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Proposal of a model to measure competitiveness through factor analysis[☆]

Propuesta de un modelo de medición de la competitividad mediante análisis factorial

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Abstract

This article presents a proposal for a simultaneous competitiveness measurement model for the three geographical levels: country, states, and municipalities. For this, a multivariate factor analysis method is used to help identify five factors, seven sub-factors, and thirty variables, which will be used for the measurement and to present the results of an empirical study on eleven entities: the country, the State of Sonora, and nine municipalities, which represent 80% of the population and 80% of their TGP. The results indicate that, in 2010, the municipality of Hermosillo was the most competitive.

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Keywords: Competitiveness models; Competitiveness index; Competitiveness determinants; Competitiveness characterization

JEL classification: J21; O18; R11

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Resumen

En este artículo se presenta una propuesta de modelo para medir la competitividad de los tres niveles geográficos simultáneamente: país, estados y municipios; utilizando para ello un método multivariado de análisis factorial que ayuda a identificar a cinco factores, siete subfactores y 30 variables, con las que se miden y presentan los resultados de un estudio empírico sobre once entidades: el país, el Estado de Sonora y nueve municipios que representan el 80% de la población y 80% de su PBT. Los resultados indican que el municipio de Hermosillo fue el más competitivo, en 2010.

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Palabras clave: Modelos de competitividad; Índice de competitividad; Determinantes de la competitividad; Caracterización de la competitividad

Códigos JEL: J21; O18; R11

Introduction

Since ancient times, productivity has been a relevant topic in the economic development and social wellbeing of countries, and has been studied since the classical theories of absolute advantage, comparative advantage, the competitive advantage of the nations, up to the widespread models that resolve some of the deficiencies of these theories.

In this article, a conceptual model is proposed. This model was empirically tested to simultaneously measure competitiveness in the three geographical levels: municipal, state, and national. The aim of this work is to contribute toward furthering competitiveness in the regions.

Analytical framework of competitiveness

Concept of competitiveness and its determinant factors. The origins of the concept of competitiveness go back to the 15th – 17th centuries, with the *economic theory known as mercantilism*. In this theory, the manner of creating wealth for the country was through foreign trade, in which the following rule was applied: the value of what is annually sold to foreigners must always be greater than our consumption of their products. As a result, mercantilism looked to foreign trade as a zero-sum game, where the wealth of a country is obtained from the trade deficit of the other country (Hidalgo Capitán, 1998). However, in Adam Smith's *classical theory* of 1776 titled "An inquiry into the nature and causes of the wealth of nations", the author criticizes the mercantilist point of view, which envisaged trade as a zero-sum game (Smith, 1937). In its place, Adam Smith envisaged trade as a sum-sum game in which all the trade partners can benefit with the lowest unitary costs, that is, based on an absolute advantage. For his part, David Ricardo (1971) applies the following rule: "the technologically superior country ought to specialize in the manufacture of that good over which it has absolute advantage and the technologically inferior country ought to specialize in the good over which it has the least absolute disadvantage" (Cho & Moon, 2013; Ramos Ramos, 2001). This rule was known as "comparative advantage" (Cho & Moon, 2013; Ramos Ramos, 2001). Although Ricardo's model explains trade based on the productivity levels between nations, it does not explain why these differences exist.

Neoclassical theory. Eli Heckscher (1949) and Bertil Ohlin (1933) created the *factor endowment theory*. They developed the model addressing the idea that *all nations have a similar*

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