# Social Cohesion and Economic Growth: Small States vs Large States

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## Small States *vs* Large States

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*ABSTRACT*

*The purpose of this paper is to analyze empirically if the effect of social cohesion on economic growth is conditioned by country size. Two groups of countries, large and small, were set up, and by using the System-GMM estimator and panel data in a 5-year rolling window, from 1970 to 2010, the impact of civil war and ethnic tension on growth rate of GDP per capita of the two groups of states was estimated. Also, the difference between small and large states in terms of the impact of civil war and ethnic tension on β-convergence rate was analyzed. We conclude that the effects of social cohesion (measured by civil war) in economic growth and in β-convergence rate are influenced by country size, and the positive effect is higher in small states.*

*JEL classification: O47, O57*

*Keywords: Country Size, Small States, Social Cohesion and Economic Growth.*

## 1 – INTRODUCTION

In recent decades several researches about small states have been published. Most of these studies focused on the impact of reduced dimension (land area, population or GDP) in growth and economic development (Armstrong et al., 1998; Briguglio, 1998; Easterly and Kraay, 2000). One of the first debates with a specific focus on issues concerning small states occurred in 1962 when the Institute of Commonwealth Studies initiated a series of seminars at the University of London. These seminars took place at regular intervals over a period of two years and they introduced more than 20 works related to the common problems faced by small states (Lockhart, 1993). These works were later edited by Benedict (1967) in his book *Problems of Smaller Territories*, constituting one of the first works about small states.

Many theoretical studies argue that small states compared to large states are disadvantaged due to the negative effect of small size on the economic growth process. Particular characteristics of small states include: small market size, small population, dependence on a limited export market and exported products and scarcity of natural resources. But, paradoxically, many small states have a high level of economic growth and they are part of the group of countries with the highest GDP per capita worldwide. Several authors explain the success of small countries by the strong social cohesion. Thus, we intend to analyze whether social cohesion impacts on economic growth is statistically different between small and large countries.

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The social cohesion or lack of social cohesion has influenced history of many countries and with impact on economic performance. The latest example of country division due to ethnic diversity is South Sudan's independence from Sudan in July 2011. We used civil war and ethnic tension to estimate the impact of the social cohesion on growth rate of GDP per capita. Also, the difference of social cohesion impacts between small and large states was analysed in terms of the effects on β-convergence rate.

In our analysis, we first use the statistical technique of cluster analysis to constitute two groups of countries, small and large, based on the size of the land area and population. Subsequently, we refer to the generic formula used in studies of economic growth and system-GMM estimator for our empirical analysis. Our database is for the period 1970-2010. We conclude that the effects of social cohesion (measured by civil war) on economic growth and on β-convergence rate are influenced by country size, and the negative effect is higher in large states.

This paper is structured as follows: the second section provides a review of the literature and some stylized facts; the third section presents the methodology, the model and the database; the fourth section presents the empirical results and discussion; and finally, the fifth section is dedicated to the conclusion.

## 2 – AN OVERVIEW OF THE LITERATURE

### 2.1 – Country Size

We found several criteria used to define country size, such as population, land area, total GDP or external trade, but there is no consensus about the best and most complete criteria to be applied. However, population size is the most common. According to Read (2001), the common use of population as a criterion to define countries size is due to the wide availability of the data and the easy way that the limits can be established. However, we did not find any authors that present theoretical or statistical justification for the use of a certain limit.

The population size used to define small states has been varying over time. In the 70s and 80s it was 5 million (Jalan, 1982), in the 90s and the first decade of this century it was 1.5 million (Commonwealth Secretariat, 1997) and 3 million (Armstrong et al., 1998). Some authors criticize the use of the population as a measure of country size. Read (2001) critiqued the use of the population, because it is a continuous variable and there is no theoretical natural reason to explain the arbitrary choice of a structural limit.

We found some studies that define the countries through a combination of population, land area and GDP. Crowards (2002) defined small sates with: population – 2.7 million; area – 40,000 $km^2$; and, GDP – $ 2,500 million. Thorhallsson (2006) defines "micro" states as correspond to states with military expenditure lower than 400 million US dollars. There are others studies that define country size by external trade. Davenport (2001) classifies small states are those with exports less than 0.03% of world trade.

In this paper we define countries sizes by a combination of land area and total population. We used cluster analysis to classify the countries according to the size of

population and land area.[1] Some studies in this subject use the combination of population, land area and GDP to classify countries. In our case we did not consider the GDP because this variable could also serve as an indicator of the country's level of development. Moreover, the object of our research is small states and not states with small economic size.

We used the data of 2009 for 215 states and we set up two groups of states, a group with 83 small states (we can consider 45 as “small” and 38 as "micro") and the other with 132 large states (we can consider 127 as “medium” and 5 as “large”).[2]

## 2.2 – Some Characteristics of Small States

The theoretical literature suggests several factors that can explain the economic growth of a country as a result of their size. Since this study focuses on small states, we will describe the benefits and constraints of small country size. In dichotomous terms, some of these constraints/benefits can be seen as a benefits/constrains to large states:

1) High per capita cost of some goods and services due to small population – this high cost is explained by indivisibility of the cost of various public goods and services and the political costs. This indivisibility is indicated as a barrier to international competitiveness of small states (Briguglio, 1995).

2) Small domestic market – the small domestic market does not support multiple companies producing the same goods and services, thus, the economic structure is less diversified in small states (Briguglio, 1995). Small size of the market (in terms of land area and population) may lead to less diversification of raw materials and resources, which restricts domestic production (Castello and Ozawa, 1999). These characteristics imply that small states have strong geographic concentration of exports and limited diversification of production and exports, which increase the exposure to external shocks. The small domestic market leads the country to a high level of openness to external trade, which also increases exposure to external shock.

3) Difficulties to access the capital markets – the private financial markets identifies small countries as having greater risk than large countries due to vulnerability and the trend to weak growth in the long term. Thus, the spreads are high and the access to funding is more difficult for small countries. This results in high external debt and financing costs (Eckaus 1995; Armstrong and Read, 2003; Commonwealth, 2014). Nonetheless, Srinivasan (1985) and Bray (1992) found that small countries receive net official transfers per capita and in terms of weight in budget support higher than large countries, which helps to mitigate the difficulty to access the foreign financial markets.

4) High environmental, economic, social and political vulnerability – the environmental vulnerability is due to the location of countries (small and large) in areas subject to these disasters. However, the greater vulnerability of small states, according to Briguglio (1995), is due to the disproportionate effect (in terms of unit area and per capita cost) that a disaster of

[1] There are various techniques, methods and measures that can be applied in the clusters analysis, depending on the type of data and the purpose of the study. For our study, because the number of objects is reduce, we used the hierarchical technique (which is the most appropriate for reduce objects), the measure Squared Euclidean Distance and the method Average Linkage Between Groups. The statistical program used to do the calculations was SPSS 17.0.

[2] The group of countries is in the appendix. Even considering a more recent data of population and land area there is no change in the country groups classification.

the same intensity may have in a small state compared with a large state. The economic vulnerability of small states according to Armstrong and Read (2003), is explained by the high degree of external trade, small domestic market, high per capita cost of certain goods and services, export concentration and little diversification of production. Downes and Mamingi (2001) link the social vulnerability of small states to their inability to withstand external cultures and social influences which have proven to be very costly in financial and human terms for these states. Political vulnerability results from direct or indirect dependence of small states on political intentions of large and powerful countries, in terms of trade and other assistance (Castello and Ozawa, 1999; Downes and Mamingi, 2001).

5) Strong social cohesion – Castello and Ozawa (1999) consider small states more open to changes, extremely adaptable and flexible to new challenges, with greater political integration and better prepared to face uncertainties and external shocks, due to the prevalence of greater solidarity and social cohesion. According to Bray (1992) and Castello and Ozawa (1999), small countries tend to develop a very integrated society and with a very complex relationship network due to reduced geographical distance and higher frequency of face-to-face contact. This allows to a high degree of communication and efficient flow of information between government and companies, which is important to strengthen the relationship between the two sectors. These behaviours have a positive impact on economic growth (Armstrong and Read, 2003).

Homogeneity of population – Alesina and Spolaore (1997) and Alesina (2003) argue that larger population may involve less homogeneity, because the cultural differences has a positive correlation with country size. This implies that the public choices are close to the average individual's preferences in a small state. The stability of many national governments has been threatened by serious domestic conflicts associated with racial, religious and linguistic diversity. Hence, greater social homogeneity is conducive to a more stable government.

We conclude that the difficulty to taking advantage of the economies of scale in various economic activities seems to be the main constraints associated with small countries. However, Backus et al. (1992) observe that there is not a strong connection between GDP per capita and measures of scale effects. On the other hand, the strong social cohesion is indicated as the main benefit associated with the small country size. But, Briguglio (1995) argues that this greater cohesion in small states can create administrative problems, in the sense that people know each other well and are related very often. This may compromise impartiality and efficiency in public administration by for example interfering with the promotion and recruitment of the workforce, which should be based on merit.

### 2.3 – Social Cohesion and economic growth

We found several definition of social cohesion. Easterly et al. (2006) defines social cohesion as the nature and extent of social and economic divisions within a society. These divisions may be by income, race, political party, social class, language or other demographic variables. Berger-Schmitt (2002) considers social cohesion as the strength of social relationships and associations, and the sense of belonging to the same community. According to Berger-Schmitt (2002) the concept of social cohesion covers two dimensions: i) *inequality dimension* - the goal is to promote equal opportunities and reduce disparities and divisions within a society. It also includes the aspect of social exclusion; ii) *social capital dimension* - the goal is to strengthen social relations, interactions and push and embraces all aspects which

are usually understand as the social capital of a society. Jenson (2010) defends that greater social cohesion leads to better institutions and better institutions leads to higher growth.

Different measures are used as a proxy to analysis the impact of social cohesion on economic growth. Knack and Keefer (1997) measured social cohesion by the level of trust in a society, and the result was a positive and significant impact on economic growth. Easterly and Levine (1997) used the ethno-linguistic diversity as a proxy of social cohesion, and they found an inverse relationship between the proxy and economic growth. Montalvo and Reynal-Querol (2005) considered the proxy religious heterogeneity and the result was a negative effect on economic growth.

Since the social cohesion positively influences the growth rate of GDP, the countries should promote social cohesion. The quality of institutions, the level of education and the level of income are indicated as important factors to increase the social cohesion. Heyneman (2000) argues that exist three ways by which education promotes social cohesion: i) provides public knowledge of the social contract; ii) promotes the expected behaviour relatively to social contracts, as a result of the social experiences that the students acquire in schools; iii) helps to understand the consequences of non-compliance of contracts. Alesina and Ferrara (2000) argue that have income successful favours the "trust" (social cohesion), because the professional experience of success is likely to make the individual more susceptible to trust. For Sokoloff and Engerman (2000) economic institutions with high quality allow broad access and share of economic opportunities, which reduce the inequalities and promote social cohesion.

Social cohesion is indicated as one of the main benefits of small country size (Armstrong et al, 1998; Briguglio et al, 2006; Guillaumont, 2010). Small countries usually have higher degree of social homogeneity, cohesion and identity, which facilitates the formation of social capital and a more fertile environment for economic growth (Armstrong and Read, 1998). Be part of the same country implies agreements about policies to facilitate governance (as: redistribution schemes, provision of public goods and foreign policies). The small size facilitates consensus and common involvement in decision making (Alesina, 2003). On the other hand, social cohesion allows more contact between members of a society, which favours nepotism and clientelism, which are factors that do not favour the competition in economic sectors. In this sense, we will empirically analyze if the impact of social cohesion on economic growth is influenced by the country size.

### 2.4 – Stylized Facts

The low population and land area are presented as the main constraints to economic growth of small states, since these dimensions translate into small domestic market (population) and natural resources (land area). In the period 1970-2010 the average annual growth rate of GDP per capita was statistically significantly higher in small states (2.1%) compared to large states (1.7%).[3] The growth rate of GDP per capita was higher in small states during the period 1970-2005, but in the last five years (2006-2010), large states had higher growth performance. The average level of GDP per capita is statistically significant higher in small states (US$12,262) compared to large states (US$8,244) in the period 1970-2010. Even with the elimination of the five small states (Bermuda, Brunei, Kuwait, Qatar and Luxembourg) with the highest average level of GDP per capita, the average level of the group

[3] The groups of small and large states are the groups defined in this study.

remains higher than the group of large states.[4] These facts show that the small size compared to large size is not a handicap to economic growth.

Assuming the linguistic diversity index as a proxy to social cohesion, we conclude that the average of the index is lower in small countries comparing to large countries, and this difference is statistically significant at 10%. If we consider civil war as a proxy to social cohesion, we find that the 91 countries (10 small countries and 81 large countries) with information available, the average years with civil war in the period 1970-2010 is higher in large countries (11.33 years) compared to small countries (1.14 years).[5] Thus, we conclude that social cohesion is superior in small countries.

## 3 – EMPIRICAL MODEL AND DATA

### 3.1 – Empirical Model

Our empirical model follows the generic formula used in studies of economic growth, which includes Augmented Solow model plus other determinants of growth. Considering the studies of Caselli et al. (1996), Levine et al. (2000) and Aisen and Veiga (2013), this is our model of economic growth:

$$lnY_{i,t} - lnY_{i,t-1} = \gamma lnY_{i,t-1} + \psi X_{i,t} + \theta Z_{i,t} + \mu_i + \omega_t + \epsilon_{i,t} \quad (1)$$

where: $lnY_{i,t}$ – logarithm of real GDP per capita of country $i$ at the end of period $t$; $X_{i,t}$ – vector of basic variables; $Z_{i,t}$ – variables of interest; $\mu_i$ – country individual effect; $\omega_t$ – period specific effect; $\epsilon_{i,t}$ – error term; γ, $\psi$, and θ – parameters to be estimated; $i$ = 1,…,N (represents countries); and, $t$ = 2,…,T (period).

Assuming $\vartheta = 1 + \gamma$ and $y_{i,t} = lnY_{i,t}$ the equation (1) is equivalent to:

$$y_{i,t} = \vartheta y_{i,t-1} + \psi X_{i,t} + \theta Z_{i,t} + \mu_i + \omega_t + \epsilon_{i,t} \quad (2)$$

In this dynamic model the lagged dependent variable ($y_{i,t-1}$) may be correlated with the error term ($\epsilon_{i,t}$) and the individual effect ($\mu_i$). Also, we have the situation of the endogenous variables $X$ and $Z$. The use of the OLS estimator in equation (2) will be inconsistent and biased. First-difference of equation (2) eliminates the individual effects (which solves the problem of heterogeneity and thus prevents the estimator bias), as $\mu_i - \mu_i = 0$. The equation becomes:

$$\Delta y_{i,t} = \vartheta \Delta y_{i,t-1} + \psi \Delta X_{i,t} + \theta \Delta Z_{i,t} + \Delta \omega_t + \Delta \epsilon_{i,t} \quad (3)$$

But, we still have the problem of autocorrelation, because $y_{i,t-1}$ term in $\Delta y_{i,t-1} = y_{i,t-1} - y_{i,t-2}$ is correlated with the $\epsilon_{i,t-1}$ in $\Delta \epsilon_{i,t} = \epsilon_{i,t} - \epsilon_{i,t-1}$, and, on the other hand, any predetermined variables in $X$ or $Z$ that are not strictly exogenous become potentially endogenous because they may be related with $\epsilon_{i,t-1}$ (Roodman, 2009b).

Arellano and Bond (1991) indicate the use of instrumental variables in the regression of the first-differences equation (3) that solves the problem of autocorrelation and endogeneity.

[4] Data source: GDP per capita are from Penn World Table - PWT 7.1.
[5] Data source: Uppsala Conflict Data Program/Peace Research Institute Oslo (UCDP/PRIO) Armed Conflict Dataset, version 4 - 2011: www.ucdp.uu.se.

The authors propose as instruments the use of the lagged variable into two or more periods if it is endogenous, the use of lagged variable into one or more periods if it is predetermined, and the use of variable as their own instruments if it is strictly exogenous.

The GMM (Generalized Method of Moments) estimator applied to the moment conditions of the equation (3) is known as First-differenced GMM (see: Arellano and Bond, 1991). Blundell and Bond (1998) showed that the First-differenced GMM estimator may be biased when the value of the parameter ($\vartheta$) is close to one. Thus, Blundell and Bond (1998) propose the use of system-GMM estimator which combines in one system the equation in first-difference (3) with the equation in levels (2) as the best estimator to solve the econometric problems associated with our economic model (the endogeneity of explanatory variable and country specific effects). For the equation in levels (2), Arellano and Bover (1995) suggest the use of the lagged values of the variables in first difference as valid instruments if the explanatory variable in level is correlated with the fixed effect ($\mu_i$) and the first difference is not.

Blundell and Bond (1998) presents three advantages associated with system-GMM over other estimation methods for dynamic panel data models: i) The estimator is not biased by the omission of variables that are constant over time; ii) The use of instruments allows parameters to be estimated consistently in models with endogenous explanatory variables; and, iii) The use of instruments potentially allows consistent estimation even in the presence of measurement error.

We tested the consistency of the system-GMM estimator using the following tests: Hansen test – validity of the instrument matrix; difference-in-Hansen – validity of the subsets instruments; and, Arellano and Bond (1991) – independence of the error term.

In addition to the model presented above, we will use another model in order to assess the statistical significance of differences between the coefficients of the variables of interest in small and large states. Thus, we include a third column in the table, where we have common data for the basic variable and the variables of interest (social cohesion) are interacted with a dummy variable to identify the two groups of states. The statistical significance of the difference between the coefficients of the interaction terms is analyzed by the Wald test. The model to be estimated is:

$$\Delta y_{i,t} = \vartheta \Delta y_{i,t-1} + \psi \Delta X_{i,t} + \theta \Delta Z_{i,t} * d_L + \lambda \Delta Z_{i,t} * d_S + \Delta \omega_t + \Delta \epsilon_{i,t} \qquad (4)$$

where: $d_L$ – *dummy* = 1 for Large states; $d_S$ – *dummy* =1 for Small states.

By the literature review we conclude that variables such as initial level of GDP per capita, human capital, investment and population growth display similar economic and statistical behaviour in relation to growth rate of GDP per capita in both small and large countries. Thus, we consider these variables basic to our model and are kept in all regressions. On the other hand, we consider civil war and ethnic tension as proxies to social cohesion (our variable of interest) and we will investigate empirically whether their impacts on the growth rate of GDP per capita are significantly different between small and large states.

We used the econometric software STATA.12 to estimates our model. The estimates are made using the command "*xtabond2*" developed by Roodman (2009b). We use the "*robust*" option on the command "*xtabond2*" in all estimations, to ensure that the estimator is robust to heteroskedasticity. Following Roodman (2009a), in all estimations the number of instruments is less than the number of countries in order to prevent bias in statistical tests.

### 3.2 – Data and variables

Our unbalanced panel data refers to the period 1970-2010 for 159 states, of which 31 are classified as small and 128 as large states.[6] The data were first considered in 5 year periods non-overlapping (1971-1975, 1976-1980,..., 2006-2010), but in the group of small states the observations are fewer and we could not have results with economic and statistical significance for many variables. Thus, we used the 5-year "rolling window" for all variables, which led to a larger number of observations.[7]

The "rolling windows" technique allows for a greater number of observations. However, it can create autocorrelation. To overcome the problem of autocorrelation and endogeneity we had to use more lags. So, to limit instrument proliferation, we follow Roodman (2009a and 2009b) and used the "*collapse*" option, available with the command "*xtabond2*" in STATA program.[8] This option generates one instrument for each variable and lag distance, instead of one for each time period, variable, and lag distance. The "rolling windows" technique can also generate multicollinearity of the regressors. We used the Variance Inflation Factors (VIF) test to detect the collinearity of the regressors. Also, we tested all estimations for sensitivity to reduction in the number of instruments.

Our main data source is the PWT 7.1. Although there is a new version, the PWT 8.0, we chose the PWT 7.1 because it contains more data on the group of countries identified as small in our study. The variables were considered endogenous. The variables of the model are:

- Initial GDPpc (log) (PWT) – Logarithm of real GDP per capita (PPC, I$, 2005) lagged by 5 year period. A negative coefficient is expected.
- Invest. (% GDP) (PWT) – Average investment (% GDP) over the current 5 year period. A positive coefficient is expected.
- Secondary (%) (World Development Indicators - WDI) – Average of secondary school enrolment rate over the current 5 year period. This is a proxy for the level of human capital. A positive coefficient is expected.
- POP_gr (%) (PWT) – Average of population growth rate over the current 5 year period. A negative coefficient is expected.
- Civil war – Refers to the year in which a country had situations of ethnic or civil war or civil violence. A dummy is used and is equals to 1 if there was civil war during the year. The period considered is 1970-2010. A negative coefficient is expected.[9]
- Index of ethnic tension – Measures the degree of tension within a country caused by racial, nationalities and languages divisions. The index ranges between 0 and 6, where low ratings correspond to countries with higher tension. The period considered is 1984-2010. A positive coefficient is expected, because lower tension means greater social cohesion.[10]

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[6] The table with data is on appendix.

[7] Example of studies that used rolling window: Barrell and Gottschalk (2004) and Klomp and de Haan (2009).

[8] The "collapse" option makes this transformation of the instrument matrix (Roodman, 2009b):

From: $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \dots \\ y_{i,1} & 0 & 0 & 0 & 0 & 0 & \dots \\ 0 & y_{i,2} & y_{i,1} & 0 & 0 & 0 & \dots \\ 0 & 0 & 0 & y_{i,3} & y_{i,2} & y_{i,1} & \dots \\ \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \ddots \end{bmatrix}$ to : $\begin{bmatrix} 0 & 0 & 0 & \dots \\ y_{i,1} & 0 & 0 & \dots \\ y_{i,2} & y_{i,1} & 0 & \dots \\ y_{i,3} & y_{i,2} & y_{i,1} & \dots \\ \vdots & \vdots & \vdots & \ddots \end{bmatrix}$

[9] Data source: Marshall, M. C. (2013) Major Episodes of Political Violence (MEPV) and Conflict Regions. Center for Systemic Peace: www.systemicpeace.org.

[10] Data source: International Country Risk Guide (ICRG): https://www.prsgroup.com/about-us/our-two-methodologies/icrg.

- Time dummy – We divide the period of analysis into 5 year periods, non-overlapping, and we assume each period as a time dummy.

## 4 – EMPIRICAL RESULTS AND ANALYSIS

### 4.1 – Social Cohesion and Economic Growth

In table 1, the variables of interest (index of ethnic tension and civil war) have the expected behaviour. The basic variables have the expected signals and most are statistically significant. Initial GDP per capita has a negative and statistically significant coefficient in all estimations of the two groups. Investment (% GDP) and Secondary (% GDP) have positive impacts in all estimations of the two groups and most of the effects are statistically significant. The population growth coefficient is negative and statistically significant in almost all estimations.

On the estimation with the ethnic tension (column 2), in order to avoid that the number of instruments exceeds the number of countries, we did not consider time dummies, due to the shortage number of observations for small countries. We considered time dummies in the remaining estimations, but the coefficients are not included in the tables in order to save space. The Hansen test did not reject the validity of the instruments used, the autocorrelation test rejects second-order autocorrelation, the difference-in-Hansen test did not reject the validity of the subsets of instruments and the VIF test does not show the existence of multicollinearity. Therefore, these tests support the validity of our results.[11]

The coefficients of the variable index of ethnic tension are positive and statistical significance in both groups of countries (columns 1 and 2) and the coefficient is higher in the group of small countries (column 2). The result was expected because small countries are characterized by higher social cohesion. By the estimation to compare the coefficients between the two groups of countries, we found that the index of ethnic tension has a positive and statistically significant impact in the two groups of countries (column 5). The coefficient still higher in small countries, but the Wald test does not reject the null hypothesis of equality of the coefficients. [12]

The variable civil war has a negative effect in small countries, but is not statistically significant (column 4). Doing the estimation to compare the coefficients between the two groups of countries (column 6), the variable continues not statistically significant, but the effect become positive in small countries. On large countries, civil war has negative and statistically significant impact (columns 3 and 6). So, we conclude that civil war seems to have uncertain effect on small countries, however, in neither case is statistically significant. But in the large countries the effect is negative and statistically significant. This lack of statistical significance of the civil war in small countries may be explained by the reduced period of civil war in small countries.

Thus, we conclude that the lack of social cohesion has a negative effect on growth rate of GDP per capita. The effect of social cohesion (when is measured by civil war) on growth rate of GDP per capita is influenced by country size and the negative impact is superior in

[11] The results of the VIF test are in appendix (table A.3). There is evidence of multicollinearity if: i) The largest VIF is greater than 10 (some choose a more conservative threshold value of 30); ii) The mean of all the VIFs is considerably larger than 1.

[12] Wald test: $chi^2(1) = 0.14$; $Prob > chi^2 = 0.7062$ - Accept the null hypothesis of equal coefficients.

large countries. This result is consistent with the conclusion of the stylized facts previously analyzed, where we verify that small countries have higher social cohesion.

**Table 1: Social Cohesion and Economic Growth**

| Variables | (1) GDPgr_L | (2) GDPgr_S | (3) GDPgr_L | (4) GDPgr_S | (5) GDPgr_T | (7) GDPgr_T |
|---|---|---|---|---|---|---|
| Initial GDPpc (log) | -0.0532*** | -0.0353* | -0.0302** | -0.0873*** | -0.0548*** | -0.0345*** |
| | (-4.094) | (-1.879) | (-2.193) | (-3.830) | (-5.114) | (-3.945) |
| POP_gr (%) | 0.196 | -1.842*** | -0.661 | -1.018** | 0.178 | 0.286 |
| | (0.105) | (-3.699) | (-0.914) | (-2.481) | (0.153) | (0.390) |
| Invest. (% GDP) | 0.000684 | 0.00214 | 0.000806* | 0.00348** | 0.00119 | 0.000922 |
| | (0.859) | (0.933) | (1.747) | (2.454) | (1.042) | (1.288) |
| Secondary (%) | 0.00168*** | 0.00142 | 0.00108** | 0.00198* | 0.00145** | 0.00129*** |
| | (2.648) | (0.909) | (2.178) | (1.847) | (2.365) | (4.022) |
| Index ethnic tension | 0.00874* | 0.0514** | | | | |
| | (1.670) | (2.269) | | | | |
| Dummy civil war | | | -0.0169* | -0.0406 | | |
| | | | (-1.744) | (-0.824) | | |
| Index ethnic tension_L | | | | | 0.0281** | |
| | | | | | (2.283) | |
| Index ethnic tension_S | | | | | 0.0304*** | |
| | | | | | (2.738) | |
| Dummy civil war_L | | | | | | -0.0335* |
| | | | | | | (-1.845) |
| Dummy civil war_S | | | | | | 0.0900 |
| | | | | | | (1.385) |
| Nº observations | 2,579 | 488 | 4,145 | 863 | 3,067 | 5,008 |
| Nº Countries | 113 | 23 | 128 | 31 | 136 | 159 |
| Nº instruments | 51 | 20 | 113 | 28 | 30 | 110 |
| Hansen test (p-value) | 0.111 | 0.330 | 0.252 | 0.229 | 0.433 | 0.311 |
| AR1 test (p-value) | 0.643 | 0.0944 | 0.694 | 0.862 | 0.138 | 0.261 |
| AR2 test (p-value) | 0.421 | 0.774 | 0.892 | 0.774 | 0.136 | 0.874 |
| Difference-in-Hansen tests (p-value) | | | | | | |
| Instruments level | 0.182 | 0.830 | 0.658 | 0.345 | 0.909 | 0.203 |
| Time Dummies | 0.651 | | 0.170 | 0.302 | 0.147 | 0.488 |

Notes: The dependent variable is growth rate of GDP per capita (GDP_gr). Meaning of acronyms: _L – group of Large states, _S – group of Small states, _T – Total states. t-statistics are in parenthesis. Significance level to reject the null hypothesis: *** - 1%, ** - 5% e * - 10%.

### 4.1.1 – Sensitivity analysis

We checked the robustness of our conclusion about the difference between the coefficients of the variables of interest across the two groups of countries by doing a sensitivity analysis of our results. First, we used other criteria to classify the countries in clusters, by considering separately total GDP, total population and total land area to define the clusters. Also, a limit of 3 million was used to define small countries (following Armstrong et al., 1998), but the results were identical to those obtained with the use of the total population variable to define the clusters, so we do not present these estimations. Second, we controlled the sample by excluding high income states, low income states and member states of the Organization of Petroleum Exporting Countries (OPEC) plus other states considered

petroleum exporters by United Nations Conference on Trade and Development (UNCTAD).[13] Third, we eliminated the first and last 10 years of our database, forming two sub-periods, 1970-2000 and 1980-2010. Finally, we eliminated some states with population and land area outliers in each group.[14] The tables with the estimation results are in the appendix (tables A.4 and A.5).

Due to limited observations available, we did not consider the sub-period 1970-2000 for the estimation with index of ethnic tension. In all estimations, the index of ethnic tension has positive and statistically significant coefficients in both groups of countries, and the differences between the coefficients are not statistically significant by Wald test. The variable civil war has no statistical significance in the group of small countries and in the group of large countries, the coefficients are negative and most statistically significant. This finding is consistent with that obtained above. All regressions passed the specification tests of Hansen, autocorrelation and difference-in-Hansen, and the VIF test does not show the existence of multicollinearity. Hence, our findings are robust to changes in the criteria used to classify the countries, the country income level, the removal of outliers and the sample period used.

### 4.2 – $\beta$-convergence

In this subsection we analyze the impact of social cohesion in the β-convergence rate across the countries of each group. The neoclassical model defend diminishing returns to capital, so if two economies have the same preferences and technologies, poorer economies typically grow faster and tend to catch up to the richer economies (Barro and Sala-i-Martin, 1992). The concept of β-convergence is divided into absolute (unconditioned) and conditional. Absolute convergence means that poor country grows faster than rich country and in the long run achieves the same steady state. In this situation, it is not considered the influence of structural variables on econometric estimation. Conditional convergence means that countries converge to different steady states, and it is considered the influence of structural variables on econometric estimation. We will analyse conditional convergence.

#### 4.2.1 – The model

Considering the neoclassical model defined in the studies of Solow (1956), Mankiw et al. (1992) and Islam (1995):

$$log(\hat{Y}_t) - log(\hat{Y}_{t0}) = (1 - e^{-\beta T})log(\hat{Y}^*) - (1 - e^{-\beta T})log(\hat{Y}_{t0}) \qquad (5)$$

where: $\hat{Y}_T$ – GDP per effective unit of labour at time *t*; $\hat{Y}_{t0}$ – GDP per effective worker at some initial date; $\hat{Y}^*$ – steady-state level of GDP per effective worker; $\beta$ – convergence rate; $\beta = (1 - \alpha - \varphi)(n + g + \delta)$.

[13] We followed the income classification of countries defined by the World Bank for the year 2010. We exclude 18 petroleum exporting states: Angola, Algeria, Libya, Nigeria, Venezuela, Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates, Kazakhstan, Russia, Norway, Ecuador, Gabon and Indonesia.

[14] Outlier countries: Small States (Hong Kong, Singapore, Moldavia, Lebanon, Puerto Rico, Guyana, Suriname, Iceland and Latvia); Large States (China, United States, Indonesia, Russia, Brazil, Canada and Australia).

A conventional representation of the growth model in panel data for our estimation is given by:

$$log\left(\frac{y_{i,T}}{y_{i,t_0}}\right) = \gamma log\left(y_{i,t_0}\right) + \psi X_{i,T} + \theta Z_{i,T} + \lambda\left(Z_{i,T} * logy_{i,t_0}\right) + \mu_i + \omega_T + \epsilon_{i,T} \quad (6)$$

where: $y_{i,T}$ – GDP per capita of country *i* at time *T*; $y_{i,t_0}$ – GDP per capita of country *i* at initial date; $X_{i,T}$ – vector of basic variables; $Z_{i,T}$ – variables of interest; $\mu_i$ – country individual effect; $\omega_T$ – period specific effect; $\epsilon_{i,T}$ – error term; γ, $\psi$, $\lambda$ and θ – parameters to be estimated.

In the neoclassical growth model the existence of convergence implies that the γ coefficient is negative. Considering $\gamma = -\left(1 - e^{-\beta T}\right)$, applying logarithms, we have: $T\beta = -\ln(1+\gamma)$ and dividing by *T,* we have annual convergence rate: $\beta = -\frac{\ln(1+\gamma)}{T}$.

The derivative of equation (6) with respect to initial GDP per capita ($y_{i,t_0}$) gives the impact of the variables of interest in the convergence rate:

$$\frac{\partial \Delta y_{i,T}}{\partial \Delta y_{i,t_0}} = \gamma + \lambda Z_{i,T} \quad (7)$$

### 4.2.2 – Empirical results and analysis

The basic variables and the variable of interest have the same sources and period of analysis used previously. The data are in a 5 year "rolling window" and we use the system-GMM to estimate our model.

The results are reported in table 2. Initial GDP per capita has a negative and statistically significant coefficient in all regressions, which means existence of conditional convergence across countries of each group. Most of the variables have the expected coefficients signals and are statistically significant. The Hansen test never rejects the validity of the instruments matrix, the autocorrelation test always rejects the existence of a second order autocorrelation and the difference-in-Hansen test never rejects the validity of the subsets of instruments, so these tests support the validity of the results.

We focus our analysis on the effect of the interaction term of initial GDP per capita with the proxies of social cohesion on β-convergence rate and in comparing the coefficients of interaction term between the two groups of states. The interaction terms with index of ethnic tension (columns 1 and 2) have a negative effects and not statistically significant in both groups of countries. Comparing the two coefficients (column 5) we see that the impact remains negative and not statistically significant. The interaction terms with civil war (columns 3 and 4) has the expected effects, positive, but is not statistically significant. The estimation to compare the coefficients of interaction term between the two groups of countries (column 6) indicated a positive coefficient, as expected, but is statistically significant only in large states. Thus, lack of social cohesion (measured by civil wars) seems to contribute statistically significant for the reduction of β-convergence rate only in larges states. But when the social cohesion is measured by index of ethnic tension the effect in the β-convergence rate is not statistically significant in both groups.

**Table 2: *β*-convergence – Social Cohesion**

| Variables | (1) GDPgr_L | (2) GDPgr_S | (3) GDPgr_L | (4) GDPgr_S | (5) GDPgr_T | (6) GDPgr_T |
|---|---|---|---|---|---|---|
| Initial GDPpc (log) | -0.0505** | -0.0215* | -0.0455*** | -0.0177* | -0.0327* | -0.0219** |
| | (-2.103) | (-1.652) | (-4.089) | (-1.682) | (-1.663) | (-2.266) |
| Secondary (%) | 0.0023*** | 0.00196 | 0.00157*** | 0.00198 | 0.0016*** | 0.000620 |
| | (3.264) | (1.171) | (3.334) | (1.515) | (3.651) | (1.637) |
| POP_gr | 1.275 | -1.252 | 0.350 | 1.418 | 0.556 | 0.921 |
| | (0.759) | (-1.023) | (0.286) | (0.770) | (0.820) | (1.076) |
| Invest. (% GDP) | 0.00177* | -0.000258 | 0.00167* | 0.00156 | 0.000688 | 2.45e-05 |
| | (1.658) | (-0.283) | (1.773) | (0.755) | (0.744) | (0.0427) |
| Index ethnic tension | 0.0191 | 0.0832* | | | 0.00716 | |
| | (0.325) | (1.660) | | | (0.146) | |
| Ethnic tension*GDPpc | -0.00297 | -0.00632 | | | | |
| | (-0.473) | (-1.206) | | | | |
| Dummy civil war | | | -0.0993 | 1.489 | | -0.425* |
| | | | (-0.478) | (1.453) | | (-1.669) |
| Civil war*GDPpc | | | 0.00910 | 0.130 | | |
| | | | (0.343) | (1.554) | | |
| Ethnic tension*GDPpc _L | | | | | -0.00113 | |
| | | | | | (-0.209) | |
| Ethnic tension*GDPpc _S | | | | | -0.000373 | |
| | | | | | (-0.0698) | |
| Civil war*GDPpc _L | | | | | | 0.0569* |
| | | | | | | (1.681) |
| Civil war*GDPpc _S | | | | | | 0.0382 |
| | | | | | | (1.255) |
| Nº observations | 2,579 | 488 | 4,145 | 863 | 3,067 | 5,008 |
| Nº Countries | 113 | 23 | 128 | 31 | 136 | 159 |
| Nº instruments | 90 | 18 | 80 | 26 | 112 | 145 |
| Hansen test (p-value) | 0.139 | 0.345 | 0.157 | 0.796 | 0.132 | 0.326 |
| AR1 test (p-value) | 0.373 | 0.0648 | 0.790 | 0.447 | 0.208 | 0.0512 |
| AR2 test (p-value) | 0.248 | 0.784 | 0.548 | 0.920 | 0.530 | 0.592 |
| Difference-in-Hansen tests (p-value) | | | | | | |
| Instruments level | 0.339 | 0.907 | 0.224 | 0.631 | 0.722 | 0.758 |
| Time Dummies | 0.898 | | 0.273 | 0.733 | 0.859 | 0.800 |

Notes: The dependent variable is growth rate of GDP per capita (GDP_gr). Meaning of acronyms: _L – group of Large states, _S – group of Small states, _T – Total states. t-statistics are in parenthesis. Significance level to reject the null hypothesis: *** - 1%, ** - 5% e * - 10%.

## 5 – CONCLUSION

Some studies identify a small country size as a major impediment to the economic growth process. We conclude that the difficulty to taking advantage of the economies of scale in various economic activities seems to be the main disadvantage associated with small countries. The great social cohesion is indicated as the main benefit link to small states. Following the analysis of some stylized facts we conclude that small size is not a handicap to economic growth and social cohesion is statistically significant higher in small countries.

We used land area and population size to divide the countries in two groups, small and large. We considered 215 countries, of which 83 was classified as small states and 132 as large states. We empirically analysed the impact of social cohesion on the growth rate of GDP per capita of these two groups of countries. The effects of social cohesion were analysed

using the variables civil war and index of ethnic tension. Overall, we conclude that the effect of social cohesion on growth of GDP per capita is positive and statistically significant in both groups of countries. This result is robust to changes in the criteria used to classify the countries, the country income level, the removal of outliers and the sample period used. In particular, when the effect of social cohesion in growth rate of GDP per capita and β-convergence rate is measured by index of ethnic tension the difference between the coefficients of the two groups of countries is not statistically significant. But, when we use the variable civil war, the negative impact in growth rate of GDP per capita and the contribution in reducing the β-convergence rate is statistically significant higher in large states.

Many studies consider social cohesion as the main vantage of small countries (Armstrong et al, 1998; Briguglio et al, 2006) and others found a positive impact of social cohesion in growth rate of GDP per capita (Knack and Keefer, 1997; Montalvo and Reynal-Querol, 2005). We conclude also that social cohesion has positive effects in economic growth, and when the social cohesion is measured by civil war, the negative effect is higher in large states. Since the social cohesion contributes to increase the growth rate of GDP per capita and the β-convergence rate, we suggest the improvement of the quality of economic institutions, the level of education and the level of income to strengthen the social cohesion.

## REFERENCES


Aisen, A.; Veiga, F. (2013) "How does political instability affect economic growth?" *European Journal of Political Economy*. 29, 151-167.

Alesina, A. (2003) "The Size of Countries: Does it Matter?" *Journal of the European Economic Association*. 1(2-3), 301-306.

Alesina, A.; Ferrara, E. (2000), "The determinants of trust", *NBER, Working Paper nº 7621*. Cambridge, MA.

Alesina, A.; Spolaore, E. (1997) "On the Number and Size of Nations" *The Quarterly Journal of Economics*. 112(4), 1027-1056.

Arellano, M.; Bond, S. (1991) "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations" *The Review of Economic Studies*. 58(2), 277-297.

Arellano, M.; Bover, O. (1995) "Another look at the instrumental variable estimation of error-components models" *Journal of Econometrics*. 68, 29-51.

Armstrong, H.; Kervenoael, R.; Li, X.; Read, R. (1998) "A Comparison of the Economic Performance of Different Micro-states, and Between Micro-states and Larger Countries" *World Development.* 26(4), 639-656.

Armstrong, H.; Read, R. (1998) "Trade and Growth in Small States: The Impact of Global Trade Liberalisation" *World Economy*. 21(4), 563-585.

Armstrong, H.; Read, R. (2003) "The Determinants of Economic Growth in Small States" *The Round Table*. 92(368), 99-124.

Backus, D.; Kehoe, P.; Kehoe, T. (1992) "In Search of Scale Effects in Trade and Growth*"* *Journal of Economic Theory*. 58, 377-409.

Barrell, R.; Gottschalk, S. (2004) "The volatility of the output gap in the G7" *National Institute Economic Review.* 188(1), 100-107.

Barro, R.; Sala-i-Martin, X. (1992) "Convergence" *The Journal of Political Economy*. 100(2), 223-251.

Benedict, Burton (ed.) (1967) *Problems of Smaller Territories*. London: Athlone Press.

Berger-Schmitt, R. (2002) "Considering Social Cohesion in Quality of Life Assessments: Concepts and Measurement" *Social Indicators Research.* 58, 403-428.

Blundell, R.; Bond, S. (1998) "Initial conditions and moment restrictions in dynamic panel data models" *Journal of Econometrics.* 87, 115-143.

Bray, M. (1992) *Educational planning in small countries*. França: UNESCO**.**

Briguglio, L. (1995) "Small Island Developing States and Their Economic Vulnerabilities" *World Development*. 23(9), 1615-1632.

Briguglio, L. (1998) "Small Country Size and Returns to Scale in Manufacturing" *World Development*. 26(3), 507-515.

Caselli, F. (2005) “Accounting for Cross-Country Income Differences” *in* Aghion, P.; Durlauf, S. (eds.) *Handbook of Economic Growth, Volume 1 A*. Amsterdam: Elsevier B. V., 679-741.

Caselli, F.; Esquivel, G.; Lefort, F. (1996) “Reopening the Convergence Debate: A New Look at Cross-Country Growth Empirics” *Journal of Economic Growth*. 1, 363-389.

Castello, S.; Ozawa, T. (1999) *Globalization of Small Economies as a Strategic Behavior in International Business*. New York: Garland Publishing Inc.

Commonwealth Secretariat (1997) *A Future for Small States: Overcoming Vulnerability*. London: Commonwealth Secretariat.

Commonwealth Secretariat (2014) *Small States: Economic Review and Basic Statistics, Volume 17*. London: Commonwealth Secretariat.

Crowards, T. (2002) “Defining the Category of Small States” *Journal of International Development*. 14, 143-179.

Davenport, M. (2001) *A Study of Alternative Special and Differential Arrangements for Small Economies*. London: Commonwealth Secretariat.

Downes, A. S.; Mamingi, N. (2001) “The Measurement of Country Size and Implications for the Survival of Small States in the Global Economy” *in ECCB´s Fifth Annual Conference on Development.* St. Kitts: October 5-6, 2000.

Easterly, W.; Kraay, A. (2000) “Small States, Small Problems? Income, Growth, and Volatility in Small States” *World Development.* 28(11), 2013-2027.

Easterly, W.; Levine, R. (1997) ‘‘Africa’s Growth Tragedy: Policies and Ethnic Divisions’’ *Quarterly Journal of Economics*. 12(4), 1203-1250.

Easterly, W.; Ritzen, J.; Woolcock, M. (2006) “Social Cohesion, Institutions, and Growth” *Economics and Politics*. 18(2), 103-120.

Eckaus, R. (1995) “Is it Beautiful to be Small, or is it a Burden?”. *Working paper department of economics* 95-27. Massachusetts Institute of Technology.

Guillaumont, P. (2010) “Assessing the Economic Vulnerability of Small Island Developing States and the Least Developed Countries” *Journal of Development Studies.* 46(5), 828-854.

Heyneman, S.P. (2000) “From the Party/State to Multi-ethnic Democracy: Education and Social Cohesion in Europe and Central Asia”, *Educational Evaluation and Policy Analysis*. 22(2), 173-191.

Islam, N. (1995) "Growth Empirics: A Panel Data Approach" *Quarterly Journal of Economics.* 110(4), 1127-1170.

Jalan, B. (1982) “Classification of economies by size” *in* Jalan, B. (ed.) *Problems and Policies in Small Economies*. London: Croom Helm, 39-48.

Klomp, J.; de Haan, J. (2009) “Political institutions and economic volatility” *European Journal of Political Economy*. 25, 311-326.

Knack, S.; Keefer, P. (1997) “Does social capital have an economic payoff? A cross country investigation” *Quarterly Journal of Economics.* 112(4), 1251-1288.

Levine, R.; Loayza, N.; Beck, T. (2000) "Financial intermediation and growth: Causality and causes" *Journal of Monetary Economics*. 46, 31-77.

Lockhart, D. G. (1993) "Introduction" *in* Lockhart, D. G.; Drakakis-Smith, D.; Schembri, J. (eds.) *The Development Process in Small Island States.* London: Routledge, 1-9.

Mankiw, N. G.; Romer, D.; Weil, D. (1992) "A Contribution to the Empirics of Economic Growth" *Quarterly Journal of Economics.* 107(2), 407-437.

Marshall, M. C. (2013) *Major Episodes of Political Violence (MEPV) and Conflict Regions, 1946-2012***.** Center for Systemic Peace. Disponível no: www.systemicpeace.org.

Mattoo, A.; Subramanian, A. (2004) "The WTO and the Poorest Countries: The Stark Reality". *International Monetary Fund Working Paper* 04/81.

Montalvo, J. G.; Reynal-Querol, M. (2005) "Ethnic diversity and economic development" *Journal of Development Economics*. 76, 293-323.

Read, R. (2001) "Growth, Economic Development and Structural Transition in Small Vulnerable States". *UNU/WIDER (United Nations University/World Institute for Development Economics Research), Discussion Paper* 2001/59.

Roodman, D. (2009a) "Practitioners' Corner: A Note on the Theme of Too Many Instruments" *Oxford Bulletin of Economics and Statistics*. 71(1), 135-158.

Roodman, D. (2009b) "How to do xtabond2: An introduction to difference and system GMM in Stata" *The Stata Journal*. 9(1), 86-136.

Sokoloff, K. L.; Engerman, S. L. (2000), "History Lessons Institutions, Factor Endowments, and Paths of Development in the New World", *Journal of Economic Perspectives*.14(3), 217-232.

Solow, R. (1956) "A Contribution to the Theory of Economic Growth" *The Quarterly Journal of Economics*. 70(1), 65-94.

Srinivasan, T. N. (1985) "The Costs and Benefits of Being a Small, Remote, Island, Landlocked or Mini-State Economy". *The World Bank, Discussion Paper, Economics and Research* 2.

Thorhallsson, B. (2006) "The Size of States in the European Union: Theoretical and Conceptual Perspectives" *Journal of European Integration.* 28(1), 7-31.

# APPENDIX

## Table A.1 – Groups of countries

**Small States**

| | | | | |
|---|---|---|---|---|
| Albania | Curacao | Iceland | Mayotte | Solomon Islands |
| American Samoa | Cyprus | Isle of Man | Micronesia, Fed. Sts. | St. Kitts and Nevis |
| Andorra | Djibouti | Jamaica | Moldova | St. Lucia |
| Antigua & Barbuda | Dominica | Kiribati | Monaco | St. Martin |
| Armenia | Equatorial Guinea | Kosovo | Montenegro | St. Vincent & the Grenadines |
| Aruba | Estonia | Kuwait | New Caledonia | Suriname |
| Bahamas, The | Faeroe Islands | Latvia | Northern Mariana | Swaziland |
| Bahrain | Fiji | Lebanon | Palau | Timor-Leste |
| Barbados | French Polynesia | Lesotho | Puerto Rico | Tonga |
| Belize | Gambia, The | Liechtenstein | Qatar | Trinidad &Tobago |
| Bermuda | Gibraltar | Luxembourg | Samoa | Turks & Caicos Islands |
| Bhutan | Greenland | Macao | San Marino | Tuvalu |
| Brunei Darussalam | Grenada | Macedonia, FYR | S. T. & Principe | Vanuatu |
| Cape Verde | Guam | Maldives | Seychelles | Virgin Islands (U.S.) |
| Cayman Islands | Guinea-Bissau | Malta | Singapore | West Bank & Gaza |
| Channel Islands | Guyana | Marshall Islands | Sint Maarten | |
| Comoros | Hong Kong | Mauritius | Slovenia | |

**Large States**

| | | | | |
|---|---|---|---|---|
| Afghanistan | Congo, Rep. | Iran | Nepal | Sri Lanka |
| Algeria | Costa Rica | Iraq | Netherlands | Sudan |
| Angola | Cote d'Ivoire | Ireland | New Zealand | Sweden |
| Argentina | Croatia | Israel | Nicaragua | Switzerland |
| Australia | Cuba | Italy | Niger | Syrian Arab Republic |
| Austria | Czech Republic | Japan | Nigeria | Tajikistan |
| Azerbaijan | Denmark | Jordan | Norway | Tanzania |
| Bangladesh | Dominican Republic | Kazakhstan | Oman | Thailand |
| Belarus | Ecuador | Kenya | Pakistan | Togo |
| Belgium | Egypt | Korea, Dem. Rep. | Panama | Tunisia |
| Benin | El Salvador | Korea, Rep. | Papua New Guinea | Turkey |
| Bolivia | Eritrea | Kyrgyz Republic | Paraguay | Turkmenistan |
| Bosnia & Herzegovina | Ethiopia | Lao PDR | Peru | Uganda |
| Botswana | Finland | Liberia | Philippines | Ukraine |
| Brazil | France | Libya | Poland | United Arab Emirates |
| Bulgaria | Gabon | Lithuania | Portugal | United Kingdom |
| Burkina Faso | Georgia | Madagascar | Romania | United States |
| Burundi | Germany | Malawi | Russian Federation | Uruguay |
| Cambodia | Ghana | Malaysia | Rwanda | Uzbekistan |
| Cameroon | Greece | Mali | Saudi Arabia | Venezuela, RB |
| Canada | Guatemala | Mauritania | Senegal | Vietnam |
| Central African Rep. | Guinea | Mexico | Serbia | Yemen, Rep. |
| Chad | Haiti | Mongolia | Sierra Leone | Zambia |
| Chile | Honduras | Morocco | Slovak Republic | Zimbabwe |
| China | Hungary | Mozambique | Somalia | |
| Colombia | India | Myanmar | South Africa | |
| Congo, Dem. Rep. | Indonesia | Namibia | Spain | |

## Table A.2 – Statistics data

**Large states**

| Variables | Obs | Mean | St. Dev. | Min | Max |
|---|---|---|---|---|---|
| GDP per capita (log) | 4978 | 8.222086 | 1.32276 | 5.080144 | 11.09557 |
| GDP per capita (growth) | 4830 | 0.0144257 | 0.0318562 | -0.2979097 | 0.2464264 |
| Population (growth) | 5412 | 0.0147749 | 0.0113374 | -0.0532828 | 0.1194897 |
| Investment (% GDP) | 4978 | 21.56081 | 9.525715 | 0.6920165 | 66.37524 |
| Secondary school enrolment (%) | 4498 | 55.1768 | 34.97741 | 0.18163 | 156.5211 |
| Index ethnic tension | 2938 | 3.899609 | 1.42263 | 0 | 6 |
| Dummy civil war | 4973 | | | 0 | 1 |

Notes: Data in 5 year period, rolling Windows, from 1970 to 2010, for 127 large states.

**Small states**

| Variables | Obs | Mean | St. Dev. | Min | Max |
|---|---|---|---|---|---|
| GDP per capita (log) | 2168 | 8.785968 | 1.153771 | 6.118179 | 11.82269 |
| GDP per capita (growth) | 2008 | 0.0176938 | 0.0381922 | -0.2398716 | 0.3633565 |
| Population (growth) | 2378 | 0.0124913 | 0.0135348 | -0.1391962 | 0.1140619 |
| Investment (% GDP) | 2168 | 26.92532 | 12.52897 | 2.14892 | 75.86247 |
| Secondary school enrolment (%) | 1825 | 63.79278 | 31.38732 | 1.88067 | 164.5947 |
| Index ethnic tension | 561 | 4.032204 | 1.389938 | 0 | 6 |
| Dummy civil war | 1079 | | | 0 | 1 |

Notes: Data in 5 year period, rolling Windows, from 1970 to 2010, for 54 small states.

## Table A.3 – VIF test

| Variables | Civil war | | | Index ethnic tension | | |
|---|---|---|---|---|---|---|
| | VIF_L | VIF_S | VIF_T | VIF_L | VIF_S | VIF_T |
| Initial GDPpc (log) | 3.71 | 2.42 | 3.40 | 4.08 | 2.04 | 3.80 |
| Secondary (%) | 5.00 | 3.33 | 4.53 | 5.12 | 2.24 | 4.51 |
| POP_gr (%) | 1.80 | 1.22 | 1.51 | 1.99 | 1.11 | 1.53 |
| Invest. (% GDP) | 1.17 | 1.06 | 1.12 | 1.14 | 1.11 | 1.11 |
| Dummy civil war | 1.12 | 1.07 | | | | |
| Dummy civil war_L | | | 1.11 | | | |
| Dummy civil war_S | | | 1.02 | | | |
| Index ethnic tension | | | | 1.42 | 1.50 | |
| Index ethnic tension_L | | | | | | 2.52 |
| Index ethnic tension_S | | | | | | 2.66 |
| Dummy (1976-1980) | 1.89 | 2.54 | 1.96 | | | |
| Dummy (1981-1985) | 1.90 | 2.65 | 1.97 | | | |
| Dummy (1986-1990) | 1.95 | 2.61 | 2.01 | 1.32 | | 3.20 |
| Dummy (1991-1995) | 2.01 | 2.67 | 2.06 | 1.71 | | 3.23 |
| Dummy (1996-2000) | 2.10 | 3.11 | 2.20 | 1.66 | | 3.39 |
| Dummy (2001-2005) | 2.22 | 3.43 | 2.34 | 1.63 | | 3.60 |
| Dummy (2006-2010) | 2.28 | 3.59 | 2.41 | 1.62 | | 3.64 |
| Mean VIF | 2.26 | 2.47 | 2.13 | 2.17 | 1.61 | 3.02 |

Note: Meaning of acronyms: _L – group of Large states, _S – group of Small states, _T – Total states

## Table A.4: Sensitivity analysis (I)

| | (1) Cluster GDP | (2) Cluster GDP | (3) Cluster POP | (4) Cluster POP | (5) Cluster Area | (6) Cluster Area | (7) Period (1970-2000) | (8) Period (1980-2010) | (9) Period (1980-2010) |
|---|---|---|---|---|---|---|---|---|---|
| Variáveis | GDPgr_T | GDPgr_T | GDPgr_T | GDPgr_T | GDPgr_T | GDPgr_T | GDPgr_T | GDPgr_T | GDPgr_T |
| Initial GDPpc (log) | -0.0558*** | -0.0213*** | -0.0532*** | -0.0291*** | -0.0525*** | -0.0396*** | -0.0288** | -0.0548*** | -0.0497*** |
| | (-4.858) | (-2.581) | (-4.423) | (-3.965) | (-4.532) | (-4.271) | (-2.235) | (-5.114) | (-4.101) |
| Secondary (%) | 0.00144* | 0.000756* | 0.0023*** | 0.0011*** | 0.0023*** | 0.0016*** | 0.000832* | 0.00145** | 0.0020*** |
| | (1.861) | (1.696) | (4.581) | (3.018) | (4.344) | (5.041) | (1.886) | (2.365) | (3.876) |
| POP_gr (%) | 0.165 | 0.0405 | 0.764 | 0.236 | 0.551 | 0.452 | 0.411 | 0.178 | 1.501 |
| | (0.112) | (0.0566) | (0.677) | (0.314) | (0.522) | (0.644) | (0.733) | (0.153) | (1.314) |
| Invest. (% GDP) | 0.00129 | 0.000659 | -0.000135 | 0.000601 | -0.000318 | 0.000793 | 0.00178** | 0.00119 | 0.00234** |
| | (1.025) | (1.012) | (-0.141) | (0.966) | (-0.323) | (1.072) | (2.103) | (1.042) | (2.567) |
| Index ethnic tension_L | 0.0295** | | 0.0113* | | 0.0121** | | | 0.0304*** | |
| | (2.170) | | (1.877) | | (2.106) | | | (2.738) | |
| Index ethnic tension_S | 0.0320** | | 0.0156* | | 0.0180** | | | 0.0281** | |
| | (2.264) | | (1.674) | | (2.304) | | | (2.283) | |
| Dummy civil war_L | | -0.0323* | | -0.0356** | | -0.0359* | -0.0612* | | -0.0125 |
| | | (-1.913) | | (-2.113) | | (-1.932) | (-1.707) | | (-0.395) |
| Dummy civil war_S | | 0.0161 | | 0.00346 | | 0.0217 | -0.134 | | 0.0820 |
| | | (0.162) | | (0.0283) | | (0.638) | (-0.665) | | (1.224) |
| Nº observations | 3,067 | 5,008 | 3,067 | 5,008 | 3,067 | 5,008 | 3,568 | 3,067 | 4,032 |
| Nº Countries | 136 | 159 | 136 | 159 | 136 | 159 | 154 | 136 | 159 |
| Nº instruments | 30 | 110 | 30 | 110 | 30 | 110 | 105 | 30 | 103 |
| Hansen test (p-value) | 0.395 | 0.288 | 0.699 | 0.298 | 0.389 | 0.264 | 0.398 | 0.433 | 0.204 |
| AR1 test (p-value) | 0.188 | 0.0841 | 0.527 | 0.160 | 0.331 | 0.378 | 0.133 | 0.138 | 0.592 |
| AR2 test (p-value) | 0.120 | 0.840 | 0.305 | 0.942 | 0.291 | 0.824 | 0.855 | 0.136 | 0.225 |
| Difference-in-Hansen tests (p-value) | | | | | | | | | |
| Instruments level | 0.984 | 0.589 | 0.999 | 0.311 | 0.994 | 0.139 | 0.284 | 0.909 | 0.151 |
| Time Dummies | 0.110 | 0.292 | 0.287 | 0.475 | 0.151 | 0.589 | 0.537 | 0.147 | 0.665 |

## Table A.5: Sensitivity analysis (II)

| | (1) Excludes low income | (2) Excludes low income | (3) Excludes high income | (4) Excludes high income | (5) Excludes petroleum exporting | (6) Excludes petroleum exporting | (7) Excludes outliers | (8) Excludes outliers |
|---|---|---|---|---|---|---|---|---|
| Variáveis | GDPgr_T | GDPgr_T | GDPgr_T | GDPgr_T | GDPgr_T | GDPgr_T | GDPgr_T | GDPgr_T |
| Initial GDPpc (log) | -0.0495*** | -0.0475* | -0.0864*** | -0.0258* | -0.0369*** | -0.0332*** | -0.0597*** | -0.0316*** |
| | (-3.584) | (-1.879) | (-3.431) | (-1.838) | (-3.055) | (-4.677) | (-4.123) | (-4.759) |
| Secondary (%) | 0.00212*** | 0.00111** | 0.00138* | 0.000955* | 0.000659 | 0.00117*** | 0.00222*** | 0.00128*** |
| | (4.412) | (2.545) | (1.814) | (1.854) | (1.106) | (4.560) | (3.251) | (3.802) |
| POP_gr (%) | 0.857 | -0.274 | 0.443 | 0.205 | -1.216 | -1.171*** | 0.457 | 0.349 |
| | (0.822) | (-0.370) | (0.271) | (0.229) | (-0.843) | (-3.794) | (0.387) | (0.544) |
| Invest. (% GDP) | -0.000517 | 0.000980* | 0.00224 | 0.000125 | 0.00127 | 0.00118*** | 0.000657 | 0.000449 |
| | (-0.502) | (1.705) | (1.561) | (0.215) | (1.454) | (4.024) | (0.529) | (0.632) |
| Index ethnic tension_L | 0.0106* | | 0.0426*** | | 0.0218* | | 0.00850* | |
| | (1.686) | | (3.380) | | (1.957) | | (1.820) | |
| Index ethnic tension_S | 0.0183** | | 0.0340** | | 0.0236** | | 0.0156** | |
| | (2.060) | | (2.527) | | (2.200) | | (2.243) | |
| Dummy civil war_L | | -0.00197 | | -0.0280* | | -0.0120* | | -0.0454*** |
| | | (-0.234) | | (-1.694) | | (-1.746) | | (-2.910) |
| Dummy civil war_S | | 0.00645 | | 0.0370 | | -0.0176 | | 0.0166 |
| | | (0.159) | | (0.912) | | (-0.839) | | (0.271) |
| Nº observations | 2,634 | 3,977 | 1,986 | 3,656 | 2,680 | 4,490 | 2,748 | 4,625 |
| Nº Countries | 115 | 126 | 91 | 118 | 118 | 141 | 121 | 146 |
| Nº instruments | 30 | 80 | 30 | 80 | 42 | 62 | 42 | 98 |
| Hansen test (p-value) | 0.212 | 0.141 | 0.251 | 0.232 | 0.120 | 0.239 | 0.159 | 0.231 |
| AR1 test (p-value) | 0.279 | 0.450 | 0.439 | 0.792 | 0.0334 | 0.302 | 0.803 | 0.231 |
| AR2 test (p-value) | 0.683 | 0.554 | 0.205 | 0.550 | 0.196 | 0.556 | 0.144 | 0.242 |
| Difference-in-Hansen tests (p-value) | | | | | | | | |
| Instruments level | 0.685 | 0.646 | 0.539 | 0.621 | 0.401 | 0.243 | 0.577 | 0.542 |
| Time Dummies | 0.867 | 0.598 | 0.431 | 0.394 | 0.394 | 0.734 | 0.148 | 0.226 |