Laboratory of Economics and Management
Sant'Anna School of Advanced Studies
Piazza Martiri della Libertà, 33 - 56127 PISA (Italy)
Tel. +39-050-883-343 Fax +39-050-883-344
Email: lem@sssup.it Web Page: http://www.lem.sssup.it/

LEM

Working Paper Series

On the Latin American Growth Paradox: A Hindsight into the Golden Age

Giorgia Barboni°
Tania Treibich §

° LEM-Scuola Superiore Sant'Anna, Pisa, Italy
§ LEM-Scuola Superiore Sant'Anna, Pisa, Italy and GREDEG, Nice-Sophia Antipolis, France

2010/21 **November 2010**

On the Latin American Growth Paradox: A Hindsight into the Golden Age

Giorgia Barboni*and Tania Treibich†

November 12, 2010

Abstract

In 1950, Latin American countries capabilities were promising, and the subcontinent was thought to have a big potential for convergence. In order to understand why this prediction was not fulfilled, we apply in this paper the framework set by Fagerberg and Srholec (2008(24)). Our study of the economic evolution of Latin America during the Golden Age (1950-1975) is based on historical data on economic, political and social variables from 18 countries. We use a factor analysis to classify our 20 indicators into five dimensions: the level of "industrialization", "human capital", the "macroeconomic fundamentals", "politics" and "religion". We find that only the quality of human capital and the presence of Roman Catholics significantly and positively affected Latin American economic growth in this period, while the determinants traditionally put forward in the empirical growth literature, such as technical change and openness, did not. Finally, the positive correlation between the religion and education variables reveals that this result is partly related to the role of the Catholic Church as an educational institution.

Keywords: Growth; Development; Convergence; Factor Analysis; Latin America; Economic History; Golden Age.

JEL Classification: N26, O54, C38

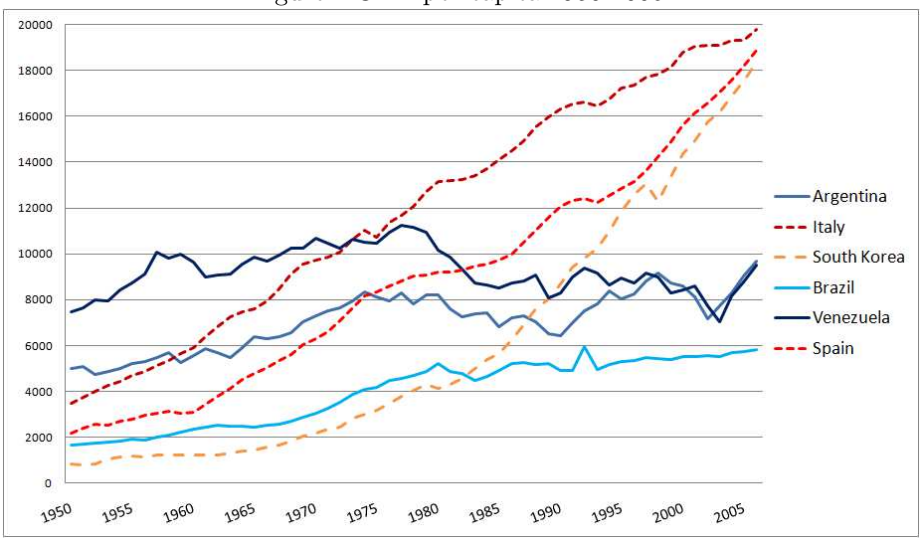
*LEM, Sant'Anna School of Advanced Studies

†LEM, Sant'Anna School of Advanced Studies and GREDEG, Université Nice-Sophia Antipolis

1 Introduction

In 1950, Latin American countries' capabilities were promising: however, some other countries starting at the same level, or even below, made a better use of their initial endowments. At the time, countries like Argentina and Venezuela had a higher GDP per capita than other European countries belonging to the developed world today (Italy, Spain...) and many East Asian countries that have managed to catch up with the Western World in the last decades (see Figure 1 below). Indeed, the data on GDP per capita over the last 60 years reveals that since 1950, Latin American countries have diverged from the Western World. With a GDP growth rate between 4 and 5 percent, they have fallen behind Europe which economy has reached a 20,000 dollars per capita level today. The Latin American countries grew slowly until 1980 and, from then, their GDP per capita growth has been stationary. The only exception would be Chile which after a period of slow growth started an expansion period in 1980s, converging to the highest levels. Asian countries in comparison followed a convergence path, starting way lower and reaching the European levels of GDP per capita after fifty years of catching up. Castaldi *et al.* (2008(16)) point out that this divergence can also be measured by the widening productivity gap between Latin America and the international frontier in the last decades.
Other indicators of education and science may also support the hypothesis that back then, Latin American countries had a big potential for convergence. Argentina, for example, was thought to be so promising that it could join the innovators' club (Castaldi *et al.*, 2008(16)). Then, what happened during the Golden Age (1950-1975) that prevented South American countries to exploit this potential for growth?

Figure 1:GDP per capita 1950-2006.



Source: created from A. Maddison data (2007(33))

We apply the framework set by Fagerberg and Srholec (2008(24)) to analyze more precisely the economic evolution of Latin American countries during the Golden Age (1950-1975), using historical data on economic but also political and technological variables in 18 countries of the subcontinent. To that purpose, we conduct a factor analysis in order to uncover the determinants of growth, and their respective weights in the development process. This allows us to classify our 20 indicators into five dimensions: the level of

"industrialization", "human capital", the "macroeconomic fundamentals", "politics" and "religion". We find that only the quality of human capital and the presence of Roman Catholics significantly and positively affected Latin American economic growth in this period, while the determinants traditionally put forward in the empirical growth literature, such as technical change and openness, did not. Finally, the positive correlation between the religion and education variables reveals that this result is partly related to the role of the Catholic Church as an educational institution.
Comparing our results to the ones generally found in the literature, we are therefore able to support the theory of a heterogeneous growth path in the Latin American subcontinent, as suggested by Adelman and Morris already in 1965 (4).

In Section 2 we review the literature on theoretical and empirical approaches to the analysis of economic growth, in Section 3 we introduce the dataset and the methodology, and in Section 4 we present the results of the factor analysis and the growth regressions. Section 5 concludes.

2 Literature review

2.1 Growth theories

Starting from the seminal work of Abramovitz (1986(1)), the traditional theories on convergence were put into question by the empirical fact that some countries lagged behind, proving that catching up was not a global phenomenon. From then, the issue shifted towards the identification of the conditions for convergence. A few years later, Bart Verspagen (1991(45)) created a simple formal model of technology gaps, in which the non linear relation between capabilities and growth could lead to multiple equilibria. His hypothesis is that knowledge spills over from more advanced countries (firms) to less advanced ones, and this process of technology diffusion allows underdeveloped countries to close the technology gap, under the condition that their initial level of technology is high enough. Indeed, Verspagen takes into account the "absorptive capacity" condition introduced by Cohen and Levinthal (1989(18)): firms can absorb new knowledge only if they can understand it. The Human Capital literature also got interested in the growth processes (Temple and Voth, 1998(41)) and could give us some insights on the importance of education and knowledge for convergence.
Although these models seem to take a strong position against neoclassical convergence models *á la* Solow, (1956(39)), they still consider technology as the main determinant for growth, and picture the development process as a stage process. Already in 1980, Kim (30) used the East Asian cases to put in place a model of development stages: first the technology is imported, then imitated and absorbed, and finally improved and exported. Technology transfer and innovation are therefore at the core of the (linear) development process.

2.2 Growth Empirics

What do the empirics tell us about growth and development processes? The standard models of convergence have been tested with different growth regressions equations, using cross-sectional data (Barro 1991(11)). Barro validated human capital models (human capital variables being positively related to the growth of GDP) and absolute convergence

models (the initial level of GDP being negatively related to the GDP growth rate). He also showed that political stability and market distorsions have a significant impact on growth (respectively positive and negative).
However, Durlauf and Quah (1999) have suggested a new method taking a dynamic approach, which intends to analyze the evolution of the whole income distribution. Moreover, more recent studies are able to uncover non-linear dynamics (Fiaschi and Lavezzi 2003) in growth patterns. Yet, these authors are more concerned with the statistical patterns of growth and convergence than with their determinants. Given the large number of variables that could theoretically affect economic growth (would they be strictly economic or not: human capital, technology, institutions...) how can we know which ones are potentially important to include in a growth regression?
The first attempt to introduce non economic variables within a development framework is due to Adelman and Morris (1965(4)). Indeed, they first used factor analysis to construct a measure of the development process, thus paving the way to a series of works which focused on the role of "social capabilities" (see Abramovitz (1986(1)) and Abramovitz and David (1996(2)) among the most influential papers). However, although there is common agreement on the importance of their work, the academic opinion has expressed some criticism about the methodology they used (*i.e.* factor analysis). A sharp critique to the use of factor analysis has been made by Rayner (1970(36)): according to the author, the use of factor analysis by Adelman and Morris is not correct, since they use socioeconomic variables (from GDP to cultural variables). Although they have a different impact on development, the factor analysis treats all variables equally, that is, by assigning them the same weight. A second critique by Brookins (1970(14) lies in the fact that ordinal data are used as if they were cardinal, which casts some doubts on the validation of such an empirical procedure. Having said that, it is worth noticing that besides Adelman and Morris' contribution, other papers have used factor analysis for the same purpose (Temple and Johnson (1998(42)) and Fagerberg and Srholec (2008(24))[1]).
More precisely, Fagerberg *et al.* (2007(23), 2008(24)) performed a factor-based analysis of growth in 115 countries between 1992 and 2004. They assume that differences in development are caused by differences in technology (technological, innovative and productive capabilities). Their findings are coherent with the mainstream viewpoint: countries grow if they are open, if their environment is favorable for business (healthy judicial and political system), property rights are well-defined, encouraging firms to be innovative. Technology transfer from the first to the third world is again seen as derived from trade and Foreign Direct Investment.

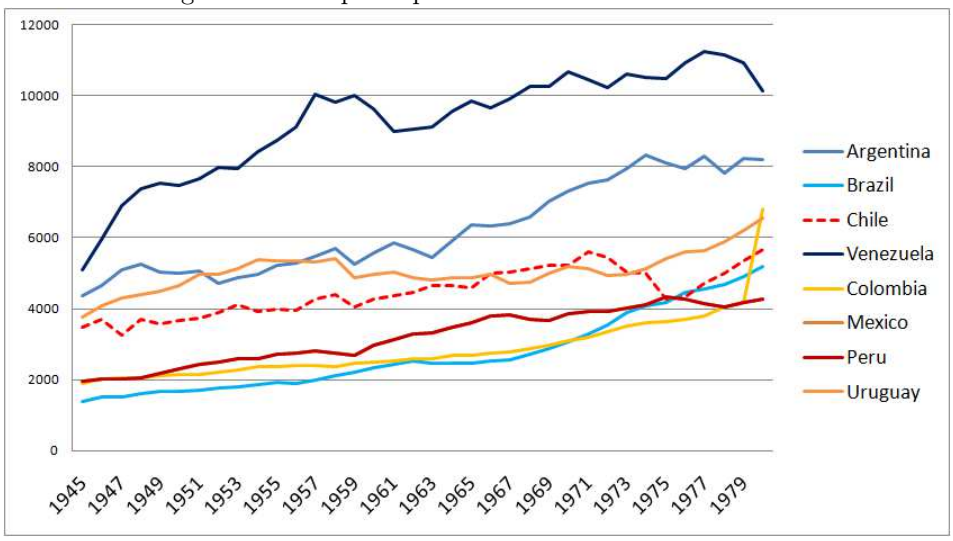
2.3 Investigating Economic growth in Latin America

What about Latin America? Are the determinants of growth in the American subcontinent the same as the general figure?
As far as the Golden Age is concerned, a common pattern of growth is observed in Latin America, putting the continent at odds with other catching-up countries, which rates of growth were significantly higher (see Figure 1). All Latin American countries are not represented in this figure for reasons of clarity; however as shown by Figure 2 below, the low growth pattern is shared by the entire sample. Indeed, Chile's take off took place

[1]In particular, Temple and Johnson, who integrated the Adelman and Morris' index with subsequent data and obtained very similar results, thus strengthening the importance of "social capabilities" for economic growth

later, at the end of the 1980s. Moreover, authors studying the same period (De Gregorio, 1992(21)) have put forward that Latin American countries followed similar strategies and patterns of growth during this period.
Latin America remains a puzzle for growth theorists, for several reasons: its growth was not technology based, we observe neither underdevelopment nor total convergence, and the rates of growth during the Golden Age are good (around 4-5%) but still very low. Studying factors of growth in different subregions of the world (Asia, Africa and Latin America), Adelman and Morris (1965(4)) characterize the results for the Latin American subsample as the most typical regional pattern. However, apart from this attempt, few quantitative studies have inquired the pattern of growth specific to Latin America, although many qualitative descriptions have retraced Latin America's economic history.

Figure 2: GDP per capita in Latin America 1945-1980.



Source: created from A. Maddison data

De Gregorio (1992(21)), Ocampo and Martin (2003(34)), Arocena *et al.* (2000(8) and 2003(9)) and Taylor (1998(40)) are the main authors having investigated Latin America's economic history during the 20th century. Ocampo and Martin suggest that Latin America experienced a "truncated convergence" and confirm our intuition that economic development was not a linear uniform process. Indeed, all these authors have stressed the importance of the choice of development strategies in accelerating or hindering economic growth and convergence in Latin America.
On this basis, the economic history of Latin America in the 20th century is broken down in four periods: before 1930 (growth based on primary exports to the industrialized countries), between 1930 and 1950 (growth based on Import Substitution Industrialization, or ISI, with improvement in capabilities), the Golden Age (still ISI with foreign investment as means of securing capital and know-how), and after 1980 (debt crisis). Although the problems faced by Latin American countries were much worse after 1980 (GDP per capita stopped growing), the 1970s' growth was achieved at the cost of a higher trade deficit and increasing resource transfers, requiring more and more foreign capital.
De Gregorio (1992(21)) studied the economic growth in twelve Latin American countries from 1950 to 1985 and finds that the crucial determinants are macroeconomic and political stability and investment, while the terms of trade have no significant effect on growth,

contrary to Fagerberg and Srholec's (2008(24)) findings for the entire cross-country analysis. He also underlines that the growth rates in Latin America were modest in comparison with the high trends of the Golden Age.
Taylor (1998 (40)) has also studied the growth determinants in eighteen Latin American countries, covering the period from 1970 to 1990. He claims that Latin American slow growth is primarily due to institutional characteristics and accumulation differences, and he rejects technological change as a determinant in growth variations. He supports the idea that following inward-looking policies since the 1930s caused economic distortions (black market prevalence, high price of capital, exchange rate depreciation) in the following decades and partly explains Latin American lack of convergence. This persistent institutional characteristic made the process of economic growth structurally different from the other continents'.
Finally, Arocena and Sutz (2000) in turn have investigated the innovative performance of Latin American countries before and during the Golden Age, trying to understand the paradox of a widening technological gap in parallel with a successful industrialization process. Their answer is that technological innovation was highly informal and of incremental or minor type, because governments preferred to buy modern productive methods abroad than to promote endogenous generation of technical knowledge.

Contrary to these authors, we want to study the Latin American puzzle in a wider perspective: as we have seen above these studies have inquired the topic but either on a qualitative basis (Arocena and Sutz, 2000(8); Arocena and Senker, 2003(9)) or on a too restricted set of variables and countries (De Gregorio, 1992(21), Taylor 1998(40)). We present our data and methodology in the following section.

3 Data and Methods

In order to understand what makes this group of countries so peculiar, we exploit the within heterogeneity of the group in order to identify its growth determinants and compare them with the ones traditionally put forward in the literature (as in Fagerberg and Srholec, 2008(24))[2]. We tried to access as many types of variables as possible, ranging from the (usual) economic ones, to the political and social ones. To that end, we had to access different sources to retrieve our data[3].

3.1 Variables and sample

The dataset was constructed by pooling different sources together, with the aim of gathering diversified information about the economic, political and social environment in Latin America between 1950 and 1975.
The general and economic variables are extracted from three sources: the Penn World Table (Heston *et al.*, 2009(28)), the OxLAD database [4] from Oxford University (Astorga

[2]The study of Fagerberg and Srholec (2008) appeared as a good framework for analysis because it is not embedded in a theoretical model and allows to consider a wide range of growth determinants.

[3]The details about the dataset and the sources are included in the Appendix

[4]The Oxford Latin American Economic History Database (OxLAD) contains statistical series for a wide range of economic and social indicators covering twenty countries in the region for the period 1900-2000.

et al., 2003 (10)) and the CEPAL database [5].
The dependent variable (GDP per capita) is due to Angus Maddison's famous work (2007 (33)). When it comes to institutional and social variables, quantification is often more scarce or difficult to implement. That's why we relied on the seminal work of Adelman and Morris (1967(5)) and Russett (1964 (38)) to account for the social variables in that period. Following Acemoglu, Johnson and Robinson (2005(3)), we intended to include political variables, which could explain partly the failure of Latin American countries. Although this factor has little effect in a worldwide cross-country analysis, we expect that it explains a higher part of GDP growth in Latin America. As a proxy for the quality of the political environment we used the polity score, extracted from the Polity IV project [6] because other commonly used sources (as for Taylor (1998(40)), taken from the Barro and Lee database [7]) are not available before 1970. In the end, we use twenty variables in the factor analysis (see the Table 1).

Although we started retrieving data for the entire Latin American subcontinent (from Mexico to Argentina), historical data is sometimes of difficult access. Due to missing values we had to remove some countries from the sample, from which eighteen remained (see Table 1).

Table 1: Variables and Countries

Variables	Countries
Population	Argentina
Life expectancy	Bolivia
Nominal exchange rate	Brazil
Initial GDP per capita	Chile
Inhabitants per physician	Colombia
Inhabitants per hospital bed	Costa Rica
FDI	Cuba
Exports	Ecuador
Imports	El Salvador
Unit value of exports	Guatemala
Export quantum	Haiti
Consumer Price Index	Honduras
Electricity	Nicaragua
Railways	Panama
Economically Active Population	Paraguay
Primary school enrollment	Peru
Polity score	Uruguay
Students enrolled in higher education	Venezuela
Percent. literate population above 15	
Percent. Roman catholics in pop.	

[5]Comision Economica para Latin America (or ECLAC: Economic Commission for Latin America and the Caribbean), http://www.eclac.org/estadisticas/bases/

[6]The Polity IV Project carries data collection and analysis through 2008 and is under the direction of Monty G. Marshall at the Center for Systemic Peace and George Mason University

[7]R.J. Barro and J-W. Lee, "Data Set for a Panel of 138 countries", http://www.nber.org/pub/barro.lee/readme.txt

3.2 Empirical methodology

As we want to analyze the impact of many different (and often correlated) variables on growth, factor analysis [8] seems the appropriate methodology to reduce the data and get a small set of uncorrelated variables (factors). As we want to test the hypothesis that Latin American pattern of growth is somehow different than the one observed at a larger level (with cross-sections over more than 100 countries), we had no pre-defined idea of the structure or how many dimensions were present in our dataset. This was therefore an exploratory analysis allowing us to infer semi-quantitative insights into the interaction of various dimensions affecting economic growth. With this method, we don't classify variables according to their type (economic, political, social...); variables are grouped according to their correlation with each other. Each factor extracted with the principal component method reflects a specific dimension of variance in the data. In order to account for the entire period, we used when possible the mean of values from 1950 and 1975 (details are described in the Appendix).
The number of factors is determined on the basis of the Kaiser criterion: factors with eigenvalues superior or equal to one are retained[9]. Moreover, the relative weight of each factor in explaining the total variance (the proportion of the factor) is easily assessed since the sum of eigenvalues is equal to the total number of variables. With this method, each variable is assigned a factor loading for each factor.Since the loadings indicate the net correlation between each factor and the observed variables, the higher the load, the more relevant in defining the factors' dimensionality. Each variable can thus be "assigned" to the factor for which it has the highest loading. This allows to interpret which dimension the factor represents.
The factor loads are then rotated to produce orthogonal factors which can later be used as growth regressors. Moreover, each country obtains a score for each factor, defining the observations for the growth regressions. Indeed, in the last step, we regress per capita growth against the country factor scores to determine how much each dimension had an impact on economic growth in Latin America.

4 Results

We present the results in two steps: first the factor analysis and second the growth regression.

4.1 Factor analysis

The principal component analysis of our data revealed five factors with eigenvalue higher than 1, explaining 84,6% of total variance [10], see Table 2.

The rotated factor loadings for all variables are reported in Table 3. A first interpretation of factor loadings can be made in terms of the sum of the squares of the entries in the factor matrix (Adelman and Morris, 1965(4)). Each $(a_{ij})^2$ represents the proportion of

[8] As presented by Harman (1960(27)) or Thurstone (1961(43))

[9] This rule rejects the factors with small variance because they are expected to have a lower predictive value; however this assumption was sometimes criticized (Jolhiffe, 1982(29)). Still we follow the general method here.

[10] Explained total variance is computed as the sum of the proportion of each factor

Table 2: Identification of factors

Factor	Variance	Difference	Proportion	Cumulative
Factor 1	6.28780	1.28296	0.3144	0.3144
Factor 2	5.00484	2.53298	0.2502	0.5646
Factor 3	2.47185	0.62250	0.1236	0.6882
Factor 4	1.84935	0.55164	0.0925	0.7807
Factor 5	1.29771		0.0649	0.8456

the total unit variance of variable i which is explained by factor j, after allowing for the contributions of the other factors. If we square the numbers of the first row of Table 1, it can be seen that 94.05 per cent of inter-country variations in population are explained by Factor 1, while the other factors contribute in a very marginal way (0 for Factor 2, 0.16% for Factor 3, 0.09% for Factor 4 and 0.36% for Factor 5)[11]. The sum of these squared factor loadings, or the "communality"[12] of each variable, gives a similar measure of the R squared value in a regression analysis. For example, the communality of *population* is: $(0.97)^2 + (0.01)^2 + (0.04)^2 + (0.03)^2 + (0.06)^2 = 0.945$.
Then we compare the factor loadings of each variable and assign it to the one with which it shows the closest linear relationship, which is that factor in which it has the highest loading (the highest scores are marked with a star ($*$) in the table). Following on our previous example, the variable *population* is naturally assigned to Factor 1. This allows us to identify the factors which we can define as:

- Factor 1 = Industrialization indicator
- Factor 2 = Human capital indicator
- Factor 3 = Macroeconomic fundamentals
- Factor 4 = Politics
- Factor 5 = Religion

Initial GDP is not included in the principal component analysis because it will be used as a control variable in the growth regression. Therefore, including it as a variable of the factor analysis would have caused GDP per capita to be correlated with the factor scores, *i.e.* the other regressors. However, we also performed a principal component analysis with the variable "Initial GDP" in order to know to which factor it would be correlated the most[13]. We find that the initial level of GDP can be attributed to Factor 2 (Human Capital), which is in line with the findings of Lavezzi and Marsili (2010(31)). Indeed, they remark that initial GDP, human capital (especially secondary education) and institutional quality are strongly correlated and each one of them can even be a proxy for the others. It is interesting to note that the economic variables are not all correlated with each other but divided in two separate dimensions. Indeed, GDP, Foreign Direct Investment, Exports,Imports, Railways and EAP variables are all highly correlated with Factor 1, along with the demographic variable (Population) and the Primary School Enrollment variable.

[11] $(0.97)^2 = 0.945; (0.01)^2 = 0; (0.04)^2 = 0.16; (0.03)^2 = 0.09$ and $(0.06)^2 = 0.36$.
[12] The proportion of the total unit variance explained by all the common factors taken together
[13] See the detailed results in the Appendix

Table 3: Rotated factor loadings

Variables	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	R^2
Population	0.9779*	0.0087	0.0412	0.0326	0.0578	0.96
GDP (1970 local currency)	0.5988*	0.4696	0.3313	-0.0900	0.0698	0.70
FDI	0.7042*	0.3107	-0.1554	0.3830	0.0747	0.77
Exports	0.8922*	0.3152	-0.0897	0.0446	-0.0080	0.91
Imports	0.8077*	0.3657	-0.2497	0.2635	0.1175	0.93
Railways	0.8118*	0.3260	0.2635	-0.0375	0.0552	0.84
EAP	0.9788*	-0.0619	0.0725	-0.0127	-0.0679	0.97
Primary School Enrolment	0.9521*	0.1225	0.0485	0.0926	0.1372	0.95
Life Expectancy	0.0501	0.9238*	-0.0568	0.1548	-0.1706	0.91
Inhabitants per Physician	-0.3843	-0.8761*	0.0383	0.1008	0.0521	0.93
Inhabitants per Hospital Bed	-0.1573	-0.8864*	0.0358	-0.2072	-0.0980	0.86
Students Enrolled in Higher Education	0.1672	0.9306*	-0.0774	-0.0330	0.0578	0.90
Percent. Literate Population above 15	0.0660	0.9311*	0.0648	0.1643	0.2018	0.94
Nominal Exchange Rate	0.2612	0.0863	0.7436*	-0.1463	0.2655	0.72
Unit Value of Exports	0.1598	0.1961	-0.8119*	0.0462	-0.1623	0.75
Export Quantum	0.0002	-0.2300	0.7076*	0.1855	-0.1840	0.62
Consumer Price Index	0.0790	0.2156	0.6720*	0.3751	-0.2600	0.71
Electricity	0.4297	0.0795	0.0282	0.7391*	0.1989	0.77
Polity Score	-0.0139	0.1816	0.0684	0.8723*	-0.0714	0.80
Percent. Roman Catholics in Pop.	0.1141	0.0713	0.0527	0.0314	0.9566*	0.94

all variables are taken in logs except the polity score

We think this group of variables reflects the "Industrialization" process of countries.
Factor 2 is highly correlated with Life Expectancy, the Number of Inhabitants per Physician, the Number of Inhabitants per Hospital Bed, the Number of Students Enrolled in Higher Education, and the Percentage of Literate Population. These are all elements defining the level of "Human Capital" in a country (here reflected by the level of education and health care). It might seem strange that another education variable such as "Primary School Enrollment" is not included in this group. However, we can interpret it as a measure of *basic* education which is more related to a country's industrialization level than to its political will to develop knowledge accumulation and human capital. In line with the literature using factor analysis to study growth determinants (Adelman and Morris, 1965 and 1967(4), (5); Temple and Johnson, 1998 (42) and Fagerberg and Srholec, 2008(24)), our work represents a further attempt at corroborating the idea, starting from the '60s, that human capital has a central role in economic growth. However, contrary to Adelman and Morris' methodology, our measure of health and education is based on variables for which the interpretation is homogeneous across countries, and for which it is possible to have a cardinal value.
On the other hand, the Nominal Exchange Rate, the Unit Value of Exports, the Export Quantum and the Consumer Price Index are highly correlated with Factor 3, which we suggest to be interpreted as a measure of countries' "Macroeconomic Fundamentals" (and economic stability). It will be very interesting to see whether this factor significantly affects economic growth.
The political variable (Polity Score) is isolated from the other dimensions, as expected.

However it is also strangely correlated with the electricity variable, defining Factor 4. Still we define this dimension as the political one ("Politics").
Finally, the religion variable (Percentage of Roman Catholics in the population) defines a fifth factor, which we name "Religion". The role of religion as an explanatory variable of economic performance still lacks of a univoque interpretation. In his study of the role of Protestantism in the development of the United States, Max Weber (1930(46) pointed out that the ethics related to religion can affect the individuals' decisions and therefore growth, the puritan work ethic being conducive to the development of capitalism. Besides this seminal work, there is also a scarce body of empirical literature which explores the impact of religion on economic growth. One of the main contributions is by Barro and McCleary (2003(12)), who find that economic growth is positively correlated to religious beliefs (in particular, beliefs in hell and heaven), but negatively correlated to church attendance (which they generalize in the sense of "belonging"). Their main conclusion is therefore that

> "stronger religious beliefs stimulate growth because they help sustain specific individual behaviors that enhance productivity"

(page 21). Still, we cannot be confident about what to expect from the relation between Latin American growth and the fifth factor for two reasons: first, there is neither the evidence nor the intuition that the Catholic ethic is, as Protestantism, conducive to economic growth. Second, the results of Barro and McCleary are highly dependent on the measure of religiosity, thus we do not know how the share of Roman Catholics in the population transfers into their findings.

4.2 Growth regressions

Once we have identified the factors, we can go on with the second step of the analysis, which is the study of the growth determinants in Latin America. For the 18 countries of the sample, we regress their average growth rate over the period (in logs) on their respective factor scores, controlling for initial GDP per capita.

As a first glance on the data before the econometric analysis, we plotted the country scores against the dependent variable. As shown in Appendix 1, the linear approximation for each factor gives us a first piece of information on the expected sign and intensity of the relation between each factor and the dependent variable. Indeed, Factor 1 ("Industrialization") seems to have almost no relation with Latin American GDP growth, since the linear approximation is almost flat. Factors 2 ("Human Capital"), 4 ("Politics") and 5 ("Religion") seem to be positively related to GDP growth, with a particularly high coefficient for factor 5. Only Factor 3 ("Macroeconomic fundamentals") looks negatively correlated with GDP growth. This may be a first hint towards our intuition that high inflation and low openness have prevented Latin American countries from thriving.

We then performed an OLS regression of the average rate of growth of GDP per capita (in logs, labelled "GROWTH") on the factors. The initial GDP per capita (in logs, labelled GDP_1950) was included as a control, as it is standard procedure in the case of a growth regression. The first regression equation is therefore:

$$ln(GROWTH)_i = \beta_0 + \beta_1 ln(GDP_{1950,i}) + \beta_2(F1_i) + \beta_3(F2_i) + \beta_4(F3_i) + \beta_5(F4_i) + \beta_6(F5_i) + \epsilon_i \quad (1)$$

We also performed some robustness checks, using two other estimation methods : the Iteratively Reweighted Least Squares Method[14] and the Stepwise Procedure[15]. The results are presented in Table 4.

The linear regression revealed the same signs as the linear approximation: all regressors are positively correlated with GDP growth except Factor 3 ("Macroeconomic fundamentals"). However, only Factor 2 ("Human Capital") and Factor 5 ("Religion") positively and significantly impacted Latin American economic growth during the postwar period. The OLS results are respectively significant at 5% and 1% level, and are able to explain 67% of the dependent variable's variance ($R^2 = 0.67$). The Stepwise Procedure confirms the OLS estimation since Factors 2 and 5 are significant, at the same levels. However, the Iterative OLS method seems not to be appropriate given the low number of observations. Still, the most interesting findings are negative: Factor 1 ("Industrialization") and Factor 3 ("Macroeconomic fundamentals") don't explain GDP growth, while they are usually presented as important determinants for economic development (as found by Fagerberg and Srholec, 2008(24)). As a matter of fact, we can link the lack of impact of Factor 3 to the development policies followed by Latin American Governments which, as we explained in the second section, pursued a growth path focused on import substitution. The fact that Factor 1, which reflects the technological and capital accumulation levels, didn't impact economic growth might (partly) explain why these countries didn't manage to catch up during the Golden Age. Indeed, Verspagen (1991(45)) showed in a non-linear model that countries with low levels of technological development were not able to catch up and were caught in a low-level equilibrium, forcing them to "fall behind". The lack of innovation or technology-based policies in Latin American countries might have therefore constrained their growth path. In a word, because the heterogeneous growth path followed by Latin American countries was neither based on technology or exports, these countries were not able to exploit their initial advantages.

Then, what was Latin American growth based on? Our analysis showed that human capital accumulation (education and health) has benefited economic growth, even after controlling for initial GDP per capita. This is in line with a major strand of literature in Growth theory based on Becker's initial arguments (1964(13)).
Finally, the presence of Roman Catholics in the population was revealed as a significant and positive determinant of growth. The role of religion in economic development is usually thought to be indirect, difficult to explain, and dependent on the measure of religion. Here the results don't fit with the findings of Barro and McCleary given that our measure of religion relates to the "belonging" (being Catholic or not) which they found to be negatively related to economic growth, contrary to the "believing" variables (believing in God or not). In the case of Latin America, other leads can be tested to explain such result: the influence of religion could be a proxy for colonization influence, or other aspects that are not represented in the factor analysis (culture, geography...).

[14]The Iteratively Reweighted Least Squares Method (IRW LS) assigns a weight to each observation, with lower weights given to outliers.

[15]The Stepwise Procedure (SW Reg) eliminates (insignificant) variables that do not contribute to the explanatory power of the model (given a chosen significance level). At each step, the stepwise method also attempts to reintroduce already eliminated variables to control for a possibility that some of them might become significant later on. We specified the threshold for removal at 5% level of significance and the level for reintroducing a variable at 5%.

In order to test this latter hypothesis, we added a geographical dummy, which takes the value 1 for South American countries, and 0 for Central American countries. We then estimated the following equation:

$$ln(GROWTH)_i = \beta_0 + \beta_1 ln(GDP_{1950,i}) + \beta_2(F1_i) + \beta_3(F2_i) + \beta_4(F3_i) + \beta_5(F4_i) + \beta_6(F5_i) + \beta_7(Dummy_i) + \epsilon_i \quad (2)$$

The results are presented in Table 5. Adding the dummies improves the R squared (from 0.67 to 0.71), although the dummy variables are not significant. Moreover, Factor 1 ("Industrialization") becomes significant (at 10% level) in the OLS regression, although this is not confirmed by the Stepwise Procedure (even when set at 10% level of significance). However, Factor 5 remains as much significant as without the dummy, and the coefficient is also similar (around 0.65).

Another way to uncover what lies behind the positive correlation between the growth rate per capita and Factor 5 is to follow Barro and McCleary's methodology (2003(12)), that is regressing the religion variable (in our case, the Percentage of Roman Catholics in the population) on the log of GDP per capita and of the rate of growth of GDP plus other explanatory variables. Partial correlations can provide us useful information, although they are not easy to understand in terms of causality. Here one of the potential determinants of the weight of religion in a Latin American country could be a measure of colonization and European influence. If the first intention of colons was to convert the local populations to Christianism, this required basic literacy. Therefore we use education variables as proxy for the institutional legacy of the old colonial powers, and we regress the Percentage of Roman Catholics in each country (REL) on the initial GDP in the country (GDP_1950), the growth rate of GDP (GROWTH), the percentage of primary school enrollment (SCHOOL), the percentage of student enrollment (STUD) and the literacy rate (LIT)[16].

$$ln(REL)_i = \beta_0 + \beta_1 ln(GDP_{1950,i}) + \beta_2 ln(GROWTH_i) + \beta_3 ln(SCHOOL_i) + \beta_4 ln(STUD_i) + \beta_5 ln(LIT_i) + \beta_6(Dummy_i) + \epsilon_i \quad (3)$$

The results of this simple regression suggest several insights into the workings of the relation between religion and economic growth. Indeed, besides the GDP growth rate, significant at 1% level, secondary school enrollment and the literacy rate are significant, respectively at 5% and 10% level. If the correlation between the share of Roman Catholics and secondary school enrollment is negative, it is positively linked to the literacy rate. Given the lasting presence of Catholic missionaries in Latin America since the sixteenth century, most schools have been held by orders and the Catholic religion has been prevalent ever since (Coleman, 1958(19)). A reasonable channel of impact could be that the more prevalent Roman Catholicism was in the country, the higher the number of Catholic institutions (such as schools, trade unions, youth movements and credit cooperatives) on the territory, which in turn was positively correlated with the literacy rate in the country. The negative correlation between the weight of Catholicism and the Secondary school enrollment rate shows that he Catholic church was more focused on basic education. Besides its impact through schools and other non-religious institutions, the Roman Catholic

[16] All variables are taken in logs

Table 4: Partial regression

	OLS	
Const	4.735	(0.406)
GDP growth rate	0.075***	(0.022)
Initial GDP per capita	0.082	(0.065)
Primary School Enroll.	-0.022	(0.021)
Secondary School Enroll.	-0.199**	(0.069)
Literacy	0.150*	(0.070)
Dummies	Yes	
R^2	0.63	
Adjusted R^2	0.43	
Nb of obs	18	

***significant at 1% level, ** at 5% level, * at 10% level
standard errors are in parenthesis

Church had a very powerful influence on Latin American societies through its 500 ecclesiastical jurisdictions (Alfaro, 1965(6)) and 15.745 parishes (Alonso, 1966(7)), and included a multitude of specialized programs, activities and associations. Because of this dominant presence, the Roman Catholic Church constantly defended itself against people or groups who claimed that its involvement in the society was too wide, defining a "competitive problem", as described by Vallier (1970(44)). In response to these attacks, the role of the Catholic Church as a social, economic and political institution was challenged, which caused a sharp differentiation between its specialized religious role, against other religions in Latin America; and its position as the dominant religion ruling Catholic schools, Catholic trade unions and Catholic political parties.
This general environment defined, in the words of Vallier (1970(44)), "a religio-Catholic culture', conceived more as an institutional force than a spiritual one, which however enhanced development through a different channel than that of beliefs. Rather, the Catholic institutions have helped develop literacy, local non-profit organizations, and promoted cooperation, thus fostering those human capabilities which proved to be the real (and only) driving force of Latin American development.

The question to be raised here is whether the determinants of economic growth are substitutable. Can a country reach full convergence when human capital accumulation and the influence of religion through education are the only engines of development, without innovation, without exports? In the case of Latin America, it seems that the lack of economic and technological power confined the subcontinent to a low growth path. Indeed, in the discussion of their results, Fagerberg and Srholec (2008(24)) point out the importance of a "well-developed innovation system" to sustain economic growth. They argue that among the four dimensions of production capability revealed in their analysis (the development of the "innovation system", the quality of "governance", the character of the "political system" and the degree "openness" to trade and foreign direct investment), the first one is "essential" for the success of a catching-up process. However, as described in the first part of the paper, the growth path chosen by Latin American Governments since the beginning of the twentieth century didn't place technological catching-up as a priority

for economic development. Contrary to the East Asian countries, they didn't believe in the success of an export-oriented and technology-oriented growth path ; and contrary to the Asian countries, they didn't succeed in catching-up.

Table 5: Regression results

	Equation 1			Equation 2		
	(1) OLS	(2)Iterative OLS	(3)Stepwise	(1) OLS	(2)Iterative OLS	(3)Stepwise
Const	1.497	-4.870	-4.10	0.023	0.796	-4.096
	(4.79)	(7.86)	(0.190)	(4.917)	(4.433)	(0.190)
Initial GDP per capita	-0.726	0.780	-	-0.480	-0.696	-
	(0.622)	(1.03)	-	(0.653)	(0.593)	
Factor 1	0.317	0.067	-	0.498*	-0.099	-
	(0.222)	(0.240)		(0.52)	(0.351)	
Factor2	0.827**	0.263	0.572**	0.882**	0.359	0.572**
	(0.293)	(0.368)	(0.196)	(0.293)	(0.338)	(0.196)
Factor 3	-0.234	-0.237	-	-0.082	-0.230	-
	(-0.196)	(0.254)		(0.236)	(0.221)	
Factor 4	-0.196	0.309	-	-0.262	0.485	-
	(0.195)	(0.288)		(0.202)	(0.355)	
Factor 5	0.604***	0.760***	0.617***	0.686***	0.650***	0.616***
	(0.195)	(0.190)	(0.196)	(0.205)	(0.185)	(0.196)
Dummies	No	No	No	Yes	Yes	Yes
R^2	0.67	0.43	0.55	0.71	0.27	0.55
Adjusted R^2	0.50		0.49	0.51		0.49
Nb of obs	18	16	18	18	17	18

***significant at 1% level, ** at 5% level, * at 10% level
standard errors are in parenthesis

5 Conclusion

This analysis has shown that Latin American economic growth in the Golden Age was based on the exploitation of Human Capital and the institutional legacy of the old colonial powers. Indeed, we found a high positive correlation between economic growth and the presence of Roman Catholics in Latin America, partly related to the role of the Catholic Church as an educational institution, thus positively affecting the literacy rate. The determinants traditionally put forward in the empirical growth literature and by Fagerberg and Srholec (2008(24)) such as technical change and openness, were not effective in Latin America. Contrary to what we expected, the political variables didn't impact economic growth, and although the macroeconomic fundamentals were negatively correlated with our dependent variable, they didn't impact economic growth in a significant way either. Therefore, without technological catching up or the exploitation of external growth opportunities, these countries, whatever initial potential they might have had, were not able to sustain the high rates of growth experienced by European countries at the period. The following period of political and economic turmoil marked the end of their dream to catch up with the World's leaders.

References

[1] Abramovitz M., "Catching Up, Forging Ahead, and Falling Behind", *The Journal of Economic History*, 1986, Vol. 46, No. 2, The Tasks of Economic History, (June), pp 385-406.

[2] Abramovitz M. and P. David, "Convergence and deferred catch-up: productivity leadership and the waning of American Exceptionalism" in R. Landau, T. Taylor, and G. Wright, eds., *The Mosaic of Economic Growth*, 1996, Stanford.

[3] Acemoglu D., S. Johnson, J A. Robinson, "Institutions as a Fundamental Cause of Long Run Growth", *Handbook of Economic Growth*, Edited by Philippe Aghion and Steven N. Durlauf, Volume IA, Ch. 6, 2005.

[4] Adelman I. and C.T. Morris, "A Factor Analysis of the Interrelationship Between Social and Political Variables and Per Capita Gross National Product", *The Quarterly Journal of Economics*, 1965, Vol. 79, No. 4 (Nov.), pp. 555-578.

[5] Adelman, I. and C. T. Morris, *Society, Politics and Economic Development*, The Johns Hopkins University Press (Baltimore, MD), 1967.

[6] Alfaro C., *Guia Apostolica Latinoamericana (Organizations and movements in Latin America)*, Barcelona, 1965.

[7] Alonso I., *Estadisticas Religiosas de America Latina (Religious Statistics for Latin America)*, 1966.

[8] Arocena R. and Sutz J., "Looking at National Systems of Innovations from the South", textitIndustry and Innovation, 2000, Vol.7, pp. 55-75.

[9] Arocena R. and P. Senker, "Technology, Inequality, and Underdevelopment: The Case of Latin America", *Science, Technology, & Human Values*, 2003, Vol. 28, No. 1 (Winter), pp 15-33.

[10] Astorga P., A. R. Berges, and E. V.K. Fitzgerald, *The Oxford Latin American Economic History Database (OxLAD)*, The Latin American Centre, Oxford University, 2003.

[11] Barro, R. J., "Economic Growth in a Cross Section of Countries", *Quarterly Journal of Economics*, 1991, Vol. 106, pp 407-43.

[12] Barro R.J. and R.M. McCleary, "Religion and Economic Growth across Countries", *The American Sociological Review* 2003, Vol. 68, No. 5 (Oct.), pp pp. 760-781.

[13] Becker, G. S. *Human Capital* Columbia University Press (New York), 1964.

[14] Brookins O.T., "Factor Analysis and Gross National Product: A Comment", *The Quarterly Journal of Economics* 1970, Vol.84, No. 4 (Nov.), pp pp. 648-650.

[15] Castaldi C., M. Cimoli, N. Correa and G. Dosi, "Technological Learning, Policy Regimes and Growth: General patterns and the Latin American case", *LEM Working Paper*, 2004.

[16] Castaldi C., M. Cimoli, N. Correa and G. Dosi, "Technological Learning, Policy Regimes and Growth: The Long Term Patterns and Some Specificities of a 'Globalized' Economy", mimeo, June 2008 .

[17] Castellacci F., "A Neo-Schumpeterian Approach to Why Growth Rates Differ", *Revue Économique*, 2004, Vol. 55, No. 6, Innovation, Structural Change and Growth (Nov.), pp. 1145-1169.

[18] Cohen W. M.; D. A. Levinthal, "Absorptive Capacity: A New Perspective on Learning and Innovation", *Administrative Science Quarterly*, 1990, Vol. 35, No. 1, Special Issue: Technology, Organizations, and Innovation. (March), pp. 128-152.

[19] Coleman W.J., *Latin-American Catholicism. A Self-Evaluation*, Maryknoll Publications (Maryknoll, NY), 1958.

[20] Comin D. and Hobijn B., "Cross-country technology adoption: making the theories face the facts", *Journal of Monetary Economics*, 2004, Vol. 51, pp. 39-83.

[21] De Gregorio J., "Economic Growth in Latin America", *Journal of Development Economics*, 1992, Vol. 39, pp. 59-84.

[22] Durlauf S. and D. T. Quah, "The New Empirics of Growth", *Handbook of Macroeconomics*, Edited by J.B. Taylor and M. Woodford, Vol. 1, Ch.4, 1999.

[23] Fagerberg J., M. Srholec and M. Knell, "The Competitiveness of Nations: Why Some Countries Prosper While Others Fall Behind", *World Development*, 2007, Vol. 35, No. 10, pp. 1595-1620.

[24] Fagerberg J. and M. Srholec, "National innovation systems, capabilities and economic development", *Research Policy*, 2008, Vol. 37, pp.1417-1435.

[25] Fiaschi, D. and A. M. Lavezzi, "Distribution Dynamics and Nonlinear Growth", *Journal of Economic Growth*, 2003, Vol. 8, pp 379-401.

[26] Gereffi G., "Rethinking Development Theory: Insights from East Asia and Latin America", *Sociological Forum*, 1989, Vol. 4, No. 4, Special Issue on Comparative National Development: Theory and Facts for the 1990s (Dec.), pp. 505-533.

[27] Harman H.H., *Modern Factor Analysis*, University of Chicago Press, 1960.

[28] Heston A., R. Summers and B. Aten, *Penn World Table Version 6.3*, Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania, August 2009.

[29] Jolliffe I.T., "A Note on the Use of Principal Components in Regression", *Journal of the Royal Statistical Society*, 1982, Series C (Applied Statistics), Vol. 31, No. 3, pp. 300-303.

[30] Kim L., "Stages of development of industrial technology in a developing country: a model", *Research Policy*, 1980, Vol. 9, pp. 254-277.

[31] Lavezzi, M. and M. Marsili, "An Empirical Analysis of Growth Regimes", mimeo, April 2010.

[32] Londono J-L., "Poverty, Inequality, and Human Capital Development in Latin America 1950-2025", *The World Bank*, 1996.

[33] Maddison A., *The World Economy: Historical Statistics of the World Economy: 1-2006 AD*, OECD, 2007.

[34] Ocampo J A. and J.Martin, *Globalization and Development*, Stanford University Press, Stanford, CA, and Economic Commission for Latin America and the Caribbean, Santiago, 2003.

[35] Pritchett L., "Divergence, Big Time", *Journal of Economic Perspectives*, 1997, Vol. 11, pp. 3-17.

[36] Rayner A.C., "The Use of Multivariate Analysis in Development Theory: A Critique of the Approach Adopted by Adelman and Morris" *The Quarterly Journal of Economics* 1970, Vol. 84, No. 4 (Nov.), pp. 639-647.

[37] Rodrik D. and Subramaniam A., *Why did financial globalization disappoint?*, Harvard University, March 2008.

[38] Russett, B. M., *World Handbook of Political and Social Indicators*, Yale University Press (New Haven), 1964.

[39] Solow R.M., "A Contribution to the Theory of Economic Growth", *The Quarterly Journal of Economics*, 1956, February, pp 65-94.

[40] Taylor A. M., "On the Costs of Inward-Looking Development: Price Distortions, Growth, and Divergence in Latin America", *The Journal of Economic History*, 1998, Vol. 58, No. 1 (March), pp. 1-28.

[41] Temple J. and H-J. Voth, "Human capital, equipment investment, and industrialization", *European Economic Review*, 1998, Vol. 42, pp. 1343-1362.

[42] Temple J. and P.A. Johnson, "Social Capability and Economic Growth", *The Quarterly Journal of Economics*, 1998, Vol. 113, No. 3 (Aug.), pp. 965-990.

[43] Thurstone L. L., *Multiple Factor Analysis*, University of Chicago Press, 1961.

[44] Vallier I., *Catholicism, Social Control, and Modernization in Latin America*, Prentice-Hall (Englewood Cliffs, NJ), 1970.

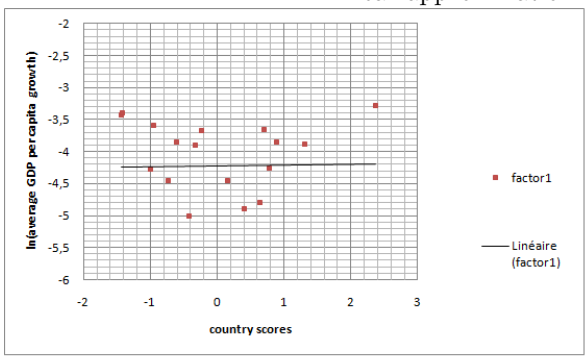
[45] Verspagen B., "A New empirical approach to catching up and falling behind", *Structural change and Economic Dynamics*, 1991, Vol. 2, No. 2.

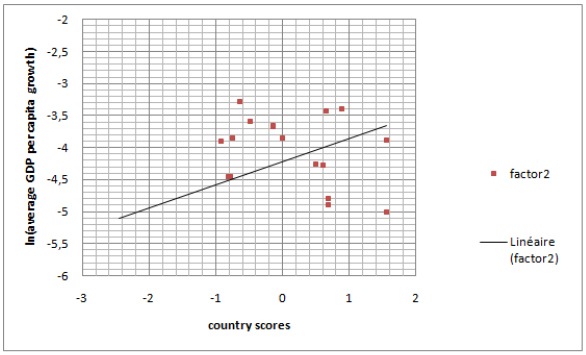
[46] Weber M., *The Protestant Ethic and the Spirit of Capitalism*, 1930, Unwin University Books (London).

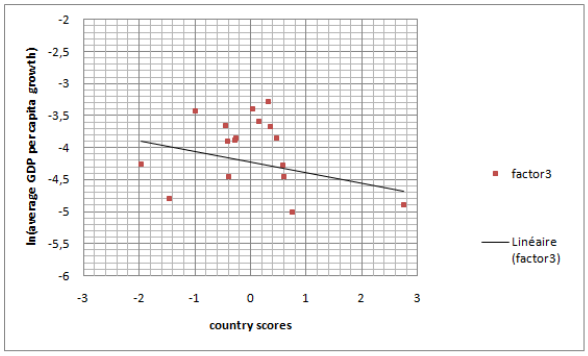
Appendix

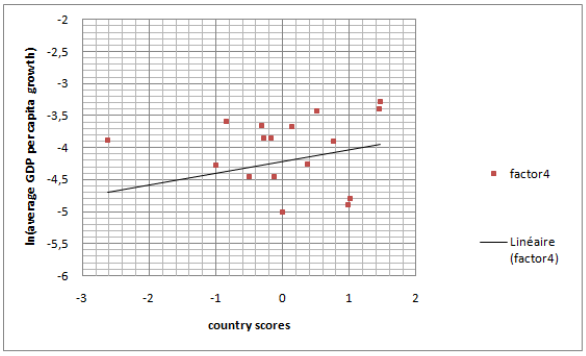
Appendix 1

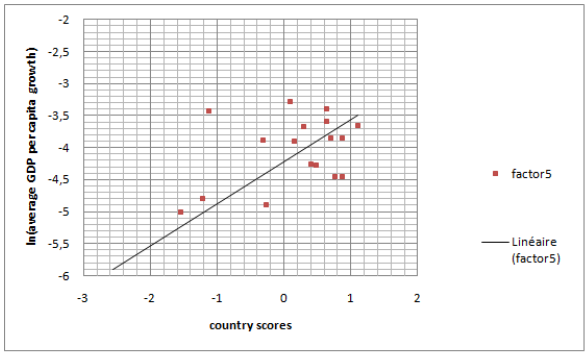
Linear approximation of country factor scores.











Appendix 2

Table 6: Data and Sources

Variables	Description	Source
GDP	million 1990 International Geary-Khamis dollars	Maddison
Population	Population (in thousands)	PWT
Life expectancy at birth	1950-55 and 1975-80	CEPAL
Nominal exchange rate	Local currency units per US dollar	OxLAD
GDP (1970 local currency)		OxLAD
Inhabitants per physician*	1958	Russett
Inhabitants per hospital bed*	1959-60	Russett
FDI	Net inflows (from balance of payments) expressed in million US dollars	OxLAD
Exports	Total value of merchandise exports valued FOB (free on board); expressed in million US dollars	OxLAD
Imports	Total value of import goods valued CIF (cost, insurance, and freight); expressed in million US dollars	OxLAD
Unit value of exports	The fixed-weight index of price of exports, generally constructed using the Laspeyres formula	OxLAD
Export quantum	The fixed-price index of the quantity of exports, generally constructed using the Laspeyres formula	OxLAD

mean 1950-1975 (or single value when *)

Variables	Description	Source
Consumer Price Index	the annual changes in the cost to the average consumer of acquiring a fixed basket of goods and services (Laspeyres formula)	OxLAD
Electricity Output	Gross output of electricity, expressed in million gigaWatt hours	OxLAD
Railways	Route length of line open at the end of each year; expressed in kilometres	OxLAD
EAP	Economically Active Population: The number of employed and unemployed persons	OxLAD
Primary school enrollment	Gross enrollment in primary level of education regardless of age; expressed in thousands	OxLAD
Polity score	It captures this regime authority spectrum on a 21-point scale ranging from -10 (hereditary monarchy) to +10 (consolidated democracy	Polity IV
Students enrolled in higher education*	per 100.000 population, in 1959-61	Russett
Percent. literate population above 15*	1950 (except Honduras 1960)	Russett
Percent. Roman catholics in pop.*		Russett

Appendix 3

Table 7: Rotated factor loadings with Initial GDP per capita

Variables	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	R^2
Initial GDP per capita	0.337	0.763*	-0.078	-0.129	-0.103	0.729
Population	0.975*	0.012	0.042	0.030	0.063	0.958
Life Expectancy	0.030	0.900*	-0.053	0.192	-0.145	0.872
Nominal Exch.Rate	0.260	0.096	0.748*	-0.179	0.232	0.722
Inhab. per Physician	-0.360	-0.867*	0.041	0.080	0.048	0.892
Inhab. per Hospital Bed	-0.156	-0.898*	0.007	-0.196	-0.104	0.879
FDI	0.722*	0.351	-0.122	0.322	0.034	0.764
Exports	0.889*	0.340	-0.081	0.020	-0.024	0.914
Imports	0.815*	0.390	-0.229	0.235	0.103	0.934
Unit Value of Imports	0.158	0.206	-0.814*	0.051	-0.172	0.762
Export Quantum	-0.008	-0.274	0.690*	0.238	-0.129	0.625
CPI	0.092	0.246	0.698*	0.310	-0.311	0.749
Electricity	0.435	0.082	0.006	0.739*	0.170	0.771
Railways	0.808*	0.322	0.286	-0.041	0.076	0.846
EAP	0.976*	-0.053	0.074	-0.022	-0.066	0.966
Primary School Enroll.	0.951*	0.123	0.054	0.090	0.142	0.950
Polity Score	-0.003	0.165	0.073	0.887*	-0.056	0.823
Students Enroll. In Higher Educ.	0.153	0.939*	-0.066	-0.035	0.052	0.913
Literate pop.	0.055	0.910*	0.080	0.191	0.225	0.925
Roman Catholics	0.124	0.076	0.052	0.031	0.956*	0.939

all variables are taken in logs except the polity score

Appendix 4

Table 8: Regression results with Initial GDP per capita

	Equation 1			Equation 2		
	(1) OLS	(2)Iterative OLS	(3)Stepwise	(1) OLS	(2)Iterative OLS	(3)Stepwise
Const	3.355	-3.552	-4.096	1.903	-4.458	-4.095
	(-5.419)	(4.608)	(0.183)	(5.598)	(3.865)	(0.182)
Initial GDP per capita	-0.967	-0.105	-	-0.736	-0.021	-
	(-0.703)	(0.594)		(0.739)	(0.501)	
Factor 1	0.359	0.003	-	0.485	-0.048	-
	(-0.220)	(0.217)		(0.252)	(0.247)	
Factor2	0.936**	0.210	0.564***	0.958**	0.060	0.564***
	(-0.327)	(0.329)	(0.188)	(0.328)	(0.304)	(0.188)
Factor 3	-0.208	-0.104	-	-1.011	-0.116	-
	(-0.187)	(0.146)		(0.214)	(0.141)	
Factor 4	-0.224	0.418	-	-0.262	0.537	-
	(-0.190)	(0.261)		(0.194)	(0.261)	
Factor 5	0.607***	0.760***	0.657***	0.673***	0.769***	0.657***
	(-0.188)	(0.149)	(0.188)	(0.199)	(0.129)	(0.188)
Dummies	No	No	No	Yes	Yes	Yes
R^2	0.71	0.48	0.59	0.74	0.50	0.59
Adjusted R^2	0.55		0.53	0.55		0.53
Nb of obs	18	17	18	18	17	18

***significant at 1% level, ** at 5% level, * at 10% level
standard errors are in parenthesis