UCD CENTRE FOR ECONOMIC RESEARCH

WORKING PAPER SERIES

2005

Geography, European Settlements and Compared Development in the Americas

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WP05/18

November 2005

**UCD SCHOOL OF ECONOMICS
UNIVERSITY COLLEGE DUBLIN
BELFIELD DUBLIN 4**

GEOGRAPHY, EUROPEAN SETTLEMENTS, AND COMPARED DEVELOPMENT IN THE AMERICAS

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July 2005

ABSTRACT

The interplay between factor endowments, institutional development and economic performance has received considerable attention in recent years. This paper exploits the importance of geographic factors and institutional structures for explaining patterns of settlement and examines how these influenced growth outcomes. I find evidence that prospective European migrants preferred to settle in regions with favourable natural endowments and institutional packages designed to attract them. These settlers not only benefited from a growth-inducing institutional framework but also contributed actively to its quality in a mutually reinforcing relationship. Countries that competed for migrants achieved higher income levels through institutional development and better provision of public goods. Finally, my findings show that the link between European migrants and economic development is not linear, as the positive effects of attracting European settlers on institutions and public goods are set off only when European populations grow to outnumber other ethnic groups. Countries where European migrants remained a minority were more likely to develop institutions that advantaged a small elite and eliminated opportunities for the bulk of the population.

(In the unlikely event of civilisation collapsing in Europe before new barbarian inroads) *Europe would revive and flourish in the American world, which is already filled with her colonies and institutions.*

<div align="right">

Edward Gibbon, late 1770's[1]

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1. INTRODUCTION

Recent literature on differences in economic performance across countries has resulted in an emerging consensus on the importance of institutional quality for growth in the long run. This trend results to a great extent from research directed at studying the comparative merits of institutions, geography and policies in explaining different development levels (see for instance, (William Easterly and Ross Levine, 2002, Dani Rodrik et al., 2002)). This view, however successful in identifying institutions as the more proximate determinant for economic performance, explains little about the underlying causes for such diverging institutional development.

In this paper, I describe and examine the historical and geographical factors that had a lasting impact on the governance of the nations in the western hemisphere. Although institutions are important for all countries regardless of their geographic location, the factors that explain their systematic improvement or persistence through time are different or at least have had varying degrees of influence in different parts of the world.

Some recent research has highlighted the importance of European settlements for the establishment of institutional frameworks that are conducive to economic growth (Daron Acemoglu et al., 2001, S. Engerman

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[1] **Gibbon, Edward.** *The History of the Decline and Fall of the Roman Empire (Iv)*. London: J.B. Bury, 1896-1900.. Cited in **Black, Jeremy.** *War and the World: Military Power and the Fate of Continents, 1450-2000*. London: Yale University Press, 2000..

and K. Sokoloff, 2002). The argument is that settlement colonies (that is, colonies where the population from European descent constitutes the majority) replicated the institutional structure already known from Europe. On the other hand, societies with strong ethnic polarization were more likely to develop institutional structures that greatly advantaged members of colonial classes at the expenses of the indigenous population.

(Edward Glaeser et al., 2004) support the view that European immigrants, in addition to European-style institutions, also brought themselves to the New World, i.e., their human capital which was higher than that of the indigenous population. Some accounts of this presumed higher capital are well known from previous literature: Europeans brought new techniques, new crops and livestock to the New World including sugar, cereals, horses, and cattle, thereby increasing dramatically agricultural productivity (Jared M. Diamond, 1997, David S. Landes, 1999). To this list I would like to add two additional considerations: i) migrants were initially more likely to participate in the commercial economy and ii) were better placed to engage in trade with native Europe than Amerindian or African populations. (Alessandra Casella and James E. Rauch, 1997) argue that exporters with ethnic connections to business groups in the export market have advantages over those who lack these ties.

Little consensus exists on the channels through which institutional quality impacts economic development. (Edward Glaeser, Rafael La Porta, Florencio Lopez-de-Silanes and Andrei Shleifer, 2004) find that most indicators of institutional quality used in recent literature are flawed. In particular, they are highly critical of using risk of expropriation by government, government effectiveness, or constraints on government as measures of institutional quality. However, they agree on the importance of secure property rights. In fact, rarely, if ever, do historians dispute the

importance of well-defined private property rights for long-term economic development.

Property rights are positively related to second tier factors such as investment, technology transfer, efficiency in resource use, and well developed markets for land and capital (Jeffrey B. Nugent and Vitória Saddi, 2002). These positive outcomes are a result of the advantages intrinsic to property rights:

- Owners are more willing to invest thereby increasing the productivity of land
- The development of a market for land leads to competitive pressure for its efficient use
- The availability of land as collateral (leading to the development of a credit market)

As for reasons that help explain diverging development of property rights, see figure 1.1.

Regardless of which view is adopted, institutional development through human capital or relative inequality, there is strong evidence of the importance transatlantic migrations had for subsequent development outcomes in the New World.

The published evidence for the important role played by European populations and their descendants is, nonetheless, confined to the Americas and Oceania. The simple average fraction of European population in North and South American countries is 25% (the median is 11%), and ranges from approximately 0% in Haiti and Jamaica to 97% in Argentina[2]. Mexico is the only major country, among the 5 most populous countries in the American mainland, where this fraction is inferior to 20% (with 9%).

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[2] For data on the fraction of population from European descend, see table A3.

The fraction of population from European descent was generally much lower in Africa, with highest values in South Africa (22%) and Mauritius (17%). Equally important, European colonization in Africa started much later than in the Americas, as it only was possible in the late 19th century when repetition guns and quinine became readily available to combat local opposition and endemic malaria, respectively. Additionally, European settlements were frequently not permanent and many settlers left after the independence of the new African nations in the 1960's, European settlements in Asia were numerically even less relevant, as most Asian nations never were serious candidates to become settlement colonies due to high local population densities before their "discovery" by Europeans.

Another important factor of European influence is direct rule over colonies, which ended one or two centuries ago in most of the western hemisphere but was much more recent in Africa. The institutions that colonial powers set up in Africa were designed for extractive policies with the aim of transferring the mineral and agricultural resources of the colonies to Europe. These institutions frequently persisted as accession to independence often resulted in a new local elite replacing the colonial administration as the receptor of the gains from extractive institutions.

(David N. Weil, 2005) sums up this point by stating that most of Asia was not colonized at all, or if colonized, managed to maintain its pre-colonial civilization, population, and language. He further argues that European control over Africa was more complete than over Asia, but it never resulted in the wholesale displacement of the native population (as in the Americas). The varying importance of European settlements suggests significant heterogeneity in explanatory factors of economic development, i.e., the possibility that different fundamental determinants may exert varying degrees of influence in hindering or facilitating development in different subsets of countries (Chih Ming Tan, 2004, Luís Vaz Silva, 2004).

Considering the heterogeneity resulting from the very different historical and geographical settings, this chapter will restrict the sample to North and South American countries only. The next section briefly describes the historical background and examines the consequences of very different settlement policies within one single country, in this case Brazil. Section 3 summarizes the data and descriptive statistics, while section 4 presents new empirical evidence on the relationships between factor endowments, colonization, and economic performance. Section 5 presents some concluding remarks.

2. THE HISTORICAL BACKGROUND

2.1 The Western Hemisphere

The first mover in the colonization of the New World was Spain. Spain chose Mexico and the more temperate highland regions of tropical South America as the core of its new overseas empire. These were already the most densely populated areas in the Americas, permitting the Spaniards to live from the fruit of the natives' labour once they had successfully replaced the local elite as the new ruling class. Spanish America was characterized by a relatively restrictive immigration policy when compared to the more neutral or favourable immigration policies of British or Portuguese America. Restrictions on immigration to Spanish America were based on nationality and religion, whereas restrictions on immigration to Portuguese America were only based on religion thereby allowing significant immigration from Germany, Italy, Switzerland, and Spain.

Consequently, people from Spanish descent constitute a minority (1%-21%) in the mainland area situated between Mexico in the North and

Peru/Bolivia in the south. The only noteworthy exception in this region is Costa Rica (Spanish account for circa 75% of the population), a country that after independence actively encouraged immigration and whose small-scale agriculture was exceptional for the region.

A second group of immigrants was attracted to the tropics that remained outside Spanish control, mostly North-eastern Brazil and the Caribbean. These regions eventually specialized in cash crops such as tobacco, indigo, cotton, and most of all sugarcane. The plantation of sugar, in particular, had important demographic consequences, as sugar was best grown on relatively large estates with slave labour. It was the most important commodity in world trade in the 17th and 18th centuries and the high marginal productivity of labour in the sugarcane plantations secured the means to finance a constant flow of slaves to cultivate them.

The choice of North-eastern Brazil as the first sugar growing area seems obvious: vast and scarcely populated land with suitable climate adding to the familiarity that Portuguese had already achieved with the methods of cultivation and manufacture in their Atlantic Islands (mostly Madeira). However, Brazilian Amerindians proved unsuitable for estate labour and could not be made slaves after 1570[3]. In the meanwhile, Portugal had in the sixteenth century direct access to the slave trading kingdoms of Central and Western Africa, and the consequent transoceanic slave trade set the pattern for what came to be the forced mass migration of millions of Africans to the New World[4].

The prices of slaves were set in competitive international markets without any national or cultural barriers to owning or using them. It is interesting to note that changing Portuguese positions on slavery did not apply to black slavery until the mid-eighteenth century. Even the great Jesuit missionary

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[3] King Dom Sebastião ruled on March 20, 1570 that they should not be made slaves by Portuguese colonists in Brazil, except in certain circumstances which included "just war".
[4] The first order for West African slaves originated in Hispaniola in 1517.

and preacher António Vieira (1608-1697) advocated increased slave imports from Africa into Brazil to guarantee the continued freedom of Amerindians (A.J.R. Russell-Wood, 1978). Brazil was not included in the abolition of slavery in Portugal (1761) due to irreconcilable differences between the enlightened minority in Lisbon and the numerically superior colonists in South America on the issue of black slavery.

Dutch presence in North-eastern Brazil in the mid-seventeenth century enabled the dissemination of sugar producing techniques into the West Indies, and ultimately the mass importation of African slaves to the islands. In the period 1517-1760 approximately 3.9 million Africans arrived in the Americas against 2.1 million Europeans[5], and considering that the majority of the Africans were sold in the Caribbean and Brazil it becomes clear that this region absorbed the bulk of immigration to the Western Hemisphere prior to this date. Within a few decades in the seventeenth century Africans became a majority, and this demographic pattern has persisted to this day throughout the region.

The last group of immigrants decided to settle in the more temperate regions of the New World, first in the northern hemisphere and later also in the southern tip. These new countries originated from massive European immigration and their institutions and societies closely resemble their European counterparts. The native populations, already numerically inferior to those of Spanish America, suffered from very high mortality rates due to lack of immunity to the new diseases that arrived with European migrants. Those who survived were often dislocated to less productive land. By 1800, in present-day Canada and the United States, only about 600000 Indians remained, already a small minority in a region

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[5] **Engerman, S. and Sokoloff, K.** "Factor Endowments, Inequality, and Paths of Development among New World Economies," *NBER Working Paper Series*. Cambridge, MA, 2002..

dominated by 5 million Europeans and 1 million African-American slaves (Alan Taylor, 2002).

Included in this group are two countries in North America (USA and Canada), one in Central America (Costa Rica) and four in South America (Chile, Argentina, Uruguay and Brazil). Although all of these countries have a majority population from European descent, some important distinctions remain between them: Brazil and the USA have significant African minorities whilst in Chile half the population is Indian. The most homogeneous populations in this group can be found in Canada, Argentina and Uruguay.

Equally important is the pattern of land ownership, which was much more widespread in North America, where around 1900 most rural households owned land. The proportion of landownership was highest in Canada, and fell gradually towards the Southern U.S., where large estates were more familiar. Nowhere in Latin America was the prevalence of land ownership as high as in North America[6].

The consequences of these very different initial endowments are reflected in the diverging paths of growth among these groups of countries. The first group comprises the settlement colonies, normally situated in temperate regions, which were characterized by more homogeneous populations and relatively low inequality. The U.S. and Canada became the economically most successful countries in this group, whilst the remaining (from Chile to Brazil) form a sort of middle ground between the rich North American nations and the less developed countries in tropical regions. The North American countries benefited from a homogeneous, well-educated population and largely disseminated landownership, resulting in broad participation in the commercial economy. The fulfilment of this

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[6] Although landholding was significantly more common in Argentina and São Paulo than in Mexico.

precondition for capital formation contrasts with a somewhat narrower participation in the Mercosul countries, and helps explaining the early industrialization in North America. Argentina never had a land policy like the US or Canada, with most of the land being sold by the state in much larger blocks to a few big landholdings. This results in class polarization being more prevalent in the Argentine society than ethnic polarization.

The group of tropical countries have more heterogeneous populations and accordingly higher levels of inequality. Also, rent seeking is more attractive for ethnically polarized societies because redistribution of existing resources towards one particular group becomes more tempting than in a society without evident ethnic or class distinctions (William Easterly, 2000). The minority of European descent holds a disproportionate amount of wealth and political influence at the expense of the Indian or African majorities. (David L. Weimer, 1997) finds that if key agents value highly personal political power over economic or social gain, they may defeat rule changes that may be socially beneficial.

Accordingly, the ruling classes utilized several instruments in order to maintain the existing status quo and their members in competitive rent seeking positions:

- Restrictions on voting
- Low school enrolment
- Language

Latin American countries had restrictions on voting until the early 20th century. Unlike the US, which also adopted racial limitations, Latin American countries typically chose to screen by literacy or wealth (and lacked secrecy in balloting until much later). As a result of these different

restrictions on voting rights, much higher fractions of the populations voted in the United States or Canada than anywhere else in the Americas.

It is precisely the countries that competed for migrants (Argentina, Uruguay, and Costa Rica) that first liberalized voting and extended schooling to the bulk of the population. The result of these different policies towards the provision of public goods, like mass education, is still visible today and can be seen in the last column of table A4. Apart from small Caribbean states, the lowest rates of illiteracy in Latin America are those of Uruguay (2.3%) and Argentina (3%), whereas the highest are recorded for Haiti (48.1%), Alagoas (North-eastern Brazil; 30.6%), and Guatemala (30.1%).

Language is the third instrument of discrimination against particular population subgroups. Social groups whose members do not speak the official language will have difficulty in engaging with government institutions, considering that official documents are written and published in the official language. Also, banking and capital formation is made more difficult because these groups are more likely to experience difficulties in participating in credit and banking-like transactions.

Table A6 presents in column 2 data on a variable that measures the fraction of the population that does not speak the official language (GUNN1). The data is presented as cited in (William Easterly and Ross Levine, 1997) and is based on the work of (Erik Gunnemark, 1992). Observations for countries with strong European immigration are always lower than 10%, and are zero for Costa Rica, Uruguay, and Chile. On the other hand, all observations above this threshold, bar those for Suriname and Paraguay, lie in the core areas of Spanish colonization. Estimates are particularly high for Bolivia (55.9%), Peru (31.8%), and Ecuador (28.6%) in South America, and Belize (40.9%), Guatemala (33.3%), and Mexico (11.1%) in the Central America. Belize is the only non-Spanish speaking country in this sample and as such could serve as a natural experiment. It seems that

having had a different colonizer did not improve the assimilation of the (European) official language. The high illiteracy rate (23.1%) suggests that Britain did not invest more in public goods in this region than Spain did, and might explain partially the very high fraction of the population that does not speak the official language.

What do these countries, with low dispersion of knowledge of the official language among the native population, have in common? One interpretation, here advanced, is that the percentage of the population that does not speak the official language is a function of i) high native population densities and ii) poor provision of public goods, i.e., mass education by the state. Remarkably, countries with significant African populations (Caribbean/Brazil) do not present the same degree of linguistic fractionalization (Suriname is the exception). Resistance to the adoption of a major European language is mostly a preserve of the Incan and Mayan/Aztec world.

At this point it is important to distinguish between countries where Europeans constitute the majority of the population and countries where they are a minority. Although countries with mostly European populations did better than others at developing their economic institutions, their specific weight on overall population is certainly not the only determinant and may not even be the most important explanatory factor for development. This is particularly evident for countries where Europeans are a minority, and a look at Central America might shed some light on this issue: Nicaragua had one of the highest fractions of Europeans in total population, yet developed property rights later than El Salvador or Guatemala and its agriculture was mostly characterized by large holdings.

Costa Rica, Colombia, El Salvador and Guatemala have all common terrain, climate and legal and colonial backgrounds, but Guatemala and El Salvador developed property rights later and predominantly for large

plantations (mostly smallholders in Costa Rica and Colombia). This ranking predicts quite well present day development levels: Costa Rica and Colombia became more democratic and invested more in education, while El Salvador and Guatemala form a middle group. Nicaragua, in spite of having more Europeans (its population mix resembles more Colombia's ethnic composition), is by far the least developed country in this group.

(Jeffrey B. Nugent and James A. Robinson, 2000) explain this difference in institutional development by setting private property rights as a function of the existence of schism among the elites. The argument is that in countries where such a rupture existed, the elites had the necessity to attract larger proportions of the population to their side and the way to do so is through granting effective property rights. Guatemala and El Salvador were governed by a conservative alliance, where the European minority either controlled directly or was supported by most of the relevant institutions such as the army or the church. Consequently, these countries lacked internal competition (political or other) and witnessed the development of large estates with monopsony power over labour.

2.2   Brazil

Diverging growth paths exist not only between different countries, as substantial differences in economic performance within one single country have long been acknowledged. The contrasts between the U.S. North and the U.S. South are, possibly, the most often referred in literature, although the degree of inequality within the U.S. is quite modest by the standards of Brazil.

The U.S. South achieved higher development than Latin America partly for the reasons that its climate is unsuited for sugar plantations. The U.S. South

specialized in crops (Tobacco, Rice, Cotton) that exhibited limited scale economies, hence the share of slave populations and consequently the degree of inequality was lower than those of the Caribbean/Brazil. Secondly, many of the significant economic institutions were either determined at the national level or shaped by competition among states, therefore had many features in common with northern states ((S. Engerman and K. Sokoloff, 2002)). The U.S. is essentially a temperate country with a relatively small subtropical part, whilst Brazil is essentially a tropical country with a relatively small temperate part in the south.

Another factor that contributed to different patterns of landholding in the New World consists of different sets of property rights. Initially, the property rights in North and South America reflected the property rights in the country of origin (Lee J. Alston and Bernardo Mueller, Forthcoming). However, differences soon emerged: in contrast to English tradition, multigeniture was common in the northern U.S. where it was more important to motivate all members of the family. Conversely, in the southern U.S., with its greater use of slave and indentured labour, primogeniture contributed to maintain large agricultural units that could capture the economies of scale there existent. Thus, primogeniture was partly responsible for the greater concentration of wealth and political power in the southern colonies. It was not until 1798 that all states adopted multigeniture.

Different property rights also affected other parts of the Americas, as indentured servitude was illegal in Spanish and Portuguese America. Indentures made up approximately 70% of the free white immigrants to North America in the 17th and 18th centuries (Lee J. Alston and Bernardo Mueller, Forthcoming) as the migrants did not have the means to pay for their transportation. This prohibition of indentured servitude, combined with the low population density of Portugal (resulting in less incentive to

emigrate), resulted in Brazil being scarcely populated by Portuguese in the 17th century.

This absence of settlers changed gradually during the 17th century due to increased global demand for sugar and accordingly higher incomes in sugar growing regions. These early settlers received large grants of land through *sesmarias*. The *sesmaria* is an institution that dates back to 1375 when Portugal, severely affected by the consequences of the bubonic plague, needed to increase agricultural productivity and settlement in rural areas. The holder of a *sesmarias* had complete property rights over land with the exception clause of beneficial use, whose purpose was to encourage settlement (holding the land idle might result in loss of title). This set of institutions persisted for centuries (the beneficial use clause was reaffirmed in the Brazilian constitution of 1988) and was successful in encouraging the settlement of most of contemporary Brazil. However, it did not attract many voluntary settlers until the 18th century because in order to petition for a *sesmaria* a prospective migrant had to own the capital to finance slaves and a sugar mill.

The north-eastern parts of Brazil proved particularly suitable for the plantation of sugarcane and their population was the first in the Americas to become dominated by large numbers of African slaves. This demographic pattern persisted well into the twentieth century.

In contrast, the South and Southeast came to attract considerable numbers of European settlers, in particular after 1808. In this year, the Portuguese authorities adopted a more encouraging immigration policy, authorizing foreigners to buy and own land, with the intentions to settle the temperate south (disputed with Spain) and to create a "white Brazil".

Brazil had a relatively early nationwide Land Law (1850), but this law was for the most part a result of a political deal between the northern and southern provinces, where the North agreed to support the Land Law in

exchange for a (merely) gradual abolition of slavery (Jeffrey B. Nugent and Vitória Saddi, 2002). This first Land Law, although not effective in increasing land registration and titling, succeeded in encouraging immigration as a means to provide an elastic supply of labour, itself threatened by the impending abolition of slavery. Moreover, coffee producers in São Paulo could not afford slaves and thus had even more reasons to encourage immigration. This situation shows similarities with the one encountered in the U.S., where slavery was less prevalent in the North because most northerners simply could not afford slaves and their value was lower than in the South. Unlike sugar, the cultivation of coffee was accessible to smallholdings.

The Brazilian Parliament was in the 1840s aware of and even debated the Australian failure in generating self-sustaining agricultural expansion by financing immigration through land sales (Paul A. Rivera et al., 2004). This failure was mostly due to competition from the U.S. where land could be obtained at virtually no cost; therefore Brazil needed a land law that could provide land to immigrants at very low prices. State expenditure on immigration was equally important for South American countries since greater distance from Europe (relatively to North America) had to be compensated with direct subsidies to the immigrants. São Paulo State was particularly successful in attracting immigrants due to the complementarity between its land and immigration policies[7].

The first meaningful Land Law in Brazil was enacted by the São Paulo state only in 1895. It was only then, and initially only in this state, that land registration and titling became common. It was the advent of the Republic in 1889, and the consequent granting of increased autonomy to the federal states that allowed São Paulo to advance with its own Land Law, as devolution resulted in different laws and property rights from state to state.

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[7] During the 1890s São Paulo attracted 17% more migrants than Argentina (**Rivera, Paul A.; Nugent, Jeffrey B. and Saddi, Vitória.** "Abolition and the Evolution of Property Rights in Land: The Role of Immigrant Labor and Its Recruitment in Brazil," *California State University Channel Islands.* 2004.).

This Land Law was successful in reducing the bureaucratic process and thereby lowered the costs of land registration and titling.

Eventually, a higher inflow of immigrants in São Paulo resulted in faster development of land tenure than in the neighbours to the north, Minas Gerais and Rio de Janeiro (also coffee producers). Among the major outcomes of the State of São Paulo immigration program, five must be referred to:

- Solved labour shortages on coffee farms during the transition to the free labour economy
- Immigrants became coffee producers
- Creation of a whole coffee complex (coffee producers became exporters, bankers, factors, railroad owners and politicians)
- Increased precision of land rights (average price of land was higher than in any other state)
- More small sized properties in São Paulo than in any other coffee-growing state

This is not to say that being a coffee-producing state was indispensable to the development of land rights in Brazil. The two southernmost states in the Federation, Rio Grande do Sul and Santa Catarina, had small properties and a well developed system of land tenure even earlier than São Paulo. This region progressed, largely through immigration, from a relatively conservative and isolated ranching region that was itself politically marginal and economically underdeveloped within Brazil (Lauren Benton, 2002) to one of the most prosperous and socially most progressive regions of South America[8]. Paraná, the coffee-producing third state of Southern

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[8] See table A4.

Brazil developed its land rights somewhere in between Minas Gerais and São Paulo.

Nonetheless, even increased regularization of land rights in São Paulo did not reduce the political power of the colonels (informal political leaders) since their interests and sources of wealth were more diversified than in other states. In conclusion, immigration policies and the development of property rights resulted in faster development in São Paulo and the states of temperate Brazil.

3. THE DATA AND DESCRIPTIVE STATISTICS

Appendix A contains the data on the variables used in this paper. Table A1 presents the complete list of variables used, together with their respective definitions and sources, while the descriptive statistics for the same variables can be seen in table A2.

Table A3 reports my estimates for the fraction of overall population that is of European descent in the countries of the western hemisphere. The starting point consists of the estimates used by (Daron Acemoglu, Simon Johnson and James A. Robinson, 2001);henceforth AJR), which are visible in column 1. Column 2 adds the most recent estimates available in the CIA World Factbook. It is important to note that these estimates are not directly comparable as AJR's numbers refer to 1975 and not to present-day. Column 3 shows the estimates used in this paper, which are for the most part resulting from the data in the previous columns. When different from the estimates in columns 1 and 2, the alternative source is indicated in the notes.

The prevailing trend is to revise AJR's estimates downwards. Where AJR's estimates have an average of 32%, the new estimates have a mean of 25%. Some of the differences are very large and cannot be explained due to the passage of a quarter of a century. Differences are particularly large for Ecuador (revised downwards from 30% to 7%), Trinidad and Tobago (from 40% to 1%), and Costa Rica (upwards from 20% to 75%).

According to this new data on the ethnic composition of North and South American countries, three regions have particularly small white minorities (3% or less of total population): Caribbean Islands (Jamaica, Haiti), the region to the south of Mexico (Guatemala, Honduras, Belize), and North-east South America (Trinidad & Tobago, Guyana, Suriname). The only noteworthy exception is Paraguay, which has the highest fraction of Mestizo population (95%) in the hemisphere[9].

The most predominantly white populations exist in the northern and southern tips of the hemisphere: Argentina (97%) and Uruguay (88%) in the southern tip, and Canada (87%) and the USA (77%) in North America. Again there is one exception to this rule of thumb, in this case Costa Rica (75%), which competed successfully for European immigrants in spite of its tropical location.

Table A4 presents data on social and economic variables for the countries and Brazilian federal states that constitute this sample. The observations are ranked in descending order from the wealthiest country (USA) to the poorest country in the hemisphere (Haiti). It is hardly surprising that most of the top twenty observations evolved from settlement colonies and have at present at least half of the population from European descend. The few exceptions consist mostly of small Caribbean island states (Bahamas and Barbados), oil producing and exporting economies (Trinidad and Tobago),

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[9] This exceptional status of Paraguay can be partly explained by the History (the De Francia dictatorships in the 19th century favouring miscegenation of the population).

or others (Mexico and Amazonas)[10]. Conversely, all countries or states with a majority of European population are ranked in the upper half of this table with the poorest of them, Goiás in centre-west Brazil, ranked 28th out of 55 observations.

A second conclusion that can be drawn from this data is that settlement colonies of British origin were economically more successful than their Latin American counterparts. However, the identity of the colonizer does not explain entirely this differential development as Argentina and Uruguay developed in the first century after independence more according to a pattern similar to that of the northern American countries. Uruguay remained wealthier than Canada until 1900 and both countries still had in the 1950's an income per head in line with those prevailing in Western Europe[11]. The gap that now exists between these two Latin American countries and the developed world is mostly a result of the last half-century as they became more alike their southern American neighbours to the west (Chile) and east (Southern Brazil) due to relative economic stagnation of the former and faster development in the latter.

Finally, columns three and five present data on the Gini coefficients and illiteracy rates respectively. As expected, both variables are negatively correlated with GDP per head, and the relationship is somewhat stronger with illiteracy rates (coefficient of correlation is -0.57) than with the measure of inequality (coefficient of correlation is –0.36).

The data for the institutions variables are reported in table A5. The first four columns show the indexes that were considered for the new composite institutions index, whose estimates are listed in column 5. According to this new index, the best institutional quality is found in North America followed by the Latin American countries which had competed in the past

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[10] Amazonas is a relatively sparsely populated and resource rich federal state with export-oriented industries located in the capital city (Manaus).
[11] See **Maddison, Angus.** *The World Economy: Historical Statistics*. Paris: OECD, 2003. for historical statistics on GDP per head.

for European migrants: Chile (6.47), Uruguay (5.37), Costa Rica (5.25), and Brazil (4.86). The only noteworthy exception to this list is Argentina whose estimate is below sample average (3.67). It is likely that Argentine ratings were considerably affected by the severe economic, social, and political crisis of the last few years.

As discussed in the introduction to this paper, little consensus exists on the channels through which institutional quality impacts on economic growth (except for secure property rights). (Edward Glaeser, Rafael La Porta, Florencio Lopez-de-Silanes and Andrei Shleifer, 2004) are particularly critical of some of the measures for institutions used in recent literature on growth, but these indicators are not used for the composite index used in this work. One of the critiques is that these variables are outcome measures and as such don't reflect "deep" underlying measures. Nevertheless, the view adopted in this paper is that institutions are a stock variable that results from policies in a previous period (Dani Rodrik, Arvind Subramanian and Francesco Trebbi, 2002). Thus, the aim is to obtain a measure that reflects and summarizes public policies in the previous decades.

Furthermore, the Rule of Law and Corruption Perceptions indexes (used for the composite institutions index) are here regarded as a picture a society and as such less volatile than the indicators referred by (Edward Glaeser, Rafael La Porta, Florencio Lopez-de-Silanes and Andrei Shleifer, 2004). There are also good *a priori* reasons to include political risk as a determinant: Argentina probably should be wealthier than it is, were it not for the persistent periods of political instability (particularly considering the outstanding human capital accumulation in this country). (Alberto Alesina et al., 1996), among others, find that political stability contributes to economic growth.

Column 6 shows the averages obtained with the six aggregate measures calculated in Aggregate Governance Indicators 1996-2004 (World Bank).

They are the result of one of the most comprehensive statistical compilations on responses on the quality of governance and offer the additional advantage of allowing for a bigger sample, as this data is available for more countries. The coefficient of correlation between these two measures of institutional quality is 0.93.

Finally, the last columns in this table show measures of early institutions. Column 7 reports estimates for constraints on the executive using data from (Ted Robert Gurr, 1997). Presented is the average I obtained for the period 1850-1914 (the period with most voluntary immigration from Europe to the New World). Column 8 presents data on the democratisation process during this period using data from the same data source (Ted Robert Gurr, 1997). The estimates are obtained comparing the index of democracy/autocracy in 1914 with the same index in 1850, so that a positive value corresponds to a movement towards more democracy and a negative value corresponds to a regressive movement towards autocracy. The last column (Early Institutions Index) is the sum of the previous two variables.

Ideally, early institutions should be estimated through a measure of secure property rights as this might have been the most important factor of institutional quality for a migrant willing to establish himself in the western hemisphere. Unfortunately, systematic data on property rights do not, to my knowledge, exist for this period.

(Daron Acemoglu, Simon Johnson and James A. Robinson, 2001) already used constraints on the executive as a measure of early institutions, although they used a snapshot estimate for a particular year (1900) instead of the average over an extended period as in this work. This variable is used under the assumption that a country with less constraints on the executive is less likely to respect private property rights as it is mostly the social groups that capture the state that are likely to usurp someone else's private property for their own benefit. The measure on democratisation was

included in response to the argument advanced in (S. Engerman and K. Sokoloff, 2002) that the right to suffrage was part of a package of policies thought to be potentially attractive to the prospective migrant. It is striking that it is precisely the countries that competed for migrants, and in the periods when they hoped to attract them, that moved more firmly away from autocracy and towards universal suffrage.

Finally, table A6 presents four different variables that try to summarize ethnic and linguistic polarizations within a society. The first column presents data on racial tensions and the second column shows data on the GUNN1 variable discussed in section 2.1. The lowest levels for racial tensions are measures for Argentina, Colombia, Costa Rica, and Uruguay. On the other hand, racial tensions are highest in Guyana and Trinidad and Tobago. This country ranking would suggest that racial tensions are minimized in countries where Europeans constitute the majority (Colombia is the exception), and are highest in small Caribbean countries where the population has multiple origins (native, African, Asian, European).

However, a look at the last two columns, with data on ethnolinguistic fractionalization, gives a somewhat different picture: the lowest estimates are observed for the Dominican Republic, Jamaica, Bahamas, and Haiti. The highest estimates are now obtained for countries with big Amerindian populations or countries that attracted immigrants from different sources (Canada, Guyana, Trinidad and Tobago, USA). The following table shows the factors of correlation of the variables in table A6.

Table 3.1: Correlation Matrix

	RACIALT	GUNN1	AVELF	ELF60
RACIALT		-0.221	-0.578	-0.71
GUNN1			0.832	0.316
AVELF				0.814

As expected, the two variables of ethnolinguistic fractionalization have a strong and positive relationship. The high correlation between the GUNN1 and AVELF variables is partly due to the fact that GUNN1 is one of the five measures utilized to obtain the average ethnic and linguistic fractionalization (AVELF). Perhaps more interesting is the strong association between RACIALT and ELF60. Considering that the causality has to go from ethnic composition to racial tensions (and not the other way), it seems probable that racial tensions within a society can to a large extent be determined by its population mix and level of fractionalization.

4. EMPIRICAL FINDINGS

4.1 From Geography to present-day societies

This section reports the results of the first stage ordinary least-squares regressions. Table B1 presents the estimates of regressions with the fraction of the population of European descent as dependent variable. The purpose is to shed some light into the reasons that determined why some of the overseas possessions eventually became settlement colonies while others did not. Panel A shows the results with a restricted sample, using only independent countries whereas Panel B also includes Brazilian federal states thereby allowing for a much larger sample. Considering the huge differences within Brazil, both in European settlements and in geographic terms, there is clearly an opportunity to treat the federal states as if they were independent states.

Column (1) in Panel A shows the estimate with Log European settler mortality rates (ESM) as determinant. Columns (2) to (8) show three different geographic measures individually and as joint regressors. The ESM variable is of all determinants the one with the least explanatory power. All alternative variables exhibit higher explanatory power and, in column (8), are able to explain more than half of the variation in the dependent variable. However, only one of the determinants (the land variable) remains significant. A Spanish and a British colonial dummies were also examined in these regressions (not shown) but were always found to be statistically not significant. It seems that the identity of the colonizer was not a fundamental factor in determining where Europeans settled[12].

 Panel B repeats the same regressions, obviously excluding ESM because no ESM data is available for the individual federal states of Brazil. It is still possible to explain more than half of the variation in the dependent variable but now all three regressors remain statistically significant (see column (8)).

Table B2 is, to my knowledge, the first attempt at explaining ethnolinguistic fractionalization. All available variables that might plausibly be related to ELF60 were examined. Interestingly, it is now the ESM variable that is correlated with ELF (columns (1) and (2)), while the alternative geographic variables show little or none explanatory power (columns (3) to (9)). Additionally, the dummies for Spanish and British colonies are always statistically significant at the 1% or 5% level and have always positive coefficients, suggesting that the levels of ethnolinguistic fractionalization are higher in countries that were formerly British or Spanish colonies. However, these results must be interpreted with care due

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[12] Although Spain had relatively restrictive immigration policies, some Spanish speaking countries competed successfully for European migrants after independence.

to the very small omitted group, which consists of only two observations (Brazil and Haiti), both with low estimates.

What seems more indisputable is that ELF tends to be higher in ex-British colonies than in the Spanish-speaking world. This might be the result of more immigration and from more varied sources into English-speaking countries. Apart from the forced migration of Africans, these countries attracted economic migrants from all parts of Europe (particularly to Canada and the USA) and contract labour from Asia (particularly to Guyana and Trinidad and Tobago). In contrast, Spain had much more restrictive immigration policies due to the belief that Spain was suffering from underpopulation and because her colonies were better endowed with native labour. Even after independence only a handful of the former Spanish colonies competed successfully for immigrants and from a restricted pool of European nations.

Columns (4) and (5) in Panel B show that ELF does not vary according to the settlement/nonsettlement nature of the colony, as both subsamples have exactly the same mean.

So far, we have attempted to explain European settlements exclusively with factor endowments but some literature suggests that institutional quality might have affected the directions of overseas migrations. (Jeffrey B. Nugent and Vitória Saddi, 2002) question the importance of land registration and titling for attracting European immigrants, while (S. Engerman and K. Sokoloff, 2002) make the case for the franchise of voting. At some point institutions must matter and this hypothesis is examined in table B3. The regressions are similar to those in table B1 bar the inclusion of the Early Institutions Index (EII) as an additional determinant.

The EII is always statistically significant (albeit in some regressions only at the 10% significance level) and the best fit is obtained in column 1 with the

land variable as an additional regressor. Adding more variables does not improve our results significantly. The estimates suggest that a country with average institutions could through this channel attract European settlers that make up to 10-15% of its total population. Considering that the average fraction of population from European descent is 25% in the western hemisphere, we can conclude that early institutions account for approximately half of the settlements at the same time as geographical factors explain the remaining half.

Nevertheless, these results must be interpreted with care due to possible reverse causality between European settlements and institutions. (Daron Acemoglu, Simon Johnson and James A. Robinson, 2001) defend that European settlers determined to some extend institutional quality because settlement colonies were more likely to adopt a set of institutions similar to those known from native Europe.

In order to exam this topic, a Durbin-Wu-Hausman test of exogeneity of instruments was conducted. The basic principle is to use the residuals (v_i) from the reduced form equation

(1) $\quad EII_i = \alpha + \beta_1 LA_i + \beta_2 INE_i + v_i,$

Where EII is the Early Institutions Index, LA is the availability of agriculturally suitable land and INE the inequality variable (Gini coefficient), as an autonomous regressor in the structural equation. The structural equation is:

(2) $\quad EUR_i = \alpha + \beta_1 LA_i + \beta_2 EII_i + \beta_3 v_i + \mu_i,$

where EUR is the fraction of Europeans in total population. Inequality was included in the reduced form equation for being exogenous (it is

uncorrelated to European settlements), although it is weakly and negatively related to early institutions (factor of correlation is –0.13).

We test the null hypothesis that the coefficients of the residuals v_i are not statistically different from zero using a simple t test. If we reject the null hypothesis at a small significance level, we conclude that Early Institutions is endogenous because v_i and μ_i are correlated.

In this particular case, the t test statistic for β_3 in equation (2) is –1.97 (p-value of 0.066). Thus, there is some evidence of endogeneity in the variable Early Institutions.

Comparing directly OLS and 2SLS estimates and determining whether the differences are statistically significant might lead to further evidence for endogeneity between institutions and European settlements. If 2SLS estimates differ significantly from OLS estimates, we can conclude for endogeneity considering that both OLS and IV estimates are consistent when all variables are exogenous.

IV estimates were obtained using inequality (as seen before, uncorrelated to European settlements) and a British dummy variable (weakly and positively related to the institutions variable and not a significant determinant of settlements) as instruments for Early Institutions. In both cases the coefficient of Early Institutions jumps to values between 0.11 and 0.14 (not shown in the tables). As expected, the new estimates for the coefficient of institutions diverge significantly from our previous OLS estimates (around 0.03). These results provide further evidence for endogeneity and suggest that the causality ran in both directions. The impact of institutions on European settlement as estimated through IV seems very large and one or more of the following problems might have affected the estimates: i) very small sample with less than 20 degrees of freedom and ii) poor instruments. In the present case both instruments are only weakly correlated to the endogenous variable. Therefore, even if the instruments are only moderately correlated to the error term (they might be

correlated to another factor that affects the dependent variable) then the inconsistency in the IV estimator can be very large (large asymptotic bias). In conclusion, empirical evidence seems to corroborate that both views on the relationship between European settlements and institutional quality reflect a significant part of the prevailing causalities. On one hand, AJR's hypothesis that settlement colonies were more likely to adopt a set of growth inducing institutions (including secure property rights, independent judiciary, etc.) is confirmed through endogeneity tests and significant deviations between OLS and IV estimates. On the other hand, the hypothesis that the set of institutions offered to the migrants determined to some extend the success in attracting immigrants is equally confirmed. What is less clear is the specific weight that the institutional package carried as OLS and IV estimates differ significantly. At this point, it seems reasonable to advance the hypothesis that the prospect of secure property rights and the possibility of ample participation in democratic life accounts for at least half the variation in transatlantic migrations and geographical factors (particularly the availability of land) accounts for the remaining.

4.2   From societal make-up to economic growth

So far we have seen why some parts of the Americas evolved into settlement colonies or were successful in attracting voluntary migrants after accession to independence. The next step, discussed in this section, is to examine the channels through which these different societal make-ups affected development outcomes. As seen in previous sections of this work,

literature offers some explanations for higher growth rates in former settlement colonies[13]:

- More initial human capital
- Better institutions (whether *a priori* designed to attract prospective migrants or as a result of settlers' *a posteriori* demands)
- Better provision of public goods in settlement colonies resulted in higher capital accumulation
- Lower inequality

Ideally, these channels of causality should be explored through sets of regressions in the two subgroups of countries. However, this approach involves reducing an already small sample into two even smaller ones. This problem is particularly acute for the countries with a majority of white population as they number only seven in the western hemisphere.

In order to circumvent this problem it was decided to study the population means and standard deviations of some "suspect" variables for the two subsets of countries. These descriptive statistics are reported in table C1.

One of the most striking differences is visible in Log GDP per head as the "neo-Europes" have incomes per head which more than double those of the non-settlement countries (12120USD versus 5620USD). The difference is so large that the poorest of the settlement countries (actually it is the Brazilian federal state of Goiás) still has higher income per head than the mean for non-settlement countries. Equally important, the standard deviation is lower in both subgroups than for the sample as a whole.

As regards the explanatory variables, settlement countries exhibit a better performance in all of them as measured through the population mean. The results are particularly meaningful for institutional quality as captured

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[13] As former settlement colonies are considered all countries that at present have at least half of their population from European origin.

trough the World Bank Governance Indicators and for early institutions as measured through the Variation in Democracy 1850-1914 and the Early Institutions Index. For all three variables, the standard deviations are lower for both subgroups than for the original sample.

The results for present-day institutions are not surprising considering that settlement countries are wealthier and that most research finds a strong positive relationship between the quality of the institutional framework and economic development. Perhaps more interesting is the relationship between settlement and the two measures of early institutions, particularly democratisation in 1850-1914: all settlement countries bar the U.S. moved decidedly towards further democratisation. This process had been accomplished in the U.S. in an earlier period, and therefore there was no (need for) substantial change in this period. The non-settlement countries have a mean of –0.4 corresponding to no change or even a slight regression towards autocracy over this period. Although some of these countries advanced at times towards more democratic institutions, there is no clear trend in this subgroup as a whole towards more democracy.

A second group of variables is characterized by equally large differences in the population averages but now only one of the subgroups having a lower standard deviation. Illiteracy rates in settlement countries are on average less than half of those in non-settlement countries (6.1% versus 15.3%) and even the worst among the former (Brazil with 12.3%) is below population mean for the latter. Equally important is the relatively low standard deviation in the settlement subgroup reflecting the fact that countries where whites constitute the majority invest more in mass education. Nevertheless, non-settlement countries, although having on average more illiterates, are by no means condemned to a low provision of public goods as is attested by the large standard deviation. Among the countries in this group that have very low rates of illiteracy are small Caribbean states (Bahamas,

Barbados, Trinidad & Tobago, Suriname, Guyana), larger ones that invested heavily in public goods due to policy choice (Cuba) and rich federal states of Brazil (Brasília).

The reasoning for the GUNN1 variable is very similar. On average, only 2.7% of the population of a settlement country does not understand the official language (19.3% in non-settlement countries). Again, the standard deviation is very low in the settlement countries, certainly resulting from the fact that in all these countries more than 90% of the population speaks the official language. The standard deviation for non-settlement countries is much higher showing that belonging to this set of countries is not necessarily an impediment to the official language being understood by all groups of the society. As seen in section 2.1, this instrument of discrimination against particular subgroups of the society is mostly a preserve of the core areas of Spanish colonization characterized by large populations of Amerindians.

The last two variables in this group of determinants involve aspects of institutional quality. The Composite Institutions Index exhibits a low standard deviation in the subgroup of non-settlement countries reflecting systematically poor institutions, while the standard deviation is somewhat higher for the settlement group. This last result can partly be attributed to the very low value observed for Argentina (itself certainly exacerbated by the severe crisis this country suffered in the last few years) whose specific weight is exacerbated in a relatively small sample of seven observations.

The Executive Constraints in 1850-1914 also shows a low standard deviation for the non-settlement countries (symptomatic of consistently poor institutions) with a significantly larger standard deviation for the settlement countries. Some countries in this group (Argentina, Brazil, and particularly Chile) were laggards in following the example of the U.S. and Costa Rica in building up strong constraints against executive power during this period.

Of all the more immediate variables through which Settlement colonies might have influenced economic growth the least promising is inequality in income distribution as measured through the Gini index. Not only are population means for both groups of countries similar (50.6 for settlement countries and 51.6 for non-settlement countries) but also the respective standard deviations remain high following the split. If the population mix is not a good predictor of relative inequality then the relevant determinant(s) must be searched somewhere else. Table 4.2.1 shows average Gini coefficients per income brackets:

Table 4.2.1: Average Gini Coefficient by income level

GDP per head in USD	1610-2500	2501-5000	5001-7500	7501-10000	10001-12500	12501-17500	17501-35750
Average Gini Coefficient (excluding Cuba)	53.7	52.9	51 (53.4)	50.9	53	50.6	37
Number of Observations	4	14	11	9	4	3	2

A clear tendency towards lower levels of income inequality is only visible for the highest income bracket (including the U.S. and Canada). It is possible that settlement countries do not have lower levels of inequality because the South and Central American countries in this group are middle rather than high-income countries. However, the Kuznets curve hypothesis is not confirmed for the western hemisphere, as inequality is not higher in middle-income countries than in poorer places. Excluding the odd case of the (10000-12500) bracket, a very mitigated trend towards lower inequality emerges, though it must be noted that this particular group includes South America's most prosperous regions (comprising Rio de Janeiro, São Paulo, Argentina, and Rio Grande do Sul).

These results coincide partly with the findings of (Robert J. Barro, 1999), except for the Kuznets curve, which cannot be ascertained for Latin

America. He also found, in a broader panel of countries, little evidence for a strong relation between income inequality and rates of growth and investment.

Before we look at level regressions with income levels as the dependent variable it is important to understand the relation between European settlements and economic development. Specification uncertainty persists on whether this relation is linear (more European immigrants have a positive effect on development levels) or if the positive effects of European immigration are only established if their share in total population surpasses a certain threshold. In order to examine this question two simple OLS regressions were run, one with the entire sample and one restricted to the countries/states where Europeans are a minority. For both, GDP per head is the dependent variable and the fraction of Europeans in total population is the examined determinant. The results can be seen in the following table:

Table 4.2.2: Ordinary Least-squares estimates

	Total	Europeans < 50%	Europeans > 50%
		Dependent variable is Log GDP per head in 2002	
C(1)	8.29	8.47	8.43
Europeans	1.16	0.08	1.16
	(0.28)	(0.61)	(0.63)
Number of Observations	56	41	15
R-squared	0.26	0.001	0.15

Note: heteroskedastic-consistent standard errors are in parentheses.

The variable Europeans, although significant in the full sample (column 1), has no explanatory power when Europeans constitute a minority (column 2) and is only significant at the 10% significance level when they make up the majority of the population (column 3).

These estimates imply that the fraction of Europeans is irrelevant for determining income levels unless their specific weight in overall population

exceeds a certain threshold (in this case 50% of the population). This suggests that this variable should be regarded as a threshold variable instead of a continuous covariate. One interpretation for these results is that the proximate determinants through which European settlements influence positively economic growth (better institutions and provision of public goods) are only triggered when European populations grow to be the majority. Furthermore, these results support the view expressed in (S. Engerman and K. Sokoloff, 2002) that extreme inequality or heterogeneity in the population were more likely to develop institutional structures that greatly advantaged members of the elite classes and disadvantaged the bulk of the population (through education and language for example). It was precisely in the countries that actively competed for European migrants that the elite status of the small communities of old families of European descent was firstly eroded.

Table C2 reports OLS regression estimates with income levels as the dependent variable. Panel A examines the effect of institutions on development and adds geographical factors as additional regressors. The institutions variable is always significant at a low significance level and its coefficient is remarkably constant around 0.75. However, these estimates must be interpreted with care due to probable endogeneity in this variable. The dummy for oil exporting countries also has a strong correlation with economic performance. This variable explains on average 0.4 log points of income per head. Columns (3) and (4) add the disease environment and climate as additional determinants. Both variables are found to be statistically insignificant once institutions are controlled for (the exception is climate in column (6)).

Panel B shows the regression results with settlement variables as additional independent variables. The dummies for Spanish and British colonies, in columns (1) and (2), have no explanatory power once institutional quality

is taken in the equation. In column (3) we check if European settlements affected economic development otherwise than through institutions. For this purpose, we add a dummy for settlement colonies (countries/states where Europeans constitute the majority) to the original specification with institutions as the only determinant. The results suggest that institutional development is the most significant channel through which European populations shaped development outcomes. It is, as yet, too early to completely rule out further channels of transmission, but it seems reasonable to assume that any additional avenue carries less specific weight than institutional development.

Table C3 scrutinizes more possible determinants of economic development. Columns (1) to (4) add measures of ethnic/racial tensions and ethnolinguistic fractionalization. All are found to be statistically insignificant after controlling for institutions and do not improve significantly to the overall fit. Column (5) examines the hypothesis that discrimination based on language might have a lasting impact on economic performance but finds little evidence to support this view. The estimated coefficient has the "correct" sign (negative relation between the fraction of the population that does not speak the official language and economic development) but is not statistically significant and has little impact on the estimated coefficient for institutions. More promising is the equation shown in column (6), as human capital (here measured through illiteracy rates) remains significant once institutions are controlled for.

We should note at this point that illiteracy rates are treated as exogenous in this equation although they are likely to be endogenous. Wagner's law says that more developed countries tend to spend proportionally more on public goods thereby implying that wealthier countries have *ceteris paribus* lower rates of illiteracy. Therefore, little credit should be given to the estimated coefficient of illiteracy rates. It will be revised at a later stage once a

suitable instrument for human capital is found. Equally important is that the estimated coefficient for institutions is now at 0.58 substantially lower. This is probably due to the inclusion of an endogenous variable correlated with income or institutions, which will typically bias the coefficient on institutions downwards. The resulting coefficient is likely to underestimate the effect of institutions on income.

Finally, in column (7) the two variables previously found to be significant are included in the baseline specification with institutions as the main determinant. Both, illiteracy rates and institutional quality remain significant but the dummy for oil exporting countries looses most of its predictive power as its coefficient collapses to a value which is about half of the previous estimates.

Table C4 reports IV regression results with otherwise similar model specifications. The instrument of choice for institutions is disease environment in 1950, following the findings of (Luís Vaz Silva, 2004). Of the other two plausible instruments proposed in this paper, using climate as instrumental variable results in the same overall trends to those here reported (notwithstanding somewhat higher coefficients on institutions) and using the land variable as instrument bears inconsistent estimates due to very low correlation with institutions in this sample.

Panel A includes geographical and settlement variables, of which only the dummy for oil exporting (column (2)) and the land variable (column (3)) remain significant. The equation in column (3) shows that countries with big concentrations of Amerindian populations can expect lower income levels than countries with lower local population densities and consequently greater abundance of available farmland. Institutional development might not have been the exclusive channel of transmission that handicapped the core areas of Spanish colonisation in the new world characterized by large Amerindian populations explored by a small

European elite. Conversely, countries with wide-open spaces might have benefited in more than one way from their initial endowment.

Just as interesting are the coefficients on the identity of the colonizer visible in columns (5) and (6), as they replicate the findings in (Daron Acemoglu, Simon Johnson and James A. Robinson, 2001). Both are statistically insignificant and the coefficients are close to zero. In this specification, where the effect of institutions on economic development is controlled for, the coefficient on Spanish colony is now marginally positive and the coefficient on British colony becomes negative. (Daron Acemoglu, Simon Johnson and James A. Robinson, 2001) interpret these results with a possible overestimation of institutional quality in English-speaking countries that is subsequently "corrected" in the second-stage effect.

Panel B examines the variables previously seen in table C3. All are statistically insignificant including the illiteracy rate in column (6). However, this variable is still considered exogenous thereby mitigating the importance of this result. The last column adds the dummy for oil exporting countries to the specification in column (6). This dummy variable has now enhanced explanatory power and its estimated impact on income levels is 0.3 log points. This model implies that oil-exporting countries such as Mexico and Trinidad & Tobago, with GDP per capita of around 9000USD should have income levels more in the level of the Dominican Republic (6500-7000USD) considering their institutional development and human capital accumulation. The coefficient of institutions remains remarkably constant in the 0.8-0.85 range.

Table C5 addresses the problem of endogeneity in the education variable. The first four columns propose different instruments that might plausibly be related to levels of education and that had been shown to have little, if any, relation to economic performance. The instruments here tested are relative inequality in income distribution, the land variable, European

settler mortality rates and climate. The coefficients are insignificant at the 10% significance level in all regressions, although they have always the "correct" sign and a plausible magnitude of around 0.03 log points for each additional percentage point in the illiteracy rate. Perhaps, the best fit is obtained in column (4) with climate as instrument for education, with a p-value for the coefficient on illiteracy of around 0.1. The last column adds the dummy for oil to the previous specification although its coefficient collapses to half (0.15 log points) and is no longer significant once institutions and human capital are controlled for. On the other hand, the illiteracy variable sees its explanatory power enhanced (p-value is now 0.068) and the estimated effect on income levels remains stable at around 0.03 log points. This means that if El Salvador could halve its illiteracy rate from 20% to 10% of the adult population than it could anticipate seeing its income levels rise in the long term to the level of the Dominican Republic (from around 4900USD to around 6600USD).

The estimated effect of institutions on economic performance remains large and relatively stable at around 0.7 log points throughout all regressions in table C5. This implies that if Argentina could improve its institutional quality as measured through the World Bank Governance Indicators by one unit (to the level of Costa Rica's) than it could expect to see its income levels double to around 22000USD in the long term. Conversely, if Ecuador improves its institutional framework to an intermediate level (as in Brazil or Mexico) than its GDP per head could rise to around 6000USD from the present level of 3600USD.

5. CONCLUDING REMARKS

In this paper we looked at economic development in the western hemisphere over the last few centuries. The sample was deliberately restricted to North and South American countries because some of the explanatory factors we use to explain diverging growth paths are intrinsic to this hemisphere. This is certainly the case of European settlements, as their importance is mostly confined to the Americas and Australia. The varying importance of European settlements suggests significant heterogeneity in explanatory factors of income levels, a topic that has been hitherto little explored by literature on economic development.

Although the settlement hypothesis had been already advanced in previous literature, many questions persisted on the mechanisms through which European migrants affected income levels and why only a handful of countries were successful in attracting voluntary migration from overseas. Our work finds evidence that factor endowments (temperate climate, abundance of farmland, and benign disease ecology) were instrumental in explaining European settlements in the northern and southern tips of the hemisphere. More intriguing is the case of Costa Rica, highly successful in competing for settlers despite its tropical location. This exception leads us to the second important factor for explaining European settlements: institutional development. At least some dimensions of institutional quality, including secure property rights and franchise of voting, must have been important to the prospective migrant. The corollary is that institutions should not be treated as exogenous, as they have a strong positive relationship with European settlements. The causality is likely to flow in both directions: on one hand, settlement countries designed *a priori* an institutional package intended to attract migrants, and benefited subsequently from their strong demands for better land registration/titling and law enforcement.

The data support the view that institutions are the single most important channel of transmission between settlements and economic performance. A

second proximate determinant through which settlements affected economic development is the provision of public goods, specifically mass education. I do not find strong evidence for inequality in income distribution being significantly correlated with settlement countries or growth outcomes. Figure 5.1 presents a scheme with the channels of causality that were avowed in this study.

A related finding is that the fraction of the population from European descent should not be considered a continuous covariate. Most of the beneficial effects associated with European populations (better institutions and greater investment in public goods) are only triggered when settlers grow to become the majority. One possible explanation is that trust does not travel easily across ethnic lines: European minorities are less willing to invest in mass education when most of the beneficiaries are from a different ethnic group. Furthermore, an independent judiciary and further democratisation are unlikely outcomes when a small elite captures the state in order to disadvantage the majority of the population.

Fortunately, this all does not mean that the settlement/non-settlement dichotomy is deterministic for growth outcomes. Although it explains much of the diverging growth paths in the American mainland, some countries were able to escape this logic. This is particularly evident for some island nations in the Caribbean (The Bahamas, Barbados), which achieved relatively high levels of income despite never having competed for permanent European settlers. It seems that these small countries have been major beneficiaries of the greater mobility in service industries that has characterized the last decades. This trend is just as visible in other parts of the world; for example in the African continent where island nations such as the Seychelles, Mauritius, or Cape Verde, achieved higher levels of economic development than their counterparts on the mainland.

While this paper contributes to the growing literature on development in the long run by examining the complex interplay between factor

endowments, institutional structure and development outcomes, some drawbacks persist in this field. Historical data on many of the most relevant aspects of institutional quality is not available systematically. Consequently, executive restraints in 1850-1914 were used as a proxy for secure property rights in the same period due to missing data on the total precision of the land law in the 19th century. Also, a process of democratisation in this period is arguably more relevant for explaining the attractiveness of a newly independent country to prospective migrants than for explaining subsequent patterns of economic growth. Recent literature on this topic has often concluded that the causality is more likely to flow from development to democratisation than the other way round[14]. Nonetheless, it must be noted that most examples of autocratic, yet good-for-growth, regimes come from East Asia with few, if any, cases in the Americas.

Another source of concern is related to the difficulty in explaining the diverging growth paths between the North American countries on one hand, and Argentina and Uruguay on the other. Personal interpretations on this topic are at two a penny but few are substantiated with data analysis[15]. These two South American countries are almost unique in having once been prosperous and migrating subsequently to the group of middle-income countries. Certainly, other developed countries have in their past suffered from more or less prolonged periods of economic and institutional decline, but these could normally be reversed at some point. One of the most outstanding contrasts between these two groups of countries regards the very different patterns of landownership, which was much more widespread in North America. Unfortunately, this avenue of research could not be explored in this work for want of more comprehensive historical data on dissemination of landownership in this part of the world.

[14] See, for example, **Glaeser, Edward; La Porta, Rafael; Lopez-de-Silanes, Florencio and Shleifer, Andrei.** "Do Institutions Cause Growth?," *NBER Working Paper Series.* Cambridge, MA, 2004..
[15] For example, **Landes, David S.** (*The Wealth and Poverty of Nations*. New York: W.W. Norton & Company, Inc., 1999) attributes higher income levels in North America to superior culture there.

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Figure 1.1: Two Theories that explain change in land laws

Standard neoclassical theory for development of land rights

Increase in relative price of land-intensive product or population growth	→	Increasing land scarcity	→	Raises incentives to create property rights to capture the rents

Nugent and Saddi (2002)

Decision to attract Immigrants (policy choice)	→	Credible promises of access to land rights	→	Development of property rights
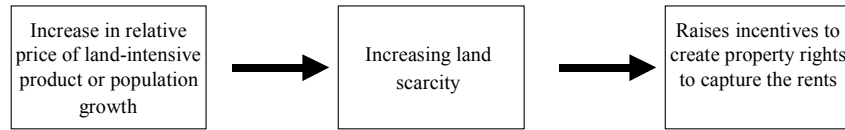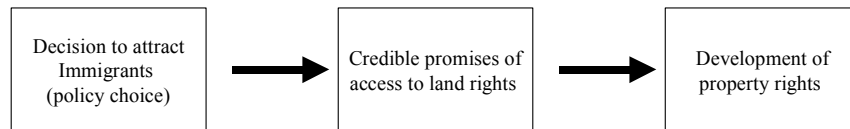
Figure 5.1: Channels of causality in the western hemisphere

Factor Endowments Availability of farmland Temperate climate Benign disease ecology	→	European settlements	→	**Public Goods** Mass education
		↑↓		↓
		Institutions Land registration & titling Law enforcement Independent judiciary Franchise of voting	→	Economic performance

Appendix A: Data

Table A6   **Ethnic polarization**

Country	RACIALT	GUNN1	AVELF	ELF60
Argentina	6	0.063	0.063	0.31
Bahamas	4	0	0	
Barbados		0	0.073	0.22
Belize		0.409	0.409	
Bolivia	3	0.559	0.599	0.68
Brazil	5	0.032	0.056	0.07
Canada	3	0.093	0.376	0.75
Chile	5	0	0.051	0.14
Colombia	6	0.015	0.056	0.06
Costa Rica	6	0	0.053	0.07
Cuba				
Dominican Republic	4	0	0.011	0.04
Ecuador	4	0.286	0.325	0.53
El Salvador	5	0	0.051	0.17
Guatemala	2	0.333	0.477	0.64
Guyana	1	0.067	0.238	0.58
Haiti	4	0	0.064	0.01
Honduras	5	0.091	0.097	0.16
Jamaica	5	0	0.013	0.05
Mexico	5	0.111	0.174	0.3
Nicaragua	4	0.079	0.099	0.18
Panama	5	0.002	0.191	0.28
Paraguay	5	0.96	0.411	0.14
Peru	2	0.318	0.432	0.59
Suriname		0.75	0.75	
Trinidad and Tobago	1	0.071	0.231	0.56
United States	5	0.001	0.209	0.5
Uruguay	6	0	0.067	0.2
Venezuela	5	0	0.053	0.11
Average	**4.24**	**0.151**	**0.201**	**0.322**

Notes: All data as cited in Easterly and Levine (1997).

RACIALT refers to racial tension in 1984, 1(high tension) to 6 (low tension).

GUNN1 measures the percentage of the population that does not speak the official language.

AVELF is a composite indicator that results from the average of 5 different measures of ethnic and linguistic fractionalization.

ELF60 is an index of ethnolinguistic fractionalization in 1960.

Appendix A: Data
Table A2 **Descriptive Statistics**

Variable	Observations	Mean	Standard Deviation	Median	Minimum	Maximum
Log GDP per capita (PPP) in 2002	56	8.69	0.62	8.65	7.38	10.48
Composite Institutions Index	26	4.23	1.23	3.97	2.07	7.32
World Bank Governance Indicators	29	0.01	0.77	-0.06	-1.59	1.63
Population of European descent	56	0.34	0.27	0.29	0	0.97
Kmsq of Land per inhabitant in 1850	53	0.72	1.49	0.18	0	6.72
Incidence of tropical diseases	54	0.4	0.38	0.33	0	1
Fraction of land in temperate region	53	0.29	0.38	0.03	0	1
European settler mortality rate	27	80.12	36.82	71	15	163.3
Gini Coefficient	53	51.29	7.09	53.4	27	61.8
Adult illiteracy rate in 2002	56	12.8	9.6	10.8	0	48.1
Dummy for former Spanish colony	56	0.32	0.47	0	0	1
Dummy for former British colony	56	0.14	0.35	0	0	1
Dummy for oil exporting	56	0.09	0.29	0	0	1
Ethnic tensions	27	4.31	1.38	5	0.5	6
Racial tensions	25	4.24	1.48	5	1	6
GUNN1	28	0.15	0.25	0.05	0	0.96
Average Ethnolinguistic fractionalization	28	0.2	0.2	0.1	0	0.75
Ethnolinguistic fractionalization in 1960	25	0.29	0.23	0.2	0.01	0.75
Dummy for settlement colony	56	0.27	0.45	0	0	1
Executive Constraints in 1850-1914	22	3.2	1.25	3	1	7
Variation in Democracy in 1850-1914	22	1.41	4.68	1	-7	9
Early Institutions Index	22	4.61	5.11	5.5	-4.17	14.29

Appendix A: Data
Table A3 **Construction of Settlement Variable**

	Fraction of Population of European descent			
Country	AJR data for 1975	CIA World Factbook Current	Adopted	Notes
Canada	0.98	0.66	0.87	Data from 2001 Census refers 13.4% as visible minorities
USA	0.84	0.77	0.77	
Mexico	0.15	0.09	0.09	CIA refers 60% Mestizo
Guatemala	0.23	0.02	0.02	CIA refers 55% Mestizo
El Salvador	0.20	0.09	0.09	CIA refers 90% Mestizo
Honduras	0.20	0.01	0.01	CIA refers 90% Mestizo
Nicaragua	0.20	0.17	0.17	CIA refers 69% Mestizo
Costa Rica	0.20	0.94	0.75	CIA data includes Mestizo; 75% was adopted to correct for this
Panama	0.20	0.10	0.10	CIA refers 70% Mestizo
Belize	0.20		0.03	Data from Population and Housing Census
Bahamas	0.10	0.12	0.12	
Jamaica	0.10	0.00	0.00	CIA refers 0.2% as white and 7.3% as mixed
Haiti	0.00	0.00	0.00	CIA refers 5% as white and Mulatto; almost all assumed Mulatto
Dominican Republic	0.25	0.16	0.16	CIA refers 73% Mulatto
Barbados	0.20	0.04	0.04	
Trinidad and Tobago	0.40	0.01	0.01	CIA refers 0.6% white
Colombia	0.25	0.20	0.20	CIA refers 72% as mixed (Mestizo and Mulatto)
Venezuela	0.20		0.21	Data from Inter-American Development Bank
Suriname	0.01	0.01	0.01	CIA refers 31% Creole
Guyana	0.02		0.02	CIA refers 7% as being "Other" including whites
Brazil	0.55	0.55	0.54	data from 2000 Census
Peru	0.30	0.15	0.15	CIA refers 37% Mestizo
Ecuador	0.30	0.07	0.07	CIA refers 65% Mestizo
Bolivia	0.30	0.15	0.15	CIA refers 30% Mestizo
Paraguay	0.25		0.03	CIA refers 95% Mestizo; 3% assumed white
Argentina	0.90	0.97	0.97	
Chile	0.50	0.95	0.50	CIA data includes Mestizo
Uruguay	0.90	0.88	0.88	CIA refers 8% Mestizo
Average	**0.32**	**0.30**	**0.25**	
Median	**0.22**	**0.14**	**0.11**	

Appendix A: Data

Table A4   **Social and Economic Characterization**

Country	GDP per capita 2002	Europeans	Gini coefficient	(in year)	Illiteracy rates 2002
USA	35750	0.77	40.8	2000	0
Canada	29480	0.87	33.1	1998	0
Bahamas	17280	0.12	45.3	1993	4.5
Distrito Federal (Brasília)	16660	0.49	57.6	2001	5.5
Barbados	15290	0.04	48.9	1979	0.3
Rio de Janeiro (South-East)	11670	0.55	53.3	2001	5.6
São Paulo (South-East)	11560	0.71	53.4	2001	6.0
Argentina	10880	0.97	52.2	2001	3.0
Rio Grande do Sul (South)	10140	0.87	53.1	2001	6.2
Chile	9820	0.50	57.1	2000	4.3
Santa Catarina (South)	9440	0.89	47.8	2001	5.9
Trinidad and Tobago	9430	0.01	40.3	1992	1.5
Mexico	8970	0.09	54.6	2000	9.5
Costa Rica	8840	0.75	46.5	2000	4.2
Amazonas (North)	8530	0.24	52.3	2001	7.7
Paraná (South)	8390	0.77	55	2001	8.6
Uruguay	7830	0.88	44.6	2000	2.3
Espírito Santo (South-East)	7770	0.49	55.3	2001	11.5
Brazil	7770	0.54	56.6	2001	12.3
Mato Grosso do Sul (Center-West)	7220	0.55	56	2001	10.3
Minas Gerais (South-East)	6900	0.54	54.3	2001	11.7
Mato Grosso (Center-West)	6900	0.44	53.9	2001	11.2
Dominican Republic	6640	0.16	47.4	1998	15.6
Suriname	6590	0.01			6.0
Colombia	6370	0.20	57.6	1999	7.9
Panama	6170	0.10	56.4	2000	7.7
Belize	6080	0.03			23.1
Goiás (Center-West)	6030	0.51	55.2	2001	11.7
Venezuela	5380	0.21	49.1	1998	6.9
Amapá (North)	5330	0.27	40.8	2001	7.1
Cuba	5260	0.37	27	1978	3.1
Sergipe (North-East)	5180	0.32	53.9	2001	21.4
Peru	5010	0.15	49.8	2000	15
Rondônia (North)	4930	0.43	52.4	2001	10.2
El Salvador	4890	0.09	53.2	2000	20.3
Bahia (North-East)	4710	0.25	56.9	2001	22.9
Paraguay	4610	0.03	56.8	1999	8.4
Pernambuco (North-East)	4560	0.41	57.6	2001	22.0
Guyana	4260	0.02	43.2	1999	3.5
Roraima (North)	4240	0.25	46.5	2001	11.5
Rio Grande do Norte (North-East)	4110	0.42	55.5	2001	24.2
Guatemala	4080	0.02	48.3	2000	30.1
Jamaica	3980	0.00	37.9	2000	12.4
Pará (North)	3960	0.26	52.9	2001	11.2
Acre (North)	3900	0.30	61.8	2001	16.7
Ecuador	3580	0.07	43.7	1998	9.0
Paraíba (North-East)	3370	0.43	58.5	2001	27.2
Ceará (North-East)	3190	0.37	60.5	2001	24.8
Alagoas (North-East)	3070	0.34	54.9	2001	30.6
Tocantins (North)	2980	0.31	58.7	2001	18.5
Honduras	2600	0.01	55	1999	20.0
Nicaragua	2470	0.17	55.1	2001	23.3
Bolivia	2460	0.15	44.7	1999	13.3
Piauí (North-East)	2150	0.27	58.6	2001	29.4
Maranhão (North-East)	1990	0.27	56.5	2001	23.4
Haiti	1610	0.00			48.1
Average	**7362**	**0.34**	**51.3**		**12.8**

Sources: Human Development Report 2004 for GDP per capita and illiteracy rates.

The World Bank for data on Gini Coefficients. Data for Gini Coefficients for Bahamas, Barbados, and Cuba is from Deininger and Squire (1996).

All data for Brazilian federal states is from IBGE (Brazilian Statistical and Geographical Institute) and refers to 2002.

Data on Gini Coefficients and Illiteracy rates excludes rural populations in the north of Brazil (Rondônia, Acre, Amazonas, Roraima, Pará, and Amapá).

Appendix A: Data

Table A5 **Composite Institutions Index**

Country	PII 2004	ICRG-PR	RULELAW	TI-CPI	Total	World Bank	Xconst	Delta Dem	EII
Argentina	X	X	X	X	3.67	-0.27	3	7	10
Bahamas		X				1.13			
Barbados				X		1.13			
Belize				X		0.37			
Bolivia	X	X	X	X	3.28	-0.43	3.4	5	8.4
Brazil	X	X	X	X	4.86	0.01	3	3	6
Canada	X	X	X	X	7.32	1.63	4.5	5	9.5
Chile	X	X	X	X	6.47	1.25	2.8	8	10.8
Colombia	X	X	X	X	3.89	-0.55	2.83	-7	-4.17
Costa Rica	X	X	X	X	5.25	0.77	5.29	9	14.29
Cuba		X		X	3.92	-0.95	2	0	2
Dominican Republic	X	X	X	X	4.06	-0.25	3	0	3
Ecuador	X	X	X	X	3.91	-0.66	3	-2	1
El Salvador	X	X	X	X	4.08	-0.06	3	-5	-2
Guatemala	X	X	X	X	3.22	-0.65	3.1	-6	-2.9
Guyana		X	X		3.20	-0.18			
Haiti	X	X	X	X	2.07	-1.59	1	0	1
Honduras	X	X	X	X	3.14	-0.51	3	5	8
Jamaica	X	X	X	X	3.87	-0.05			
Mexico	X	X	X	X	4.70	0.04	3.25	-6	-2.75
Nicaragua	X	X	X	X	3.28	-0.32	3	2	5
Panama	X	X	X	X	4.04	0.16	1	0	1
Paraguay	X	X	X	X	2.96	-0.78	3.17	6	9.17
Peru	X	X	X	X	4.01	-0.35	3	3	6
Suriname		X		X	4.44	0.05			
Trinidad and Tobago	X	X	X	X	4.77	0.30			
United States	X	X	X	X	6.84	1.35	7	0	7
Uruguay	X	X	X	X	5.37	0.54	4	5	9
Venezuela	X	X	X	X	3.43	-0.97	3	-1	2
Average	**4.18**	**65.7**	**2.5**	**3.95**	**4.23**	**0.01**	**3.20**	**1.41**	**4.61**

Sources: Public Institutions Index 2004 (World Economic Forum) for PII data.

Political Risk Index (International Country Risk Guide 2003) for ICRG-PR data.

Corruption Perceptions Index 2004 (Transparency International) for TI-CPI data.

Average of six aggregate indicators in Aggregate Governance Indicators 1996-2004 (World Bank) for World Bank data.

Gurr (1997) for data on constaints on executive (Xconst) and variation in democracy (Delta Dem).

Appendix A: Data

Table A6 **Ethnic polarization**

Country	RACIALT	GUNN1	AVELF	ELF60
Argentina	6	0.063	0.063	0.31
Bahamas	4	0	0	
Barbados		0	0.073	0.22
Belize		0.409	0.409	
Bolivia	3	0.559	0.599	0.68
Brazil	5	0.032	0.056	0.07
Canada	3	0.093	0.376	0.75
Chile	5	0	0.051	0.14
Colombia	6	0.015	0.056	0.06
Costa Rica	6	0	0.053	0.07
Cuba				
Dominican Republic	4	0	0.011	0.04
Ecuador	4	0.286	0.325	0.53
El Salvador	5	0	0.051	0.17
Guatemala	2	0.333	0.477	0.64
Guyana	1	0.067	0.238	0.58
Haiti	4	0	0.064	0.01
Honduras	5	0.091	0.097	0.16
Jamaica	5	0	0.013	0.05
Mexico	5	0.111	0.174	0.3
Nicaragua	4	0.079	0.099	0.18
Panama	5	0.002	0.191	0.28
Paraguay	5	0.96	0.411	0.14
Peru	2	0.318	0.432	0.59
Suriname		0.75	0.75	
Trinidad and Tobago	1	0.071	0.231	0.56
United States	5	0.001	0.209	0.5
Uruguay	6	0	0.067	0.2
Venezuela	5	0	0.053	0.11
Average	**4.24**	**0.151**	**0.201**	**0.322**

Notes: All data as cited in Easterly and Levine (1997).

RACIALT refers to racial tension in 1984, 1(high tension) to 6 (low tension).

GUNN1 measures the percentage of the population that does not speak the official language.

AVELF is a composite indicator that results from the average of 5 different measures of ethnic and linguistic fractionalization.

ELF60 is an index of ethnolinguistic fractionalization in 1960.

Appendix B: From Geography to different patterns of settlement

Table B1 Determinants of European settlements in the Western Hemisphere

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A	Dependent variable is fraction of population of European descent							
Log European settler mortality	-0.24							
	(0.09)							
Availability of Land		0.59			0.5	0.39		0.40
		(0.13)			(0.13)	(0.14)		(0.15)
Disease environment			-0.55		-0.32		-0.16	-0.18
			(0.21)		(0.18)		(0.23)	(0.21)
Climate				0.69		0.39	0.6	0.28
				(0.19)		(0.28)	(0.29)	(0.35)
R-squared	0.19	0.47	0.25	0.43	0.54	0.55	0.44	0.57
Number of observations	27	26	27	26	25	25	26	25
Panel B	With Brazilian federal states							
	Dependent variable is fraction of population of European descent							
Availability of Land		0.03			0.07	0.03		0.05
		(0.02)			(0.02)	(0.01)		(0.02)
Disease environment			-0.32		-0.42		-0.09	-0.2
			(0.08)		(0.08)		(0.07)	(0.08)
Climate				0.49		0.49	0.44	0.39
				(0.07)		(0.07)	(0.09)	(0.09)
R-squared		0.02	0.2	0.44	0.32	0.47	0.46	0.52
Number of observations		53	54	53	52	52	53	52

Note: heteroskedastic-consistent standard errors are in parentheses.

Appendix B: From Geography to different patterns of settlement

Table B2 Determinants of Ethnolinguistic fractionalization in 1960 (ELF60)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A	Dependent variable is ELF60								
Log European settler mortality	-0.24	-0.2							
	(0.06)	(0.07)							
Availability of Land			0.01			-0.05	-0.11		-0.11
			(0.06)			(0.09)	(0.14)		(0.14)
Disease environment				-0.15		-0.17		-0.08	-0.09
				(0.13)		(0.16)		(0.18)	(0.19)
Climate					0.15		0.23	0.1	0.18
					(0.13)		(0.18)	(0.17)	(0.21)
Dummy for Spanish colony		0.2	0.23	0.22	0.2	0.22	0.2	0.2	0.21
		(0.06)	(0.06)	(0.06)	(0.06)	(0.07)	(0.06)	(0.06)	(0.06)
Dummy for British colony		0.24	0.4	0.42	0.42	0.41	0.4	0.41	0.39
		(0.11)	(0.11)	(0.13)	(0.12)	(0.14)	(0.13)	(0.13)	(0.14)
R-squared	0.33	0.39	0.21	0.28	0.29	0.29	0.30	0.29	0.31
Number of observations	25	25	25	24	24	24	24	24	24

Panel B	Statistics on ELF60 by country group				
	Spanish colony	British colony	Other colonial entity	Settlement colony	Nonsettlement colony
Mean	0.27	0.44	0.04	0.29	0.29
Number of observations	17	6	2	7	18

Note: heteroskedastic-consistent standard errors are in parentheses.

Table B3 Determinants of European settlements in the Western Hemisphere II

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A	Dependent variable is fraction of population of European descent						
Early Institutions Index	0.03	0.03	0.03	0.02	0.03	0.03	0.02
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Availability of Land	0.4			0.35	0.34		0.35
	(0.09)			(0.1)	(0.14)		(0.16)
Disease environment		-0.39		-0.25		-0.21	-0.24
		(0.19)		(0.18)		(0.37)	(0.3)
Climate			0.4		0.17	0.27	0.02
			(0.26)		(0.31)	(0.41)	(0.43)
R-squared	0.6	0.48	0.5	0.63	0.61	0.52	0.63
Number of observations	21	22	21	21	21	21	21

Note: heteroskedastic-consistent standard errors are in parentheses.

Appendix C: Explaining economic development

Table C1 Descriptive Statistics for 2 groups of observations (Settlement and Non-Settlement)

Variable	Observations	Mean	Standard Deviation	Median	Minimum	Maximum
Log GDP per capita (PPP) in 2002	56	8.69	0.62	8.65	7.38	10.48
Settlement	15	9.26	0.5	9.15	8.7	10.48
Non–Settlement	41	8.48	0.53	8.46	7.38	9.76
Illiteracy Rates in 2002	56	12.8	9.6	10.8	0	48.1
Settlement	15	6.1	4.1	5.9	0	12.3
Non–Settlement	41	15.3	10	12.4	0.3	48.1
Composite Institutions Index	26	4.23	1.23	3.97	2.07	7.32
Settlement	7	5.68	1.27	5.37	3.67	7.32
Non–Settlement	19	3.7	0.66	3.89	2.07	4.77
World Bank Governance Indicators	29	0.01	0.77	-0.06	-1.59	1.63
Settlement	7	0.75	0.71	0.77	-0.27	1.63
Non–Settlement	22	-0.23	0.64	-0.29	-1.59	1.13
Gini Coefficient	53	51.29	7.09	53.4	27	61.8
Settlement	15	50.6	6.81	53.3	33.1	57.1
Non–Settlement	38	51.56	7.27	53.9	27	61.8
GUNN1	28	0.15	0.25	0.05	0	0.96
Settlement	7	0.027	0.038	0.001	0	0.093
Non–Settlement	21	0.193	0.275	0.071	0	0.96
Executive Constraints in 1850-1914	22	3.2	1.25	3	1	7
Settlement	7	4.23	1.53	4	2.8	7
Non–Settlement	15	2.72	0.76	3	1	3.4
Variation in Democracy in 1850-1914	22	1.41	4.68	1	-7	9
Settlement	7	5.29	3.09	5	0	9
Non–Settlement	15	-0.4	4.21	0	-7	6
Early Institutions Index	22	4.61	5.11	5.5	-4.17	14.29
	7	9.51	2.7	9.5	6	14.29
	15	2.32	4.28	2	-4.17	9.17

Appendix C: Explaining economic development

Table C2 Determinants of Income levels in OLS regressions

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A	Dependent variable is Log GDP per capita in 2002					
Governance Indicators	0.75	0.79	0.72	0.71	0.76	0.79
	(0.1)	(0.1)	(0.13)	(0.11)	(0.1)	(0.11)
Dummy for oil exporting		0.34			0.43	0.44
		(0.14)			(0.15)	(0.14)
Disease environment			-0.14			0.28
			(0.3)			(0.27)
Climate				0.4	0.46	0.60
				(0.27)	(0.28)	(0.29)
R-squared	0.69	0.73	0.65	0.7	0.76	0.77
Number of observations	29	29	27	26	26	26
Panel B	Dependent variable is Log GDP per capita in 2002					
Governance Indicators	0.74	0.73	0.68			
	(0.11)	(0.12)	(0.11)			
Dummy for Spanish colony	-0.04					
	(0.15)					
Dummy for British colony		0.07				
		(0.2)				
Dummy for settlement colony			0.25			
			(0.21)			
R-squared	0.7	0.7	0.71			
Number of observations	29	29	29			

Note: heteroskedastic-consistent standard errors are in parentheses.

Appendix C: Explaining economic development

Table C3 Determinants of Income levels in OLS regressions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A	Dependent variable is Log GDP per capita in 2002						
Governance Indicators	0.76	0.79	0.78	0.78	0.78	0.58	0.63
	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)	(0.12)
Ethnic tensions	0.01						
	(0.05)						
Racial tensions		0.04					
		(0.05)					
Average Ethnolinguistic fractionalization			-0.13				
			(0.35)				
Ethnolinguistic fractionalization in 1960				0.11			
				(0.34)			
GUNN1					-0.08		
					(0.32)		
Illiteracy rate						-0.021	-0.018
						(0.008)	(0.009)
Dummy for oil exporting							0.18
							(0.15)
R-squared	0.69	0.71	0.72	0.7	0.72	0.76	0.77
Number of observations	27	25	28	25	28	29	29

Note: heteroskedastic-consistent standard errors are in parentheses.

Appendix C: Explaining economic development

Table C4   Determinants of Income levels in IV regressions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A	Dependent variable is Log GDP per capita in 2002						
Governance Indicators	0.83	0.87	0.7	0.52	0.83	0.84	0.5
	(0.25)	(0.22)	(0.23)	(0.36)	(0.26)	(0.31)	(0.81)
Dummy for oil exporting		0.38					
		(0.13)					
Availability of Land			0.35				
			(0.17)				
Climate				0.56			
				(0.42)			
Dummy for Spanish colony					0.01		
					(0.18)		
Dummy for British colony						-0.04	
						(0.31)	
Dummy for settlement colony							0.47
							(0.91)
Instrument for Governance Indicators	Disease Environment						
Number of observations	27	27	25	26	27	27	27
Panel B	Dependent variable is Log GDP per capita in 2002						
Governance Indicators	0.83	0.85	0.85	0.83	0.85	0.77	0.82
	(0.24)	(0.24)	(0.25)	(0.29)	(0.27)	(0.27)	(0.25)
Ethnic tensions	0.01						
	(0.05)						
Racial tensions		0.04					
		(0.04)					
Average Ethnolinguistic fractionalization			-0.11				
			(0.35)				
Ethnolinguistic fractionalization in 1960				0.07			
				(0.4)			
GUNN1					-0.02		
					(0.32)		
Illiteracy rate						-0.014	-0.01
						(0.012)	(0.01)
Dummy for oil exporting							0.3
							(0.17)
Instrument for Governance Indicators	Disease Environment						
Number of observations	26	24	26	24	26	27	27

Note: heteroskedastic-consistent standard errors are in parentheses.

Appendix C: Explaining economic development

Table C5   Instruments for levels of education

	(1)	(2)	(3)	(4)	(5)
Panel A	Dependent variable is Log GDP per capita in 2002				
Governance Indicators	0.72	0.66	0.7	0.71	0.71
	(0.29)	(0.23)	(0.3)	(0.25)	(0.24)
Illiteracy rate	-0.027	-0.041	-0.033	-0.03	-0.032
	(0.028)	(0.028)	(0.025)	(0.018)	(0.018)
Dummy for oil exporting					0.15
					(0.21)
t-test value illiteracy rate				-1.64	-1.83
p-value value illiteracy rate				0.102	0.068
Instruments	Disease Environment	Disease Environment	Disease Environment	Disease Environment	Disease Environment
	Gini	Land	ESM	Climate	Climate
Number of observations	24	25	25	26	26

Note: heteroskedastic-consistent standard errors are in parentheses.