*Original Research Article***Comparative Advantage of Selected Agriculture Products in Iran: a Revealed Comparative Advantage Assessment**Mahmood Bakhshinejad^{1*}, Ali Hassanzadeh²¹*Department of Economics, Islamic Azad University, Shahrekord Branch, Iran*²*Banking Department, Monetary & Banking Research Institute (MBRI), Central Bank of Iran***Abstract**

The paper is an examination of Balassa's 'revealed comparative advantage' (RCA). The results of researches show that when using the RCA, it should always be attuned in such a way, that it becomes symmetric. This paper consists of three major parts i.e. theory, analytical tool and case studies of comparative advantage. First we evaluate the theory and various empirical measures. Then this analytical tool is applied to analyze exported product. The results indicate that Iran had not comparative advantage in export of walnut, almond hazelnut, apple, orange. To increase competitiveness, we suggest several policy recommendations such as increasing agricultural productivity, promoting the development of indigenous technological capabilities, and reducing the cost of doing business. The conclusion is based on a theoretical discussion of the properties of the measure, and on convincing empirical evidence, according to the Balassa index. The index for 2007 shows that Iran does not have a comparative advantage in export of walnut, almond hazelnut, apple and orange and reduced its market share in these products.

Keywords: Revealed Comparative Advantage; agriculture sector; almond; apple; hazelnut; walnut; orange.

INTRODUCTION

Iran has undertaken a series of economic reforms towards opening up the economy. In the new epoch of "diversified agriculture", an often asked question is, "Where lies Iran's comparative advantage (CA) in agriculture?"; i.e., which of Iran's agricultural products are relatively more competitive and have a better chance to thrive in the long run, given national and world-wide competition? To answer this question, one needs to first evaluate the competition faced by each product to determine their respective competitiveness. Then Iran's comparative advantage in each product can be assessed by comparing this product's competitiveness to one another. Iran would have high comparative advantage in products where it has relatively high competitiveness.

Specifically, the paper examines the structure of comparative advantage enjoyed by Iran in the global market, individually and in a comparative framework. Following this, an analysis of the comparative advantage is intensity factors for the economy to which it is applied. The pattern of comparative advantage is also examined for inter-temporal variation over the period 2002-2007. The study of comparative advantage has been undertaken using the Balassa (1965) index of revealed comparative advantages.

Using the Law of Comparative Advantage, one can search for answers to the questions of "who exports what and why?" Analysis of comparative advantage is certainly not a novel idea but, despite a plethora of studies in the last 50 years, few have specifically addressed agricultural trade (Winter, 1995). Some suggest that the conspicuous absence of CA analysis from agriculture may be due, in part, to the magnitude of distortion brought by government policy (Haley, 1985). In the 1950s Wassily Leontief argued that "...fluctuation in yield here and abroad, not to speak of government intervention, affect foreign trade products to such an extent that the amounts of agriculture commodities exported and imported in one single year can be expected to reflect long-run comparative costs much less than is the case for any other type of good." (Leontief, 1956). Clearly, the strength of this argument has been weakened by recent development in agricultural trade liberalization. As agricultural producers become more expected to market forces, and as dependence on foreign markets increases, the relevance of CA is increasingly apparent.

This study uses the "revealed comparative advantage" (RCA) approach to assess Iran's comparative advantage in selected agricultural products. The assessment provides systematic information about direct or indirect competition faced by Iran's agricultural products, which can be useful for decision-making regarding sustainable agricultural development policies in Iran.

MATERIALS AND METHODS

The idea of Comparative Advantage is attributed to the work of John Stuart Mill, Adam Smith and David Ricardo. It is largely derived from the proposition on opportunity cost and labour specialization. Smith and Mill first advanced the concept of absolute advantage, claiming that a nation will export an item when it is the lowest cost producer of that item. Ricardo refined the idea of Comparative Advantage by recognizing that a nation tends to allocate its resources to their most productive use. A nation may therefore import a good even when it is the lowest cost producer of that good (Laursen, 1998).

More recently, Heckscher and Ohlin revolutionized trade theory by emphasizing international differences in resource (or factor) endowments. "Factor abundance theory", or the Heckscher-Ohlin model, predicts that a country will export commodities that are relatively intensive in the factor with which the country is relatively well endowed. Thus, a land-abundant country will export land intensive good, while a capital-abundant country will export capital intensive goods. The purview of the Heckscher-Ohlin model has been consequently extended through the work of Wassily Leontief, Paul Samuelson, Jaroslav Vanek, and others (Memedovic, 1994).

Empirical tests of Comparative Advantage often use cost or price information to measure efficiency in production, as well as availability and allocation of scarce resources. Transportation models and linear programming techniques, for example, have determined Comparative Advantage through mark proximity or cost minimizing solution, subjects to resource availability and prices. These forms of analysis, however, are often constrained by a lack of reliable and internationally comparable data, even when survey methods are used to overcome data scarcity. The estimation of exchange rates, purchasing power and valuation of local land, labor and capital can be problematic. Further complications also arise when taking into account the so-called "milieu factors", such as government policy, history and other likely source of CA that not easily lend themselves to quantification.

Ideally, measures of Comparative Advantage should reflect regional or cross-country difference in a hypothetical pre-trade environment, known as autarky. Autarky is the condition where equilibrium prices are unaffected by influences external to an economy (Hook, 1986). Since, in reality, all countries engage in some level of international trade, "true" Comparative Advantage in autarky can not be directly observed. In 1965, Bela Balassa introduced the notion of "Revealed Comparative Advantage" (RCA) as a way to approximate

CA in Autarky. According to Balassa, "the concept of RCA pertains to the relative trade performances of individual countries in particular commodities. On the assumption that the commodity pattern of trade reflects inter-country differences in relative costs as well as in non-price factors, this is assumed to reveal the comparative advantage of traditional countries" (Balassa, 1977). If trade performance is determined CA, then direct observations of trade performance should Reveal Comparative Advantage. Barring production or export subsidies, the greater the CA in the production of that commodity. The plausibility of this condition has almost certainly been strengthened by recent trade liberalization.

Comparative Advantage reflects relative competitiveness. Competitiveness can be measured by market shares (Mahanta, 2005). The larger Iran market share of a product's sales, the more competitive it is relative to other suppliers in the market. For example, if Iran's market share of product A is greater than its market share of product B, then it is relatively more competitive in product A than in product B; in other words, it has stronger comparative advantage in product A than product B. Based on the RCA approach, we measure Iran's comparative advantage in agricultural products by the following index: $RCA_j = S_j / s$

The RCA index thus defined compares Iran's market share of each agricultural product (S_j) to its average market share for all agricultural products under comparison (s). Iran has above-average comparative advantage in products whose RCA scores are greater than 1. Iran has stronger comparative advantage in products with higher RCA scores.

Competitiveness and comparative advantage are unlikely to be constant over time because of change in consumers' preference, production cost, transportation costs, regulations, etc. Variation of competitiveness can be measured by changes in market shares. An increase (or decrease) in market shares indicates competitiveness gain (or loss). However, it is usually not appropriate to directly use change of RCA scores to measure variation of comparative advantage. The following formula provides a more precise measure of comparative advantage:

$$RCAV_i = C_{i,t+1} (RCA_{j,t+1} - \beta RCA_{j,t}) \times 100$$

$$\beta = (1 + g) (1 + \sum_{j,t} g_j)^{-1}$$

The sign and value of RCAV scores indicate the direction and magnitude of comparative advantage variation over time. For example, an Iran's agriculture product RCAV score of (+)5 indicates that Iran has gained comparative in this product, and if without the change in comparative advantage, sales of this Iran agriculture product would have been 5 percent lower than its actual

level. The implications for negative RCAV scores are the opposite. Note that the sum RCAV scores for all the products is equal to Zero. This captures the shift of comparative advantage among products. When Iran becomes relatively more competitive in some products, it has become relatively less competitive in other products.

RESULTS

The data were analyzed for 2007 (the latest year for which complete trade data were available) for both IRAN and the rest of the world. In order to get an appreciation for trade dynamics, the year 2002 was also examined. RCA was tested for the walnut, almond, hazelnut, apple, orange which will be discussed in turn.

Table 1: Comparative advantage of Iran's walnut, almond, hazelnut, apple, orange

Product	2007 RCA (Index) ¹	2007 vs. 2002 RCAV (Index) ²
Walnut	0.18	(3.72)
Almond	0.0	(5.63)
Hazelnut	0.005	(1.89)
Apple	0.018	5.01
Orange	0.03	6.04

¹ A measure of comparative advantage; computed based on the RCA equation based on wholesale value of export from FAOSTAT.

² A measure of variation of comparative advantage; computed based on the RCAV equation.

The index for 2007 shows that Iran does not have a comparative advantage in these products (Table 1 shows the RCA scores of the agriculture in 2007 and their RCAV scores between 2002 and 2007). These results could be suitable to two main forces, namely declining competitiveness and structural change.

We use market shares to measure Iran's competitiveness in the five selected agriculture products from 2002 to 2007. Iran reduced its market share in these products (Table 2, 3, 4, 5, 6).

We use the RCAV index to measure variation of Iran's comparative advantage in the five products between 2002 and 2007. During the period, Iran decreased comparative advantage in products.

DISCUSSION

This paper contends that the analysis of comparative advantage (CA) for agricultural commodities has not only become relevant, but may in fact be an important tool for

Table 2: Iran's competitiveness in Walnut in 2007

Product	supply ¹ (\$1 000)	marketshare ² (%)
Africa	0.0	0.0
America	19.0	0.0
Asia	2 198.0	0.002
Europe	7.5	0.0
Oceania	0.0	0.0

¹ Wholesale value of export from FAOSTAT

² Wholesale value of export from FAOSTAT

Table 3: Iran's competitiveness in Apple in 2007

Product	supply ¹ (\$1 000)	marketshare ² (%)
Africa	0.0	0.0
America	23.0	0.0
Asia	103 656.0	0.005
Europe	340.0	0.0
Oceania	0.0	0.0

¹ Wholesale value of export from FAOSTAT

² Wholesale value of export from FAOSTAT

Table 4: Iran's competitiveness in Almond in 2007

Product	supply ¹ (\$1 000)	marketshare ² (%)
Africa	0.0	0.0
America	0.0	0.0
Asia	111 732.0	0.03
Europe	1 628.0	0.0
Oceania	0.1	0.0

¹ Wholesale value of export from FAOSTAT.

² Wholesale value of export from FAOSTAT

Table 5: Iran's competitiveness in Orange in 2007

Product	supply ¹ (\$1 000)	marketshare ² (%)
Africa	0.0	0.0
America	0.001	0.0
Asia	0.003	0.008
Europe	0.0	0.0
Oceania	0.0	0.0

¹ Wholesale value of export from FAOSTAT.

² Wholesale value of export from FAOSTAT

understanding the future of world agriculture. Although autarky precludes direct observation of CA, Measure of RCA can provide useful approximation of CA.

While Balassa's export-based RCA index overlooks aspects of domestic consumption and value-added

Table 6: Iran's competitiveness in Hazelnut in 2007

Product	supply ¹ (\$1 000)	marketshare ² (%)
Africa	0.0	0.0
America	0.0	0.0
Asia	0.007	0.0003
Europe	0.0	0.0
Oceania	0.0	0.0

¹ Wholesale value of export from FAOSTAT² Wholesale value of export from FAOSTAT

processing, it is nevertheless a meaningful gauge for measuring the relative strength or weakness of agricultural exports. In the case of walnut, almond, hazelnut, apple, orange the measurement of RCA has shown that CA is a dynamic, not a static condition. The dynamics of CA have become increasingly apparent as agricultural markets become less insulated by government trade and support policies.

As regards the previous, the fall in the RCA index across a number of sectors presumably reflects the fact that many indigenous and traditionally labour-intensive sectors have found it increasingly difficult to compete. This has been caused by quite high rates of wage inflation in Iran over the last decade and greater competition from international markets. As regards structural change, the fall in RCA reflects the fact that comparative advantage is dynamic rather than static.

Due to data constraints, the comparative advantage assessment in this publication compares the wholesale value of Iran and other countries' agricultural supplies to the market irrespective of the final destination of these commodities. A more refined assessment in the future should compare the agricultural production of Iran and foreign countries.

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