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A new Competitiveness Index for Latin America

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Abstract. This paper discusses the calculation of a competitiveness index for 17 countries in Latin America which denotes their competitive position in the present analysis based on the comparison of the indicators in four dimensions and weight thereof. The dimensions analyzed are economic, social, institutional and technological (using indicators such as GDP, foreign direct investment, migration rate, income per capita, the rate of property rights, the level of corruption, investment in research and development, labor, etc.). Based on the sequence and value of these indicators, a competitiveness index of these countries was calculated, resulting in a ranking of the countries. Other factors such as security, infrastructure, the role of technology and education, liberalization of the economy, and factors associated with investments in human capital are also examined. The period used for this analysis was 1999-2010 and, as aforementioned, determined by a suitable combination of different indicators of competitiveness relations.

Keywords: Latin America, Competitiveness, Economic Development, Institutions.

1. Introduction

For years, Latin America and the Caribbean were characterized by low and unstable levels of economic growth. This region is currently seen as dynamic and macro-economically stable. In recent years these countries 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 stimulates the accumulation of international reserves, in turn restoring the credibility of their economies. This, along with good management of public finances and fiscal and monetary policies that characterize their current independence and economic autonomy, helps stimulate growth.

Until late 2009 and early 2010, a large portion 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 economic policy response from these countries.

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 potential level. This is a great challenge for Latin America in the future.

2. Analysis

2.1. Definition of Competitiveness

The first definitions of the term 'competitiveness' dates from classical economists like Adam Smith (1776) and David Ricardo (1817), who link the factors of production with the use of comparative advantages. This term has been linked to trade liberalization from its origins. The competition has since been seen as the ability of a particular nation to be successful in the international market with the use of their factors (Ohlin, 1933). Although this term has been used continuously for more than three centuries, there is no uniform definition to define the level of competitiveness.

The dynamics of the international market, with the multiplicity of new actors, the inclusion and importance of new production factors such as knowledge and the deployment of services like transferable activity, have contributed to the absence of a common definition. It has constantly adapted to changing dynamics, acquiring different scopes and nuances according to the context.

For some authors, the concept of competitiveness has no meaning when applied to national economies and the obsession with it is wrong and dangerous. Paul Krugman (1994) is aware of the danger that can come from seeking competitiveness at any cost. The problem is that most people treat the competitiveness of a nation the same as the competitiveness of a private company. Krugman correctly points out the importance

of not confusing the terms productivity and competitiveness. This index was developed using as many clear cut indicators and interpretations of results as possible. In contrast to indexes like Doing Business (WB, 2012) or GCR (WEF, 2012), micro-economic aspects aren't included because the inclusion of black market firms can lead to a difficult and variable interpretation.

According to other authors, success is, in the case of developed economies, mainly determined by the capacity for innovation (i.e., Porter, 1990, Martin, 2003). Amiti (2001) affirms that regional competitiveness is closely linked to technological advances, maintenance of industrial connections, and the vertical dependence compatibility of old technologies with new. Regional competitiveness is closely linked with the region's ability to adapt to current trends in the use of powerful technology and market their vertical connections. Malmberg, Sölvell and Zander (1996) also argue that competitiveness is associated with maintaining their positions at a regional and international level, particularly in the context of economic globalization. Madies and Prager (2008) argue that regional competitiveness is determined by the ability to attract international resources, e.g., investment, skilled labor, etc.

From this arises a big question: what causes a nation to be more or less competitive than another? This is where the greatest discrepancy arises because, according to the perspective and scope, or the definition used for competitiveness, it can give a value to specified variables which to encompass the concept. This competitive index has been developed based on distinctive empirical research using the relationships between economic growth and trade openness, foreign direct investment, quality of infrastructure, technological development, labor efficiency and the quality of its institutions, and the level of corruption, etc.

2.2. Index Specification

This competitiveness index (CI) compares indicators (i) for a given state (j) and year (t) with the most favorable value among other countries (max $[I_{ijt}]$). There are 4 dimensions and each have two indicators. Each of the country's 8 indicators is therefore weighted by a uniform share (12.5 %). To account for some dynamics the uniform share is divided into three 4-year periods 1999-2002, 2003-2006, and 2007-2010. These are weighted (P_k) 2, 4 and 6.5 %. This allowed priority to be given to the recent development rather than past values. The final adjustment for every indicator ratio is done over its standard deviation and recomputed back to 100 % (sum of total standard deviation). To evaluate the regional competitiveness of Latin America with the 17 countries chosen, we have used the following formula:

$$CI_j = \sum_{i=1}^{8} \left(\sum_{t=1}^{12} \frac{I_{ijt}}{\max_j [I_{ijt}]} * \frac{\frac{0.125 * P_k}{SD_{it}}}{\sum_{i=1}^{8} \left(\frac{0.125 * P_k}{SD_{it}} \right)} \right)$$

Looking closely at the data and the standard deviation adjustment, it is possible to see that lower weights are given to the indicators with highest standard deviation and variability like GDP. On the other hand, higher weights are given to the indicators with lowest standard deviation and variability like FDI. Uniform total weight (12.5 %) for each indicator is then in sum slightly shifted. This allows us to control for extreme values and high variability.

2.3. Data

Seventeen Latin American countries were chosen, ten of South America and 7 from Central America. The data comes from international data sources such as the World Bank (WB WDI), the Economic Commission for Latin America and the Caribbean (ECLAC), U.S. Census Bureau, RYCIT and the Heritage Foundation. Where possible, indicators came from the same source, using a single method of measurement. Due to an insufficiency of data in the areas of migration on expenditures for research and development, some data was estimated. The basic method of estimation was OLS, a binary linear prediction with time and space.

The indicators used for the Economic Dimension were the GDP per capita based on purchasing power parity (PPP) obtained from the World Bank. The net foreign direct investment (FDI) (million dollars/per 1 million inhabitants) data was obtained from the Economic Commission for Latin America (ECLA). For the Social Dimension the net migration rate (the difference of immigrants and emigrants of an area in a period of time, divided per 1,000 inhabitants) from U.S. Bureau of Census, our estimates and the Gross National Income per capita (an indicator of income developed by the World Bank) were used. For the Institutional

Dimension, the International Property Right Index and Index of Freedom Corruption from Heritage Foundation was consulted. For the Technological Dimension R&D per GDP % and Labor Force obtained from RYCIT and the Economic Commission for Latin America (ECLA) were used.

3. Results

In the table below shows the Competitiveness Index score for the 17 countries of Latin America. The four dimensions on which the index has been developed are visible, each with a 25% weight in the index calculated.

Tab 1: The results of the index for Latin America, 1999-2010

Country	Index	Dimension			
		Economic	Social	Institutional	Technological
Chile	78.2%	23.2%	16.8%	25.7%	12.4%
Costa Rica	76.7%	33.8%	15.1%	15.7%	12.0%
Uruguay	68.0%	26.4%	14.1%	20.4%	7.1%
Brazil	63.2%	22.5%	14.3%	13.9%	12.5%
Argentina	60.0%	24.5%	14.6%	10.2%	10.8%
Panama	58.7%	22.0%	14.0%	11.4%	11.4%
Peru	54.6%	20.3%	10.8%	12.3%	11.4%
Colombia	53.1%	21.8%	12.1%	11.9%	7.3%
Paraguay	52.4%	27.1%	11.2%	8.0%	6.1%
Venezuela	51.6%	21.8%	14.5%	7.8%	7.5%
Ecuador	49.4%	20.2%	12.1%	8.6%	8.5%
Bolivia	48.5%	18.6%	10.3%	8.8%	10.8%
El Salvador	47.0%	20.0%	7.1%	14.3%	5.6%
Nicaragua	43.4%	21.0%	8.6%	8.6%	5.2%
Honduras	42.7%	18.8%	10.5%	9.4%	4.0%
Guatemala	42.0%	18.5%	9.8%	9.9%	3.8%
Guyana	40.4%	19.2%	3.0%	11.4%	6.8%

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

Among the South American countries, Chile has the highest competitiveness index according to these calculations, followed by Uruguay, Brazil and Argentina. The South American countries with the lowest index of competitiveness are Bolivia, Ecuador and Venezuela.

Among the countries that are at the head in Central America are Costa Rica with 76.7% followed by Panama. The last places in Central America are for Guyana and Honduras.

Chile is considered one of the most trade friendly countries in Latin America according to official data from the World Economic Forum 2012 occupying the 14th position worldwide, followed by Uruguay and Costa Rica, which, according with the same official figures, occupy the 40th and 43rd positions, surpassing Brazil in position 65. This could also explain the placement of these countries according to this index, which represents the reality in terms of competition between these countries. This data compliments this index by saying that Chile leads, followed closely by Costa Rica, then Uruguay and Brazil. Chile is internationally known as one of the strongest economies in Latin America, where the neo-liberal model has been in place since 1973 and where the institutional dimension is characterized by its smooth operation. This in turn attracts foreign direct investment due to institutional security, respect for private property and a relatively low level of corruption. This is an open economy with independent trade agreements with more than 58 countries. The level of technology is also an important factor in this country, as well as the quality of education which is among the highest in South America. This could explain the factors that have put Chile ahead in this index.

Costa Rica is among the technological pioneers in Latin America and has one of the lowest internet access costs and is also has a highly skilled workforce. Costa Rica is considered one of the safest countries in

Latin America, followed by Chile and Uruguay. In regard to infrastructure, the World Economic Forum places them in 10th position worldwide. These factors also explain their second position in the index.

Uruguay is a small open economy with a growing foreign market. They have the highest level of broadband in Latin America. Uruguay is a member of Mercosur with Argentina, Brazil and Paraguay, which is a free trade area with a GDP of more than 2 billion dollars. This country has one of the highest levels of schooling. It is considered a safe country along with Chile and Costa Rica and has a high level of infrastructure, especially in technology and water.

Panama is also highlighted due to its second position in Central America. Panama stands out due to its economic growth and great strides in infrastructure; it has 7 ports, a mega airport as well as a railway and canal connecting the Pacific with the Atlantic. They have actively worked on their competitiveness in the region. Unlike other regions, it is very focused on services rather than commodities. They took over the Panama Canal operations in 1999, which could explain their focus on services rather than goods, influenced as well by large amounts of international trade over the last century. This international exposure could also explain a bit of their outward show of competitiveness.

Brazil and Argentina maintain their positions and are some of the top economies in Latin America. Peru and Colombia are advancing thanks to the strong institutional changes that have been made in recent years. This year Ecuador approved a new legal code to attract investment and increase production. The reform gives way to institutional changes such as wage increases and tax cuts, which could improve their position in the future.

Among the common characteristics found in countries with low levels of competitiveness are the institutional and technological factors, low foreign direct investment in connection with the level of corruption and the largest common factor- the relatively high rate of migration from these countries before the global economic crisis. These countries have a large concentration in a few exports and still have one the greatest gaps between rich and poor. One issue of concern is the misuse of raw materials, and many countries are retreating to a singular focus on the export of raw materials

4. Conclusions

This index represents achieved values in Economic, Social, Technological and Institutional dimensions. The process of achieving prosperity itself is more complicated than simple numbers can represent and this papers attempts to shed some light on this issue by comparing common characteristics (index indicators, country facts) of countries with low and high level of competitiveness. This paper and index can serve as a basis for further institutional change analysis to uncover possible casual effects of factors to competitiveness and country prosperity.

Countries with a low rate of competitiveness, despite astonishing economic growth, have key structural problems; savings and investments are very low in comparison with other structures in the world. These countries have inadequate legal security for private property and fairly high rates of corruption. These factors lead to uncertainty, which results in low foreign direct investment, directly impacting the level of technology, industrialization and infrastructure development. These are the main barriers limiting economic development and competitiveness improvement.

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