]. Despite episodes of political unrest and economic stagnation in 1930s for most of the past 180 years, Uruguay has been a model democracy with one of the lowest rates of income inequality in the region[9].

[8] See Gudmundson [1984] for a review of the literature on the Costa Rican revolution and civil war in 1948.

[9] However, Uruguay did not escape the wave of military dictatorships that swept through South America in the 1970s.

4.3.3. Bolivia

The history of Bolivia contrasts with the development experiences of Costa Rica and Uruguay. Bolivia is one of the less developed and more unequal countries in the region (and in the world). Despite recent improvements in the Gini index (from 60.1 in 2002 to 56.3 in 2008), the differences in income still remains: in 2007, the 10% of the population earned 45% of the population's total income, while the poorest earned merely 0.5% [World Bank, 2011]. It can hardly be argued that the origins of Bolivian underdevelopment and inequality are found in colonial times. After the discovery of large silver deposits in Potosí in 1545, Bolivia became a key mining centre and an important source of revenue for the Spanish Empire and virtually every aspect of Bolivia's economic, political but also cultural and social development responded to the mining monocultures of silver first and then tin. The labour force was organised around the exploitation of minerals and based on forced labour [Cunningham and Jacobsen, 2003].

After independence, the white Creole elite, took control of the State, and although servitude and slavery were abolished, indigenous people were prevented from participating in the political life through the introduction of the 'qualified vote' i.e. only alphabetised people with a minimum income could vote at the elections and new forms of forced labour were introduced[10]. Universal vote was introduced only after the Bolivian National Revolution of 1952. However, this was of little help for the redistribution of power which was in the hands of the wealthy elite [Albro, 2005]. One of the main limitations for political inclusion was the skewed distribution of land that strongly favours small elite groups. The numerous land reforms introduced after 1952 implemented only temporary and minor changes and had little effect on wealth distribution [Medina, 2010]. In fact, in the 1980s, over 66% of land was still controlled by 0.22%

[10]The most common was *ponguaje*, through which indigenous population had to provide cheap or unpaid labour in exchange for access to subsistence parcels of land [Bueno, 2011]

of landowners with an average of more than 16,000 hectares per owner [Weisbrot and Sandoval, 2008].

The last decades have been characterised by political instability and a continuos economic fluctuations arising from the unstable commodity market. A succession of militaristic dictators repressed labour-based organisations and continued the social discrimination of the indigenous populations [Madrid, 2012]. In current times, Bolivia is still a mining country with the second largest natural gas reserve in South America[11]. The economy's reliance on mining has reinforced regional tensions and determined political power in Bolivia [Morales, 2010]. Of all the oil and gas significant producers in the world, Bolivia is perhaps the only country where sub-national governments share these resources revenues according to where they happen to be underground. This creates further divisions and limits redistribution [Weisbrot and Sandoval, 2008].

4.3.4. Peru

Peru was also a mining centre during the colonial period. Peru was in fact described as the "Spain's great treasure house in South America" [Pike, 1967]. Labour was organised following the needs of the mining sector under different forms of forced labour creating the same social inequalities between indigenous and colonisers described in the Bolivian case. Colonisers monopolised control over land and gradually the land tenure system became polarised between large haciendas and subsistence-based indigenous communities [Hunefeldt, 2004]. After independence, the elite class that inherited the power from colonisers aimed to preserve and enhance their privileged economic status[12].

[11] Natural gas and oil and other minerals replaced tin in its role on Bolivian economy, after the collapse of the world tin market in 1980s

[12] At the time of independence and for several decades after, Peru had a racially defined occupational structure. Artisans were black, peasants were Indians, smaller merchants were mestizos, and elites were white [Hunefeldt, 2004].

The new-independent country experienced severe political instability lasting until the advent of the guano boom in mid-19th century[13].

The Guano Era in Peru represents a period of economic prosperity. Demand for guano increased with the industrial revolution in the United Kingdom first and the increase of demand in the rest of Europe and US afterwards. Although the revenues of guano were used to accomplish some social projects such as the end of slavery and the Indian tribute (1854), Peru failed to become a modern state. Much of the guano wealth went into the support of state bureaucracy and some infrastructure projects that were never completed [Hunefeldt, 2004]. The guano revenues were distributed between British and Peruvian bondholders who held long-standing claims on the government. According to Quiroz [1987] two-thirds of the total bond value was held by only 126 people, mostly land-owners and state bureaucrats. In addition, guano financial windfalls made it easy to get loans on the international financial markets which eventually led to a deep financial crisis[14]. The discovery of synthetic fertilisers and the collapse of the guano price in the international market were devastating to the Peruvian economy. The discovery of nitrate mines could have replaced the role of guano in Peruvian economy, but the conflict between Chile and Peru for the control of the mines ended in the War of the Pacific where Peru lost its nitrate-rich provinces [Greenhill and Miller, 1973].

After guano and nitrate, Peru experienced several booms in its primary sector. Rubber, coffee, sugar cane, cotton, rice and other natural resources were crucial for Peruvian

[13]Guano is created by seabird droppings deposited for thousands of years and sedimented n coastal islands. The benefits of guano as fertilising were known by pre-Columbian societies, by it was Alexander von Humboldt who alerted Europeans to the value of guano.

[14]The Peruvian debt crisis had his origins in the independence wars. In 1822 and 1824 two loans were contracted in London, and by 1848 the principal and interest had increased Peru's debts of three times the initial loan. In addition, the government acknowledged internal debt to those citizens who had supplied funds for the patriot armies during the independence wars in order to foster the development of an entrepreneurial middle class. During the guano boom, British bondholders pressured the Peruvian government for repayment and in 1849 they obtained new bonds to be issued backed by future sales of guano. However, new loans were used to repay old loans and accumulated interest.

development. Nonetheless, these resources were in the hands of a Peru's oligarchy (estimated as 40 to 200 families) that retained much influence until late 1960s. In 1980s some attempts to address the problems of rural communities were made, and although the levels of inequality still remain very high, the political participation of the marginalised communities has increased, fostering a greater redistribution and the new wave of democracy in the country.

4.3.5. Explaining the Evolution of Institutions in Latin America

A main conclusion from the empirical analysis in Section 4.2 that finds support in the country experience comparative analysis of this section, is that institutions and inequality reinforce each other and this relationship has origins in colonial times. The evolution of political institutions, and specifically, the adoption of more authoritarian rather than democratic regimes depends on the political actors that hold power within the country. Latin American political actors were created during colonial times. Silver mines and cash-crops defined the distribution of power and wealth in these territories. Highly stratified societies, with a small part of the population controlling political power and wealth distribution, were created in those territories where natural resources were abundant during colonial times (e.g. Peru and Bolivia).

Resource-poor regions had a more equal distribution of wealth, or alternative, poverty was more equally distributed. As seen for Costa Rica, in most of the resource-poor regions there was little wealth to redistribute and land-production was mainly based on subsistence-agriculture. In the same way, political power was not as concentrated as elsewhere. Institutions and inequality thus reinforced each other and, through the political and economic actors, this relationship became persistent over time[15]. This first result complements the Engermann and Sokoloff's theory that finds the origins

[15] see Khan [2010] and the discussion in Chapter 3, p. 56.

of institutions in former colonies in the inequality created from the distribution of the natural resources.

All countries in Spanish- and Portuguese-America acquired independence around the same time (first half of 19th century). The newly independent economies slowly started the process of integration into the world economy. Two features distinguished the post-independence period. One is the increasing impact of Britain in Latin American economies, another one is the participation to the international trade through their primary sector[16]. The new resource-bonanza in the second half of the nineteenth century provided these countries with new economic resources[17] which guaranteed access to the international financial markets. The industrialisation process that started in Britain in the 19th century required access to Latin American primary goods which made British investors willing to finance these activities.

The empirical analysis shows that British intervention in Latin America affected both inequality and institutions. Britain was a strategic market for Latin American exports and there is evidence that the increased trade with Britain (which was the greatest industrial power in that time) had a positive effect in these economies, especially those ones able to provide a better response to the demands of the British market. British capital on the other hand, has a positive effect on family farms (it reduces inequality) but a negative direct effect on democracy. Those Latin American countries that welcomed British investments in large quantities also made themselves vulnerable to its cessation (in fact, this is also the period when Latin American countries acquired a large international debt).

[16]No industries were put in place during the colonial time, and at the few indigenous textile industries (e.g. in Ecuador, Bolivia) could not compete with the technological advances from external competitors such as Britain

[17]The second half of the nineteenth century was the period of new resource-booms in these economies. Coffee was cultivated in Costa Rica and Colombia, cacao was already a main commodity in some regions in Ecuador and Venezuela and in many other tropical territories, it was the period of guano-boom in Peru, and Uruguay and Argentina developed their production of cattle-based products.

According to Miller [1993], external loans and direct investments in Latin America contributed to put off much of the needed reforms to taxation structures and financial institutions, and probably undermined local political institutions as more politicians became beholden to their links with the British companies. In those countries were elites controlled the country resources, these investments fed bureaucratic practices and were used to maintained the benefits of the elites in power, which therefore decrease the quality of institutions. This is the negative direct effect of British investments on inequality. Nonetheless, in more egalitarian societies (such as Costa Rica and Uruguay), the capital inflows benefited the development of trade sectors which offer greater possibilities of employment and therefore decrease inequality with a positive effect on institutions.

Finally, natural resources also played (and keep playing) a role in shaping institutions. In general the discovery of natural resources in early 20th century offered the opportunity to modernise the economy and to build basic infrastructure (e.g. roads that facilitate the transport of coffee in Costa Rica, railways in Peru). However, the presence of resource rents also increased the payoff to controlling power, especially when the group that held political power controlled the distribution of the rents, incentivising elites to block democratisation (as argued by Boix [2003]). For instance Peru and Bolivia introduced universal suffrage relatively late – 1979 and 1956 compared to, for instance, Costa Rica and Uruguay in 1948 and 1918 respectively – excluding from vote those groups without economic resources.

Moreover, the effects of natural resources (oil and other minerals) depend on the interactions with the previous established social and political institutions [as discussed by Dunning, 2008]. In more autocratic societies, resource rents are used by the political elites to support their privileges (see for instance the case of Peru after the guano boom), while in more democratic societies these resources may incentivise redistributive

policies. Haggard and Kaufman [2008], show that more democratic regimes are more likely to undertake a broadening of social insurance and services. In fact, Uruguay, Costa Rica and Chile are the countries with the longest continuous histories of competitive politics and also have the oldest and more established welfare states. The social-policy initiatives of authoritarian regimes in Latin America were mostly directed either toward increasing benefits for privileged groups or toward the consolidation of existing programmes increasing thus inequality levels.

The results in this chapter also complement the work of Nugent and Robinson [2010]. These authors contrast the experiences of four coffee export countries in Latin America, Colombia, Costa Rica, El Salvador and Guatemala on the basis of their landownership structures. While Colombia and Costa Rica introduced early legislations that protected smallholders, the onset of the coffee boom induced mass land grab by political elites in El Salvador and Guatemala which created large coffee plantations. According to Nugent and Robinson, the origins of these differences are on the politics of the 19th century. In Colombia and Costa Rica, political elites consistently used competitive elections as way to allocate political power, and elites were not primarily landowners (in contrast to El Salvador and Guatemala). This chapter shows that we can trace the origins of political inequality back to colonial times, and that post-colonial factors and the discovery of new resources contributed to the evolution of the political institutions and inequality. Therefore, while the findings in this chapter agrees that 19th century's politics are relevant for explaining the evolution of institutions in Latin America, the results go further and explain why certain countries had more unequal political distribution in first place.

Both institutions and inequality tend to evolve slowly over time. Colonisation offers a good opportunity to analyse whether differences across colonies gave rise to systematic differences in the way institutions evolved. In fact, colonial past created certain

dynamics for institutional development with the result that countries take different paths. Inequality of wealth from colonial era led directly to narrow participation and continued political inequality. The evidence from the colonies in the Americas suggests that those that began with extreme inequality and population heterogeneity exhibit persistence over time in evolving institutions that restricted access to economic opportunities. After independence, the rents arising from the exploitation of natural resources gave the political elites the means to maintain their economic benefits and power. The effects of British intervention depended on the institutions previously set in these countries.

4.4. Final Remarks to Chapter 4

This chapter has identified the factors that affected the evolution of the political institutions in Latin America after independence. Latin American countries are characterised by high levels of political instability, high inequality, and the dependency on the production of natural resources. These features and their interaction are used to explain how Latin American institutions evolved.

There is no consensus in literature on the dynamics and the causal relationship between institutions and inequality. While it is plausible that inequality plays a part in blocking the adoption of good institutions, the reverse holds as well, so that poor institutional quality results in higher degree of inequality. This study suggests that income inequality and poor institutional quality may indeed reinforce each other and that the specialisation on the production of natural resources affects this relationship over time.

The mechanisms through which institutions, inequality, and natural resources interact are investigated with an empirical study that uses a two equation model in which in-

equality and institutions are functions of each other. The results show that in fact there exists a bivariate relationship between institutions and inequality. We observe that the paths of institutional development in Latin America are sensitive to the incidence of inequality: higher levels of inequality are related to lower quality of institutions. Moreover, natural resources have a negative effect on the quality of political institutions in Latin America: the discovery of natural resources favours more authoritarian regimes. This result supports the findings in Chapter 2 which shows a negative effect of natural resource rents on Latin American economic growth. There is little evidence that these resources directly affect the levels of inequality (the effect goes through institutions). However this study has only considered the discovery of mineral resources (oil and natural gas), so there is still room to investigate the effects of the production of other resources on both institutions and inequality.

Colonial and post-colonial factors have been used to explain how institutions, inequality and natural resources interact. There is no evidence that either European settlements or the initial native population affected the evolution of Latin American institutions, which offers further support to the findings of Chapter 3. However, colonial experience did affect institutions through the exploitation of natural resources in colonial times. A quick look at some country experiences in the region shows that the relationship high inequality-poor institutional quality was already in place at the time of independence in countries such as Bolivia and Peru, large exporters of silver and other minerals during the colonial times. The analysis thus complements the Engerman and Sokoloff's hypothesis [1997; 2002] that inequality of wealth from colonial era is linked to narrow participation and continued political inequality. From the specialisation in these economic activities during the colonial times these countries inherited an elite psychology that segmented the population into a colonial elite and a subordinate exploited class that gave these societies extractive economic and social structures with extreme levels of inequality in wealth and human capital.

However, post-independence events also affected the character of institutions and this needs to be included in the analysis. New resource discoveries after independence facilitated the participation of Latin American economies into the international market. Costa Rican coffee, Uruguayan livestock, Peruvian guano and Bolivian tin were key for the economic development of these economies in the post-independence period. During the colonial times, Spanish colonisers built up a system based on monopolies with their colonies that did not allow Latin American territories to freely trade with other countries, but this situation disappears after independence. The new born countries were free to trade with other countries and Britain took this opportunity. After the independence the trade with Britain rapidly increased and so did the British capital invested in this region. Access to foreign savings to finance either public or/and private enterprises was a permanent characteristic that had conditioned the economic development of Latin America. The development of the coffee exports in Costa Rica was stimulated by the increasing British demand and it was financed by British merchants. As a matter of fact, the first bank founded in Costa Rica was the Banco *Anglo-Costarricence* in 1862. Britain was also the main destiny of the production of livestock in Uruguay and this country was the recipient of notable amounts of British investments.

The empirical analysis shows that British capital has a negative direct effect on institutions, but a positive indirect effect through redistribution. Latin American governments acquired a large debt in the British capital market which left these countries with high levels of public and private debt. However, countries with a better initial redistribution of resources may have used these investments in productive enterprises that, in the long-run, benefited the economic development and the institutional setting of these economies (as seen in Costa Rica that improved the transport infrastructure during the coffee era).

These results help to explain the common conclusion in literature that *British did better*, i.e. those territories colonised by Britain inherited better institutions. This conclusion is based on the empirical observation that former British colonies in average have better institutions. However, it is difficult to disentangle the specific mechanisms of how *British did better*. The British-controlled territories benefited of investments in the infrastructure of colonies and preferential agricultural trade ties with Britain. By the beginning of the World War I, many basic services (i.e. hospitals, sewage systems, public water supplies, schools) were fairly developed in these territories [Rogonzinski, 2000]. Therefore, the evidence suggests that the indirect effect on British investments on institutions through inequality prevailed. British investments benefited the improvement of basic services which reduced inequality which translated into an improvement of institutions and this may explain the positive sign of the British dummy.

Overall, the results of this chapter give econometric support to Boix's [2003] argument that inequality and institutions reinforce each other. In societies with high levels of inequality and land-concentration, the cost of taxation and redistribution becomes high enough for the elites to prefer an authoritarian regime. This regime will put in place policies that allow elites to keep their economic and political benefits and therefore reinforce the current levels of inequality and land-concentration. In fact, this can be used to explain the long-standing political discrimination of indigenous populations in Peru and Bolivia after independence. From the colonial times these countries inherited a strong wealthy elite that also controlled political power. The established authoritarian regimes delayed policies to abolish forced labour and allow the political participation of the poorer parts of the society through the introduction of 'qualified vote' systems (only alphabetised people with a minimum income could vote at the elections).

However, this analysis differs from the previous literature in the specific mechanisms on how inequality, institutions, and natural resources interact. In the Engerman and

Sokoloff's argument, the institutions set during colonial times tend to be highly persistent so that current institutions are a reflection of colonial times. Previous chapter shows that this is not the case for Latin America and we need to look into post-independence events that shape current institutions. Moreover, whereas Boix [2003] explains how inequality and institutions interact, the author fails to explain the impact of colonial past on current institutions in developing countries. The understanding of the origins of institutions and inequality can be used to explain the observed persistence of the relationship between institutions and inequality.

The Dunning's claim [2008] that natural resources may have both authoritarian and democratic effects based on the redistribution of resources is not entirely consistent with the Latin American experience. There is no evidence here that in societies with substantial inequality of assets (not related to the natural resource sector) a resource boom helps to mitigate the negative impact of inequality on institutions through an increase in redistribution policies. On the contrary, there is a tendency for these resources to promote authoritarian regimes – the presence of resource rents increases the payoff of controlling power in order to control the distribution of rents. Even in those countries with a more egalitarian wealth redistribution, these resources generated some conflict over power. See for example the Costa Rican political instability marred by power struggles among the coffee elite in 1860s.

To sum up, the econometric evidence presented here suggests that struggles over power control and redistribution of income and wealth in Latin America have their origins in colonial times. The discovery of natural resources after independence provided the elites with further incentives to maintain authoritarian regimes in order to control the rents generated by these resources. The decrease of inequality increases the political participation and therefore favours institutions that promote democratisation which in

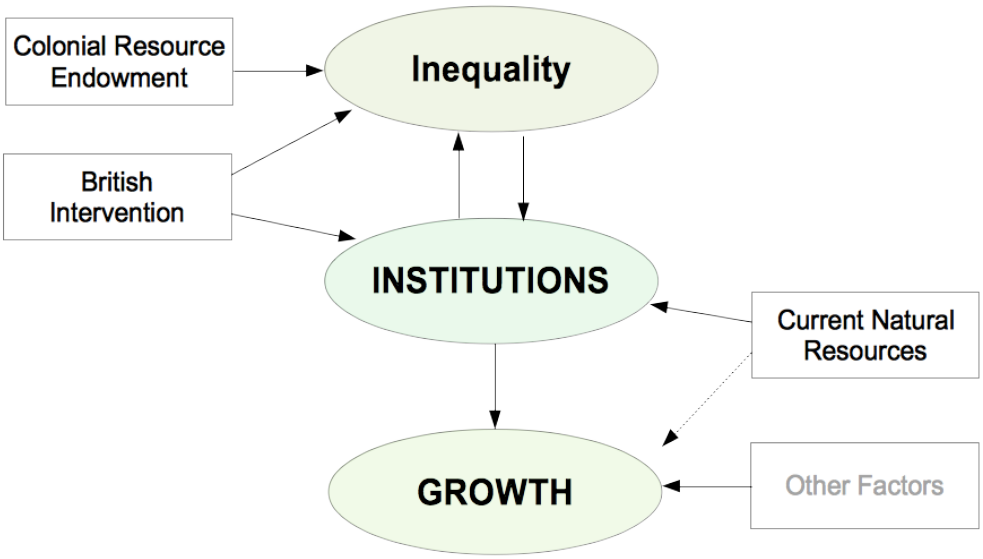
turn will favour a better redistribution making the reduction of inequality a key aspect for improving the quality of institutions in Latin America.

5. Conclusions

The debate on what causes GDP per capita to grow is still ongoing but several scholars consider institutions as a fundamental determinant of economic growth. This thesis offers further empirical support to this literature by analysing the role of institutions in Latin American economic growth. Chapter 2 shows that institutions are a fundamental cause of growth in Latin America. However, institutions are not exogenous to growth, i.e. these are an outcome of the growth process, and factors that affect growth may also affect institutions. Therefore, although institutions matter for growth, we need to explain the origins and evolution of institutions. Chapter 3 and 4 take up this challenge and investigate how Latin American institutions originated and evolved.

Figure 5.1 summarises the main conclusions of this thesis by illustrating how the different variables interact and affect growth in Latin America. First, and unlike argued by Glaeser et al. [2004], INSTITUTIONS are fundamental for explaining growth. This does not imply that other variables do not matter, in fact economic growth is a complex process affected by a number of other factors. The implication of this result is that institutions play a role in this complex process and this role needs to be investigated. Another variable that turns to be significant for growth in the region is *natural resources*. This should not be a surprising result considering that many of these countries in the area are net exporters of natural resources, however the effect of these resources is negative which — for further research.

Figure 5.1.: Institutions and Growth in Latin America



The main contribution of this thesis to the literature lies in the explanation of the genesis and evolution of institutions in Latin America and the role of natural resources. Several authors emphasise that the origins of institutions in developing countries is rooted in colonial times, however, this thesis does not find empirical support for some of the common colonial factors used by this literature. In particular, the conclusions of Acemoglu, Johnson, and Robinson [2001] and Easterly and Levine [2012] that *European settlements* matter for explaining institutional differences do not hold for Latin America. There is also little evidence for the hypothesis that *native populations* affected the quality of institutions [as argued by Acemoglu, Johnson, and Robinson, 2002; Baker et al., 2008; Mahoney, 2010].

The research carried out in this thesis shows that the colonial aspects that matter for Latin American institutions are *coloniser identity* and *colonial resource endowment*. In particular, the empirical evidence shows that former British colonies have better early and current institutions, and that being a mineral centre during colonial times

decreases the quality of institutions. Previous literature has already emphasise the importance of these two colonial aspects [La Porta et al., 1998, 1999 on coloniser identity, and Engerman and Sokoloff, 1997, 2002 on the colonial resource endowment]. However, while these authors assume that current institutions are strongly correlated with early ones, this thesis argues that this is not the case for Latin America. In fact, there is empirical evidence that current and early institutions in Latin America are not correlated and therefore, colonial aspects alone do not explain how institutions evolved since independence.

In order to explain the evolution of Latin American institutions, this thesis considers one of the main features of Latin American economies: INEQUALITY. The region is characterised by a high level of inequality, in fact, it is the most unequal in the world. This thesis explains the evolution of Latin American institutions using a bilateral causation of institutions and inequality: while poor institutions may affect the adoption of redistribution policies, high levels of inequality may affect the quality of institutions. It investigates how colonial and post-colonial factors affect this relationship. The results show that colonial resource endowments affect the inequality levels of the region which in turns affects institutions. Furthermore, the discovery of NATURAL RESOURCES (i.e. oil and natural gas) also affects this relationship and this sheds further light into the role of the exploitation of these resources in the region. The effects of natural resources depend on the pre-existing institutional setting and levels of inequality. The discovery of natural resources provide the political elites with the incentives to promote authoritarian regimes in order to control the resource rents which negatively affects institutions and growth.

Finally, this thesis goes further in investigating the role of Britain in Latin America. As mentioned, British colonies seem to have better institutions than non-British ones, however, British colonisers do not seem to behave much differently than Iberian ones.

Therefore, we need to look in which specific aspects of British intervention benefit the institutions in these countries. Several economic historians have emphasised the role of Britain in the post-independence development of Latin America. This intervention took place through investments and trade and affects both inequality and institutions. The analysis investigates the legacy that British intervention left behind.

What follows explains in detail the main conclusions of the thesis and how these contribute to the current literature.

Institutions are a fundamental determinant of Latin American growth

The findings in Chapter 2 show that institutions are indeed fundamental for Latin American economic growth. This chapter first engages with the Glaeser et al.'s argument [2004] that human capital is a *more fundamental* source of growth than institutions. The findings in Section 2.3 contradict this argument and show that, in the case of Latin America, initial low levels of democracy are a better predictor of subsequent low economic growth than initial low levels of human capital. Glaeser et al.' criticisms to institutions come from two observations: (i) commonly used measures of institutions are more volatile than human capital and therefore do not represent durable features of the environment, (ii) given the high correlation between institutional measures and GDP per capita, institutions are not a *cause of* but they are *caused by* economic growth. We cannot reject that institutions in Latin America are volatile. Measures for democracy and constraints on the executive (commonly used as institutional variables) have indeed a higher standard deviation than years of schooling (used as variable for human capital); however, this should be considered as a characterisation of these institutions *per se*, that is, institutions in Latin America are unstable. It is in fact the instability of these institutions that harms growth and therefore high volatile institutions do play a role in explaining the region's poor growth performance.

Moreover, Glaeser et al.'s observation that economic growth affects institutions cannot be rejected too. The growth process encompasses many aspects that influence the economic, political and social spheres. We can hardly argue that these aspects do not affect the variables that cause growth including institutions. Any empirical analysis thus needs to include ways to deal with endogeneity issues. The growth regression analysis for Latin America proposed in Section 2.4 of Chapter 2 uses a panel system generalised method of moments (GMM) that deals with these problems. This is preferred to the instrumental variable analysis (IV) used by Glaeser et al. for two reasons. First, it is hard to identify valid instrumental variables that affect institutions or human capital but do not affect growth. An invalid instrument gives inconsistent estimates. Second, Glaeser et al. use cross-country data. Panel data allows for further ways to obviate endogeneity and GMM estimators ensure the use of valid instruments. The results support the conclusion that institutions are more fundamental than human capital for explaining growth, i.e. the variable for human capital loses statistical significance once we include institutional variables into the regression. The analysis also shows that natural resources have affected Latin American growth and in fact the natural resources (and geographical factors in general) are also considered to be fundamental determinants of the growth process.

Finally, while research on what causes growth looks for the determinants of the long-run average growth, growth in the region is also highly volatile. Chapter 2 also considers this issue by studying the causes of growth accelerations (episodes of rapid growth) in Latin America. Rodrik [1999]; Pritchett [2000]; Sen [2013] agree that understanding what causes growth to accelerate will help to explain what generates large fluctuations in growth of per capita income. Based on the work of Hausmann, Pritchett, and Rodrik [2005] and Sen [2013], Section 2.5 first identify the episodes of rapid growth in the region between 1960 and 2011 and then offers an empirical analysis of the sources of growth accelerations in Latin America. The results support the findings in Hausmann,

Pritchett, and Rodrik [2005]. While favourable external conditions trigger growth accelerations in Latin America, changes in the underlying political balance and variations in government expenditure (used as measure of economic policies) reduce the probability of observing rapid growth.

Another important conclusion of Chapter 2 is that natural resources are also a fundamental determinant of growth. Resource rents have a negative effect on long-run average economic growth in the region (Section 2.4), while positive changes in terms of trade and in the rents arising from natural resources increase the probability of observing episodes of rapid growth (Section 2.5). These results may seem contradictory, but a closer look shows they are not. In countries specialised on commodity exports, changes in the price of commodities are closely related to external shocks. This increases growth volatility which in turn decreases growth (this has been largely debated in Auty [2001]; Sachs and Warner [2001]; Ortega and de Gregorio [2007]. These problems could be obviated with the adoption of good policies (that, for instance, favoured the diversification of the productive structure), but most Latin American countries lack good governance and political stability which affects how these resources are managed.

Latin American institutions have colonial origins

Even if we know that the high levels of political instability in Latin America affects the region's economic growth through various channels, the analysis in Chapter 2 does not say how and why good/bad institutions arise. These questions are addressed in Chapter 3 and 4 which investigate the origins of institutions in Latin America and how these institutions evolved since independence.

Chapter 3 examines whether the dominant explanations in the literature on the continuing influence of the colonial experience on current institutions can explain the Latin American experience. In particular, the literature argue that the problems in former

colonies are deeply rooted in colonial times and in the institutional setting established during this period. This is based on the hypotheses that early institutions (institutions at the time of independence) depend on a variety of colonial factors, and that current and early institutions are strongly correlated.

Nonetheless, a crucial finding of this analysis is that, for Latin America, the assumption that early and current institutions are correlated, does not hold. This might be explained by the region's early decolonisation process. The bulk of Latin American countries became independent in the first half of the 19th century - around a century before the rest of the colonies. However, colonial factors may still affect the region's institutions. Four hypotheses were proposed in order to analyse the effects of these colonial aspects. These hypotheses are based on (i) the coloniser identity, (ii) the size of European settlements during the colonial period, (iii) the pre-colonial populations, (iv) the colonial resource endowment. For Latin America there is no evidence that either European settlements or pre-colonial populations influenced institutions. This is in contrast with Acemoglu et al. [2001] theory that areas with larger European settlements during the colonial times inherited better institutions, and with Mahoney's theory [2010] which states that pre-colonial populations have a direct impact on current institutions and development.

The analysis emphasises that former British colonies have better early and current institutions than non-British ones. However, the problem with this result is that we cannot identify the specific features of the British colonial rule responsible for these results. In many aspects, British colonisers were very similar to other colonisers, especially during the first period of colonisation. They did set up monopolies in order to control the trade with the colonies and adopted various forms of forced labour.

Colonial mineral resource endowment (i.e. gold and silver) seems to be relevant in explaining institutions while European settlements and native populations are not sig-

nificant for institutions in Latin America. In fact, the explanation of how institutions arise in Latin America is more complex than the one illustrated by Acemoglu et al., or Mahoney. It requires more than colonial history to explain the factors that affect the creation of these institutions that are positively correlated with growth. To explain how institutions affect Latin American development we need to consider other factors.

Inequality and institutions reinforce each other

This thesis contributes to the literature on the relationship between institutions and inequality. Latin America is characterised by the highest level of inequality in the world. Efforts in literature have failed in reaching a consensus in the causal relationship between inequality and institutions. This thesis examines the possible dynamics between institutions and inequality.

The analysis considers that a bilateral relationship between these two variables is plausible. Institutions is statistically significant for explaining inequality, but inequality also explains institutions. To deal with the simultaneity issues that this relationship may cause, the econometric analysis considers a two simultaneous equation model (one for institutions and one inequality) in which each variable depends on the other and on other factors. The results show that high levels of inequality play a role in blocking the adoption of good institutions, but poor institutional quality also increases inequality even when controlled by other variables. This result supports Boix's argument [2003] that inequality and institutions reinforce each other, but it goes further and explains how the relationship high inequality-bad institutions emerge in Latin American countries. This was put in place during the colonial times. Countries such as Bolivia and Peru, specialised in the production of silver and other mineral resources during the colonial times, inherited a highly stratified society with a small group of families that

controlled political and economic power. These countries set up highly authoritarian governments which aimed to maintain the elite privileges. In fact, these countries tend to delay policies that would increase political participation (e.g. universal suffrage) and distribution of wealth (e.g. creation of welfare states).

The economic and political equilibria set up in these countries did suffer the influence of other events that took place after independence, such as the British intervention in Latin America and the discovery of these resources.

Natural resources affect institutions

Many changes took place in Latin America after the independence wars in 1820s. The results of Chapter 4 show that these changes also affected institutions in the region. Two particular post-independence aspects are considered, the effect of British intervention in the 19th and early 20th century and the discovery of new natural resources. The discovery of oil and natural gas has a negative direct impact on institutions in Latin America. This supports the idea behind *resource curse* theories proposed by several authors [Sachs and Warner, 1995; Ross, 2001; Soysa, 2005; Caselli, 2006]. The rents arising from the exploitation of natural resources offer specific political incentives that may affect the quality of institutions. In commodity-dependent countries the volatility of these rents tends to translate into fiscal volatility which limits growth potential. In addition, conflicts over redistribution of these rents provide incentives for ruling elites to favour more authoritarian regimes.

However this is not an unconditional effect. The experiences of Latin American countries show that the management of these resources did depend on the pre-existing institutional settings and political equilibria as argued by Dunning [2008]. Rents from guano in Peru, and tin in Bolivia were used by the political elites in power to support their privileges. Although coffee in Costa Rica was mainly organised under small

holder land [Nugent and Robinson, 2010], it did bring some conflicts among the coffee-oligarchy. Only after the 1948's protests a new process of democratisation took place. This was made possible by a strong coffee-based peasantry and urban middle-class. Unlike Dunning [2008] and Nugent and Robinson [2010] this thesis explains how colonial factors, and in particular colonial resource endowments, influenced the pre-established distribution of power. Therefore, even if natural resources are not fate, these resources have had a strong impact of these countries' institutions.

The effects of British intervention in Latin America

Finally, another important contribution of this thesis is the explanation of the effects of British intervention in Latin America. In the 19th century, Britain became the main industrial power in the world, and the growth of its industrial production increased the demand for raw material and also food. The increase in British demand favoured Latin American exports and this had a positive effect on institutions. In the late 19th century however, Britain shifted from being a manufacturing centre to be the main financial centre in the world. Latin American countries rapidly embraced the use of global capital markets to finance their public debt and a large amount of British capital went to these countries.

The empirical analysis reveals two potential effects of these investments on Latin American institutions. One is a direct negative effect on institutions. Latin American countries whose elites welcomed British investment also made themselves vulnerable to its cessation. Key sectors of the economy (e.g. railways, banking system) became controlled by firms based in London whose primary interests laid in profit remittances from Latin America. External loans created thus problems of economic management which became evident as soon as trade declined and credit was curtailed (i.e. during the first World War). This way of government financing put-off reforms in taxation and

financial institutions and undermined the political class. The elites of these countries obtained substantial increments to their wealth and power in this period, but these benefits were concentrated among certain social groups and tended to consolidate their power. In a way, we can argue that the flow of money from British financial market to Latin America, could have similar effects to the rents arising from resource exploitation. External borrowing offered governments access to cheap funds at the cost of the vulnerability of these economies to crises in the London market.

The second effect of British investments on institutions in Latin America goes through inequality. There is empirical evidence that British investments decreased the levels of inequality and therefore improved the regions' institutions. It is likely that in those countries with fairer redistribution of power, these investments favoured the development of productive sectors that will in the long-run offer greater employment opportunities. For instance, British investments financed coffee production in Costa Rica and meat production in Uruguay. Given the more equal distribution of power in these countries, the taxation of the new revenues generated benefited a larger part of the population. In fact, Costa Rica and Uruguay (along with Chile) have the oldest established welfare states. This positively affect institutions, in fact, these countries also have the longest continuous histories of competitive politics in the region. This also helps to explain the common conclusion in literature that *British did better*. In British-controlled territories, the indirect effect of British investments on institutions prevailed. These investments benefited education, health, and other basic services, which may have benefited social inclusion and institutions.

Once we have a better understanding of the factors that affect institutions, future research should focus on investigating what facilitates the redistribution of power within

a country. After independence, the several revolutions and democratisation processes that took place in Latin America allowed these countries to reach important milestones. Democracy and universal suffrage became a reality in Latin America in 1980s and 1990s; however, sound political practices have not always kept pace. A reason for this could be found in the persistence of the unequal distribution of power in some countries. Power control is the key tool used by the elites in Latin American countries to maintain their privileged positions. Even during periods of transition (which may translate into a temporary loss of power), economic elites look for alternative ways to influence the distribution of resources in order to maintain their privileges. Research on how to contrast the elite behaviour in favour of a better distribution of the political power which improves institutions would enhance our comprehension of the role of these institutions.

APPENDICES

A. Appendix Chapter 2

A.1. Data sources and Variable Definitions

The main databases used for Chapter 2 are the World Development Indicators from the World Bank and the Penn World Table (version 8.0). The World Bank DataBank contains collections of time series data on a variety of topics for different countries in the world and the World Development Indicators is the primary World Bank collection of development indicators, compiled from different international sources. The Penn World tables offer information on relative levels of income, output, inputs and productivity, covering 167 countries between 1950 and 2011.

The Barro-Lee data set on educational attainment provides data for the measure of human capital. This is a panel data set for 146 countries for the period 1950-2010. Data on institutions for this chapter is from the International Country Risk Guide. It provides variables covering political and social attributes for 140 countries for the period 1984-2012. Table A.1 provides the variables definitions and the specific sources.

Table A.1.: Chapter 2 - Variable definitions and sources

Variable	Definition	Source
Real GDP per capita growth	Difference between real GDP per capita in year t and real GDP per capita in year t-1	Feenstra et al. [2013]
Real GDP per capita (constant 2005 US$)	GDP per capita is gross domestic product divided by midyear population	Feenstra et al. [2013]
Investments in Physical Capital	Ratio of real gross domestic investment (private plus public) to real GDP	Feenstra et al. [2013]
Educational attainment	Average years of schooling of the population aged 25 and over	Barro and Lee [2010]
Life Expectancy at birth, total (years)	Life expectancy indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life	World Bank [2011]
Government Consumption	General government final consumption expenditure includes all government current expenditures for purchases of goods and services (including compensation of employees) as percentage of GDP. It also includes most expenditures on national defense and security. Data are in constant 2005 U.S. dollars	Feenstra et al. [2013]
Inflation	Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. The Laspeyres formula is generally used	World Bank [2011]
Openness	Exports plus Imports divided by real GDP. It is the total trade as a percentage of GDP	Feenstra et al. [2013]
Oil rents	Oil rents are the difference between the value of crude oil production at world prices and total costs of production as a percentage of GDP	World Bank [2011]
Natural resource rents	Total natural resources rents are the sum of oil rents, natural gas rents, coal rents (hard and soft), mineral rents, and forest rents as a percentage of GDP	World Bank [2011]
Democracy	This is a measures of democratic accountability which measures how responsive government is to its people, on the basis that the less responsive it is, the more likely it is that the government will fall, peacefully in a democratic society, but possibly violently in a non-democratic one. The original variable ranges between 0 and 6, but it has been re-scaled to 0-1	PRS Group Inc. [2010]
Government Stability	This variables is an assessment both of the government's ability to carry out its declared program(s), and its ability to stay in office. The original variable ranges between 0 and 12, but it has been re-scaled to 0-1	PRS Group Inc. [2010]

Table A.2.: Chapter 2 - Descriptive Statistics

Variable		Mean	Std. Dev.	Min	Max	Observations
real GDP	overall	0.085953	0.12568	-0.41178	0.4453516	N = 318
per capita	between		0.05076	-0.02013	0.1860602	n = 34
growth	within		0.115537	-0.4508	0.4063384	$\overline{T}$ = 9.35294
real GDP	overall	7751.502	6050.761	1268.708	32273.78	N = 352
per capita	between		5570.306	1386.317	26429.71	n = 34
	within		2618.905	-1981.75	22606.34	$\overline{T}$ = 10.3529
Investment in	overall	22.49014	9.135864	2.592429	72.71719	N = 352
physical capital	between		7.209744	5.036227	42.03563	n = 34
	within		6.05304	-1.35893	57.45467	$\overline{T}$ = 10.3529
Educational	overall	5.752817	2.137884	0.9	10.18	N = 252
Attainment	between		1.582103	2.581	8.022	n = 25
(schooling 25+)	within		1.470108	3.090817	9.334635	$\overline{T}$ = 10.08
Life Expectancy	overall	67.56088	7.276042	43.21606	79.25385	N = 393
(at birth)	between		5.019519	53.372	74.73172	n = 35
	within		5.322541	52.66173	79.22472	$\overline{T}$ = 11.2286
Government	overall	12.35231	7.571384	2.38275	43.04948	N = 352
Consumption	between		7.16548	3.6806	37.78621	n = 34
	within		3.144453	-2.24954	33.70476	$\overline{T}$ = 10.3529
Inflation	overall	1.095756	8.791645	-0.01892	117.4964	N = 267
(consumer price	between		2.569621	0.0141	11.85149	n = 33
index)	within		8.357149	-10.7307	106.7407	$\overline{T}$ = 8.09091
Openness	overall	71.35385	40.47607	8.773735	193.9352	N = 352
	between		37.69134	16.9446	161.8509	n = 34
	within		16.07821	20.60421	128.4165	$\overline{T}$ = 10.3529
Oil rents	overall	0.070846	0.097418	0	0.4412898	N = 119
	between		0.084557	0.005283	0.278075	n = 14
	within		0.050879	-0.09813	0.3084315	$\overline{T}$ = 8.5
Natural resources	overall	0.058835	0.093204	0	0.6218496	N = 299
rents	between		0.081775	0	0.32706	n = 35
	within		0.044421	-0.18302	0.353625	$\overline{T}$ = 8.54286
Democracy	overall	0.540621	0.256499	0	1	N = 275
Accountability	between		0.174377	0.127778	0.852904	n = 25
	within		0.191034	0.137086	1.066758	$\overline{T}$ = 11
Government	overall	-0.70378	0.339733	-1.65927	-0.0870114	N = 260
Stability	between		0.173945	-1.04841	-0.4115315	n = 25
	within		0.295408	-1.42224	0.1013228	$\overline{T}$ = 10.4

Table A.2 provides summary statistics and shows variation between countries and within countries. For example, the variation of the real GDP per capita between countries is US\$5,570.31 while within countries it is equal to US\$2,618.91. Table A.2 also

reports minima and maxima. For instance, the years of schooling in adults aged 25 and over varied between 0.9 and 10 years (with an average of 5.8). The years of schooling in each country varied between 2.58 and 8 years. The years of schooling "within" varied between 3.09 and 9.3 The within number refers to the deviation from each country's average (a country deviated from its average by $9.3 - 5.8 = 3.5$).

Finally, Table A.2 shows the total number of observations (N), number of countries with observations (n) and average number of time periods for each country ($\overline{T}$). For instance, investments in physical capital is observed in 34 countries for a total of 352 observations. In average, there are 10.35 observations for each country.

A.2. Fixed Effect Analysis

This section shows the results of estimating equation 2.2 using Fixed Effect panel estimators. Fixed effect estimators in static panels is largely preferred to analyse panel data when the individual units are countries. The intuitive explanation is that the fixed effects model can be thought of as a model of the entire population. This is thought in contrast to the random effect model that assumes we are using a random sample from a population. The formal formulation of the model assumes that differences between countries can be captured by differences in the intercept term, α. Equation 2.2 becomes:

$$Dy_{i,t} = \mathbf{i}\alpha + \beta y_{i,t'} + \delta' \mathbf{X}_{i,t} + u_{i,t} \tag{A.1}$$

Which can be explained as a regression model with n dummy variables, one indicating each country (so that the model has no intercept). A formal test to assess that fixed

effects are more appropriate (than random effects) is the *Hausman test*. The null hypothesis is that *"individual effects are uncorrelated with the explanatory variables"*. If we reject H_0, the fixed effect estimator is unbiased and is preferred.

Table A.3 shows the same results of Table 2.6, using fixed effect estimators. It also shows the results of the Hausman test (bottom of the table). However, the parameters of the fixed effect estimators tend to be imprecise due to the elimination of the between variation component. Growth episodes within countries look more alike than growth episodes across countries. Restricting the analysis to the within variation eliminates one source of bias, but makes it harder to identify growth effects with any degree of precision (see Durlauf et al. [2005] for a discussion on growth econometrics). However, the main issues of these estimators is that does not deal with the endogeneity problems of some explanatory variables with the residuals, which makes our estimates inconsistent. GMM estimators are preferred because it alleviates biases due to measurement error and endogenous explanatory variables.

Table A.3.: Economic Growth in Latin America - Fixed Effects

Independent Variables	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
(log) initial real GDP per capita	-.041*	.049	.032	.030	.136	.028	.019	.017
	(.023)	(.037)	(.037)	(.041)	(.087)	(.050)	(.052)	(.050)
(log) Investments	.132***	.175***	.185***	.154***	-.237***	.171***	.177***	.158***
	(.028)	(.034)	(.033)	(.036)	(.073)	(.042)	(.042)	(.041)
total years of schooling (25+)		-.009	.009	-.010	.020	-.016	-.025	-.029*
		(.006)	(.011)	(.012)	(.036)	(0.16)	(.016)	(.016)
Life Expectancy			.507	-.222	-1.005	-.073	-.041	.095
			(.419)	(.462)	(1.296)	(.525)	(.525)	(.513)
Mortality rate (under 5)			.002**	-.000	-.002	-.000	-.000	.000
			(.001)	(.001	(.003)	(.001)	(.001)	(.001)
(log) Government consumption				-.152***	-.193***	-.179***	-.208***	-.192***
				(.038)	(.058)	(.043)	(.044)	(.043)
(log) Inflation				-.002***	-.001*	-.002***	-.002***	-.002**
				(.001)	(.001)	(.001)	(.001)	(.001)
(log) Openness				.041	-.025	.060*	.059	.055
				(.030)	(.075)	(.036)	(.035)	(.034)
(log) Oil rents					-.038***			
					(.013)			
(log) Natural Resource rents						-.012	.002	.012
						(.013)	(.014)	(.014)
Democracy							.097	
							(.072)	
Government Stability								.261***
								(.085)
constant	.045	-.819***	-3.05*	.532	2.687	-.152	-.118	-.693
	(.214)	(.308)	(1.79)	(1.99)	(5.637)	(2.277)	(2.256)	(2.202)
N	34	25	25	24	12	24	22	22
T	9	9	9	9	9	9	9	9
n	318	244	244	200	85	177	163	163
F	12.26***	10.25***	8.24***	7.71***	4.83***	6.23***	6.74***	7.89***
Hausman test (χ^2)	10.76***	24.92***	31.89***	18.45**	22.96***	17.31**	22.28***	177.40***
Notes	Robust standard errors in parentheses. *,**,*** significant at 10, 5 and 1% respectively							

B. Appendix Chapter 3

B.1. Data sources and Variable Definitions

The analysis on the colonial origins of institutions in Latin America (Chapter 3) uses different data sets. The measures of early institutions are from Poliyarchy dataset [Vanhanen, 2000] and Political Constraint Index [Henisz, 2010]. As measure for early institutions, I consider an average of the variable in the first 10 years after the country acquired the independence. The Polyarchy dataset is compiled by Tatu Vanhanen and covers 187 countries over the period 1810-2000. It provides an index of democracy among other variables. The current version of the dataset is 2.0. The Political Constraint Index Dataset (POLCON) is an endeavour to identify underlying political structures and measure their ability to support credible policy commitments and covers 226 present and historical countries over the period 1800-2007.

The measures for current institutions are from the Worldwide Governance Indicators [Kaufmann et al., 2013]. This dataset reports on six broad dimensions of governance for 215 countries over the period 1996-2012. For the analysis, I consider an average of these indicators between 2000-2010.

Table B.1 shows some descriptive statistics and Table B.2 provides the variables definitions and sources. Table B.3 shows the data that has been created for this analysis.

Table B.1.: Chapter 3 - Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Early institutions					
Democracy	31	0.114134	0.147272	0	0.403
Political constraints	31	0.13055	0.170659	0	0.453337
Current institutions					
Rule of Law	41	0.51249	0.171589	0.186076	0.803323
Political stability	41	0.527212	0.153425	0.139588	0.751878
Explanatory Variables					
British colony	49	0.346939	0.480929	0	1
European settlements in 1800	49	0.157923	0.102771	0	0.4612
Native population in 1500	48	1.386844	0.995758	0	5.64
Mercantilist coloniser	49	0.567568	0.502247	0	1
Sugar suitability	49	1.134926	1.214803	0	5.315139
Colonial mineral centre	49	0.183674	0.39123	0	1

B.2. The Impact of European Settlements on Institutions

The analysis in Chapter 3 uses updated data on institutions. This adds some Latin American countries to the analysis increasing thus the number of observations. It also considers European settlements in 1800 rather than in 1900. The reason is that in 1900, the bulk of Latin American countries were already independent. Considering that we aim to analyse the effects of colonisation on institutions, European settlements in 1800 is a more appropriate measure.

This section analyses the impact of European settlements on institutions using the same sample as in Acemoglu et al. [2001], and therefore, using European settlements in 1900. Acemoglu et al. [2001] and Easterly and Levine [2012] argue that large European settlements during colonial times positively affected the economic development of these territories through the institutions that these actors put in place in the colonised territories. One crucial finding of this thesis is that, in the case of Latin America, European settlements has no effect on institutions (and even when this variable is statistically significant, it has a negative effect on Early institutions as show in Table 3.3).

Table B.2.: Chapter 3 - Variables definitions and sources

Variable	Definition	Source
Democracy	Index of Democracy created by Tatu Vanhanen based on two indicators, one for competition and one for participation. This index is explained in Vanhanen [2000]	Vanhanen [2000]
Political Constraints	Measure the feasibility of change in policy given the structure of a nation's political institutions and the preference of the actors that inhabit them	Henisz [2010]
Rule of Law	Captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. The indicator varies between -2.5 and 2.5. It has been re-scaled to 0-1.	Kaufmann et al. [2013]
Political Stability	measures perceptions of the likelihood that the government will be destabilised or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism. The indicator varies between -2.5 and 2.5. It has been re-scaled to 0-1.	Kaufmann et al. [2013]
British colony	Dummy variable indicating whether the country was a British colony.	La Porta et al. [1999] and author's research
European settlements in 1800	Percentage of population that was European or of European descent in 1800.	Acemoglu et al. [2001] and McEvedy and Jones [1977]
Pre-colonial population	Total population in 1500	Acemoglu et al. [2002] and McEvedy and Jones [1977]
Mercantilist coloniser	This variable assumes the value of 1 if the country was colonised by a *mercantilist* coloniser, 0 if the coloniser was more *liberal*. In the case of Latin America and the Caribbean, Britain is considered liberal, and therefore this variable assumes the value of 0 for all former British colonies. In the case of former Spanish colonies, the variable is equal to 1 if they are considered as colonial centres in the first part of the colonisation process, 0 in the case they were considered centres in the second part of the colonisation process (when there was the change from Habsburg to Bourbon dynasty in Spain). The former Spanish colonies with liberal coloniser are Argentina, Paraguay, and Uruguay.	Author's elaboration based on Mahoney [2010]
Colonial Minerals	Dummy variable. It is equal to 1 if the main economic activity during the colonial period was based on the exploitation of gold or silver. 0 otherwise.	Author's elaboration
Sugar suitability	Percent of national land area suitable for the production of sugar, taking into account such factors as soil, rainfall, temperature, and elevation.	FAO [2010]

Table B.3.: Chapter 3 - Variables

country	Britain colony	Mercantilist Coloniser	Colonial mineral centre
ANGUILLA	1	0	0
ANTIGUA AND BARBUDA	1	0	0
ARGENTINA	0	0	0
ARUBA	0	0	1
BAHAMAS	1	0	0
BARBADOS	1	0	0
BELIZE	1	0	0
BERMUDA	0	0	0
BOLIVIA	0	1	1
BONAIRE	0	0	0
BRAZIL	0	1	1
BRITISH VIRGIN ISLANDS	1	0	0
CAYMAN ISLANDS	1	0	0
CHILE	0	1	0
COLOMBIA	0	1	1
COSTA RICA	0	1	0
CUBA	0	1	0
CURACAO	0	0	0
DOMINICA	1	0	0
DOMINICAN REPUBLIC	0	1	0
ECUADOR	0	1	0
EL SALVADOR	0	1	0
FRENCH GUIANA	0	1	0
GRENADA	1	0	0
GUADELOUPE	0	1	0
GUATEMALA	0	1	1
GUYANA	1	0	0
HAITI	0	1	0
HONDURAS	0	1	1
JAMAICA	1	0	0
MARTINIQUE	0	0	0
MEXICO	0	1	1
MONTSERRAT	1	0	0
NETHERLANDS ANTILLES	0	0	0
NICARAGUA	0	1	0
PANAMA	0	1	0
PARAGUAY	0	1	0
PERU	0	1	1
PUERTO RICO	0	1	0
ST. KITTS AND NEVIS	1	0	0
ST. LUCIA	1	0	0
ST. MARTIN	0	0	0
ST. VICENT AND THE GRENADINES	1	0	0
SINT MAARTEN	0	0	0
SURINAME	0	1	0
TRINIDAD AND TOBAGO	1	0	0
TURKS AND CAICOS ISLANDS	1	0	0
URUGUAY	0	1	0
VENEZUELA	0	1	1

Table B.4 shows the results of regressing early institutions on European settlements and European mortality rate. Acemoglu et al. [2001] use institutions in 1900 as *early institutions* in most of the specifications and assign the minimum value that the variable can assume to those countries that were not independent in 1900. Considering that many countries were not independent in 1900, I consider that institutions after independence is a better measure of early institutions. We observe that the variable for European settlements in 1900 is not significant neither in the sample used by Acemoglu et al. nor in a sample of all former colonies (data from Acemoglu et al. [2001]). It is statistically significant if we consider the Acemoglu et al. sample, without the *Neo-Europes* (US, Canada, Australia, and New Zealand) but it has a negative sign showing a negative impact on early institutions. When considering subsamples for Latin America and Africa, European settlements are not statistically significant and have a negative sign. This result confirms the findings for Latin America from this thesis.

Table B.5 shows the results of regressing the measure of current institutions used by Acemoglu et al. (average protection against expropriation risk in 1985-1995) as dependent variable. It is worth of notice that the variable for early institutions has no effect on current ones in most of the specifications (Regressions (a)). On the other hand, European settlements in 1900 have a positive and statistically significant impact on current institutions in the sample used by Acemoglu et al (both with and without neo-Europes), but also when considering all ex-colonies. When a subsample for Latin America is considered, this variable is statistically significant only at 10%. However, we need to keep in mind that the European population in Latin America in 1900 changes. The independence of these territories, opened the opportunity to many Europeans to make business in the area and therefore, this variable may be partially capturing other factors that happened after independence. Chapter 4 shows that trade with Britain increases in this period. This trade attracted several British merchants to the new

independent countries. European settlements in 1900 could capture the effect of this trade (European mortality is not statistically significant for Latin America).

Table B.4.: European Settlements and Early Institutions

Dependent Variable - Constraints on the Executive after one year of independence						
Independent Variables	AJR sample (c)	(d)	Ex-colonies (c)	(d)	AJR (no neo-Europes) (c)	(d)
European Settlements (in 1900)	.015 (.013)		.012 (.012)		-.042** (.016)	
European Settler mortality (log)		-.392 (.293)		-.524* (.265)		-.007 (.326)
constant	3.14*** (.377)	5.24*** (1.42)	3.36*** (.294)	6.00*** (1.28)	3.61*** (.395)	3.18* (1.64)
n	60	60	86	73	56	56
R^2	.028	.041	.013	.068	.086	.000
	LAC (c)	(d)	Asia (c)	(d)	Africa (c)	(d)
European Settlements (in 1900)	-.048 (.029)		.582* (.290)		-.032 (.050)	
European Settler mortality (log)		-.729 (1.67)		-1.49 (.846)		.317 (.366)
constant	3.88*** (.945)	5.85 (7.41)	4.22*** (.864)	11.02*** (3.35)	3.53*** (.355)	1.50*** (2.05)
n	22	22	14	12	46	35
R^2	.151	.017	.048	.177	.004	.028

notes: Robust standard errors in parentheses
***, **, *; significance at 1, 5 and 10 percent respectively

Table B.5.: European Settlements and Institutions

Dependent Variable - Average protection against expropriation risk in 1985-1995									
Independent Variables	AJR sample			Ex-colonies			AJR (no neo-Europes)		
	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)
Constraints on the Executive (after one year of independence)	.176*			.127			.034		
	(.094)			(.085)			(.089)		
European Settlements (in 1900)		.032***			.033***			.016**	
		(.005)			(.005)			(.008)	
European Settler mortality (log)			-.607***			-.592***			-.349**
			(.167)			(.166)			(.169)
constant	5.87***	5.93***	9.33***	5.93***	5.91***	9.22***	6.13***	6.06***	7.94***
	(.293)	(.204)	(.791)	(.271)	(.182)	(.791)	(.284)	(.219)	(.812)
n	60	60	60	71	71	63	56	56	56
R^2	.080	.320	.253	.043	.297	.236	.004	.042	.096
	LAC			Asia			Africa		
	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)
Constraints on the Executive (after one year of independence)	.076			.106			-.170		
	(.103)			(127)			(.124)		
European Settlements (in 1900)		.028*			.578***			.031	
		(.015)			(.170)			(.033)	
European Settler mortality (log)			-.777			-.494			-.131
			(.674)			(.483)			(.200)
constant	6.16***	5.64***	9.77***	6.31***	6.58***	8.98***	6.38***	5.74***	6.47***
	(.428)	(.496)	(2.98)	(.560)	(.386)	(2.11)	(.389)	(.252)	(1.04)
n	22	22	22	11	11	10	35	35	28
R^2	.020	.018	.066	.051	.280	.102	.082	.012	.015
notes:	Robust standard errors in parentheses ***, **, *; significance at 1, 5 and 10 percent respectively								

C. Appendix Chapter 4

C.1. Data Sources and Variable Definitions

Table C.1.: Chapter 4 - Descriptive Statistics

Variable		Mean	Std. Dev.	Min	Max	Observations
Democracy	overall	0.332246	0.328692	0	1	N = 400
	between		0.197039	0.115	1	n = 20
	within		0.266577	-0.20275	1.017246	T = 20
Autocracy	overall	0.334746	0.296249	0	1	N = 400
	between		0.13727	0	0.534	n = 20
	within		0.264231	-0.19925	0.930663	T = 20
Constraints	overall	0.408285	0.324914	0	1	N = 400
on the Executive	between		0.184884	0.141667	1	n = 20
	within		0.270213	-0.15672	1.149951	T = 20
Family	overall	0.17665	0.113929	0.01	0.62	N = 400
Farms	between		0.071893	0.062	0.34	n = 20
	within		0.089762	-0.07435	0.46965	T = 20
Oil and gas	overall	0.1375	0.344806	0	1	N = 400
discoveries	between		0.169267	0	0.45	n = 20
	within		0.302662	-0.3125	1.0375	T = 20
Trade with	overall	0.1573601	.1547945	.0000836	.645317	N = 400
Britain	between		.1586171	.0000836	.645317	n = 20
	within		0	.1573601	.1573601	T = 20
British	overall	0.356444	0.24639	0.009175	0.871568	N = 320
Investments in	between		0.254073	0.009175	0.871568	n = 16
Latin America	within		0	0.356444	0.356444	T = 20

This appendix offers definitions and sources for the data used for the empirical analysis of the evolution of Latin American political institutions in Chapter 4. Table C.1 provides the descriptive statistics of the variables used.

The variables for institutions, *democracy*, *autocracy* and *constraints on the executive power*, are from Marshall and Gurr [2013]. This data set consists of six component measures that record key qualities of executive recruitment, constraints on executive authority, and political competition. It covers all major, independent states, currently 167 countries over the period 1800-2012.

As measure of inequality, I use the *percentage of family farms* from the "Vanhanen Index of Power Resources" [Vanhanen, 2003]. This covers the period 1850-2000. Family farms are distinguished from large farms cultivated mainly by hired workers. However, family farms are not dependent on the actual size of the farm which varies with the type of product and the agricultural technology being used.

The percentage of family farms capture the degree of concentration and therefore inequality in the ownership of land. The variable for the discovery of oil and natural gas is based on the dataset PETRODATA [Lujala et al., 2007]. This dataset includes 890 onshore and 383 offshore locations with geographic coordinates and information on the first oil or gas discovery and production year. Based on this dataset, I created the variable for the discovery of natural resources.

The British influence in Latin America is considered using measures of British investments in Latin America in the period 1905-1911 and trade with Britain in the period 1898-1906. Investments are from Paish [1909]. These are expressed in British Sterling. These investments were mainly based on government loans. Considering the differences in population and dimensions among countries, I have divided this variable by the average government revenue in the same period. The data for the government revenue is from the "Cross-National Time-Series Data Archive" (CNTS) [Banks and Wilson,

2013]. This data is expressed in US dollars, therefore, British investments are converted in US dollars using US$4.85=GBP£1 as exchange rate (during late 19th and early 20th centuries, many countries adopted the gold standard, as consequence, conversion rates between different currencies was fixed and determined by the respective gold standard).

Trade is from the "Annual Statement of the Trade of the United Kingdom with Foreign Countries and British Possessions". This is given by a country's exports to Britain in a given year divided by the total exports of that country. Total exports are also from CNTS [Banks and Wilson, 2013]. Trade is also expressed in US dollars following the same procedure than before. The CNTS contains data for over 200 states from 1815 onwards (excluding the periods 1974-1918 and 1940-1945) for a number of social indicators.

Table C.2 summarises variables definitions and sources.

Table C.2.: Chapter 4 - Variable definitions and sources

Variable	Definition	Source
Democracy	An eleven category scale, from 0 to 10, with a higher score indicating more democracy. Points are awarded on three dimensions: competitiveness on political participation, competitiveness of executive recruitment, and constraints on chief executive. This has been re-scaled to 0-1. Variable described in Gurr [1999].	Marshall and Gurr [2013]
Autocracy	An eleven category scale, from 0 to 10, with a higher score indicating more autocracy. This has been re-scaled to 0-1. Variable described in Gurr [1999]	Marshall and Gurr [2013]
Constraint on Executive	A seven category scale, from 1 to 7, with a higher score indicating more constraints. This has been re-scaled to 0-1. Variable described in Gurr [1999]	Marshall and Gurr [2013]
Family Farms	The area of family farms as a percentage of the total area of holdings. A family farm employs no more than four people including family members and the family owns and cultivates the land. The data set is reported in averages for each decade. For this study, we use five-years average, therefore the data has been considered twice (e.g. for the periods 1990-1995 and 1995-2000, I use the data reported for 1990s.	[Vanhanen, 2003]
Oil and Natural gas discoveries	This variable assumes the value of 1 if there was a discovery of oil or natural gas in that period of time, otherwise it is equal to 0. This variable has been created based in PETRODATA, and from several other sources (for the missing years).	[Lujala et al., 2007], and author's elaboration
British Investments in Latin America	Average of British investments in Latin American countries in the period 1905-1911, divided by the country's average government revenue. The value is expressed in US$	Paish [1909] and Banks and Wilson [2013]
Latin American trade with Britain	Average of British imports from Latin American economies in the period 1898-1906, divided by total country's exports. The value is expressed in US$	Statistical Office [1906] and Banks and Wilson [2013]

C.2. GLS Analysis

This section offers the GLS estimators of equations (4.1) and (4.2) in Chapter 4. Tables C.3 and C.4 show these estimates without dealing with endogeneity problems. The results are very similar to the ones in tables 4.2 and 4.3. In particular, we observe that inequality is related to institutions (inequality affects institutions but institutions also affect the levels of inequality). The discovery of natural resources negatively affects institutions. In this case there is the negative effect on family farms is statistically significant. The effects of British indirect rule are very similar to the ones explained in Chapter 4, and this is the case also for the variables for natural resource endowment during the colonial times (mineral centres and sugar suitability). In these specifications, early European settlements and the size of pre-colonial population are statistically significant, however, these have the opposite sign compared to the theories from Acemoglu et al. [2001] or Mahoney [2010], therefore, we can still reject these theories for the Latin American case.

Tables C.5 and C.6 show the results using the lag of the endogenous variables as regressors. The results are very similar to the ones previously described. As explained in Section 4.2, this may be due to the fact that our endogenous variables (institutions and inequality) are characterised by high persistence over time, therefore using their lagged levels could be poor instruments in this case. Nonetheless, the results show in this section confirm most of the previous findings.

Table C.3.: GLS - Dependent Variable: Institutions

Explanatory Variables	Democracy (a)	Democracy (b)	Democracy (c)	Autocracy (a)	Autocracy (b)	Autocracy (c)	Constraints on the executive (a)	Constraints on the executive (b)	Constraints on the executive (c)
Family Farms	.683***	1.22***	1.21***	-.598***	-.614***	-.595***	.805***	1.30***	1.15***
	(.131)	(.158)	(.158)	(.123)	(.131)	(.133)	(.249)	(.147)	(.148)
Oil and gas discoveries		-.078*	-.086**		.096**	.094**		-.089**	-.096**
		(.043)	(.043)		(.041)	(.041)		(.044)	(.043)
Trade with Britain late 19th		.039***	.039***		-.037***	-.037***		.033***	.041***
		(.008)	(.009)		(.009)	(.009)		(.010)	(.010)
British Invest. early 20th		-.121***	-.118***		.073***	.073***		-.106***	-.105***
		(.014)	(.014)		(.010)	(.011)		(.012)	(.012)
Mineral colonial centre		.013	.028		-.002	-.003		.009	-.044
		(.037)	(.040)		(.032)	(.034)		(.036)	(.039)
Sugar suitability		.114***	.118***		-.043**	-.044**		.067***	.111***
		(.021)	(.023)		(.019)	(.021)		(.021)	(.023)
Early European settlements			-.482**			-.079			-1.02***
			(.233)			(.255)			(.201)
Native Population			-.027*			-.016			.018*
			(.015)			(.014)			(.014)
constant	.190***	-.078	.029	.408***	.473***	.489***	.249***	.051	.301***
	(.026)	(.056)	(.080)	(.025)	(.052)	(.080)	(.026)	(.055)	(.074)
n	400	320	320	400	320	320	400	320	320
T	20	16	16	20	16	16	20	16	16
Wald chi2	27.34***	195.61***	196.64***	23.79***	190.79***	193.60***	43.88	189.97***	251.53***

notes: Robust standard errors in parentheses
***, **, *; significance at 1, 5 and 10 percent respectively

Table C.4.: GLS - Dependent Variable: Inequality

Explanatory Variables	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)
Democracy	.098***	.124***	.123***						
	(.011)	(.010)	(.010)						
Autocracy				-.086***	-.088***	-.088***			
				(.014)	(.013)	(.013)			
Const. on the executive							.110***	.121***	.119***
							(.012)	(.011)	(.012)
Oil and gas discoveries		-.023**	-.018*		-.023*	-.018		-.021**	-.017*
		(.010)	(.010)		(.012)	(.011)		(.011)	(.011)
Trade with Britain late 19th		.005***	.006***		.007***	.009***		.007***	.008***
		(.002)	(.002)		(.002)	(.002)		(.002)	(.002)
British Invest. early 20th		.018***	.016***		.010***	.010***		.018***	.016***
		(.003)	(.003)		(.003)	(.003)		(.003)	(.003)
Mineral colonial centre		-.041***	-.051***		-.055***	-.064***		-.042***	-.047***
		(.010)	(.010)		(.011)	(.011)		(.010)	(.011)
Sugar suitability		-.043***	-.034***		-.033***	-.025***		-.033***	-.029***
		(.007)	(.007)		(.007)	(.008)		(.007)	(.007)
Early European settlements			-.038			-.115			-.003
			(.073)			(.076)			(.073)
Native Populations			.012***			.012**			.008*
			(.004)			(.005)			(.005)
constant	.138***	.233***	.237***	.200***	.287***	.312***	.126***	.216***	.215***
	(.005)	(.011)	(.019)	(.006)	(.012)	(.021)	(.006)	(.012)	(.020)
n	400	320	320	400	320	320	400	320	320
T	20	16	16	20	16	16	20	16	16
Wald chi2	73.53***	457.97***	457.58***	36.74***	287.87***	305.57***	87.16***	372.12***	378.52

notes: Robust standard errors in parentheses
***, **, *; significance at 1, 5 and 10 percent respectively

Table C.5.: GLS - Dependent Variable Institutions
Using lags as instruments for Independent Variables

Explanatory Variables	Democracy (a)	Democracy (b)	Democracy (c)	Autocracy (a)	Autocracy (b)	Autocracy (c)	Constraints on the executive (a)	Constraints on the executive (b)	Constraints on the executive (c)
Family Farms (lag)	.795*** (.131)	1.33*** (.160)	1.31*** (.160)	-.703*** (.123)	-.772*** (.139)	-.730*** (.141)	.877*** (.121)	1.33*** (.150)	1.19*** (.151)
Oil and gas discoveries		-.060 (.043)	-.060 (.043)		.080** (.040)	.080** (.041)		-.071 (.044)	-.074* (.044)
Trade with Britain late 19th		.038*** (.008)	.038*** (.008)		-.036*** (.009)	-.036*** (.009)		.033*** (.010)	.043*** (.009)
British Invest. early 20th		-.121*** (.014)	-.121*** (.014)		.074*** (.011)	.073*** (.011)		-.107*** (.013)	-.106*** (.012)
Mineral colonial centre		.019 (.036)	.019 (.036)		-.015 (.032)	-.005 (.034)		.013 (.036)	.050 (.040)
Sugar suitability		.114*** (.021)	.114*** (.021)		-.047** (.018)	-.054** (.021)		.062*** (.020)	.119*** (.023)
Early European settlements			-.721*** (.249)			.086 (.272)			-1.23*** (.220)
Native Population			-.020 (.015)			-.016 (.014)			.024* (.014)
constant	.180*** (.025)	-.089 (.056)	.061 (.083)	.419*** (.025)	.523*** (.055)	.498*** (.084)	.245*** (.025)	.046 (.056)	.338*** (.077)
n	398	318	318	398	318	318	398	318	318
T	19	19	19	19	19	19	19	19	19
Wald chi2	36.69***	207.08***	221.12***	32.81***	184.62***	200.42	52.79***	192.10***	270.99***

notes: Robust standard errors in parentheses
***, **, *; significance at 1, 5 and 10 percent respectively

Table C.6.: GLS - Dependent Variable: Inequality
Using lags as instruments for Independent Variables

Explanatory Variables	Democracy (a)	Democracy (b)	Democracy (c)	Autocracy (a)	Autocracy (b)	Autocracy (c)	Constraints on the executive (a)	Constraints on the executive (b)	Constraints on the executive (c)
Democracy (lag)	.084***	.120***	.116***						
	(.012)	(.011)	(.011)						
Autocracy (lag)				-.060***	-.066***	-.064***			
				(.015)	(.014)	(.014)			
Const. on the executive (lag)							.095***	.115***	.112***
							(.012)	(.012)	(.012)
Oil and gas discoveries		-.024**	-.021**		-.025**	-.020*		-.023**	-.020**
		(.010)	(.009)		(.013)	(.012)		(.011)	(.011)
Trade with Britain late 19th		.005***	.006***		.008***	.009***		.007***	.008***
		(.002)	(.002)		(.002)	(.002)		(.002)	(.002)
British Invest. early 20th		.019***	.017***		.009***	.008***		.018***	.016***
		(.003)	(.003)		(.003)	(.003)		(.003)	(.003)
Mineral colonial centre		-.041***	-.050***		-.057***	-.067***		-.042***	-.048***
		(.010)	(.011)		(.011)	(.011)		(.011)	(.011)
Sugar suitability		-.042***	-.033***		-.031***	-.022***		-.032***	-.028***
		(.007)	(.007)		(.007)	(.008)		(.007)	(.008)
Early European settlements			-.063			-.128*			-.022
			(.073)			(.073)			(.073)
Native Population			.011**			.012**			.009*
			(.005)			(.005)			(.005)
constant	.144***	.236***	.247***	.192***	.277***	.306***	.134***	.219***	.224***
	(.006)	(.011)	(.020)	(.007)	(.013)	(.021)	(.006)	(.012)	(.021)
n	400	320	320	400	320	320	400	320	320
T	20	20	20	20	20	20	20	20	20
Wald chi2	46.19***	414.35***	437.74***	16.67***	233.88***	253.92***	58.47***	346.31***	353.37***

notes: Robust standard errors in parentheses
***, **, *; significance at 1, 5 and 10 percent respectively

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