The normalized revealed comparative advantage index

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Abstract In this paper, we propose the normalized revealed comparative advantage (NRCA) index as an alternative measure of comparative advantage. The NRCA index is demonstrated capable of revealing the extent of comparative advantage that a country has in a commodity more precisely and consistently than other alternative RCA indices in the literature. As a result, the NRCA index is comparable across commodity, country, and time. Therefore, the NRCA index provides a useful tool for quantitative regional research, especially for studies on regional comparative advantage.

JEL Classification F14 · R12 · C43

1 Introduction

Comparative advantage is a key concept in explaining the source of trade. In empirical trade research, comparative advantage can be measured by “revealed comparative advantage” (RCA) indices, which uncover the underlying comparative advantage from observable trade patterns (Balassa 1965). The most popular RCA index is Balassa’s
RCA index. While Balassa’s RCA index is useful in assessing whether or not a country has comparative advantage in a commodity, its utility in comparative studies is limited and problematic (Hillman 1980, Bowen 1983, 1985, 1986, Ballance et al. 1985, 1986, Deardorff 1994, Hoen and Oosterhaven 2006). Most studies use Balassa’s RCA index only to signify a country’s relative ranking of comparative advantage in different commodities, even though this relative order in general remains problematic (Yeats 1985). Alternative RCA indices have been proposed to address the shortcomings inherited in Balassa’s RCA index (e.g. Vollrath 1991, Laursen 1998, Proudman and Redding 1998, Hoen and Oosterhaven 2006). While these indices improve certain aspects of Balassa’s RCA index, none of them successfully becomes a general index that is comparable over space and time.

In this paper, we propose the normalized revealed comparative advantage (NRCA) index as an alternative measure of comparative advantage. This new index possesses properties necessary for comparative analysis.

2 Existing RCA indices

Balassa’s RCA (BRCA) index is the first and most widely used RCA measure in the literature (Bojnec 2001, Havrila and Gunawardana 2003). It defines country $i$’s comparative advantage in commodity $j$ as

$$BRCA_{ij} = \frac{E_{ij}}{E_j} / \left( \frac{E_i}{E} \right)$$

where $E_{ij}$ denotes country $i$’s export of commodity $j$; $E_j$ denotes export of commodity $j$ by all countries, i.e., $E_j = \sum_i E_{ij}$ (hereafter referred to as “commodity $j$’s export market”); $E_i$ denotes country $i$’s export of all commodities, i.e., $E_i = \sum_j E_{ij}$ (hereafter referred to as “country $i$’s export market”); and $E$ denotes export of all commodities by all countries, i.e., $E = \sum_i \sum_j E_{ij}$ (hereafter referred to as “the world export market”). The BRCA index is also commonly referred to as location quotient in the industrial localization and regional specialization literature (Mulligan and Schmidt 2006; Mack et al. 2007).

According to Eq. (1), the BRCA index compares country $i$’s market share in commodity $j$’s export market ($E_{ij}/E_j$) to its market share in the world export market ($E_i/E$). A value of $BRCA_{ij}$ above 1 indicates that country $i$’s market share in commodity $j$’s export market is greater than its market share in the world export market and thus country $i$ has comparative advantage in this commodity. A value of $BRCA_{ij}$ below 1 indicates that country $i$ has comparative disadvantage in commodity $j$; and a value of $BRCA_{ij}$ equal to 1 indicates that country $i$ has “neutral” comparative advantage in commodity $j$.

The BRCA index in theory can only signify whether or not a country has comparative advantage in a commodity, as its magnitude has neither the ordinal property nor the cardinal property (Hillman 1980, Yeats 1985). Yeats (1985) observed that using the BRCA index to measure countries’ comparative advantage tends to give inconsistent and misleading results, as it has a bias to signify strong comparative advantage.