The USA and Iran's Status in Pistachio Export: A Comparative Advantage and Specialization Approach

Somajeh Amirtaimoori and Amir Hosein Chizari

1Department of Agricultural Economics, Faculty of Agriculture, Tarbiat Modares University, Tehran, Iran
2Department of Agricultural Economics, College of Agriculture, Tarbiat Modares University, Tehran, Iran

Abstract: In the next decade Iran is likely to witness changes in its pistachio production, marketing and trade. Pistachio is one of the major agricultural products in Iran and its production has a long history in this country. Moreover, Iran has always been the biggest producer and exporter of pistachio in the world, but the U.S., has joined the exporter countries from 1982 and has become one of Iran's serious rivals in pistachio export in the world market. In light of these impending changes, this paper examined the U.S. and Iran's Status in pistachio export in world market and, existence or non-existence of comparative advantage, specialization, in pistachio export during 1982-2004. This study is an applications of, RCA, RSCA, MI, A² and CTB in order to assess the competitiveness of Iran and U.S. in world pistachio market. Results showed that although Iran had enjoyed a high comparative advantage and specialization, it had lacked a planned and successful strategy in pistachio export until 1998; the U.S., compared to Iran, enjoyed a more planned and successful strategy in pistachio export which made it able to increase its specialization in pistachio export and to gain comparative advantage in pistachio export in 2004. In order to maintain its export marketing, Iran needs to have a more clear and certain planning in production, marketing, export and more importantly observation of health principles (aflatoxin's problem).

Keywords: Export Strategy · International Specialization · Iran · Pistachio · Revealed Comparative Advantage · the us

INTRODUCTION

Major countries dealing with pistachio production in world are: Iran, the U.S., Turkey, Syria, China, Greece, Italy, Uzbekistan, Tunisia and Madagascar. Pistachio, as an agricultural product, is associated with Iran’s name and its production has a long history in this country. Iran’s agriculture has been known in the world by pistachio which is a major agricultural export commodity in this country. Moreover, Iran is the biggest exporter of this production in the world and possesses a considerable portion of production, harvested area and amount and value of the world pistachio export.

According to the statistics reported by FAO (2005), the annual amount of pistachio production in Iran was 227,640 Mt which constitutes 62% of the world pistachio production. After Iran, the U.S. with 128,790 Mt of production is the second major country in pistachio production and Turkey with 60,000 Mt of production is in the third place. Iran has also 33% of the total harvested area among other major countries, having 332,590 Ha harvested area of pistachio. The U.S. with 42,530 Ha and Turkey with 38,600 Ha lie in the second and third places, respectively.

Pistachio production yield in Iran, particularly in recent years, has been lower than the world average. For instance, the average of production yields in the world and the U.S. were 1305 (Kg Ha⁻¹) and 3028.70 (Kg Ha⁻¹), respectively, but the average yield in Iran was 684.4 (Kg Ha⁻¹), which is 52% lower than the world production yield. Iran has been in the tenth place among the 10 major pistachio producing countries in terms of yield. Iran was also the major exporter of pistachio, having 138,723 tons pistachio export and had 58.91% of the total export allover the world in 2004. The U.S. with 35,692 tons and China with 20,487 tons lie in the second and third place, respectively.

Corresponding Author: Mr. Somaieh Amirtaimoori, Department of Agriculture Economics, Tarbiat Modares University, P.O. Box 14115-337, Tehran, Iran
Present Address: No. 8 Fifth North Alley, Seikh Ahmadesbf Avenue, Kerman, Iran
Fig. 1: Pistachio production trend in Iran and the U.S., 1982-2004.
Source data: The website of Food and Agriculture Organization of the United Nations [22]

Fig. 2: Pistachio harvested area trend in Iran and the U.S., 1982-2004.
Source data: The website of Food and Agriculture Organization of the United Nations [22]

Fig. 3: Pistachio yield trend in Iran and the U.S., 1982-2004
Source data: The website of Food and Agriculture Organization of the United Nations [22]
Investigation of the production, harvested area and production yield trends of pistachio in Iran and the U.S. during 1982-2004 as shown in figures 1, 2 and 3, respectively. Pistachio production in Iran and U.S. on average had increased by 6054.9 tons and 4781.1 tons respectively. In addition, harvested area had a rising trend in both and, on average, increased by 11118 Ha and 1169.6 Ha, respectively. Pistachio yield had a falling trend in Iran and decreased by 172.35 Hg Ha⁻¹ average, while pistachio yield had a rising trend in the U.S. and increased by 839.24 Hg Ha⁻¹ in average. In short, Iran’s major rival (the U.S.), has been able to take advantage of both harvested area and production yield improvement in order to increase its production, but Iran has been able to take advantage of harvested area.

Iran was the biggest producer and exporter of pistachio in the world, without having a serious rival in world market until 1982. During the 60, and 70s, Turkey was Iran’s most important rival in pistachio production and export market; but in the 80, and 90s, the U.S. had a considerable growth in pistachio production yield and export and was considered Iran’s most serious rival in this respect. From 1990 until 1979 the U.S. domestic pistachio market had been a good export market for Iran. After Iran’s Islamic Revolution, Iran’s status in pistachio export has deteriorated due to the strained political relations between Iran and the U.S. leading to the stop of Iranian goods export to this country and still Iran is not a member of WTO. Iran’s most important customer has changed into its major rival in the world market. In fact, after 1979 the U.S., which was just an importer of pistachio, has been able to strongly enter the pistachio world market by advertising and marketing this product, utilizing its facilities in packaging and supplying California’s pistachio with competitive quality. Nowadays, the U.S. production and export strategy is a serious rival for Iran in world pistachio market because it has a very great amount of pistachio production and has directly entered the competition in world pistachio market.

Although it is not a long time that i.e., from 1982, the U.S. has joined to other major exporting countries, it has increased its pistachio export market, exporting 15.16% of the world pistachio market in 2004. The U.S. had an almost rising export portion trend during period of 1982-2004 and, in average, increased its export portion by 6.029 per year. On the other hand, Iran, having a rising export portion trend from 1982 to 1991 and increasing this portion from 44.79% in 1982 to 76.42% in 1991, has had an almost falling trend from 1992 onward; its portion export decreased, in average, by -0.14% per year in 1982-

Fig. 4: The U.S. and Iran’s export portion trends in the world’s pistachio in 1982-2004
Source data: The website of Food and Agriculture Organization of the United Nations [22].

2004. But Iran was still the world’s greatest pistachio exporter in 2004 by exporting 58.91% of the world’s pistachio (Fig. 4).

Considering the changes in the structure of the world trade, countries are moving towards competition and specialization. Hence, it is essential to investigate the U.S. and Iran’s Status in pistachio export. Only few empirical analyses on pistachio export market was done in Iran such as Azizi and Yazdani [1] investigated the existence or non-existence of comparative advantage and identified pistachio export strategies of the major exporter countries around the world. Furthermore, some studies investigated the existence or non-existence of comparative advantage in Iran’s pistachio export the result of which was indicative of existence of comparative advantage [2-4].

Hence, this study is going to investigate the U.S. and Iran’s Status in pistachio export, existence or non-existence of comparative advantage, specialization and strategies in pistachio export in 1982-2004. To this end, RCA₁, RSCDA₁, M₁, X₁ and CTB measures have been used.

MATERIALS AND METHODS

Comparative advantage which is discussed in the international trade means that if a country produces a product more cheaply relative to other goods, this country would possess comparative advantage for their intended goods and by entering competition can benefit from exporting this good and its welfare prosperity increases by becoming specialized in this product.
Theories of comparative advantage, such as the traditional Heckscher–Ohlin–Samuelson (H–O–S) model, refer to patterns of pre-trade relative prices that we cannot observe. Applied work uses observable data to infer or "reveal" what the pattern of pre-trade prices would be. In the H–O–S framework, for example, differences in relative factor supplies are characterized in terms of "abundance" or "scarcity" where countries are assumed to export those goods whose production makes relatively intensive use of their abundant factors. Several "specialization" measures, usually based on a country's net exports, have been used to reveal which of these goods a country has a pre-trade comparative advantage in [5]. This paper examines 5 such measures.

The starting point for the majority of empirical studies of comparative advantage specialization are measures of Revealed Comparative Advantage (RCA) (originally proposed in an international trade context by Balassa, 1965 [6], 1979 [7] and 1986 [8]. The RCA index can compare a country’s export structure to that of the world. In other words, the RCA index compares the export share of a given sector in a country with the export share of that sector in the world market. RCA index is defined as:

\[
RCA_j = \left( \frac{\frac{X_{ij}}{\sum_j X_{ij}}}{\frac{\sum_i X_{ij}}{\sum_i \sum_j X_{ij}}} \right)
\]

(1)

The numerator represents the percentage share of a given sector in the total export of a given country where \(X_{ij}\) is the total value of exports of the sector \(i\) from the country \(j\). The denominator represents the percentage share of a given sector in the world exports. This index takes values between 0 and infinity. If a sector is a bigger portion of the country's exports compared with that of world exports, then a country is considered to be specialized, or to have a comparative advantage in the goods and the RCA will be greater than 1. Conversely, if the sector is a smaller fraction of the country's exports compared with that of world exports, then the country is not specialized, or has a comparative disadvantage in the goods, resulting in an RCA greater than 0 and strictly less than 1.

Furthermore, the trend of RCA shows variance in the export portion of the goods \(i\) for the country \(j\) and its high fluctuation shows the non-existence of certain export strategies [9].

While using the above mentioned index, some sufficient and necessary conditions should be considered. Moreover, in examining the exporting function trend, the constancy of the trend should be considered, because exports of a country fluctuate for some reasons such as changing trade and exchange rules, economic sanctions and natural disaster; world demand increases or decreases considerably for a limited time as well. Hillman [10] reported that RCA index would be an appropriate index for determining comparative advantage when the following relation is true:

\[
HI = \left[ \frac{1 - \sum_j \frac{X_{ij}}{X_{ij}^{\sum_j}}} {\sum_i \frac{X_{ij}}{X_{ij}^{\sum_j}}} \right] \cdot \left[ \frac{1 - \sum_i \frac{X_{ij}}{X_{ij}^{\sum_j}}} {\sum_j \frac{X_{ij}}{X_{ij}^{\sum_j}}} \right]
\]

(2)

Where the letters denote the same as the ones in the definition of the RCA, in equation 1. For empirical testing, however, the Balassa index implies a risk of non-normality, because it takes values between zero and infinity. Since a value between zero and one represents a lack of specialization, yet a value between one and infinity represents the presence of specialization, regression analyses using RCA give too much weight to values above one. One solution first suggested by Laursen (1998) is to use a simple transformation of the RCA index providing what Laursen called Revealed Symmetric Comparative Advantage (RSCA) where:

\[
RSCA = \frac{RCA - 1}{RCA + 1}
\]

(3)

Each RSCA index lies between minus and plus one (and avoids the problems of an undefined value which can occur in the logarithmic transformation if exports are zero in a given sector). Changes above and below the old RCA value of one are now treated symmetrically (see Laursen, [11]; Dalum et al., [12]; Cole et al., [5]; Kelleher, [13] for further discussion). Although widely used, the RCA is not the only index, which has been applied to investigate the international trade specialization and comparative advantage.

778
In order to adopt the net export in a given sector and to eliminate re-export as a source of distortion, when calculating comparative advantage we used Michaely and Contribution of the Trade Balance (CTB) measures. Also we used the \( X^2 \) for measuring the level of specialization (and hence change in the level). Therefore, in this study three additional measures are used that have been widely employed in the literature. The first is the Michaely index [14], defined as:

\[
MI_{ij} = \frac{X_{ij}}{\sum_i X_{ij}} \cdot \frac{M_{ij}}{\sum_i M_{ij}}
\]  
(4)

where \( X_{ij} \) and \( M_{ij} \) are the total value of exports and imports of the sector \( i \) of the country \( j \), respectively. The first part of the formula (before the minus sign) represents the percentage share of a given sector in a country’s exports, while the latter part represents the percentage share of a given sector in a country’s imports. The index ranges between [-1;1], with a neutral value of zero. If the value of the index is positive, a country is specialized in a sector while, given a negative value, a country is said to be under-specialized in a sector. The index was developed by Michael Michaely as an ‘index of dissimilarity’. A number of researchers, working on the international trade (e.g. Kol and Mennes, [15]; Webster and Olroy, [16]; Cole et al., [5], has applied the index as a measure of trade specialization at the level of sector. In comparison with the RCA, the Michaely index is a measure of relative net export in a given sector. However, when comparing the RCA with the Michaely index, the type and size of intra industry-trade becomes of importance [11].

Another similar measure has been introduced by CEPII [17] called the Contribution of the Trade Balance (CTB). The CTB is defined as:

\[
CTB_{ij} = \left[ \frac{X_{ij} - M_{ij}}{\sum_i M_{ij} + \sum_i X_{ij}} \right] / 2 \cdot 100 \cdot \left[ \frac{\sum_i X_{ij} - \sum_i M_{ij}}{\sum_i M_{ij} + \sum_i X_{ij}} \right] / 2
\]

\[
\times \left[ \frac{X_{ij} + M_{ij}}{\sum_i X_{ij} + \sum_i M_{ij}} \right] / 2 \cdot 100
\]  
(5)

Where the letters denote the same as the ones in the definition of \( MI \), in equation 4. The measure ranges between [-400; 400]. Values greater than zero (less than zero) of the CTB index identify those sectors which give a contribution higher (lower) than their percentage share in country’s total trade. In other words, it has competition power or more (less) specialization in trade of the whole country. The measure has been applied, by Amendola et al., [18]; Amable, [19]; and Guerrieri, [20]. The \( MI \) and the CTB are two alternative measures of specialization, but they both measure net exports.

Our final measure is the \( X^2 \). The \( X^2 \) measures the sum of squared difference between the export distribution of a given country and the total trade group (or whole world) divided by the group’s export (or world’s export) distribution [11]. The \( X^2 \) is defined as:

\[
X^2 = \left[ \frac{\sum_i X_{ij} - \sum_j X_{ij}}{\sum_j \sum_i X_{ij}} \right]^2
\]

\[
= \left[ \frac{\sum_i X_{ij} / \sum_i X_{ij}}{\sum_j \sum_i X_{ij} / \sum_j \sum_i X_{ij}} \right]^2
\]  
(6)

Where the letters denote the same as the ones in the definition of the RCA, in equation 1. The size of \( X^2 \) is an indication of how strongly each country is specialized. The more a country differs from the world, the greater the value. In other words, The closer (larger) the \( X^2 \) to zero is, the closer (larger) the export structure of the country to the world structure will be.

If a country has an export structure exactly similar to that of the world, the value of the indicator will be zero. However, a very important difference between the chi square measure and the RCA is that the chi square is only devised to measure the level of specialization, as it both takes high values, when a country is seen to be less specialized than the whole world and when the country is more specialized in a commodity group as compared to the whole world. The measure ranges between 0 and infinity, although the index only takes the value of zero, if there is only one country in the world, producing everything. When compared to the RCA, the index has a disadvantage of producing very large values, when one commodity class makes up a large percentage of the total exports [11]. The measure has been applied by Archibugi and Pianta, [21]; Laursen, [11].
In this study, measures were calculated in two ways: first, by considering the total value of goods export and import (\(X_p\) - the total value of goods export and \(M_p\) - the total value of goods import) and second, by taking into account the total value of the export and import of agricultural products (\(X_{ap}\) - the total value of the agricultural products export and \(M_{ap}\) - the total value of agricultural products import). For the dynamicity of the results, measures were calculated for the period 1982-2004.

RESULTS

This paper analyzed the comparative advantage and specialization of pistachio market base on RCA\(^2\), RSCA, MI, \(X\) and CTB methodology measures for Iran and the U.S. during 1982-2004. The summary results on RCA, RSCA and \(X\) are reported in table 1. Result were presented in two ways, one by considering the total value of goods export (import) and the other by considering the total value of the export and import of agricultural products.

<table>
<thead>
<tr>
<th>Iran</th>
<th>(RCA_{ap})</th>
<th>(RCA)</th>
<th>(RSCA_{ap})</th>
<th>(RSCA)</th>
<th>(X_{ap})</th>
<th>(X)</th>
<th>(RCA_{ap})</th>
<th>(RCA)</th>
<th>(RSCA_{ap})</th>
<th>(RSCA)</th>
<th>(X_{ap})</th>
<th>(X)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1982</td>
<td>28</td>
<td>35.11</td>
<td>0.93</td>
<td>0.94</td>
<td>0.11</td>
<td>0.03</td>
<td>1.23</td>
<td>1.26</td>
<td>0.11</td>
<td>0.11</td>
<td>8.25E-06</td>
<td>1.68E-06</td>
</tr>
<tr>
<td>1983</td>
<td>30.99</td>
<td>37.96</td>
<td>0.95</td>
<td>0.95</td>
<td>0.26</td>
<td>0.04</td>
<td>1.32</td>
<td>1.48</td>
<td>0.14</td>
<td>0.19</td>
<td>1.75E-05</td>
<td>6.42E-06</td>
</tr>
<tr>
<td>1984</td>
<td>39.96</td>
<td>67.6</td>
<td>0.95</td>
<td>0.97</td>
<td>0.30</td>
<td>0.14</td>
<td>0.66</td>
<td>0.72</td>
<td>-0.21</td>
<td>-0.16</td>
<td>2.34E-05</td>
<td>2.43E-06</td>
</tr>
<tr>
<td>1985</td>
<td>49.15</td>
<td>87.91</td>
<td>0.96</td>
<td>0.98</td>
<td>0.83</td>
<td>0.40</td>
<td>0.39</td>
<td>0.45</td>
<td>-0.44</td>
<td>-0.38</td>
<td>0.000135</td>
<td>1.61E-05</td>
</tr>
<tr>
<td>1986</td>
<td>78.84</td>
<td>224.75</td>
<td>0.97</td>
<td>0.99</td>
<td>3.95</td>
<td>4.69</td>
<td>0.44</td>
<td>0.50</td>
<td>-0.39</td>
<td>-0.33</td>
<td>0.000202</td>
<td>2.30E-05</td>
</tr>
<tr>
<td>1987</td>
<td>100.91</td>
<td>155.54</td>
<td>0.98</td>
<td>0.99</td>
<td>7.94</td>
<td>2.34</td>
<td>0.33</td>
<td>0.35</td>
<td>-0.50</td>
<td>-0.48</td>
<td>0.000358</td>
<td>4.09E-05</td>
</tr>
<tr>
<td>1988</td>
<td>91.47</td>
<td>184.79</td>
<td>0.98</td>
<td>0.99</td>
<td>6.95</td>
<td>3.49</td>
<td>0.33</td>
<td>0.33</td>
<td>-0.50</td>
<td>-0.50</td>
<td>0.000379</td>
<td>4.58E-05</td>
</tr>
<tr>
<td>1989</td>
<td>64.23</td>
<td>170.07</td>
<td>0.97</td>
<td>0.99</td>
<td>4.29</td>
<td>3.49</td>
<td>0.44</td>
<td>0.44</td>
<td>-0.39</td>
<td>-0.39</td>
<td>0.000353</td>
<td>3.78E-05</td>
</tr>
<tr>
<td>1990</td>
<td>92.82</td>
<td>127.71</td>
<td>0.98</td>
<td>0.98</td>
<td>8.39</td>
<td>1.69</td>
<td>0.35</td>
<td>0.39</td>
<td>-0.48</td>
<td>-0.44</td>
<td>0.000418</td>
<td>3.94E-05</td>
</tr>
<tr>
<td>1991</td>
<td>136.55</td>
<td>140.59</td>
<td>0.99</td>
<td>0.99</td>
<td>24.01</td>
<td>2.62</td>
<td>0.40</td>
<td>0.41</td>
<td>-0.43</td>
<td>-0.41</td>
<td>0.000475</td>
<td>4.63E-05</td>
</tr>
<tr>
<td>1992</td>
<td>117.5</td>
<td>131.40</td>
<td>0.98</td>
<td>0.98</td>
<td>19.65</td>
<td>2.41</td>
<td>0.85</td>
<td>0.89</td>
<td>-0.08</td>
<td>-0.06</td>
<td>3.06E-05</td>
<td>1.67E-06</td>
</tr>
<tr>
<td>1993</td>
<td>120.29</td>
<td>149.68</td>
<td>0.98</td>
<td>0.98</td>
<td>24.09</td>
<td>3.55</td>
<td>0.56</td>
<td>0.58</td>
<td>-0.28</td>
<td>-0.26</td>
<td>0.000332</td>
<td>2.81E-05</td>
</tr>
<tr>
<td>1994</td>
<td>264.17</td>
<td>150.93</td>
<td>0.99</td>
<td>0.99</td>
<td>103.33</td>
<td>2.99</td>
<td>0.54</td>
<td>0.63</td>
<td>-0.36</td>
<td>-0.23</td>
<td>0.000321</td>
<td>1.85E-05</td>
</tr>
<tr>
<td>1995</td>
<td>325.5</td>
<td>190.58</td>
<td>0.99</td>
<td>0.99</td>
<td>152.38</td>
<td>4.36</td>
<td>0.69</td>
<td>0.72</td>
<td>-0.18</td>
<td>-0.16</td>
<td>0.000414</td>
<td>9.52E-06</td>
</tr>
<tr>
<td>1996</td>
<td>268.23</td>
<td>159.62</td>
<td>0.99</td>
<td>0.99</td>
<td>131.86</td>
<td>3.36</td>
<td>0.47</td>
<td>0.52</td>
<td>-0.36</td>
<td>-0.31</td>
<td>0.000452</td>
<td>3.02E-05</td>
</tr>
<tr>
<td>1997</td>
<td>253.11</td>
<td>127.96</td>
<td>0.99</td>
<td>0.98</td>
<td>69.02</td>
<td>1.35</td>
<td>0.80</td>
<td>0.88</td>
<td>-0.11</td>
<td>-0.07</td>
<td>4.38E-05</td>
<td>1.29E-06</td>
</tr>
<tr>
<td>1998</td>
<td>322.69</td>
<td>264.19</td>
<td>0.99</td>
<td>0.99</td>
<td>170.12</td>
<td>8.32</td>
<td>0.76</td>
<td>0.82</td>
<td>-0.14</td>
<td>-0.10</td>
<td>9.77E-05</td>
<td>3.94E-06</td>
</tr>
<tr>
<td>1999</td>
<td>240.95</td>
<td>163.39</td>
<td>0.99</td>
<td>0.99</td>
<td>84.29</td>
<td>2.42</td>
<td>0.82</td>
<td>0.84</td>
<td>-0.10</td>
<td>-0.08</td>
<td>4.95E-05</td>
<td>2.23E-06</td>
</tr>
<tr>
<td>2000</td>
<td>220.12</td>
<td>132.87</td>
<td>0.99</td>
<td>0.99</td>
<td>75.02</td>
<td>1.45</td>
<td>0.85</td>
<td>0.97</td>
<td>-0.08</td>
<td>-0.02</td>
<td>3.51E-05</td>
<td>8.74E-08</td>
</tr>
<tr>
<td>2001</td>
<td>231.93</td>
<td>151.85</td>
<td>0.99</td>
<td>0.99</td>
<td>93.75</td>
<td>2.25</td>
<td>0.85</td>
<td>0.98</td>
<td>-0.08</td>
<td>-0.01</td>
<td>3.94E-05</td>
<td>2.40E-08</td>
</tr>
<tr>
<td>2002</td>
<td>139.26</td>
<td>143.91</td>
<td>0.99</td>
<td>0.99</td>
<td>36.43</td>
<td>2.20</td>
<td>0.88</td>
<td>1.06</td>
<td>-0.07</td>
<td>0.03</td>
<td>2.92E-05</td>
<td>3.46E-07</td>
</tr>
<tr>
<td>2003</td>
<td>153.69</td>
<td>151.97</td>
<td>0.99</td>
<td>0.99</td>
<td>55.29</td>
<td>3.01</td>
<td>0.72</td>
<td>0.96</td>
<td>-0.16</td>
<td>-0.02</td>
<td>0.000179</td>
<td>2.58E-07</td>
</tr>
<tr>
<td>2004</td>
<td>198.95</td>
<td>117.04</td>
<td>0.99</td>
<td>0.98</td>
<td>81.49</td>
<td>1.41</td>
<td>1.34</td>
<td>1.74</td>
<td>0.14</td>
<td>0.27</td>
<td>0.000236</td>
<td>5.73E-05</td>
</tr>
<tr>
<td>Mean</td>
<td>156.43</td>
<td>142.14</td>
<td>0.98</td>
<td>0.98</td>
<td>50.16</td>
<td>2.52</td>
<td>0.70</td>
<td>0.78</td>
<td>-0.21</td>
<td>-0.17</td>
<td>1.88E-04</td>
<td>1.60E-05</td>
</tr>
</tbody>
</table>

Source: Author’s calculations. The required data for calculation of indices were collected from the websites of the United Nations Conference on Trade and Development [23] and Food and Agriculture Organization of the United Nations [22].
successful strategy in pistachio export is more obvious. This indicates that Iran's sensitivity has increased and some principles have been established which made it able to become close to a certain and successful export strategy. The calculated average of RCA and RSVC measures for Iran's pistachio are much more than those of the U.S. pistachio which show that Iran has a higher comparative advantage and specialization than the U.S. does for pistachio export. On the other hand, a comparison of the trend of these two measures shows that the U.S. has a more planned and successful export strategy than Iran does.

With respect to $X^2$, as noted before, since pistachio has a high share in Iran's agriculture export earning, the amounts of $X^2$ high was achieved. Like the RSVC index, $X^2$ indicates that Iran has a high specialization in the pistachio export market. Moreover the trend of $X^2$ trend is indicative of an increase in specialization and competitive power in Iran's pistachio trade from 1998 onward; in fact, its export structure became closer to the world's trade structure. Examining the $X^2$ measure trend of the U.S. also shows that this country is moving towards higher specialization.

The MI and the CTB measures were calculated in two ways, one by considering the total value of goods export (import) and the other by considering the total value of the export and import of agricultural products; the summary result on reported in Table 2. These measures suggest that pistachio in Iran had considerable influence both in the trade of the total goods and in the trade of agricultural goods in the intended period. Moreover, the rising trend of these measures reflects that this product is moving towards competitiveness and specialization. The amount of these two measures for the U.S. pistachio up to 1986 was negative and is reflective of lack of specialization for this product. However, after this period, these measures had a rising trend which shows that, by appropriate planning, this country is moving towards becoming competitive and specialized in the pistachio export. In general, pistachio portion in the U.S.'s trade was very low.
DISCUSSION AND CONCLUSIONS

Results of this study showed that although Iran had a high comparative advantage and specialization during 1982-2004, but lacked a certain and successful strategy for the pistachio export until 1998. On the other hand, the U.S., in spite of lacking comparative advantage in the pistachio export in the intended period, to be able to gain comparative advantage in the pistachio export in 2004 followed a planned and successful export strategy.

Although pistachio product is native to Iranian and Iran has a natural advantage in producing this product and the results of this study suggested that Iran has a high comparative advantage in the pistachio export and some other studies have revealed that Iran has a comparative advantage in pistachio production and export (Salimifar and Mirza'i, 2002; Azizi and Yazdani, 2004). Also considering the fact that the cost of production factors in Iran like labor is much lower than the U.S., but many problems involving the production process, marketing, processing, packaging, health principles, advertisements and pistachio export in Iran have caused the U.S., take the advantage of world market which joined to the exporter circle since 1982 and making use of certain planning which takes into account health and marketing principles such as packaging and advertisement and having certain strategy in exporting this product to world market. Also in the U.S. due to factors such as technology, proper mechanization, expert and experienced labor and optimal adaptation of input, producers have a high quality operation and a high income.

Although Iran has identified an export strategy in recent years by establishing some principles, it still needs a more precise planning for the production, marketing, exporting and especially observing health principles (aflatoxin’s problem) of pistachio in order to be able to maintain both its comparative advantage in producing and exporting pistachio and its export markets; the reason lies in the fact that rival country (the U.S.) enjoys advanced technology and careful planning. Also it is suggested that Iran should specialize in pistachio production not for comparative advantage but for enjoying the lowest comparative disadvantage.

With respect to pistachio production, Iran’s major problem is rooted in the low productivity of the land and yield. As noted before, regarding this problem Iran ranked 10 among the ten major countries of pistachio producers in 2005. Regarding the marketing issue, lack of enough facilities for peeling, grading and storage of the product; and regarding export, inefficiency and inappropriate structure of export market, lack of precise and perfect information from the world market and advertisement of pistachio at the global level are among the major problems. However, Iran’s most important problem in recent years has been the contamination of this product with aflatoxin which needs careful observation of health principles in order to be able to overcome this problem. In order to increase the productivity of pistachio, farmers should use scientific management on farm and should employ modern production methods and the government should develop research and development institutes. Regarding the marketing issue, the establishment of a centre which provides services such as grading, peeling and storage might be helpful. In addition, by identifying new and final consumption markets, accurate and precise information about the world market and prices and advertising pistachio at the global level would increase pistachio export on the one hand and decreases vulnerability of pistachio export on the other.

REFERENCES