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Are competitiveness rankings and institutional measures helping emerging economies to improve?

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Abstract

Purpose – Based on the rankings of the global competitiveness index and the fragile states index, this paper aims to suggest alternative approaches to shed some light on the effectiveness of rankings in helping emerging economies improve their competitiveness from an institutional standpoint.

Design/methodology/approach – The statistical analysis consisted of a two-stage analysis; the first stage consisted of constructing an updated Alternative Institutional Quality Index (AIQI), intending to design a comparative measure between dimensions over time. The second stage consisted of evidencing the structure of each of the observed dimensions' variance to evidence the existing changes or gaps of the AIQI and its components. The authors incorporated the Kruskas–Wallis (KW) model to test the results.

Findings – This paper demonstrates that the analyzed countries generally maintain their competitive position, even though changes in their scores are reflected. This makes invisible the development and progress factors generated by the countries that are mainly found with low scores and only reflect stable structures that allow them to maintain their position.

Research limitations/implications – The current study has a limitation because it concentrated on a few selected indicators based on the literature review. The limitations of this research may be overlooked in the future by adding additional variables and observations. The paper could be improved by including intra- and inter-regional approaches to control based on the occurrence of specific circumstances (i.e. informal institutions, economic development or factor endowments).

Practical implications – The paper contributes to the applicable measurement of competitiveness and its structural change over time.

Originality/value – This paper proposed an alternative and simple methodology to assess the evolution of the competitiveness indicators; this methodology could be used to measure structural changes at different levels, which may be an input for the design and implementation of policies to foster competitiveness.

Keywords Competitiveness, Institutions, Institutional quality, Emerging economies

Paper type Research paper

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1. Introduction

Hardly has an economic concept been so much at the forefront of policymakers' concerns in recent years as competitiveness. This growing interest may be due in part to their recognition that all countries must contend with higher economic efficiency standards derived from accelerated globalization of goods and services, as well as the external shocks generated by the recent crisis.

Since the early 1980s, many articles and studies on competitiveness have been published. In addition to the extensive academic literature, two major global rankings have been developed and are widely used to assess competitiveness., the IMD World Competitiveness Yearbook (WCY) published by the Institute for Management Development and the Global Competitiveness Index (GCI) issued by the World Economic Forum.

The WCY has been published since 1989 and covers 63 countries. It benchmarks the performance of the economies based on more than 330 criteria measuring different facets of competitiveness (Institute for Management Development, 2022). The GCI was introduced in 2004 for measuring national competitiveness, taking into account the microeconomic and macroeconomic foundations of national competitiveness; it covers more than 130 countries and measures 12 pillars (Sala-I-Martin *et al.*, 2007).

Global competitiveness rankings have frequently been the unifying theme of a large number of government action programs; this covers a wide range of activities, such as promoting the technological adaptation of companies, consolidating the bases of regional economic development, promoting the networking of SMEs and developing activities considered strategic for national economic growth.

The diversity of national approaches is determined by what countries consider to be the risks to avoid and the opportunities to seize, as well as the nature of their "chronic problems" and "critical resources." Their assessments of whether their economic performance is commensurate with their scientific and technological potential become critical.

In many countries, government action continues to be motivated by the desire to improve in the rankings. Countries largely lack an alternative conceptual framework for analyzing the relationship between business competitiveness and national economic performance. Moreover, it is somewhat surprising that the academic debate on competitiveness focuses on the absence of a widely accepted theory of the origins of competitiveness (Anca, 2012; Bhawsar and Chattopadhyay, 2015; Buitrago R and Barbosa Camargo, 2021; Olczyk, 2016).

The aim of this paper is essentially to suggest an alternative approaches to shed some light on the effectiveness of rankings in helping emerging economies improve their competitiveness.

2. Competitiveness approaches

The literature review reveals a plethora of approaches to competitiveness; in addition to the two published rankings mentioned previously, numerous published and unpublished rankings are prepared by governments, consultants and research institutions, all of which feed an insatiable appetite for benchmarking competitive performance and providing strategic guidance.

Academic approaches to competitiveness can be broadly classified into two large groups based on the level of analysis, country and firm-level. Table 1 summarizes these approaches as published in Buitrago R and Barbosa Camargo (2021).

It also seems to be a consensus in the literature that a cornerstone to competitiveness is the quality of the institutions (Ervits and Zmuda, 2018; Guerrieri and Meliciani, 2004; Hollingsworth, 2000; Ingram and Silverman, 2000; Jaffe *et al.*, 1993; Moon *et al.*, 1998; Peng *et al.*, 2008; Porter, 1990; Porter and Linde, 1995; Rodriguez *et al.*, 2005; Soete, 1987;

Level	Definition	Papers
Country	"The set of institutions and economic policies supportive of high rates of economic growth in the medium term." "set of institutions, market structures, and economic policies supportive of high current levels of prosperity" (Porter *et al.*, 2002, p. 16) "the degree to which a nation can, under free trade and fair market conditions, produce goods and services which meet the test of international markets, while simultaneously maintaining and expanding the real income of its people over the long-term." (OECD, 1992. p. 237)	(Baumann *et al.*, 2019), (Braja and Gemzik-Salwach, 2019), (Kubickova, 2019), (Peña-Vinces *et al.*, 2019), (Salas-Velasco, 2019), (Cárdenas *et al.*, 2018), (Kiseľáková *et al.*, 2018), (Wei and Nguyen, 2017), (Smit *et al.*, 2017), (Cuervo-Cazurra, 2008), (Yamakawa *et al.*, 2008), (Hausmann *et al.*, 2007), (Acemoglu and Johnson, 2005), (Rodrik *et al.*, 2004), (Hitt *et al.*, 2004)
Firm	"The capability of firms engaged in value-added activities in a specific industry in a particular country to sustain this value-added over long periods of time in spite of international competition." (Moon *et al.*, 1998, p. 139)	(Mihailova *et al.*, 2020), (Zhu *et al.*, 2019), (Hu *et al.*, 2019), (Fernández-Méndez *et al.*, 2018), (Estrin *et al.*, 2018), (Mingo *et al.*, 2018), (Manolopoulos *et al.*, 2018), (Brandl *et al.*, 2018), (Cuervo-Cazurra *et al.*, 2018), (Banalieva *et al.*, 2018), (Marano *et al.*, 2017), (Bilgili *et al.*, 2016), (Hoffman *et al.*, 2016)

Source: Author's elaboration, based on Buitrago R and Barbosa Camargo, 2021

Table 1.
Competitiveness: levels of analysis

Tobey, 1990; Wan and Hoskisson, 2003). The concept of institutional quality has also been discussed in the literature as the basis of economic transformation (Acemoglu *et al.*, 2001, 2002, Acemoglu, 2003, Acemoglu *et al.*, 2005; Acemoglu and Johnson, 2005; Lane, 2014).

3. Competitiveness levels, goals and outcomes

The construct competitiveness is applied to individuals, firms, industrial sectors and countries (Buitrago R and Barbosa Camargo, 2021). Using the same concepts and methods to measure competitiveness at all levels of analysis can create complications due to the oversimplification of the phenomena. The idea of competitiveness is not the same for a country and a firm – to take just the two main levels of analysis – their objectives and the nature of competition differ (Krugman, 1991, 1994; Pedersen, 2010).

It should be noted that the fundamental objectives of competitiveness vary depending on whether it is a company or a country. While the main aim of a company is to survive and gain a foothold in the international competitive environment (Moon *et al.*, 1998), the primary objective of a country – which is not concerned with survival – is to improve living standards and welfare (OECD, 1992; Porter *et al.*, 2002). Different actors (companies or countries) will rank these objectives differently depending on their strategic goals; a company may prefer to increase its market share rather than maximize profits; a government may prioritize attracting foreign direct investment rather than reducing inequality. Consequently, what should the basis of competitiveness be?

The aforementioned rankings comparatively measure national competitiveness based on the results achieved by each country (Carvalho *et al.*, 2020; Moirangthem and Nag, 2021; Tahir and Tahir, 2019). Results cannot be quantified in isolation because they are contingent on the methods used and the context in which they were achieved. A competitiveness

assessment based solely on obtained results provides *ex-post* information and does not indicate a country's potential capacity to accomplish its objectives (*ex-ante* review).

Because national competitiveness is primarily defined as the capacity to generate economic growth and welfare, governments focus their efforts on promoting all the factors contributing to the economy's performance. It is critical to understand how to measure competitiveness and the factors that influence it to determine aspects of improving to increase competitiveness (Lall, 2001).

If competitiveness analysis is valid, competitiveness rankings can be used to benchmark national performance. Rankings can assist policymakers in assessing their economies' shortcomings, much like technical benchmarking assists firms in assessing themselves against competitors and developing appropriate strategies. The peril of the rankings relies on the perception they generate; rankings are used to evaluate resource allocation (i.e. local and foreign investment, aid, public expenditure); it could create perverse incentives to follow an unreachable goal or to remain unchanged.

Institutional conditions have reclaimed analytical relevance in recent years, as evidenced by the (World Economic Forum, 2018) Global Competitiveness Report, which asks, "Are institutions still important?" (p. 12), highlighting the critical importance of an adequate institutional framework for international competition. Countries with strong and inclusive institutions are likely to ensure efficient factor allocation, encourage investment activities to improve performance, reduce uncertainty, promote equitable distribution of private and social benefits and facilitate economic agent interaction. On the contrary, countries with weak institutions frequently face a range of economic difficulties, including low investment flows, slow economic growth and low per capita income (Acemoglu *et al.*, 2001; Hall and Jones, 1999; Knack and Keefer, 1995; Mauro, 1995; Rodrik *et al.*, 2004).

Graham and Naim (1998) identified three types of institutional functions. The first is the formulation of rules and legislation. Legislative, ministries, municipal councils and related agencies all fall under this category. The second category of the institutional role is that of enforcing and administering rules and laws. Tribunals, boards, control and regulatory bodies are all involved in this. Thirdly, the institution is responsible for the provision of public services. These are the institutions responsible for ensuring the provision of various public goods and services.

There are many explanations for institutional quality that could be classified into three categories for analysis Graham and Naim (1998):

(1) Resource conditions: those are about the quantity, quality and distribution of available resources.

(2) Political conditions: co-optation, corruption and politicization of resource allocation.

(3) Systemic conditions: these are those that pertain to the clarity with which long-term goals are defined, the concentration of power in economic agents and external state intervention.

Our study considered these conditions to evaluate the national competitiveness outcomes from an institutional standpoint.

4. Methodology

The comparative analysis of economies based on rankings has become a fundamental instrument for comparative monitoring of the progress and effects of different public policies in a territory. However, these comparative forms have become a kind of stereotyped

pseudo-technicism, which does not allow us to observe the efforts generated by economies with limited capacities, and which highlight the progress of economies with ample resources, representing them as "winners".

This dynamic has led to the maintenance of imbalances among economies, driven mainly by "isomorphic" recommendations, which are not in line with the endogenous dynamics of each economy, creating an unbalanced allocation of opportunities. Hence, a reflection is required on how to rethink cohesion and regional development policies, from their concession to their implementation, by means of instruments and tools that address internal needs and cohesion between economies.

The purpose of this study is to examine the period 2007–2017 in 48 emerging and frontier economies (Table 2), for this selection we did a cross-validation of four different classification sources (International Monetary Fund, 2020; Morgan Stanley Capital International, 2020; Standard and Poors, 2020). There is no recognized definition for emerging economies; however, according to the sources consulted, they have in common that they are economies with sustained growth and stability, capable of producing high-value-added goods, participating in global commerce and integrating their financial markets. Additionally, these economies had experienced institutional transformations deploying transparent rules of the game that apply equally to all market participants; however, there is still a lag.

To carry out a comparative analysis of the evolution of institutional quality determinants in emerging countries, we categorized indicators from the GCI and the Fragile States Index (Appendix 2) (Fund for Peace, 2019) into three dimensions to identify the institutional conditions to compete:

(1) policy;

(2) resources; and

(3) systemic, the composition of each dimension is shown in Table 3.

A descriptive, longitudinal design study was conducted for the 48 emerging economies. The statistical analysis consisted of a three-stage analysis; the first stage consisted of the construction of an Alternative Institutional Quality Index (AIQI), through the implementation of the statistical method, principal component analysis (PCA), whose main objective is to synthesize a set of variables, recognizing the dynamics of the variance of each indicator. This allows to reduce the information to a set of smaller variables, called components. The first component captures the maximum amount of variance observed and will represent each dimension analyzed in this study.

Region	Countries
Latin America and the Caribbean	Argentina, Brazil, Chile, Colombia, Jamaica, Mexico, Peru, and Venezuela
Europe	Bulgaria, Croatia, Czech Republic, Estonia, Greece, Hungary, Latvia, Lithuania, Poland, Romania, Russia, Slovakia, Slovenia, Serbia and Ukraine
Asia	Bangladesh, China, India, Indonesia, Kazakhstan, Malaysia, Pakistan, the Philippines, Sri Lanka, Thailand, Turkey and Vietnam
Africa	Kenya, Nigeria, Namibia, South Africa, Uganda and Zambia
MENA	Egypt, Jordan, Kuwait, Morocco, Qatar, Tunisia and the United Arab Emirates

Sources: Author's elaboration, based on International Monetary Fund, 2020; Morgan Stanley Capital International, 2020; Standard and Poors, 2020

Table 2. Countries included in this study

Var_Name	Description	Dimension
fsi_fe	Factionalized elites	Systemic
fsi_gg	Group grievance	
fsi_ei	Economic inequality	
fsi_sl	State legitimacy	
gci_pr	Property rights	
gci_ipp	Intellectual property protection	
gci_bgr	Burden of government regulation	
gci_art	Availability of research and training services	
gci_eap	Effectiveness of anti-monopoly policy	
gci_pfo	Prevalence of foreign ownership	
gci_bir	Business impact of rules on FDI	
fsi_bd	Human flight and brain drain	Resources
fsi_ps	Public services	
gci_ci	Capacity for innovation	
gci_qri	Quality of scientific research institutions	
gci_csr	Company spending on R&D	
gci_uic	University-industry collaboration in R&D	
gci_ase	Availability of scientists and engineers	
gci_qi	Quality of overall infrastructure	
gci_qes	Quality of the education system	
gci_qms	Quality of math and science education	
gci_flm	Financing through local equity market	
gci_vca	Venture capital availability	
gci_alt	Availability of latest technologies	
gci_ftf	FDI and technology transfer	
gci_dpf	Diversion of public funds	Political
gci_ptp	Public trust in politicians	
gci_fdg	Favoritism in decisions of government officials	
gci_tgp	Transparency of government policymaking	

Source: Author's elaboration

Table 3. Variables and dimensions of institutional quality

By implementing this procedure in each of the observed years, a standard measurement is established, which will allow comparing them over time; however, to facilitate direct interpretation, a scaling process was implemented, so that their scores oscillate between 0 and 1.

The second stage consisted of comparing the structure of the variance of each of the observed dimensions, to analyze possible changes in the distribution of the observed countries. By means of these statistical tests, it will be possible to show whether, despite the efforts generated individually by each country, their structural behavior has been maintained.

Finally, to determine whether there are statistically significant differences between the groups of countries, based on regions, with respect to the AIQI, this study incorporated the Kruskas–Wallis (KW) model.

4.1 Alternative institutional quality index

For the construction of the AIQI, we build a dataset of 30 indicators for 48 emerging economies from 2007 to 2017. The first step consisted of the aggregation of the dimensions using the multivariate statistical methodology, Principal component analysis (PCA). One of PCA's main objectives is constructing new variables trying to lose as little information as

possible by constructing factors representing a proportion of the information collected, being the first factor that guarantees the best representation of the data.

Therefore, for the construction of each of the dimensions observed, only the first standardized factor is taken. The following formula is applied using its eigenvectors, which act as weighting factors within the new scores obtained.

$$\text{Newdimension} = \sum_{i=1}^{n} \lambda i \left(\frac{x_i - \overline{x_i}}{\sigma_i} \right)$$

where:

λi = *Vector variable i*;

x_i = *Variable i*;

$\overline{x}_i$ = *Average variable i*; and

σ_i = *Standard deviation variable i*.

In addition, based on the new scores obtained, they are rescaled using the max-min function:

$$\text{Scalated dimension}n_i = \frac{Xi - \min(X)}{\max(X) - \min(X)}$$

Finally, to obtain the AIQI, an average of the scores previously obtained for each dimension is taken. The complete results and rankings of the AIQI are in the Tables A1 and A2 in the Appendix 1.

4.2 Gap analysis

As we mentioned before, the rankings become a benchmark for all the economies; benchmarking and other assessments naturally lead to gap analysis. Once the general expectation of a country's performance is established, the expectation can be compared to the top current level of performance; this comparison is transformed into a gap analysis.

For the analysis of the evolution of the proposed dimensions (political, resources and systemic), we used a box diagram, which allowed us to visually compare the progress and distribution of the scores obtained in each dimension of the economies observed. To interpret these results, it is helpful to keep in mind that the larger the box, the greater the dispersion in the scores obtained, which translates into a larger gap between emerging economies. In the opposite case, the smaller the box, the smaller the dispersion in the scores, which commonly usually occurs when the countries are more homogeneous or when the leader is closer to the others. The tails represent how the top or bottom 25% of the countries are distributed.

To test the statistical changes in the structure of the AIQI and its determinants, the statistical tests of variance ratio and the nonparametric Wilcoxon–Mann–Whitney test were used to compare the annual evolution. Also, we rely on both tests' statistical value to quantitatively assess the impact and direction of the gap. If the variance ratio is greater than 1, the gap widens; if it is less than 1, the gap narrows, and if it is statistically equal to 1, the gap is maintained. The Wilcoxon test evaluates two related samples, and if it is statistically significant, it indicates that the countries' behavior is statistically similar.

5. Findings and discussion

In this section, we show the results of the AIQI in the period 2007 – 2017; we aim to evidence the behavior of the emerging economies regarding the institutional conditions to improve competitiveness.

5.1 Political dimension

Figure 1 shows the annual box plots of the countries' score concerning the political dimension between 2007 and 2017. Observing the evolutionary behavior of the gaps between countries in this dimension, it is evident that, since 2007, it has presented structural changes in terms of closing political gaps.

When comparing the variance's behavior concerning the previous year, it is evident that from 2007 to 2017, there are no statistically significant changes in its behavior. And when looking to observe whether there are structural changes in the variance concerning future periods, it is evident that from 2008 to 2017, the variance structure has remained the same.

When comparing the average behavior concerning the previous year, it is evident that from 2008 to 2017, there are no statistically significant changes in its behavior. See Table 4.

However, when analyzing the moments in which the structural changes in the average behavior occurred, it became evident that two periods were reflected ahead for the years 2008, 2009, 2013 and 2014. For the years 2008 and 2009, these differences were negative, i.e. 50% of the countries presented a deterioration in the scores obtained. And for the periods 2013 and 2014, an improvement in the scores was observed.

For the periods 2010, 2011, and 2012, the behavior is statistically equal until 2016, when there is a structural change. See Table 5.

5.2 Resources dimension

The annual behavior of the scores obtained in the Resources dimension by the countries between 2007 and 2017 is shown in the box plots in Figure 2.

In the Resources dimension, it is important to note that the increase in the gap corresponds mainly to the improvement performance of leading countries, which generates a distancing effect with the other countries.

When comparing the behavior of the variance of a given year compared to the immediately preceding year, it is evident that from 2007 to 2017, there are no statistically significant changes in its behavior. Likewise, when looking to observe if there are structural changes in the variance for future periods, it is evident that the structure of the variance has been maintained in all periods.

Furthermore, if the average behavior is compared to the previous year, it is evident that from 2007 to 2017, there are no statistically significant changes in its behavior. See Table 6.

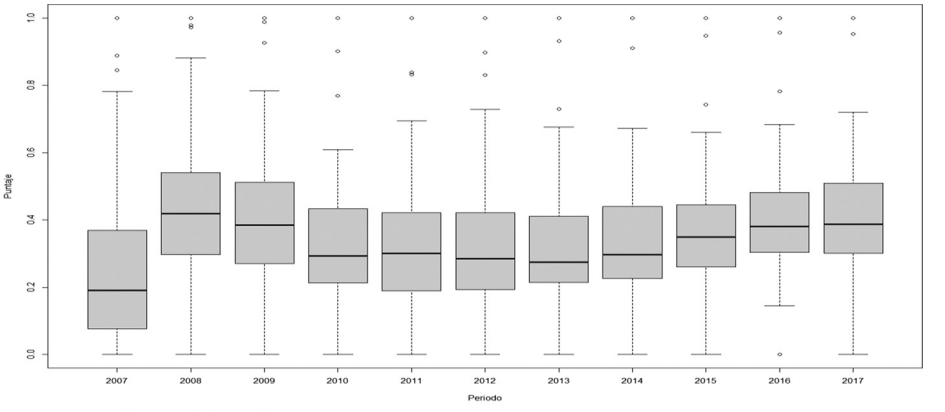

Figure 1.
Political dimension scores, 2007 –2017

Source: Author's elaboration

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
2007	1										
2008	Test:0.719	1									
	p-value: 0.262										
2009	Test:0.668	Test:0.929	1								
	p-value: 0.17	*p*-value:0.801									
2010	Test:0.597	Test:0.83	Test:0.893	1							
	p-value: 0.08	*p*-value:0.524	*p*-value:0.7								
2011	Test:0.674	Test:0.938	Test:1.01	Test:1.13	1						
	p-value: 0.18	*p*-value:0.826	*p*-value:0.974	*p*-value:0.676							
2012	Test:0.714	Test:0.992	Test:1.068	Test:1.196	Test:1.058	1					
	p-value: 0.251	*p*-value:0.979	*p*value:0.821	*p*-value:0.542	*p*-value:0.847						
2013	Test:0.616	Test:0.857	Test:0.922	Test:1.032	Test:0.914	Test:0.863	1				
	p-value: 0.1	*p*-value:0.598	*p*-value:0.783	*p*-value:0.913	*p*-value:0.758	*p*-value:0.616					
2014	Test:0.551	Test:0.766	Test:0.824	Test:0.923	Test:0.817	Test:0.772	Test:0.894	1			
	p-value: 0.043	*p*-value:0.363	*p*-value:0.511	*p*-value:0.785	*p*-value:0.49	*p*-value:0.377	*p*-value:0.702				
2015	Test:0.547	Test:0.761	Test:0.82	Test:0.918	Test:0.812	Test:0.767	Test:0.889	Test:0.994	1		
	p-value:0.041	*p*-value:0.353	*p*-value:0.498	*p*-value:0.77	*p*-value:0.478	*p*-value:0.367	*p*-value:0.688	*p*-value:0.984			
2016	Test:0.525	Test:0.73	Test:0.786	Test:0.88	Test:0.778	Test:0.735	Test:0.852	Test:0.953	Test:0.958	1	
	p-value:0.029	*p*-value:0.284	*p*-value:0.411	*p*-value:0.662	*p*-value:0.393	*p*-value:0.295	*p*-value:0.585	*p*-value:0.869	*p*-value:0.885		
2017	Test:0.541	Test:0.752	Test:0.81	Test:0.907	Test:0.802	Test:0.758	Test:0.878	Test:0.982	Test:0.988	Test:1.031	1
	p-value:0.038	*p*-value:0.333	*p*-value:0.473	*p*-value:0.739	*p*-value:0.453	*p*-value:0.346	*p*-value:0.658	*p*-value:0.952	*p*-value:0.968	*p*-value:0.917	

Source: Author's elaboration

Table 4.
Political dimension variance

Table 5.
Political dimension median

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
2007	1										
2008	Test: 1707 *p*-value: 0	1									
2009	Test: 1683 *p*-value: 0	Test: 1074 *p*-value: 0.57	1								
2010	Test: 1519 *p*-value: 0.007	Test: 835 *p*-value: 0.02	Test: 896 *p*-value: 0.061	1							
2011	Test: 1450 *p*-value: 0.029	Test: 786 *p*-value: 0.007	Test: 828 *p*-value: 0.018	Test: 1077 *p*-value: 0.585	1						
2012	Test: 1486 *p*-value: 0.015	Test: 799 *p*-value: 0.01	Test: 852 *p*-value: 0.028	Test: 1097 *p*-value: 0.69	Test: 1183 *p*-value: 0.823	1					
2013	Test: 1472 *p*-value: 0.019	Test: 758 *p*-value: 0.004	Test: 814 *p*-value: 0.013	Test: 1070 *p*-value: 0.55	Test:1147 *p*-value: 0.974	Test: 1137 *p*-value: 0.915	1				
2014	Test: 1533 *p*-value: 0.005	Test: 798 *p*-value: 0.01	Test: 855 *p*-value: 0.03	Test: 1143 *p*-value: 0.95	Test: 1221 *p*-value: 0.616	Test: 1199 *p*-value: 0.733	Test: 1217 *p*-value: 0.636	1			
2015	Test: 1622 *p*-value: 0.001	Test: 918 *p*-value: 0.087	Test: 1000 *p*-value: 0.267	Test: 1272 *p*-value: 0.381	Test:1369 *p*-value: 0.113	Test: 1337 *p*-value: 0.176	Test: 1388 *p*-value: 0.084	Test: 1322 *p*-value: 0.214	1		
2016	Test: 1703 *p*-value: 0	Test: 1108 *p*-value: 0.75	Test: 1185 *p*-value: 0.812	Test: 1457 *p*-value: 0.026	Test: 1540 *p*-value: 0.005	Test: 1506 *p*-value: 0.01	Test: 1555 *p*-value: 0.003	Test: 1497 *p*-value: 0.012	Test: 1351 *p*-value: 0.146	1	
2017	Test: 1685 *p*-value: 0	Test: 1091 *p*-value: 0.658	Test: 1171 *p*-value: 0.892	Test: 1442 *p*-value: 0.034	Test: 1484 *p*-value: 0.015	Test: 1475 *p*-value: 0.018	Test: 1521 *p*-value: 0.007	Test: 1478 *p*-value: 0.017	Test: 1318 *p*-value: 0.225	Test: 1119 *p*-value: 0.812	1

Source: Author's elaboration

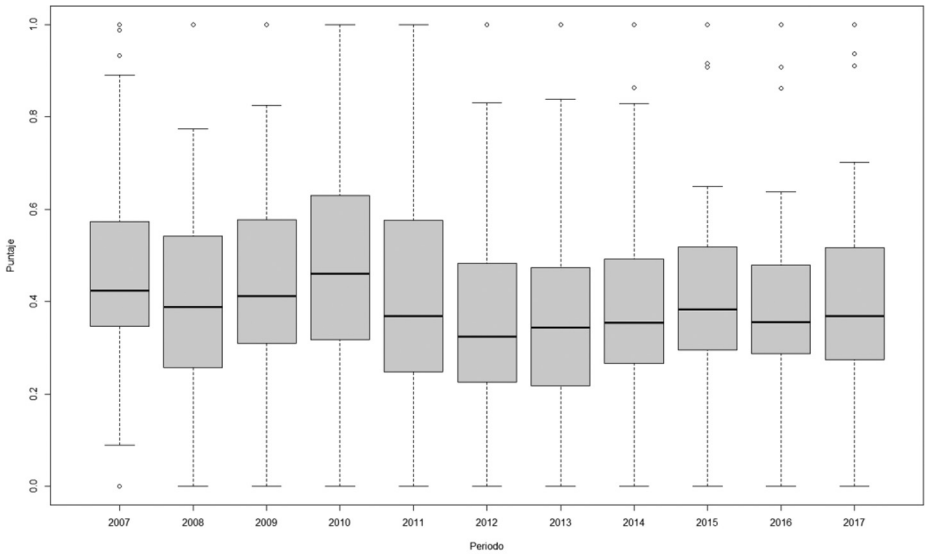

Figure 2.
Resource dimension scores, 2007 –2017

Source: Author's elaboration

When analyzing the moments in which the structural changes in average behavior occur, it was reflected that for the years 2007 and 2010, the changes happen to six periods ahead, as in 2007. It is noteworthy that for the years 2007, 2008, 2009, 2010 and 2011 these differences were negative, i.e. most countries presented a decline in the scores obtained. In the periods 2012, 2013, 2014 and 2016 an improvement in the scores obtained in the dimension was observed; see Table 7.

5.3 Systemic dimension

Figure 3 shows the annual box plots of the countries' scores for the Systemic dimension between 2007 and 2017.

The observed evolution of the behavior of the gaps between countries for the systemic dimension shows that, since 2007, it has presented structural changes in terms of closing systemic gaps, where over the past five years, there has been a greater distance in the scores obtained, indicating a smaller distance between countries in this dimension. The increase in terms of gaps is attributed to the improvement in scores in leading countries, which generates a distancing effect with the other countries.

Comparing the behavior of the variance of a year with the previous year, it is evident that from 2007 to 2017, there are no statistically significant changes in its behavior, furthermore, seeking to observe whether there are structural changes in the variance for future periods, it is evident that the structure of the variance has been maintained throughout the observation window.

Similarly, if we compare the average behavior with the previous year, it is evident that from 2008 to 2017, there are no statistically significant changes in its behavior.

On the other hand, when analyzing the moments in which the structural changes in average behavior occur, it is evident that in 2007 they are reflected in all subsequent periods. In 2012, 2013 and 2015, these differences were negative, i.e. 50% of the countries presented a

Table 6.
Resource dimension variance

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
2007	1										
2008	Test:0.889 *p*-value:0.689	1									
2009	Test:1 *p*-value:0.999	Test:1.124 *p*-value: 0.69	1								
2010	Test:1.193 *p*-value:0.547	Test:1.342 *p*-value: 0.317	Test:1.194 *p*-value: 0.546	1							
2011	Test:0.993 *p*-value:0.982	Test:1.117 *p*-value: 0.706	Test:0.994 *p*-value: 0.983	Test:0.833 *p*-value: 0.532	1						
2012	Test:0.767 *p*-value:0.366	Test:0.862 *p*-value: 0.613	Test:0.767 *p*-value:0.367	Test:0.643 *p*-value: 0.133	Test:0.772 *p*-value: 0.154	1					
2013	Test:0.784 *p*-value:0.408	Test:0.882 *p*-value: 0.669	Test:0.785 *p*-value: 0.409	Test:0.658 *p*-value: 0.154	Test:0.79 *p*-value: 0.132	Test:1.023 *p*-value: 0.938	1				
2014	Test:0.766 *p*-value:0.363	Test:0.861 *p*-value: 0.61	Test:0.766 *p*-value: 0.364	Test:0.642 *p*-value: 0.132	Test:0.771 *p*-value: 0.159	Test:0.999 *p*-value: 0.996	Test:0.976 *p*-value: 0.934	1			
2015	Test:0.788 *p*-value:0.418	Test:0.886 *p*-value: 0.681	Test:0.789 *p*-value: 0.419	Test:0.661 *p*-value: 0.159	Test:0.794 *p*-value: 0.126	Test:1.028 *p*-value: 0.924	Test:1.005 *p*-value: 0.987	Test:1.03 *p*-value: 0.921	1		
2016	Test:0.76 *p*-value:0.351	Test:0.855 *p*-value: 0.593	Test:0.761 *p*-value: 0.352	Test:0.637 *p*-value: 0.126	Test:0.765 *p*-value:0.312	Test:0.992 *p*-value: 0.977	Test:0.969 *p*-value: 0.915	Test:0.993 *p*-value: 0.981	Test:0.965 *p*-value:0.902	1	
2017	Test:0.886 *p*-value: 0.681	Test:0.997 *p*-value: 0.991	Test:0.887 *p*-value: 0.682	Test:0.743 *p*-value:0.312	Test:0.892 *p*-value: 0.697	Test:1.156 *p*-value: 0.621	Test:1.13 *p*-value:0.678	Test:1.158 *p*-value:0.618	Test:1.124 *p*-value: 0.69	Test:1.166 *p*-value: 0.602	1

Source: Author's elaboration

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
2007	1										
2008	Test: 986	1									
	p-value: 0.225										
2009	Test: 1079	Test: 1256	1								
	p-value: 0.595	*p*-value: 0.448									
2010	Test: 1205	Test: 1379	Test: 1271	1							
	p-value: 0.7	*p*-value: 0.097	*p*-value: 0.385								
2011	Test: 1004	Test: 1167	Test: 1079	Test: 944	1						
	p-value: 0.28	*p*-value: 0.915	*p*-value: 0.595	*p*-value: 0.128							
2012	Test: 816	Test: 986	Test: 894	Test: 762	Test: 968	1					
	p-value: 0.014	*p*-value: 0.225	*p*-value: 0.059	*p*-value: 0.004	*p*-value: 0.179						
2013	Test: 829	Test: 1000	Test: 921	Test: 775	Test: 985	Test: 1167	1				
	p-value: 0.018	*p*-value: 0.267	*p*-value: 0.091	*p*-value: 0.006	*p*-value: 0.222	*p*-value:0.915					
2014	Test: 903	Test: 1101	Test: 979	Test: 859	Test: 1074	Test: 1273	Test: 1267	1			
	p-value: 0.069	*p*-value: 0.711	*p*-value: 0.206	*p*-value: 0.032	*p*-value: 0.57	*p*-value: 0.377	*p*-value: 0.401				
2015	Test: 986	Test: 1189	Test: 1059	Test: 947	Test: 1173	Test: 1370	Test: 1352	Test: 1272	1		
	p-value: 0.225	*p*-value: 0.789	*p*-value: 0.498	*p*-value: 0.134	*p*-value: 0.881	*p*-value: 0.111	*p*-value: 0.144	*p*-value: 0.381			
2016	Test: 884	Test: 1108	Test: 984	Test: 872	Test: 1097	Test: 1286	Test: 1271	Test: 1165	Test: 1044	1	
	p-value: 0.05	*p*-value: 0.75	*p*-value: 0.22	*p*-value: 0.041	*p*-value: 0.69	*p*-value: 0.328	*p*-value: 0.385	*p*-value: 0.927	*p*-value: 0.431		
2017	Test: 919	Test: 1117	Test: 1000	Test: 894	Test: 1108	Test:1305	Test: 1279	Test: 1200	Test: 1078	Test: 1167	1
	p-value: 0.088	*p*-value: 0.8	*p*-value: 0.267	*p*-value: 0.059	*p*-value: 0.75	*p*-value: 0.264	*p*-value: 0.354	*p*-value: 0.728	*p*-value: 0.59	*p*-value: 0.915	

Source: Author's elaboration

Table 7.
Resource dimension median

Table 8.
Systemic dimension variance

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
2007	1										
2008	Test:0.811	1									
	p-value: 0.475										
2009	Test:0.616	Test:0.76	1								
	p-value: 0.1	*p*-value: 0.349									
2010	Test:0.678	Test:0.837	Test:1.101	1							
	p-value: 0.187	*p*-value: 0.543	*p*-value: 0.742								
2011	Test:0.695	Test:0.857	Test:1.128	Test:1.024	1						
	p-value: 0.215	*p*-value: 0.598	*p*-value:0.681	*p*-value: 0.935							
2012	Test:0.689	Test:0.85	Test:1.119	Test:1.016	Test:0.992	1					
	p-value: 0.205	*p*-value: 0.579	*p*-value: 0.702	*p*-value: 0.957	*p*-value: 0.978						
2013	Test:0.612	Test:0.755	Test:0.994	Test:0.903	Test:0.881	Test:0.889	1				
	p-value: 0.096	*p*-value: 0.339	*p*-value: 0.984	*p*-value: 0.727	*p*-value: 0.667	*p*-value: 0.687					
2014	Test:0.538	Test:0.663	Test:0.873	Test:0.793	Test:0.774	Test:0.78	Test:0.878	1			
	p-value: 0.036	*p*-value: 0.163	*p*-value: 0.644	*p*-value: 0.429	*p*-value: 0.383	*p*-value: 0.398	*p*-value: 0.658				
2015	Test:0.519	Test:0.64	Test:0.843	Test:0.766	Test:0.748	Test:0.754	Test:0.848	Test:0.966	1		
	p-value: 0.027	*p*-value: 0.13	*p*-value:0.561	*p*-value: 0.363	*p*-value: 0.322	*p*-value: 0.336	*p*-value: 0.575	*p*-value: 0.906			
2016	Test:0.536	Test:0.661	Test:0.871	Test:0.791	Test:0.772	Test:0.778	Test:0.876	Test:0.997	Test:1.033	1	
	p-value: 0.035	*p*-value: 0.16	*p*-value: 0.637	*p*-value: 0.424	*p*-value: 0.378	*p*-value: 0.393	*p*-value: 0.651	*p*-value: 0.993	*p*-value: 0.913		
2017	Test:0.538	Test:0.664	Test:0.874	Test:0.794	Test:0.775	Test:0.781	Test:0.879	Test:1.001	Test:1.037	Test:1.004	1
	p-value: 0.036	*p*-value: 0.164	*p*-value: 0.647	*p*-value: 0.431	*p*-value: 0.386	*p*-value: 0.401	*p*-value: 0.661	*p*-value: 0.996	*p*-value: 0.902	*p*-value: 0.989	

Source: Author's elaboration

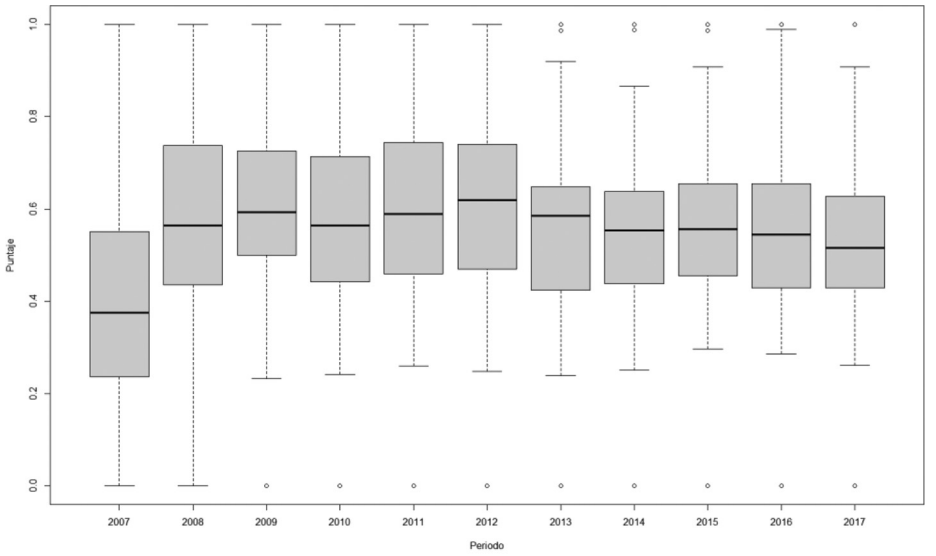

Figure 3.
Systemic dimension scores, 2007 –2017

Source: Author's elaboration.

deterioration in the scores obtained. There were no years with general improvements in the scores obtained for the following periods.

For the periods 2008, 2009, 2010 and 2011 the behavior is statistically the same, until 2012 when a structural change occurs, as shown in Table 9.

5.4 Alternative institutional quality index

The annual box plots of the score obtained in the Institutional Index by the countries concerning the Policy dimension between 2007 and 2017 are observed in Figure 4.

Analyzing the staggered behavior of the territorial gaps for the AIQI, it can be seen that, since 2007, there have been structural changes in terms of closing the gaps in the index, almost every year there has been a smaller gap in the scores obtained, indicating a greater closeness of most of the emerging countries. However, it should be noted that this reduction in the gap corresponds essentially to improvements in the scores obtained by the leading countries, which has generated an effect of closeness to the other countries, also attributable to the scores obtained by the countries with greater opportunities for improvement.

Contrasting the behavior of the variance of each year to the previous year, it is shown that from 2007 to 2017, there are no statistically significant changes in its behavior; furthermore, when wanting to observe if there are indeed structural changes in the variance for future periods, it is evident that the structure of the variance has been maintained from 2007 to 2017.

Likewise, when comparing the average behavior of a year to the previous year, it is identified that from 2007 to 2017, there are no statistically significant changes in this.

Similarly, when analyzing these structural changes in average performance could occur, it is evident that, as for the immediately consecutive periods, there are no significant changes from one year to the next. It is highlighted that for the years 2009, 2010 and 2011;

Table 9.
Systemic dimension median

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
2007	1										
2008	Test: 1601 *p*-value: 0.001	1									
2009	Test: 1684 *p*-value: 0	Test: 1264 *p*-value: 0.414	1								
2010	Test: 1647 *p*-value: 0	Test: 1184 *p*-value: 0.817	Test: 1069 *p*-value: 0.545	1							
2011	Test: 1674 *p*-value: 0	Test: 1234 *p*-value: 0.55	Test: 1125 *p*-value: 0.846	Test: 1209 *p*-value: 0.679	1						
2012	Test: 1665 *p*-value: 0	Test:1241 *p*-value: 0.517	Test: 1134 *p*-value: 0.898	Test: 1212 *p*-value: 0.663	Test: 1168 *p*-value: 0.91	1					
2013	Test: 1590 *p*-value: 0.001	Test: 1107 *p*-value: 0.744	Test: 992 *p*-value: 0.242	Test: 1068 *p*-value: 0.541	Test: 1026 *p*-value: 0.358	Test: 984 *p*-value: 0.22	1				
2014	Test: 1577 *p*-value: 0.002	Test: 1058 *p*-value: 0.493	Test: 932 *p*-value:0.108	Test: 1037 *p*-value: 0.401	Test: 977 *p*-value: 0.201	Test: 948 *p*-value: 0.136	Test: 1089 *p*-value: 0.647	1			
2015	Test: 1586 *p*-value: 0.001	Test: 1082 *p*-value: 0.611	Test: 962 *p*-value: 0.165	Test: 1055 *p*-value: 0.479	Test: 1000 *p*-value: 0.267	Test: 983 *p*-value: 0.217	Test: 1135 *p*-value: 0.904	Test: 1181 *p*-value: 0.835	1		
2016	Test: 1563 *p*-value: 0.003	Test: 1039 *p*-value: 0.41	Test: 923 *p*-value: 0.094	Test: 1013 *p*-value: 0.31	Test: 971 *p*-value: 0.186	Test: 943 *p*-value: 0.127	Test: 1103 *p*-value: 0.722	Test: 1133 *p*-value: 0.892	Test: 1111 *p*-value: 0.767	1	
2017	Test: 1527 *p*-value: 0.006	Test: 995 *p*-value: 0.251	Test: 864 *p*-value: 0.035	Test: 955 *p*-value: 0.15	Test: 920 *p*-value: 0.09	Test: 889 *p*-value:0.054	Test: 1023 *p*-value: 0.346	Test: 1065 *p*-value: 0.526	Test: 1023 *p*-value: 0.346	Test: 1065 *p*-value: 0.526	1

Source: Author's elaboration

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
2007	1										
2008	Test:0.748	1									
	p-value: 0.323										
2009	Test:0.671	Test:0.897	1								
	p-value: 0.175	*p*-value:0.712									
2010	Test:0.729	Test:0.974	Test:1.086	1							
	p-value:0.281	*p*-value: 0.929	*p*-value:0.779								
2011	Test:0.726	Test:0.971	Test:1.082	Test:0.997	1						
	p-value: 0.277	*p*-value: 0.92	*p*-value: 0.788	*p*-value: 0.991							
2012	Test:0.677	Test:0.905	Test:1.008	Test:0.929	Test:0.932	1					
	p-value: 0.184	*p*-value: 0.733	*p*-value: 0.978	*p*-value: 0.801	*p*-value:0.809						
2013	Test:0.641	Test:0.858	Test:0.956	Test:0.88	Test:0.883	Test:0.948	1				
	p-value: 0.132	*p*-value: 0.601	*p*-value: 0.877	*p*-value: 0.664	*p*-value: 0.672	*p*-value: 0.856					
2014	Test:0.597	Test:0.798	Test:0.89	Test:0.819	Test:0.822	Test:0.883	Test:0.931	1			
	p-value: 0.08	*p*-value: 0.443	*p*-value: 0.69	*p*-value: 0.498	*p*-value: 0.505	*p*-value:0.67	*p*-value: 0.807				
2015	Test:0.607	Test:0.811	Test:0.904	Test:0.833	Test:0.835	Test:0.897	Test:0.946	Test:1.016	1		
	p-value: 0.09	*p*-value: 0.476	*p*-value: 0.731	*p*-value: 0.533	*p*-value: 0.54	*p*-value: 0.71	*p*-value: 0.85	*p*-value: 0.956			
2016	Test:0.586	Test:0.783	Test:0.872	Test:0.804	Test:0.806	Test:0.865	Test:0.913	Test:0.981	Test:0.965	1	
	p-value: 0.07	*p*-value: 0.405	*p*-value: 0.642	*p*-value: 0.456	*p*-value: 0.463	*p*-value: 0.622	*p*-value: 0.756	*p*-value: 0.947	*p*-value: 0.903		
2017	Test:0.606	Test:0.811	Test:0.904	Test:0.832	Test:0.835	Test:0.896	Test:0.945	Test:1.016	Test:1	Test:1.036	1
	p-value: 0.09	*p*-value: 0.475	*p*-value: 0.73	*p*-value: 0.532	*p*-value: 0.539	*p*-value: 0.709	*p*-value: 0.848	*p*-value: 0.958	*p*-value: 0.999	*p*-value: 0.905	

Source: Author's elaboration

Table 10.
Alternative institutional quality index variance

Table 11.
Alternative institutional quality index median

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
2007	1										
2008	Test: 1503 *p*-value: 0.01	1									
2009	Test: 1569 *p*-value: 0.002	Test: 1221 *p*-value: 0.617	1								
2010	Test: 1516 *p*-value: 0.007	Test: 1158 *p*-value: 0.968	Test: 1087 *p*-value: 0.638	1							
2011	Test: 1448 *p*-value: 0.03	Test: 1068 *p*-value: 0.542	Test: 1003 *p*-value: 0.278	Test: 1058.5 *p*-value: 0.496	1						
2012	Test: 1418 *p*-value: 0.051	Test: 1008 *p*-value:0.294	Test: 940 *p*-value: 0.122	Test: 1008.5 *p*-value: 0.295	Test: 1090.5 *p*-value: 0.655	1					
2013	Test:1374 *p*-value: 0.105	Test: 949 *p*-value: 0.138	Test: 886 *p*-value: 0.051	Test: 941.5 *p*-value: 0.124	Test: 1028.5 *p*-value: 0.367	Test: 1083.5 *p*-value: 0.618	1				
2014	Test: 1416 *p*-value: 0.053	Test: 983 *p*-value: 0.218	Test: 919 *p*-value: 0.088	Test: 990.5 *p*-value: 0.238	Test: 1071.5 *p*-value: 0.558	Test:1126.5 *p*-value: 0.855	Test: 1197 *p*-value: 0.744	1			
2015	Test: 1480 *p*-value: 0.016	Test: 1068 *p*-value: 0.542	Test: 1006 *p*-value: 0.288	Test: 1073.5 *p*-value: 0.568	Test: 1159.5 *p*-value: 0.959	Test:1225.5 *p*-value: 0.593	Test: 1310.5 *p*-value: 0.247	Test: 1254.5 *p*-value: 0.455	1		
2016	Test: 1493 *p*-value: 0.012	Test: 1082 *p*-value: 0.612	Test: 1037 *p*-value: 0.403	Test: 1085.5 *p*-value: 0.629	Test: 1184.5 *p*-value: 0.815	Test: 1247.5 *p*-value: 0.486	Test: 1328.5 *p*-value: 0.197	Test: 1282.5 *p*-value: 0.341	Test: 1175.5 *p*-value: 0.866	1	
2017	Test: 1473 *p*-value: 0.018	Test: 1056 *p*-value: 0.486	Test: 999 *p*-value: 0.265	Test: 1049.5 *p*-value: 0.455	Test: 1153.5 *p*-value: 0.994	Test: 1206.5 *p*-value: 0.692	Test: 1288.5 *p*-value: 0.319	Test: 1237.5 *p*-value: 0.533	Test: 1134.5 *p*-value: 0.901	Test: 1107.5 *p*-value: 0.747	1

Source: Author's elaboration

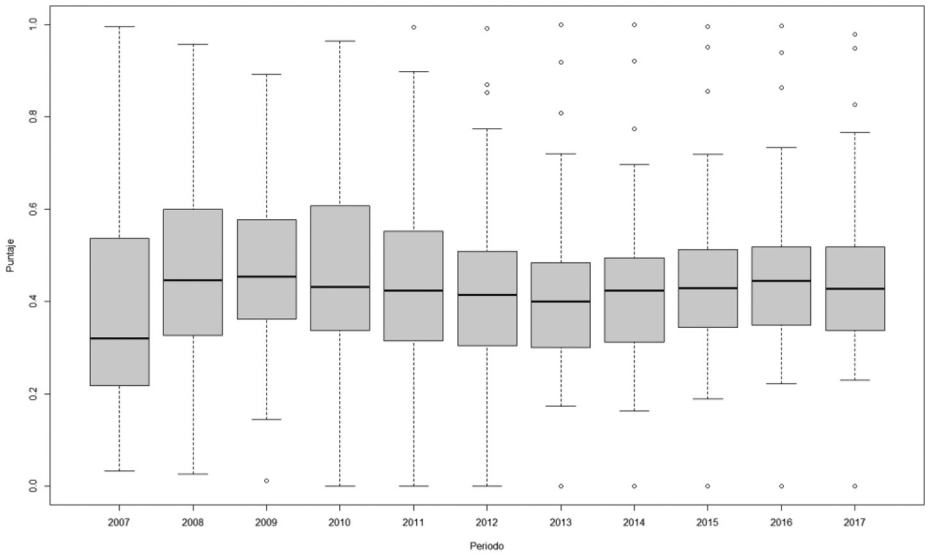

Figure 4. Alternative Institutional Quality Index scores, 2007 –2017

Source: Author's elaboration

these differences were negative, i.e. 50% of the countries presented a deterioration in the scores obtained in these years; an improvement was identified in 2013 and 2014. For the periods 2008, 2012 and 2015 the behavior is statistically equal.

5.5 Kruskas–Wallis test

To determine whether there are statistically significant differences between the groups of countries, based on regions, with respect to the competitiveness indicator, this study incorporated the KW model (Bagui and Bagui, 2004; Wei, 1981). The groups of countries analyzed were the same as those covered by this research described in Table 2. The relevance of this analysis consists in determining the explained variance with respect to the total variances of quadratic ranges, in relation to phenomena to which non-parametric tests would be applied.

The general model applied is based on:

$$KW = \left[\left(\frac{12}{N(N+1)}\right)\left(\sum_{i=1}^{i=n}\frac{R_j^2}{n_j}\right)\right] - 3(N+1) \quad (1)$$

where:

N = number of units of study, 48 in this case; and

$\left(\sum_{i=1}^{i=n}\frac{R_j^2}{n_j}\right)$ = Sum of quadratic Ranges of each group under study, each of them divided by the number of units observed.

The results of the application of the KW test for each of the years: 2007, 2012 and 2017, in relation to the calculated KW values were:

$$KW_{(Calc.2007)} = \left[\left(\frac{12}{48(49+1)}\right)(29149)\right] - 3(48+1); \ldots KW_{(2007)} = 1.719$$

$$KW_{(Calc.2012)} = \left[\left(\frac{12}{48(49+1)}\right)(30067)\right] - 3(48+1); \ldots KW_{(2012)} = 6,403$$

$$KW_{(Calc.2017)} = \left[\left(\frac{12}{48(49+1)}\right)(29834)\right] - 3(48+1); \ldots KW_{(2017)} = 5.214$$

In each of these cases, a total of 4 degrees of freedom was used, since there were five groups. The tabulated KW values were:

- with 5% error or goodness of fit: 9.488; and
- with 1% error: 13,277.

When comparing the calculated KW values with the tabulated ones for each year, it is evident that in all the years analyzed – 2007, 2012 and 2017 – the calculated values did not exceed the tabulated ones, even with a 5% error. Therefore, we confirm that there are no statistically significant differences between the groups of countries in terms of the AIQI.

6. Conclusions

By examining the structural dynamics of the indexes through the PCA methodology, it was possible to identify possible exogenous problems of the information and thus preserve the structure of the variance that best explains the behavior of the countries observed in each of the pillars. This allowed the evolution of the scores during the observation window to be evidenced and compared through standardization and rescaling.

Although the scores obtained by the studied countries vary over time, when comparing whether changes are identified in the structure of the existing gap, it is evident that it has remained constant in most of the observed periods, which means that the impact of global policies and recommendations has not generated changes in the way these countries relate to the scores obtained.

Likewise, when comparing the average behavior of the countries, it is evident that it has remained constant, which implies that at least 50% of the analyzed countries have maintained their relative scores during the observation window.

These two findings allow us to observe that the countries generally maintain their position, even though changes in their scores are reflected. This makes invisible the development and progress factors generated by the countries that are mainly found with low scores and only reflect stable structures that allow them to maintain their position.

A critical factor to consider is the speed with which the various results are obtained. Interpreting the "speed of reaction" factor can be tricky, even when the objectives are similar; countries do not always start from the same location and may take different routes to fulfill the goals. As a result, it is difficult to comprehend the nature of the issues at stake if competitiveness is viewed as a quantifiable macroeconomic variable with a well-defined causal origin.

The definition of policies based on the rankings may lead to a misdirected actions at national and regional levels. As explained in this work, even if the common goal is to generate growth and welfare, countries are externally and internally diverse, making no sense to pursue standardization of the path to reach that goal.

A continuous quest to look like the best in the ranking can distract attention from the actual requirements and vocations of the different economies. The benchmark is helpful if it is taken as a reference, not as a goal; isolating disturbances in the indicators may help understand the needed structural change to reach each country's competitiveness ultimate goal.

Finally, a more comprehensive analysis must consider the market failures that impair competitive capability, most notably the evolution of dynamic comparative advantage. Competitiveness strategies must determine which failures are addressable through policy and whether the government concerned possesses the capacity to implement such policy.

7. Contributions and limitations

This study adds to the existing body of knowledge in a variety of ways. First, it demonstrates that the analyzed countries generally maintain their competitive position, even though changes in their scores are reflected. Second, it highlights the importance of conducting a more in-depth analysis of the conditions that promote national competitiveness. Third, it demonstrates the perils of using global rankings as a benchmark and not as a reference. Finally, it demonstrates the application of a novel method for assessing structural changes in emerging economies' competitiveness positions.

The current study has restrictions because it's concentrated on a few selected indicators based on the literature review. The limitations of this research may be overlooked in the future by adding additional variables and observations. In addition, the article could be improved by including intra- and inter-regional approaches to control based on the occurrence of specific circumstances (i.e. informal institutions, economic development or factor endowments).

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Appendix 1

Country	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Argentina	0.24	0.22	0.21	0.23	0.23	0.22	0.17	0.16	0.19	0.22	0.25
Bangladesh	0.12	0.11	0.14	0.17	0.21	0.21	0.19	0.22	0.24	0.23	0.23
Brazil	0.29	0.33	0.41	0.42	0.41	0.42	0.39	0.37	0.33	0.26	0.23
Bulgaria	0.21	0.26	0.29	0.28	0.27	0.27	0.29	0.30	0.30	0.34	0.39
Chile	0.65	0.77	0.71	0.72	0.76	0.77	0.71	0.68	0.67	0.62	0.60
China	0.34	0.45	0.59	0.64	0.64	0.64	0.57	0.58	0.60	0.57	0.60
Colombia	0.32	0.37	0.40	0.35	0.33	0.37	0.32	0.33	0.35	0.34	0.32
Croatia	0.53	0.49	0.48	0.42	0.38	0.37	0.34	0.36	0.36	0.36	0.34
Czech Republic	1.00	0.61	0.62	0.67	0.60	0.51	0.49	0.47	0.49	0.56	0.57
Egypt	0.36	0.40	0.43	0.44	0.40	0.29	0.27	0.25	0.27	0.31	0.28
Estonia	0.15	0.80	0.81	0.78	0.75	0.77	0.72	0.70	0.72	0.73	0.77
Greece	0.21	0.55	0.51	0.46	0.39	0.34	0.28	0.31	0.37	0.37	0.35
Hungary	0.87	0.59	0.51	0.50	0.49	0.47	0.41	0.40	0.42	0.40	0.35
India	0.43	0.65	0.62	0.63	0.55	0.49	0.47	0.48	0.49	0.53	0.62
Indonesia	0.43	0.57	0.54	0.59	0.59	0.53	0.51	0.55	0.59	0.56	0.57
Jamaica	0.79	0.44	0.43	0.42	0.38	0.36	0.36	0.40	0.43	0.45	0.49
Jordan	0.32	0.65	0.72	0.71	0.60	0.54	0.56	0.59	0.61	0.60	0.62
Kazakhstan	0.29	0.38	0.41	0.38	0.32	0.31	0.38	0.43	0.46	0.48	0.48
Kenya	0.55	0.39	0.45	0.41	0.36	0.39	0.38	0.43	0.50	0.47	0.49
Kuwait	0.08	0.48	0.45	0.41	0.42	0.40	0.33	0.33	0.34	0.36	0.34
Latvia	0.41	0.49	0.47	0.44	0.40	0.44	0.45	0.48	0.52	0.52	0.47
Lithuania	0.79	0.56	0.56	0.50	0.49	0.48	0.48	0.52	0.55	0.57	0.56
Malaysia	0.26	0.96	0.88	0.79	0.77	0.85	0.81	0.77	0.86	0.86	0.83
Mexico	0.33	0.40	0.35	0.36	0.35	0.40	0.42	0.41	0.39	0.40	0.40
Morocco	0.17	0.51	0.48	0.42	0.45	0.49	0.49	0.48	0.51	0.49	0.47
Namibia	0.14	0.37	0.48	0.53	0.56	0.49	0.40	0.43	0.45	0.48	0.50
Nigeria	0.80	0.33	0.37	0.31	0.22	0.28	0.31	0.26	0.24	0.24	0.23
Pakistan	0.33	0.36	0.33	0.31	0.31	0.30	0.29	0.29	0.31	0.32	0.33
Peru	0.22	0.28	0.31	0.33	0.35	0.34	0.29	0.31	0.32	0.31	0.31
Philippines	0.36	0.31	0.33	0.27	0.23	0.27	0.37	0.43	0.48	0.45	0.39
Poland	0.63	0.44	0.41	0.49	0.52	0.50	0.46	0.44	0.47	0.49	0.48
Qatar	0.29	0.81	0.89	0.95	0.99	0.99	1.00	1.00	1.00	1.00	0.95
Romania	0.20	0.36	0.39	0.38	0.31	0.26	0.24	0.29	0.41	0.40	0.34
Russia	0.18	0.23	0.31	0.30	0.28	0.24	0.21	0.29	0.36	0.36	0.37
Slovak Republic	0.47	0.60	0.56	0.53	0.44	0.41	0.40	0.37	0.40	0.43	0.42
Slovenia	0.58	0.65	0.66	0.72	0.62	0.51	0.46	0.42	0.43	0.48	0.51
South Africa	0.55	0.66	0.68	0.63	0.55	0.53	0.51	0.51	0.51	0.51	0.53
Srb	0.24	0.28	0.31	0.28	0.23	0.19	0.18	0.23	0.25	0.25	0.27
Sri Lanka	0.29	0.50	0.56	0.50	0.52	0.53	0.47	0.48	0.50	0.50	0.48
Thailand	0.03	0.60	0.55	0.52	0.49	0.45	0.42	0.43	0.42	0.44	0.43
Tunisia	0.41	0.89	0.88	0.81	0.86	0.69	0.55	0.46	0.43	0.40	0.40
Turkey	0.26	0.54	0.44	0.42	0.43	0.43	0.48	0.51	0.49	0.46	0.45
Uganda	0.19	0.30	0.32	0.28	0.30	0.35	0.35	0.33	0.34	0.37	0.35
Ukraine	0.62	0.25	0.34	0.28	0.23	0.23	0.24	0.24	0.30	0.34	0.30
United Arab Emirates	0.88	0.83	0.87	0.96	0.90	0.87	0.92	0.92	0.95	0.94	0.98
Venezuela	0.25	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vietnam	0.26	0.37	0.45	0.49	0.45	0.36	0.32	0.35	0.38	0.42	0.41
Zambia	0.14	0.32	0.42	0.43	0.44	0.44	0.48	0.51	0.51	0.50	0.44

Table A1. Alternative institutional quality index (AIQI)

Source: Author's elaboration

Country	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Argentina	34	46	46	46	42	45	47	47	47	47	44
Bangladesh	46	47	47	47	47	46	45	46	45	46	47
Brazil	26	36	31	26	26	24	26	29	38	43	46
Bulgaria	38	43	45	43	41	41	39	38	42	38	29
Chile	7	6	7	6	5	5	5	5	5	5	8
China	21	24	12	10	7	7	6	7	7	8	7
Colombia	25	32	34	36	35	30	35	35	35	39	39
Croatia	13	22	22	29	31	29	32	31	33	34	37
Czech Republic	1	11	11	9	10	12	11	17	16	10	10
Egypt	20	27	29	23	28	38	41	43	43	42	42
Estonia	43	5	5	5	6	4	4	4	4	4	4
Greece	37	17	19	22	29	35	40	37	32	32	33
Hungary	3	14	18	17	18	19	23	27	27	31	34
India	15	9	10	11	14	15	17	14	18	11	6
Indonesia	16	15	17	13	11	11	10	8	8	9	9
Jamaica	5	25	28	28	30	31	30	28	23	23	15
Jordan	24	8	6	8	9	8	7	6	6	6	5
Kazakhstan	28	30	33	33	36	36	28	21	21	18	19
Kenya	11	29	25	32	32	28	27	20	14	21	16
Kuwait	47	23	24	31	25	27	33	33	37	36	35
Latvia	17	21	23	24	27	22	20	13	10	12	20
Lithuania	6	16	13	19	17	18	14	9	9	7	11
Malaysia	31	1	2	4	4	3	3	3	3	3	3
Mexico	22	28	37	35	33	26	21	26	30	28	28
Morocco	42	19	20	27	20	17	12	16	12	16	21
Namibia	44	33	21	14	12	16	24	22	22	19	14
Nigeria	4	37	36	39	46	39	36	42	46	45	45
Pakistan	23	35	40	38	37	37	37	39	40	40	38
Peru	36	42	44	37	34	34	38	36	39	41	40
Philippines	19	39	39	45	43	40	29	23	19	24	30
Poland	8	26	32	20	16	14	18	19	20	17	18
Qatar	27	4	1	2	1	1	1	1	1	1	2
Romania	39	34	35	34	38	42	43	41	28	29	36
Russia	41	45	42	40	40	43	44	40	34	35	31
Slovak Republic	14	13	15	15	22	25	25	30	29	26	25
Slovenia	10	10	9	7	8	13	19	25	25	20	13
South Africa	12	7	8	12	13	9	9	10	11	13	12
Srb	35	41	43	42	44	47	46	45	44	44	43
Sri Lanka	29	20	14	18	15	10	16	15	15	14	17
Thailand	48	12	16	16	19	20	22	24	26	25	24
Tunisia	18	2	3	3	3	6	8	18	24	30	27
Turkey	32	18	27	30	24	23	15	11	17	22	22
Uganda	40	40	41	41	39	33	31	34	36	33	32
Ukraine	9	44	38	44	45	44	42	44	41	37	41
United Arab Emirates	2	3	4	1	2	2	2	2	2	2	1
Venezuela	33	48	48	48	48	48	48	48	48	48	48
Vietnam	30	31	26	21	21	32	34	32	31	27	26
Zambia	45	38	30	25	23	21	13	12	13	15	23

Source: Author's elaboration

Table A2.
Ranking according to AIQI

Appendix 2. Fragile states index

"The Fragile States Index (FSI) produced by The Fund for Peace (FFP), is a critical tool in highlighting not only the normal pressures that all states experience but also in identifying when those pressures are outweighing a states' capacity to manage those pressures. By highlighting pertinent vulnerabilities that contribute to the risk of state fragility, the Index – and the social science framework and the data analysis tools upon which it is built – makes political risk assessment and early warning of conflict accessible to policy-makers and the public at large.

The strength of the FSI is its ability to distill millions of pieces of information into a form that is relevant as well as easily digestible and informative. Daily, FFP collects thousands of reports and information from around the world, detailing the existing social, economic and political pressures faced by each of the 178 countries that we analyze." (Fund for Peace, 2019)

"Practical application: the fragile states index analytical process

Though at the ground level, the CAST framework is applied using various practices such as individual incident reporting and observation by field monitors, the sheer volume of data to be analyzed at an international level required a different approach. To that end, technology was employed to enable researchers to process large volumes of data to perform the national level assessments that feed in to the FSI.

Based on CAST's comprehensive social science approach, data from three main streams – pre-existing quantitative data sets, content analysis, and qualitative expert analysis – is triangulated and subjected to critical review to obtain final scores for the Index." (Fund for Peace, 2019)

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