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Conference Paper

Regional competitiveness: Latin America and the Caribbean

52nd Congress of the European Regional Science Association: "Regions in Motion - Breaking the Path", 21-25 August 2012, Bratislava, Slovakia

Provided in Cooperation with:

European Regional Science Association (ERSA)

Suggested Citation: Aramayo, Lourdes Gabriela Daza; Vokoun, Marek; Damborsky, Milan (2012) : Regional competitiveness: Latin America and the Caribbean, 52nd Congress of the European Regional Science Association: "Regions in Motion - Breaking the Path", 21-25 August 2012, Bratislava, Slovakia, European Regional Science Association (ERSA), Louvain-la-Neuve

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Regional Competitiveness: Latin America and the Caribbean

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Abstract. Regional Competitiveness can be defined as the region's potential in the long run enforce economically in competition with other regions while maintaining social cohesion and environmental sustainability. This ability is determined by many factors, such as innovation, technological progress, investment attractiveness, skills of the labor force, transportation infrastructure and quality of transport services, public sector efficiency and public security. These factors influence the resulting economic, social and environmental situation of the region. The authors have compared the competitiveness of Latin America and the Caribbean states. Indicators of GDP, unemployment rate, share of high-educated employees, the rate of migration, income, population, unemployment, delinquency, CO2 emissions were used for the evaluation. For the purposes of interpretation and due to imperfect data bases, small countries to 3 million are earmarked specifically together with the island states in the Antilles states.

Among the countries over 3 million inhabitants (the area of South America and Mexico) Mexico dominates, followed by Chile and Argentina. On the contrary, as the least competitive Colombia, Paraguay and Uruguay were evaluated. Mexico's dominance is mainly due to its position in the economic dimension. Mexico and Chile, by contrast, are better in environmental terms. The specific situation is in Bolivia, which reaches above the average in the social field (e.g. in the tertiary education) but lags in the economic sphere. Among the countries over 3 million inhabitants (the area of Central America) Costa Rica, Panama and Honduras show the best results. These countries have significant differences, and compared to countries located in the index below clearly have higher scores in the social field. Among the countries under 3 million inhabitants has the best positions St. Kitts and Nevis, followed by Cuba and the Bahamas. The problematic acquisition and data validation must be mentioned in the context of evaluation of these countries.

The authors focused on selected factors of competitiveness rated best and worst of Latin American countries in the next section analysis. In this context, authors considered the economic liberalization, the role of technology in the economy, the position in international trade, education system, labor market and healthcare conditions, environment and transport infrastructure.

Keywords: Latin America, Caribbean, Competitiveness, Economic Development, Region

1. Introduction

For years, Latin America and the Caribbean have been characterized by low and unstable levels of economic growth. Today this region is characterized by its dynamic and macroeconomic stability. In recent years Latin America and the Caribbean have experienced a significant, above average growth despite the economic financial crisis. The region is growing strongly due to a significant increase in exports, which also stimulates the accumulation of international reserves, thus restoring the credibility of their economies through good management of public finances along with fiscal and monetary policies that characterize their current independence and economic autonomy.

Until late 2009 and early 2010, the region of Latin America and the Caribbean had successfully faced the consequences of the economic crisis, mainly due to the increased demand for raw materials from China and the timely response of these countries through economic policies.

Despite the positive high economic growth news from Latin America, it cannot be forgotten that the region still faces major challenges, the primary being competition. Latin America and the Caribbean have not yet reached their full potential. This presents a great challenge for Latin America in the future.

In this paper we calculated a competitiveness index for the countries of Latin America and Caribbean that denotes the competitive position of the countries concerned based on the comparison of the indicators in three dimensions and the weight thereof. The dimensions discussed are the economic, social and environmental (using indicators such as GDP, unemployment rate, the rate of property rights, the labor force with tertiary education, the rate of migration, income, CO2 emissions, etc.) Based on the sequence and value of these indicators we calculated a competitiveness index for these countries and the best and worst locations among them. Other factors discussed are security, infrastructure, liberalization of the economy, the role of technology, education and factors associated with investments in human capital. The period used for this analysis is between the years 1999-2010, determined as aforesaid by a suitable combination of different indicators of competitiveness relations. In the first part of this work we will work with some definitions of competitiveness then describe the model and the indicators used. Then, the third part of this paper will analyze the results calculated, describe our calculated value of the countries studied, and finally analyze in context and current reality to classify their positions. Subsequently we attempt to identify factors and determine the position of these countries in regards to competitiveness.

2. An Issue of Competitiveness

The concept of competitiveness is relatively new in economics and economic geography. In fact, a universal definition does not exist. Each definition is usually given for a specific purpose. Microeconomics-oriented definitions mostly implement success of goods and services in open markets to a definition of competitiveness. This success is mainly determined by the ability to innovate in the case of developed economies (eg Porter, 1990). Amiti (2001) has noted that regional competitiveness is closely linked to technological advances, compatibility of older and newer technologies and maintaining connections between vertically dependent branches. Regional competitiveness is also closely linked to the ability of regions to adapt to current trends in the business-powerful technologies and their vertical connections. Malmberg, Solvell and Zander (1996) have similarly mentioned that competitiveness is associated with maintaining a position on the regional and international levels, especially in the context of economic globalization.

Madies, Prager (2008) have stated that regional competitiveness is associated with a given ability to attract international mobile sources; i.e. investment, skilled labor, etc. This conception of competitiveness is very close to economic productivity and the localization theory. The competitiveness of the region is determined by the general and specific advantages coming from geographical nearness to material inputs, suppliers, markets, transport infrastructure etc. (OECD, 2005). Drezner (1998) also refers to the position in the market in this context.

The macroeconomics view is much more variable (Tvrdoň, Šuranová, 2007). It is often associated with economic development that is sustainable in long-term period. Social sustainability and environmental issues are observed together with economic growth. Economic growth should not be realized at the expense of the other regions.

In fact, each region provides a significant competitive advantage. A skilled workforce, good transport accessibility, and access to markets are examples mentioned in the case of advanced ("smart") regions. Conversely, the less developed regions ("learning") are able to provide especially cheap labor power and natural resources. The efficiency of the public sector (eg OECD, 2006) or the safety, health care, education, environmental quality, human capital (OECD, 2009) are mentioned as specific factors.

A usual cause of loss of competitiveness Amiti (2001) mentions the increase of the prices of labor power in the driving sectors. Amiti (2001) also states that competition of regions has convergence character because the implementation of new technologies and increasing competitiveness is likely in regions who are falling behind with lower wages and prices of

immobile production factors.

With regard to the different interpretations of the regional competitiveness concept, there are large differences in measurements of regional competitiveness. In line with the microeconomics concept based on success of goods and services in open markets, GDP per capita is used as the key indicator. Anderson (2008) has mentioned transportation as the key factor for the development of competitive economic environment (not just in the consideration of accessibility, but also within the context of the functioning market for transport services).

Based on the above mentioned theories, regional competitiveness can be defined as the ability of region (community) to be economically successful in competition with other communities while social cohesion and environmental sustainability are reached in the long-term period.

Following the above theoretical targets, the goal of this paper is defined as “to assess the regional competitiveness of Latin America”.

3. Data

Data comes from relevant databases dealing with international comparison methods and analysis. We utilized data from:

- World Bank (WB, WDI)
- Economic Commission for Latin America and the Caribbean (ECLAC, CEPAL)
- US Bureau of Census (Census.gov)
- Carbon Dioxide Information Center (CDIAC, Oak Ridge National Laboratory)
- The Heritage Foundation
- National statistical offices

We preferred to use as consistent data and methods as possible. Particular indicators were always obtained from a single database for every LA country. If there was an empty observation in the country's time series then indicators under the same method were introduced; for example, from a national statistical office. The next step was to estimate blind spots – empty observations in the time series otherwise our index could not be calculated. The general estimating method for empty observations was based on an OLS linear prediction with time and country dummy variables. If possible, some co-variates, for example GDP or a lagged dependent variable, were introduced.

4. Variables

The GDP indicator – Gross domestic product per capita in purchasing power parity (PPP) in the constant 2005 international dollar prices. We obtained this gross value added indicator

from the World Bank as the most complete of all variables. In the case of Cuba, GDP data was available in constant prices so GDP in PPP was estimated. This indicator represents a country's economic power and value added in production without price effect.

Average unemployment - corresponds to the official unemployment rate of each country and this data is managed by CEPAL/ECLAC. Information about unemployment according to CEPAL/ECLAC comes from national official sources. We completed some of the empty observations with the official national statistical sources. The remaining one year gaps in the country's time series were estimated by a naive first lag in unemployment¹. In the cases of Dominica, Grenada, and St. Kitts and Nevis, we introduced general OLS estimates (with time and country dummy and GDP variable).

Property Rights Index – is a component of the Heritage Foundation Index of Economic Freedom. “[The index is an] assessment of the ability of individuals to accumulate private property, secured by clear laws that are fully enforced by the state. It measures the degree to which a country's laws protect private property rights and the degree to which its government enforces those laws. It also assesses the likelihood that private property will be expropriated and analyzes the independence of the judiciary, the existence of corruption within the judiciary, and the ability of individuals and businesses to enforce contracts.” (Heritage Foundation, 2012, definition) In the cases of St. Kitts and Nevis, Dominica and St. Lucia general OLS estimates were used.

Labor force with tertiary education – this indicates the percentage share of most skilled and educated employees in particular country. We are aware of bias in this indicator and problematic nature due to survey-based data. The data comes from “Processing of household surveys,” World Bank (World Development Indicators) and national statistical offices. In some cases (Costa Rica, Panama, Mexico, and Peru) we got two different time series from two different available databases. We retrieved data from World Bank and a national office. If they differed about 5 to 10 % we preferred official national sources. Missing data was estimated by our general method (simple OLS with time and country dummy) mostly for smaller countries. In the cases of Antigua and Barbuda, Bahamas, Barbados, Belize, Dominica, Grenada, Guyana, Haiti, Jamaica, St. Kitts and Nevis, St. Lucia, St. Vincent and Grenadines, Suriname, Trinidad and Tobago and Venezuela estimates are introduced because

¹ For example; a naive forecast of inflation performs better than some of the more complicated models (Atkeson & Ohanian, 2001), for our average ordering purposes in overall index this simple lag method is considered sufficient. We estimated some of the missing data using lags of dependent variables and fixed affect of country heterogeneity.

there are too few observations in the country's time series.

Net migration rate – Indicator is measured per thousand inhabitants and indicates the emigrant/immigrant net balance for a particular country. The data comes from the U.S. Bureau of Census. However for Chile and Belize no data was available and OLS estimates were used (simple OLS with unemployment, time and country dummy). The data from the census covers almost all countries, but in some cases, the country's time series observations are questionable. For example, Paraguay, Brazil, and Barbados have constant rates; we tried to find national data but they were not available or no relevant computing method was present there.

Income – Gross national income per capita measured by World Bank using the Atlas method in current US dollars reflects the average income of a country's inhabitant. It includes price levels but according to the Atlas method, some of the fluctuations in prices and exchange rates are smoothed. These time series for national income are quite complete; only 3 observations were estimated by the dependent lagged variable approach. In the case of Haiti we estimated the first five years as a simple OLS (simple OLS with GDP and time dummy).

Green Gasses – were approximated by carbon dioxide indicator. The amount of CO₂ emissions from fossil-fuels is measured in thousand metric tons of carbon divided by GDP per capita (PPP) in constant 2005 international dollar prices. It reflects population and economic weighted environmental impact of human action. Missing observations were estimated and roughly approximated by the random effects² lagged dependent variable approach prediction for CO₂ emissions in thousand metric tons of carbon component of the indicator.

5. Summary Statistics

Table 1: Summary statistics for 33 LA countries, overview of indicators for period 1999-2010

Variable	Obs	Mean	Std. Dev	Min	Max
Year	396	2004.5000	3.4564	1999.0000	2010.0000
GDP per capita	396	8585.1780	5244.2410	1000.0000	26083.0000
Unemployment	396	12.2763	9.5941	1.0800	70.0000
Labour Force - education	396	21.3681	10.2724	6.1100	52.9000
Net Migration Rate	396	-3.1349	4.6166	-22.1000	5.9000
Income per capita	396	4917.5930	3951.8280	271.7000	21400.0000
Greenhouse gases	396	1.3159	2.5424	0.0023	11.7299
Property Rights Index	396	50.4899	22.7712	5.0000	90.0000

Source: WB, ECLAC/CEPAL, CENSUS.GOV, CDIAC/ORNL, NSO, Heritage.org

²

The Hausman test was conducted with fixed effects versus random effects approach with Prob > $\chi^2 = 0.3390$ to partly justify the random effects approach.

Our index is based on balanced panel of countries and all indicators refer to the period 1999-2010. Some of the data was predicted, especially for smaller countries; for detailed view see Appendix 1. Looking at extreme values we can see mostly indicators for Haiti (Min) and the Bahamas (Max). We have 396 observations for each indicator i.e. all the 33 countries have observations for 12 years. If we look at means and standard deviations we can observe high variability among countries throughout the years. Big differences between countries lead to relatively small overall index values and the nonexistent, ideal country having the best indicators will be far from even the index winner.

6. Calculating of the index

Special index to assess the regional competitiveness of Latin America was created by authors who were inspired by similar index used in evaluation of the Czech regions in project “MasterCard Czech Centers of Commerce” (individual indicators are listed in the data part). Index is based on comparing of the region (or state) with the most favorable region. It uses the simple formula (1):

$$P_i = \frac{I_i}{I}$$

where "P" represents the percentage of the i-th region comparing of best region 'I'. The best region reaches 100%. In this way, data are standardized for further analysis.

The next step, in the construction of the MasterCard index, is determination of the weights of indicators. In this case, the expert determination of the values of indicators is used.

Determined values are modified using standard deviation. The weights are determined so that the total sum of weights of individual indicators amounted to 100%.

Following formula characters modification using standard deviation (2):

$$u_j = \frac{v_j}{\sigma_j}$$

where "u_j" represents the adjusted weight of j-indicator, "v_j" is weight of j-indicator expertly set, "σ_j" is standard deviation values of the j-indicator. In this way, domination of indicators with high variance is removed. Division of constant (so that the total sum of weights again reach 100%) is follow up step in process. The result is the final weight "c_j" for j-indicator.

The final part of the MasterCard index compilation is to determine the points for different regions. This calculation is determined by the formula (3):

$$R_i = \sum_{n=1}^j (P_{ij} * c_j)$$

where "R" represents value of the competitiveness of i-region, "P_{ij}" indicates a percentage value of i-region in j-indicator to the best of the region, "c_j" is the total weight of the j-indicator.

7. Results

We have decided to present the results according to the regional view and number of inhabitants. For practical reasons we specified 3 mil inhabitants as the minimum for larger countries. Smaller countries and the Antilles region were problematic because many of the observations come from estimations and predictions. Results are presented as follows: (1) Larger countries from South America (2) Larger countries from Central America + Mexico, and (3) Other countries, smaller and island countries.

Table 2: Results for South American countries over 3 mil inhabitants

Country	Index	Mil. Inhabitants	ECON	SOCIAL	ENV
Chile	57,0%	16804	21,63%	35,33%	0,02%
Argentina	44,6%	39939	14,14%	30,41%	0,01%
Uruguay	44,1%	3350	17,85%	26,06%	0,16%
Peru	42,9%	28836	12,86%	29,98%	0,02%
Brazil	42,0%	192004	15,35%	26,62%	0,00%
Ecuador	40,6%	13485	11,92%	28,66%	0,03%
Venezuela	39,5%	28121	12,29%	27,24%	0,01%
Bolivia	39,1%	9694	10,74%	28,32%	0,03%
Colombia	38,2%	45011	11,44%	26,70%	0,01%
Paraguay	35,6%	6238	10,35%	25,20%	0,10%
Average	42,3%	38 348	13,9%	28,5%	0,0%

Source: WB, ECLAC/CEPAL, CENSUS.GOV, CDIAC/ORNL, NSO, Heritage.org

Chile and Argentina are strong economic countries with the highest economic growth in this region and according to our index we can see that the differences between these countries stems from the social dimension, which is surpassed by Chile with 5%. Argentina has a lower unemployment rate but Chile has a higher national income per capita and is, in general, above average in all South America. The rate of labor force with tertiary education is much higher in Chile than in Argentina. We can also see greater migration from Chile and how this contributes to the environmental conditions in Argentina in its index. It is necessary to emphasize the factor of property rights that in Chile reaches 10% whereas that in Argentina is only 3.62% and in Uruguay 7.84%. On the other hand, if we compared **Uruguay and**

Argentina, Argentina lacks an educated and trained workforce, but compensates with better environmental conditions and per capita income. Peru and Ecuador are relatively similar countries with economic growth around 4% in GDP levels. They differ in the level of property rights where Brazil has an advantage over **Peru and Ecuador**. Peru also has the edge on the social dimension even though both are well above average in South America. The labor force with tertiary education is much higher in Peru and unexpectedly higher than in **Brazil**. These are strong contributing factors to Brazil's fall according to the calculations in our index, despite its strong economic growth. The last block of four countries, **Venezuela, Bolivia, Colombia and Paraguay**, has very similar characteristics. These four countries are characterized by their low percentage in regard to respect for private property, have migration rates above average and all but Bolivia have rates below average in regard to the workforce with tertiary education.

The following table shows the results for the countries from Central America including Mexico.

Table 3: Results for Central American countries over 3 mil inhabitants + Mexico

Country	Index	Mil. Inhabitants	ECON	SOCIAL	ENV
Costa Rica	51,4%	4518	17,41%	33,86%	0,13%
Mexico	49,7%	108468	21,07%	28,65%	0,00%
Panama	46,5%	3399	13,63%	32,67%	0,16%
Honduras	34,4%	7326	12,82%	21,52%	0,04%
Guatemala	34,3%	13689	14,20%	20,10%	0,04%
El Salvador	32,1%	6133	15,16%	16,80%	0,09%
Nicaragua	29,4%	5675	8,97%	20,35%	0,06%
Average	39,7%	21 315	14,75%	24,85%	0,07%

Source: WB, ECLAC/CEPAL, CENSUS.GOV, CDIAC/ORNL, NSO, Heritage.org

First in Central America is Costa Rica with 51.4% in the competitiveness index followed by Mexico (49.7%) and Panama (46.5%). Costa Rica is among the pioneers in the technology sector, has one of the lowest rates in regard to internet access, and is also characterized by having a highly skilled workforce. Costa Rica is considered one of the safest countries in Latin America, followed by Chile and Uruguay. They are 10th in regards to infrastructure according to the World Economic Forum. This could help explain their 1st position in Central America. According to our index, Costa Rica has the third highest economic growth rate high in Central America after Mexico and Panama and an above average unemployment rate. However, this has benefitted their position in the social dimension, giving them the second highest percentage in regard to the rate of labor force with tertiary education after Panama. They also have the highest percentage in regard to the respect for private property. Mexico

has the second position in our index thanks to its high economic growth and Mexico has the third highest rate in regards to respect for private property and the fourth highest rate in regard to the labor force with tertiary education. We also highlight the case of Panama with its third place in Central America. It is notable for its high economic growth, the second in Central America, and its great strides in infrastructure; it has 7 ports, a mega airport, a railway and a canal connecting the Pacific with the Atlantic. Panama is one of the countries that has focused on the competitiveness in the region. Unlike other regions, it is very focused on services rather than commodities. The last places in Central America according to our competitiveness index are occupied by Guatemala, El Salvador and Nicaragua. The common feature of these countries according to our index is the low economic growth, which is well below the average of the other countries in this region. They have some of the lowest income rates, well below the regional average. The economic dimensions in these countries are the most damaging factors. Indicators of the social dimension are used to highlight the low level of respect for private property, well below average except in El Salvador. In these countries the environmental dimension has a small role that could especially help countries with lower indices up their positions. Their economic activities and emissions are quite low in contrast to Panama and Costa Rica.

The following table shows the results for the Caribbean countries and countries with less than 3 million people.

Table 4: Results for the Antilles and other countries below 3 mil inhabitants

Country	Index	Mil Inhabitants	ECON	SOCIAL	ENV
Bahamas	67,9%	0,334	27,46%	39,31%	1,17%
St. Kitts and Nevis	66,0%	0,051	28,39%	31,90%	5,72%
Barbados	58,8%	0,272	24,85%	32,50%	1,41%
Antigua and Barbuda	57,2%	0,087	22,59%	30,84%	3,73%
Cuba	54,7%	11,202	22,82%	31,87%	0,02%
Trinidad and Tobago	48,4%	1,331	25,02%	23,37%	0,05%
Grenada	41,2%	0,104	15,93%	22,25%	3,03%
Dominica	39,6%	0,068	13,66%	20,25%	5,73%
Suriname	39,4%	0,515	12,98%	26,12%	0,26%
St. Lucia	38,4%	0,171	14,91%	21,30%	2,21%
Belize	38,0%	0,299	12,68%	23,99%	1,35%
Dominican Republic	37,1%	9,638	9,84%	27,24%	0,03%
Jamaica	32,7%	2,720	13,06%	19,62%	0,06%
St. Vincent and Grenadines	32,4%	0,109	14,59%	14,26%	3,58%
Haiti	21,6%	9,765	2,50%	19,06%	0,05%
Guyana	17,9%	0,752	8,47%	9,23%	0,16%
Average	43,2%	2,34	16,9%	24,6%	1,8%

Source: WB, ECLAC/CEPAL, CENSUS.GOV, CDIAC/ORNL, NSO, Heritage.org

This last set of countries presents the island and smaller countries with less than 3 mil inhabitants. All the countries are relatively strong in economic dimension and differences are apparent in social dimension. For the first time, we can see the environmental dimension having impact on the overall index. It is very hard to look at a detailed comparison because many of the values are estimated. We will concentrate on a block of countries according to their score in social dimension. The first five countries with index above 50 % and social dimension above 30 % are very strong and play important roles in the region. They are comparable to larger countries like Chile and Costa Rica. The first four countries are former British colonies, which still belong to the Commonwealth and perform better than Cuba thanks to the environmental dimension. The next seven countries have a social dimension between 20 -30 % and overall index values above 37 % and less than 49 %. They are generally weaker in GDP and unemployment numbers. The only exception is Trinidad and Tobago with its industrial tradition resulting in one of the lowest environmental scores. In social dimension the main component GNI correlates with GDP and we again observe the big differences in the environmental dimension. The last four countries are very different from each other and we observe that Jamaica is only one percentage point below average in GDP but on the other hand there are very poor countries like Haiti and Guyana. Again, we have to be cautious in interpreting and jumping in conclusions. These numbers provide a general view of these smaller and island countries rather than a rigorous and precise data analysis, which is not possible due to the lack of data.

8. Analysis of other factors that can influence the level of competitiveness

Latin America and the Caribbean are still behind in terms of competitiveness in important areas such as innovation and productivity, which is the main obstacle to the success of the economic growth with equity strategy. To increase their competitiveness, Latin American and Caribbean countries need to work on important areas, seen as essential growth sectors in developed economies such as infrastructure, logistics, security, removal of trade barriers, and the reduction of asymmetry between industry and seizing new global opportunities, namely to support the investment business relationships with new international partners, such as Asia, the Pacific and of course the European Union. This could play an important role in quality job creation, along with social policies that could improve access to education and social services, which could result in the reduction of existing social gaps (in income, employment of women) and thus promoting social cohesion and human rights together with the growth of these countries.

The following tables summarize somewhat different points of view to the theories of competitiveness and their respective indicators in combination with the current reality of the selected countries. We focus primarily on countries that have attained the best position according to our index of competitiveness.

Table 5: Factors that can influence the level of competitiveness: Top ranking countries in South America

South America	Top Ranking Countries		
	Chile	Argentina	Uruguay
Economic liberalization and Institutional Changes	The Chilean economy is internationally known as one of the strongest in the continent. The neoliberal economic model has been operational since 1973 and has continued until now.	Argentina has a mixed economy with a strong tendency toward nationalization, with government intervention in all sectors of the economy, but not as central planned as China. Monetary expansion increases the risk of higher inflation.	Uruguay's economy is small and open, with a growing foreign market projection in regional and international markets.
Technology	Chile remains the leader in Latin America in the penetration of computers and the Internet.	Argentina is among the first in Latin America.	Uruguay has the highest level of broadband in Latin America and highest Internet connectivity rates after Chile.
International Markets	The Chilean economy is currently open to the global market. Chile has signed several trade agreements with more than 58 countries.	Argentina, together with other countries in South America, belongs to the integration of the Union and the Mercosur group of South American Nations.	Uruguay is a member of Mercosur, along with Argentina, Brazil and Paraguay, which is a free trade zone with a GDP of over \$ 2 billion.
Education	Quality of education is very high compared to the rest of LA. They are ranked 2 nd after Argentina, but there are currently many issues within the educational system.	Argentina leads in the level of education. It has one of the highest levels of literacy (96.9%).	Uruguay has the highest level of education and schooling, not only a high level of education but also their level of illiteracy and the quality of higher education.
Labor Force	The pay gap between men and women is still very high. There is low labor force participation among women. Chile has no restrictions on night work and brain drain is the lowest in LA.	Argentina has the highest minimum wage requirements in Latin America.	In terms of wage flexibility, Uruguay ranks lowest in Latin America.
Expenditure on health	8,2% of GDP	9,5% of GDP	7,4% of GDP
Mortality (2011)	5.97 / 1000 population	7.38/1000 population	9.58/1000 population
Hospital beds per 1000 inhabitants	2,1 beds/1000 population	4 beds/1000 population	2,9 beds/1000 population
Security	Chile is one of the safest countries in Latin America.	Argentina has a similar level of security as Panama.	It is considered a safe place in addition to Chile and Costa Rica.
Environment	Deforestation and mining threaten natural resources, air pollution from industrial and automobile emissions, water pollution and canalization.	Environmental problems (urban and rural) such as deforestation, soil degradation, desertification, air and water pollution. Argentina is the world leader in setting voluntary targets for greenhouse gas emissions .	Pollution of water in bulk / industry, inadequate disposal of solid / hazardous waste.
Transport and Information Infrastructure	Chile has the best infrastructure in Latin America, followed by Panama, especially in transport (ports and airports) and electricity. Chile has the lowest costs in LA for export and import container. According to the WB, Chile is a country that requires the fewest documents for export.	Argentina is among the top 5 countries in Latin America with the best infrastructure along with Panama, Chile and Uruguay.	Uruguay has a high level of infrastructure similar to Chile. Especially in technology and water.

Source: Global Competitiveness Index / IGC / World Economic Forum and others.

Table 6: Factors that can influence the level of competitiveness: Lowest Ranking Countries in South America

South America	Lowest Ranking Countries		
	Paraguay	Colombia	Bolivia
Economic liberalization and Institutional Changes	Paraguay has a strong and diverse economy. It has a large informal market (gray economy), which is a big problem. The political uncertainty, corruption, limited progress on structural reforms and poor infrastructure is a major obstacle to growth.	Colombia is now considered a newly industrialized country with a developing economy.	Bolivia is one of the poorest and least developed countries in Latin America. A lack of foreign investment in the key sectors of mining, hydrocarbons and higher food prices all pose challenges for the economy.
Technology	Paraguay has one of the lowest levels of technology along with Cuba and Nicaragua.	Colombia has a low intermediate level of technology and is currently working on its improvement.	Has the lowest position in respect to technology. According to the World Economic Forum ranked number 17 in Latin America.
International Markets	Paraguay also has the third largest free trade zone in the world.	Colombia seeks to deepen the phase of internationalization of the economy.	In the field of regional integration, Bolivia is a full member of the OAS, the Andean Community of Nations (CAN), UNASUR and the associated state of Mercosur. In terms of physical and energy integration, the country aims to become a major energy center of SA.
Education	Paraguay has one of the lowest levels of education, along with Haiti.	Colombia has a medium quality of the education system and the average number of years of schooling behind Brazil and Chile.	96% of the population is literate. One of the least illiterate Latin American countries.
Labor Force	Paraguay has a very flexible labor market.	Colombia has the highest labor costs and it is more expensive to employ people at all levels (social, etc.).	Bolivia and Venezuela are the countries where regulations do not allow payments for layoffs and downsizing. Bolivia has one of the cheapest labor forces in SA.
Expenditure on health	7,1% of GDP	6,4% of GDP	4,8 % of GDP
Mortality (2011)	4.57/1000 population	5.26 /1000 population	6.76 deaths/1,000 population
Hospital beds per 1000 inhabitants	1,3 bed/1000 population	1 bed/1000 population	1,1 bed/1000 population
Security	Paraguay has low-medium security, like Nicaragua.	Colombia has improved significantly in their fight against FARC and the drug cartels, although there is still major crime on the Venezuelan border.	Bolivia ranks among Brazil and Colombia for security for executives of multinational companies. It is safer than Brazil, but less secure than Colombia.
Environment	Deforestation, water pollution, and a lack of facilities for waste, which poses great health risk to residents.	Deforestation, land degradation from the overuse of pesticides, water quality, and air pollution, especially in Bogota.	The clearing of land for agricultural purposes is contributing to deforestation; soil erosion from overgrazing and poor cultivation methods; desertification; loss of biodiversity and industrial pollution.
Transport and Information Infrastructure	Paraguay has a very low level of infrastructure is one of the three lowest in Latin America.	Colombia has a lower-middle level of infrastructure, better than Venezuela, but among the six lowest in Latin America.	The worst infrastructure in Latin America is in Haiti. Bolivia's infrastructure is above that of the infrastructure of Paraguay and Nicaragua.

Source: Global Competitiveness Index / IGC / World Economic Forum and others.

Table 7: Factors that can influence the level of competitiveness: Top Ranking Countries in Central America

Central America	Lowest Ranking Countries		
	Costa Rica	Mexico	Panama
Economic liberalization and Institutional Changes	Costa Rica has attracted one of the highest levels of FDI per capita in LA thank to the country's political stability and the incentives offered in the free-trade zones. CAFTA-DR project attracted FDI in key sectors of the economy (insurance and telecom	Since the mid-1980s, Mexico has had a neoliberal economic model with a strong emphasis on trade liberalization. They have become the world leader in free trade agreements. They have signed contracts of this kind with more than 40 countries worldwide.	Panama has had a neoliberal economic model since the 1990s.
Technology	Costa Rica is a leader in fixed technology in Latin America, but has one of the lowest rates in the wireless connection.	Mexico is one of the countries with the most awards in UNESCO Science Prizes in Latin America and is second in terms of scientific publications.	Panama is the leader in Latin America in terms of technology thanks to the canal project and investment in this country in this field.
International Markets	Costa Rica has the highest level of education in Latin America, even higher than Germany and the U.S., according to the World Economic Forum.	Mexico is one of the Latin American countries with the highest quality education system after Costa Rica and Uruguay, especially in technical fields.	Panama has a very high level education system after Costa Rica and El Salvador.
Education	They have a highly skilled workforce.	Available and cheap labor. Unlike other countries in the region, they do not require too much extra for working at night or on holidays. The outdated nature of Mexican labor law tends to encourage an informal market. They experience a lot of brain drain.	The method of hiring and dismissing of employees in Panama receive very negative reviews, as well as the total labor market rigidities.
Labor Force			
Expenditure on health	10.5% of GDP	13,8% of GDP	8,3% of GDP
Mortality (2011)	4.33/1000 population	4.86 beds/1,000 population	4.65/1000 population
Hospital beds per 1000 inhabitants	1,2 beds/1000 population	1,6 beds/1000 population	2,2 beds/1000 population
Security	Costa Rica has one of the highest points as the safest countries in the region of Latin America, followed by Chile and Uruguay.	Uncertainty is one of the biggest problems in Mexico. This is manifested in two forms: uncertainty for Mexican residents due to increased crime and increased drug trafficking.	Panama has become one of the safest places in Latin America, particularly for foreign multinationals. It is very close to the level of Costa Rica, Chile and Uruguay.
Environment	Deforestation and soil erosion are major problems in Costa Rica along with solid waste management and air pollution.	Mexico has a shortage of facilities for waste management. Natural resources are limited; polluted freshwater in the north, inaccessible and poor quality freshwater in the center and extreme southeast, sewage and industrial waste pollution.	water pollution, tropical deforestation, land degradation and soil erosion threaten to clog the Panama Canal, air pollution in urban areas, mining and resources are the most threatened natural issues that Panama faces today.
Transport and Information Infrastructure	Costa Rica is in tenth place in Latin America in terms of infrastructure according to the World Economic Forum.	Mexico has the second best-quality rail services in Latin America, also has good roads and airports.	Panama has the best infrastructure in Latin America, particularly in transport and technology.

Source: Global Competitiveness Index / IGC / World Economic Forum and others.

Table 8: Factors that can influence the level of competitiveness: Lowest Ranking Countries in Central America

Central America	Lowest Ranking Countries		
	Guatemala	El Salvador	Nicaragua
Economic liberalization and Institutional Changes	Guatemala has problems with the misuse of public funds, public institutions, but the biggest problem is inflation.	Neoliberal model; this smallest country in CA has the third largest economy in region. El Salvador supports a free trade and investment and embarked on a wave of privatization (telecommunications, power distribution, banking and pension funds).	It is one of the poorest countries in the region, after Haiti. There is little involvement in the network of international agreements and has a lot of tariff barriers and regulations
Technology	Low quality of scientific human capital.	Low spending on research and development.	Nicaragua is a country with the worst level of technology. The biggest problems are the unavailability of technology, scientific research centers, and low quality.
Education	Haiti, Guatemala and Nicaragua are the countries with the lowest levels of education. Guatemala has the lowest illiteracy rate after Haiti (73.5%).		Haiti, Guatemala and Nicaragua are the countries with the lowest level in the field of education. Nicaragua has the third lowest rate of illiteracy (78%).
Labor Force	Guatemala's labor force has the greatest development potential in Central America.	According to the World Economic Forum, El Salvador has the highest wage flexibility followed by Peru and Chile.	El Salvador experiences the largest amount of brain drain, along with Venezuela
Expenditure on health	5,7% of GDP	3,9% of GDP	9,5% of GDP
Mortality (2011)	4.98/1000 population	5.62/1000 population	5.03/1000 population
Hospital beds per 1000 inhabitants	0,6 beds/1000 population	1,1 beds/1000 population	0,9 beds/ 1000 population
Security	Guatemala joined Honduras and El Salvador as the most dangerous countries in Central America, with similar characteristics. The biggest problem is crime and violence.	El Salvador is one of the most dangerous countries in Central America, particularly with regard to violence and organized crime.	Nicaragua also has many security problems, but is in a better position than Guatemala, Honduras and El Salvador.
Environment	Guatemala has problems with deforestation, soil erosion and water pollution.	Deforestation, soil erosion, water pollution, soil contamination are major problems in El Salvador.	Nicaragua has problems with deforestation, soil erosion, water pollution.
Transport and Information Infrastructure	Infrastructure is at a medium level after Salvador.	El Salvador has a good infrastructure. Salvador is placed fourth in infrastructure in Latin America by the World Economic Forum.	Nicaragua is the last country in infrastructure in Latin America, and the second worst in technology and transport.

Source: Global Competitiveness Index / IGC / World Economic Forum and others.

9. Conclusions

To assess the regional competitiveness of the countries from Latin America and the Caribbean we used an index based on the comparison of the values of the region (or state) with the most favorable value. For the evaluation indicators, the gross domestic product per capita (PPP), the unemployment rate, index of respect for private property, participation in the labor force with tertiary education, net migration and per capita national income GDP were used. These socioeconomic indicators complement the environmental indicator of CO₂ emissions per unit of GDP per capita. Based on the values of these indicators the competitiveness of the countries of Latin America is assessed. The index of the countries of Latin America and Caribbean was calculated cumulatively. For the purposes of the better interpretation they have been classified into three groups: South America, Central America including Mexico and the Antilles and smaller countries with less than 3 million people.

In South America, Chile dominates with an index of 57%, followed by Argentina (44.62%) and Uruguay (44.1%). On the contrary, the least competitive in South America were Bolivia (39.10%), Colombia (38.2%) and Paraguay (35.6%). Central American countries that obtained the highest rates in competitiveness in their region according to our calculations were: Costa Rica (51.4%), Mexico (49.7%) and Panama (46.5%), the countries occupying the lowest competitiveness positions in Central America were El Salvador (32.10%), Nicaragua (29.4%) and Haiti (21.6%). In the Antilles region the top three places are for the Bahamas (67.9%), St. Kitts and Nevis, (66%) and Barbados (58%). The countries in this region with the lowest positions turned out to be St Vincent and Grenadines (32.4%), Haiti (21,6%) and Guyana (17.9%). Regarding the evaluation of these countries can be problematic, however, as we emphasize the imprecise method for collection and verification of data accuracy.

Evaluation of these countries is therefore to be taken with caution. Among the common characteristics found in countries with low levels of competitiveness are the institutional and technological factors. The data seems to indicate that the level of respect for private property plays a key role in the competitiveness index. A low positioning in the index seems to correspond with the countries that do not provide adequate legal security for private property.

As there is uncertainty in these countries, the level of foreign direct investment is negatively impacted which has a direct impact on the level of technology and industrialization of these countries as well as infrastructure development. We consider this to be just one of the main barriers to economic development and a key area of improvement in the competitiveness of these countries. Another key area for improvement is the flaws in the institutional sector. This aspect leads to another topic needing further analysis.

10. Literature

- [1] Amiti, M. (2001): Regional Specialization and Technological Leapfrogging. *Journal of Regional Science*. Vol. 41. No. 1. pp. 149 – 172
- [2] Anderson, S. P. (2008): Spatial Competition, Pricing and Market Power in Transportation: A Dominant Firm Model. *Journal of Regional Science*. Vol. 48. No. 2. Pp. 367 – 397
- [3] Atkeson, A. a. (2001): Are Phillips curves useful for forecasting inflation? *Quarterly Review* (issue Win). pp. 2-11
- [4] Cameron, A. C. (2010). *Micro-econometrics Using Stata* (Revised ed.). Stata Press. Pp.692
- [5] Drezner, Z. (1998): On the Logit Approach to Competitive Facility Location. *Journal of Regional Science*, Vol. 38. No. 2. pp. 313 – 327
- [6] Madies, T. – Prager, J. C. (2008): *Innovation et la compétitivité La documentation Francoise*, Paris.: www.ladocumentationfrancaise.fr/rapports-publics/084000589/index.shtml (24/01/2012)
- [7] Malmberg, A. – Solvell, O. – Zander, I. (1996): Spatial Clustering, Local Accumulation of Knowledge and Firm Competitiveness. *Human Geography*. Vol. 78. No. 2. pp. 85 – 97
- [8] OECD (2005): *Building Competitive Regions: Strategies and Governance*. Paris. OECD. 141 p.
- [9] OECD (2006): *Competitive Cities in the Global Economy*, Paris. OECD. 446 p.
- [10] OECD (2009): *Regions at Glance*, Paris. OECD. 198 p.
- [11] Porter, M. (1990): *The Competitive Advantage of Nations*. New York. Free Press. 855 pp.
- [12] Tvrdoň, J. – Šuranová, J. (2007): Teoretické a praktické otázky vyjadrenia regionalnej konkurenceschopnosti v ekonomike Slovenska In: 2nd Central European Conference in Regional Science. Košice. Technical University of Košice. 1089 – 1098 pp.
- [13] Damborský, M. - Wokoun, R. - Kouřilová, J. Hodnocení socioekonomické úrovně měst a krajů ČR. Nový Smokovec 21.03.2012 - 24.03.2012. In: Rehák, Š. - Šipikal, M., Szitásziová, V., Černěnko, T. (ed.). 2. zimný seminár regionálnej vedy [CD-ROM]. Bratislava : Ekonóm, 2012. 11 s.
- [14] World Competitiveness Yearbook (WCY). 2012. World Competitiveness Yearbook (WCY). [ONLINE] Available at: <http://www.imd.org/research/publications/wcy/index.cfm> [Accessed]
- [15] The Global Competitiveness Report 2011 – 2012. The Global Competitiveness Report. [ONLINE] Available at: <http://www.incae.edu/es/clacds/informe-competitividad-global-2011-2012.php>

APPENDIX

Appendix 1 – Overview of estimated values

Variable/Country	GDP	Unem	LF	Mig	GNI	PRI	CO ₂	Suma
St. Kitts and Nevis	0	11	11	0	0	11	2	35
Dominica	0	9	11	0	0	10	2	32
Belize	0	1	11	11	0	0	2	25
St. Lucia	0	0	12	0	0	11	2	25
Grenada	0	8	11	0	0	1	2	22
Guyana	0	6	12	0	0	0	2	20
Suriname	1	4	12	0	1	0	2	20
Haiti	0	0	12	0	5	0	2	19
St. Vincent and Grenadines	0	5	12	0	0	0	2	19
Cuba	12	1	2	0	2	0	2	19
Antigua and Barbuda	0	0	11	0	0	1	2	14
Barbados	1	0	11	0	0	0	2	14
Jamaica	0	0	12	0	0	0	2	14
Chile	0	0	0	12	0	0	2	14
Bahamas	0	2	9	0	0	0	2	13
Venezuela	0	0	11	0	0	0	2	13
Nicaragua	0	1	8	0	0	0	2	11
Trinidad and Tobago	0	0	8	0	0	0	2	10
Guatemala	0	5	2	0	0	0	2	9
Uruguay	0	0	7	0	0	0	2	9
Dominican Republic	0	0	1	0	0	0	2	3
Honduras	0	1	0	0	0	0	2	3
Ecuador	0	1	0	0	0	0	2	3
Bolivia	0	0	0	0	0	0	2	2
El Salvador	0	0	0	0	0	0	2	2
Paraguay	0	0	0	0	0	0	2	2
Brazil	0	0	0	0	0	0	2	2
Colombia	0	0	0	0	0	0	2	2
Panama	0	0	0	0	0	0	2	2
Argentina	0	0	0	0	0	0	2	2
Costa Rica	0	0	0	0	0	0	2	2
Peru	0	0	0	0	0	0	2	2
Mexico	0	0	0	0	0	0	2	2
Suma	14	55	186	23	8	34	66	386

Source: Own calculations using data from WB, ECLAC, RYCIT, U.S. Census Bureau, RYCIT and the Heritage Foundation.