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**ORIGINAL ARTICLE****Visualizing the future of Iran's market of agricultural products with an emphasis on membership in WTO (the case study of wheat)****Shahryar Fathi, Maryam Vosooghi, Saber akbarian***Malekan Branch, Islamic Azad University, Malekan, Iran*

Shahryar Fathi, Maryam Vosooghi, Saber akbarian: Visualizing the future of Iran's market of agricultural products with an emphasis on membership in WTO (the case study of wheat)

**ABSTRACT**

The agriculture sector has always been considered an important element in providing the needs of human life. It has a special significance in Iran because of certain features such as varied continental conditions, fertile soil, adequate labor force and variety of plants. Membership of Iran in World Trade Organization "WTO" brings out the question "what effects will the membership of Iran in WTO have on Iran's agriculture, especially production of wheat?" The World Trade Organization (WTO) is an international organization that regulates the world's trade and resolves the disagreements of the members. The members of the WTO are the countries that have signed the agreements of this organization (nearly 30) and Iran is currently a member of this international organization. In this research firstly the method of calculation of tariff equivalent rate is studied; then using the econometric method of Ordinary Least Squares (OLS) the function of production of wheat is estimated; then using this function, the actual production of wheat in Iran before and after conducting these agreements have been calculated.

**Key words:** agriculture, the World Trade Organization, Tariff equivalent rate, agricultural agreement**Introduction**

International economics deals with economic relations between countries and the interdependence of these relationships is important for the economic welfare of most countries. The World Trade Organization (WTO) is an international organization that regulates the world's trade and resolves the disagreements of the members. The members of the WTO are the countries that have signed the agreements of this organization (nearly 30 agreements). The Headquarters of the WTO is in Geneva, Switzerland. The number of the members of the WTO was 150 (as of November 2006) and Vietnam is the newest member of this organization.

*Iran and the WTO:*

The WTO is the only international organization that its duties are related to regulating the international trade. The main objective of WTO is to ensure a mild, free and scheduled procedure of the global trade. Islamic Republic of Iran should join the WTO with the goal of preventing a global consensus against the country, gaining better conditions and discrimination within the global markets for the domestic products to be exported, using the WTO mechanism to resolve commercial disputes, creating

a favorable atmosphere for foreign investment in the country, matching the domestic regulations and rules with those of the WTO, developing banking facilities and fundraising, increasing competition in various economic sectors, upgrading the quality of domestic products and raising the economic status and prestige of the Islamic Republic of Iran in the world. Before joining the WTO, Iran should prepare some preliminaries. In order to join the WTO, Iran should change the domestic rules to competitive ones for the manufacturers by the gradual elimination of customs barriers and subsidies so as to prevent economic recessions and bankruptcy of manufacturing businesses.

*The effects of membership of Iran in WTO from the view point of Iran's customs:*

In the current international trading system and Iran's efforts to achieve a fair share of global markets, membership of Iran in the WTO is scrutinized deeply and comprehensively by the experts and with an accurate understating of the mechanism and features of this specialized international organization will have the following benefits:

1. Enjoyment of Iran's export from preferential tariffs of the other members of the WTO, and

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subsequently, increase of competitive potential of Iran's exports in global markets.

2. Exemption of exports from the regulations of price difference fund in WTO members. According to the mentioned regulations, in the majority of WTO members, the difference of price of exports of non-member countries is charged with tax. Lack of this exemption especially in export of agricultural products to Europe, imposes an extra tax to these products.

3. Membership of Iran in WTO increases foreign joint ventures.

4. Membership of Iran in WTO increases funds related to foreign purchases.

5. Membership of Iran in WTO causes prepares international financial institutes to grant more facilities to Iran. This, costs much less than financing of free resources. On the other hand the studies show that non-tariff barriers have been increased by industrial countries between 1980 and 1995. Due to these facts, export of industrial and especially traditional goods of Iran to WTO members particularly European countries can face various non-tariff barriers. Joining WTO does not require immediate removal of tariffs and decrease the competitive power of products of countries; but it depends on negotiations and bargaining power and economic conditions of each country. For instance, WTO allows more time to reduce or abolish tariffs for agricultural products. Furthermore, WTO cares about members' balance of payments, and allows the countries with this type of problem to limit their import and to pursue policies to encourage export.

#### *Agriculture sector in Iran's economics:*

Agriculture sector has always been considered an important element in providing the needs of human life. Before the industrial revolution human activities were mainly focused on agriculture; but achievements of industrial revolution and increase of productivity in the agricultural sector due to the use of the industrial machinery, decreased the share of agriculture from labor force. But agriculture sector in Iran is considerably important because of special features such as diverse climatic conditions, fertile soil, sufficient manpower and plant diversity. Although Utilization of the resources of this sector is not convenient because of severe restrictions and barriers such as low productivity in agriculture sector, relatively common traditional production methods, Small and scattered Operational units, pricing system beneficial to consumers, lack of alterant industries, use of inefficient irrigation practices, indiscriminate use of inputs like fertilizers and pesticides and lack of adequate storage facilities and warehousing; it is possible to eliminate the barriers, reduce food import supply food and industrial needs of country, provide the future needs and export a considerable amount of agricultural

products. Iran is a unique country that can have a fair share of the global market and provide the global customers with its products. Iran is located in a temperate zone and has adequate water resources and suitable climate, so it is one of the best agricultural areas in the Middle East and has a special global place in export of agricultural products.

#### *Wheat:*

Wheat as the staple food of Iranian people (to which a great portion of the cultivation is annually allocated to) is the most important source of calories needed daily. Over 58 percent of calories and 52 percent of the protein per capita consumption of people is supplied through bread. Factors that improve performance and increase wheat production are implementation of infrastructure programs, implementation of increased irrigated wheat plan, revised pricing policy for agricultural products and a relative increase in wheat price. These factors increase the motives of the manufacturers in the production of wheat and other main products. Wheat is among the oldest and most important grain crops used by human which is the most widely cultivated and produced and its cultivation is ranked first in the world, 220 million hectares worldwide and 6.4 million hectares in Iran from which 36% is irrigated wheat and 64% is dry land wheat. According to statistics of Food and Agriculture Organization of the United Nations (FAO) the global production of wheat in 2004 was 627 million tons with the average performance of 2906 kilograms per hectare.

#### *The economic importance of wheat:*

Common wheat (*T.aestivum* L.em. Tell) grows in wide range of weather conditions around the world and in fact is the most compatible specie in cereals. The land dedicated to cultivation of wheat is more than other crops because wheat is the main food of human and is directly consumed.

Vavilov, the Russian researcher, has identified four primary areas for cultivation of wheat:

1. Central Asia (north and west of India, Afghanistan, Tajikistan and Uzbekistan) the following species of wheat can be cultivated in these regions:

*T.aestivum* with Subspecies of

*T.vulgare*

*T.compactum*

*T.sphaerococum*

2. Near East (Asia Minor, Iran and mounts of Turkmenistan) the following species of wheat can be found in these regions:

*T.aestivum*, *T.compactum* x *T.vulgare* with

Subspecies of

*T.timopheevii*

*T.orientale*

*T.persicum*

3. Africa (Ethiopia and Somalia) the following species of wheat can be cultivated in these regions:

T. polonicum, T. dicoccum, T. turgidum, T. durum

4. Mediterranean region (lands of Mediterranean):

T. aestivum ssp. spelta, T. polonicum, T. dicoccum, T. durum

#### Estimation of wheat production function:

In this research, firstly how to calculate the tariff equivalent rate for wheat is studied, then this rate is calculated for all years of implementing the agricultural agreement and the data is inscribed in separate tables. In this section the variables used in production function are introduced and finally the function is estimated using the Ordinary Least Squares (OLS).

#### Research period:

The research period is the years from 1999 to 2009.

The variables in function estimation are:

Wholesale price of wheat: Wholesale price of wheat is considered confidential by the Central Bank; so with great effort, the wholesale price of the goods in 1999 was extracted, and based on that, the wholesale price in other years was estimated using wholesale price index (see appendix).

Import prices: for each product there is a report in which the import prices are used to calculate equivalent tariff rate.

Exchange rate: the free market and official rates of exchange in research period in fifth and sixth columns of the table respectively.

Import prices in terms of Rial: since the import price in third column is in terms of US Dollar, it can be expressed in terms of Iranian Rial regarding the exchange rate. So the second column if multiplied by the exchange rate gives the import price in terms of Rial. There are two rates for exchange, so there will be two rates for import price.

Price gap: the difference of wholesale price and import price

Tariff equivalent: Tariff equivalent in terms of both official and free market exchange

$$TEI = \frac{Pdi - pwi}{pwi} \times 100$$

TEI: Tariff equivalent per year

Pdi: domestic wholesale price per year

pwi: import price per year

In calculation of the tariff equivalent two factors, exchange rates and domestic prices, play a determining role in the tariff equivalent to be positive or negative.

Take a look at columns 10 and 11 and note that the tariff equivalent in free exchange rate is negative in most of the years; which means the domestic price

of the product is less than the import price (as the agricultural agreements emphasize that they should be). This fact implies some kind of hidden tax on the product. However, the tariff equivalent in official rate is positive most of the time, showing that the domestic price of the product is more than the import price; which implies supportive policies for that product. In case of wheat, since the government is the exclusive buyer, the guaranteed price and the wholesale (market) price of wheat are approximately equal; so the wholesale price is used in estimation.

#### Wheat:

Two types of prices (guaranteed and wholesale) are used for estimating wheat production function.

After estimating the production function we seek to examine these hypotheses:

H<sub>0</sub>: Pattern of wheat production will not increase by implementing the regulations of market access

H<sub>1</sub>: Pattern of wheat production will increase by implementing the regulations of market access

$$\ln(sw) = 7834/5 + 15/87 \ln pw (-1) + (MA = 0/72)$$

$$T \quad 9/40 \quad 2/85 \quad 4/26$$

$$R^2 = 0/62 \quad DW = 1/52 \quad F = 21/34 \quad n = 29$$

The equation above shows that wheat production is function of price index and production in last period. The t-statistic any Y-intercept and price index variable are meaningful with a confidence level of 5%; and because the calculated F is greater than the "F" of the table, the whole regression is valid with the mentioned level. The R<sup>2</sup> statistic in equation is 0.62 which is good indicator for estimation.

Regarding the (...) Test and finding out that the equation is MA, the MA(I) expression is added to equation to eliminate autocorrelation, and subsequently, with a DW (Durbin-Watson) statistic of 1.52 the model does not have any autocorrelation.

#### 1. Wheat production before implementing market access rules:

Wholesale price of wheat in 1999: 410

$$\ln(sw)_{88} = 7834/5 + 15/87 \ln(pw_{87}) - (I)$$

$$\ln(sw) = 7834/5 + 15/87 \ln(410) =$$

$$\ln(sw) = 7834/5 + 15/87(6/01) = 7929/97$$

$$\ln(sw) = 7929/97$$

$$sw = \text{Ant} \ln(7929/97)$$

$$Sw = 8.7543$$

In order to calculate the production of wheat in 2009 before joining the WTO, we replace the price of wheat in 1999 in equation (I) and the actual wheat production in 2009 is calculated to be 8754.3 thousand tons.

## 2. Wheat production after implementing market access rules:

1.1. Wheat production based on free exchange rates and without imposing a tariff wall

$$\begin{aligned} \ln(sw)_{88} &= 7834/5 + 15/87 \ln(410) = \\ sw_{88} &= \text{Ant} \ln(7929/97) = \\ Sw &= 8.7543 \end{aligned}$$

1.2. Wheat production based on free exchange rates and with imposing a tariff wall

$$\begin{aligned} pw &= 495/6 \\ \ln(sw)_{88} &= 7834/5 + 15/87 \ln(495/6) = 7931/68 \\ (sw)_{88} &= \text{Ant} \ln(7931/68) = \\ Sw &= 6.8177 \end{aligned}$$

1.3. Wheat production based on official exchange rates and with outimposing a tariff wall

$$\begin{aligned} pw &= 395/98 \\ \ln(sw)_{88} &= 7834/5 + 15/87 \ln(395/98) = 7929/42 \\ (sw)_{88} &= \text{Ant} \ln(7929/42) = \\ Sw &= 5.05068 \end{aligned}$$

### Appendix:

#### Conclusion:

Detailed results of the estimation with OLS method

The table of estimated parameters with OLS method shows that the most important statistic of this table is t-statistic. If you seek to test meaningfulness of a specific coefficient the t-statistic can be of great help. If the absolute value of t-statistic is greater than the "t" of the table (which is usually supposed to be 2) then that coefficient is meaningful and if it is

smaller, the coefficient is not meaningful and cannot affect the dependent variable. So regarding to table 2 and t-statistic of each independent variable, the Y-intercept coefficient and the coefficients of variables are meaningful and can affect the dependent variables. Statistical quantities such as coefficient of determination ( $R^2$ ) and SD wastes and other statistics are calculated in this table. The most important statistic of this table is the Durbin-Watson (DW) statistic which is used to determine the existence of autocorrelation of disturbing sentences. Regarding to DW in this table (1.52) it can be deduced that the disturbing sentences have nearly no autocorrelation.

The other important statistic in this table is the  $R^2$  statistic which is the model's coefficient of determination. This statistic expresses that what percentage of the variability of the dependent variables can be explained by independent variables, The  $R^2$  in this table is 0.62.

#### The econometric model after estimation of coefficients and conclusion:

$$\begin{aligned} \ln(sw) &= 7834/5 + 15/87 \ln pw(-1) + (MA=0/72) \\ T & \quad 9/40 \quad 2/85 \quad 4/26 \\ R^2 &= 0/62 \quad DW=1/52 \quad F=21/34 \quad n=29 \end{aligned}$$

It is clear that in this equation all the coefficients are positive. The results of this research indicate that without imposing a tariff wall after implementing the regulations of market access, Iran's wheat production will not change; so the  $H_0$  hypothesis can be accepted but if a tariff wall imposed after implementation of market access rules, Iran's wheat production will decrease from 8754.3 thousand tons to 9817.7 thousand tons with the free exchange rate and 5050.68 with the official exchange rate; in this case too, the  $H_0$  hypothesis can be proved.

#### Calculation of the tariff equivalent of non-tariff barriers imposed on imports of wheat according to import prices in Iran

year	Whole sale price index	Wholesale price	Import Price (Dollar)	Exchange rate		Import Price (Rial)		Price Gap		tariff equivalent	
				According to the free market rate of exchange	According to the official rate of exchange	According to the free market rate of exchange	According to the official rate of exchange	According to the free market rate of exchange	According to the official rate of exchange		
1999	5.176	14.840	13.0	8634	1755	96.1156	17.235	82.-316	97.604	38.-27	<b>25.257</b>
2000	194	923.44	0.14	8131	1755	1101.39	237.73	-177.95	685.71	-16.16	<b>288.45</b>
2001	210.3	1001.03	0.14	7925	1755	1081.22	239.44	-80.2	761.59	-7.42	<b>318.07</b>
2002	237	1128.12	0.1	7991	7958	791.11	787.84	337.01	340.28	42.6	<b>43.19</b>
2003	259.2	1233.79	0.16	8323	8282	1355.27	1348.59	-121.48	-114.8	-8.96	<b>-8.51</b>
2004	295.1	1404.68	0.17	8747	8719	1443.26	1438.64	-38.58	-33.96	-2.67	<b>-2.36</b>
2005	328.1	1561.76	0.17	9042	9023	1507.3	1504.13	54.45	57.62	3.61	<b>3.83</b>
2006	352.7	1678.85	0.17	9226	9195	1561.16	1555.91	117.69	122.94	7.54	<b>7.9</b>

2007	400.4	1905.9	0.25	9357	9285	2297.64	2279.96	-391.74	-374.06	-17.05	<b>-16.41</b>
2008	410	1951.6	0.35	9667	9574	3419.8	3386.9	-1468.2	-1435.3	-42.93	<b>-42.38</b>
2009	<b>420.3</b>	<b>2000.63</b>	<b>0.25</b>	<b>9677</b>	<b>9577</b>	<b>2448.51</b>	<b>2423.21</b>	<b>-447.88</b>	<b>-422.58</b>	<b>-18.29</b>	<b>-17.44</b>

Calculation of the tariff equivalent of non-tariff barriers imposed on imports of wheat according to import prices in Iran

year	Guaranteed Price	Import Price (Dollar)	Exchange rate		Import Price (Rial)		Price Gap		tariff equivalent	
			According to the free market rate of exchange	According to the official rate of exchange	According to the free market rate of exchange	According to the official rate of exchange	According to the free market rate of exchange	According to the official rate of exchange		
1999	672	13.0	8634	1755	96.1156	17.235	-484.96	83.436	17.-72	<b>65</b>
2000	875	0.14	8131	1755	1101.39	237.73	-226.39	637.27	-25.87	<b>72.83</b>
2001	1050	0.14	7925	1755	1081.22	239.44	-31.22	810.56	-2.97	<b>77.20</b>
2002	1300	0.10	7991	7958	791.11	787.84	508.89	512.16	39.15	<b>39.40</b>
2003	1500	0.16	8323	8282	1355.27	1348.59	144.73	151.41	9.65	<b>10.09</b>
2004	1700	0.17	8747	8719	1443.26	1438.64	256.75	261.373	15.10	<b>15.37</b>
2005	1870	0.17	9042	9023	1507.30	1504.13	362.70	365.87	19.40	<b>19.57</b>
2006	2050	0.17	9226	9195	1561.16	1555.91	488.84	494.09	23.85	<b>24.10</b>
2007	2050	0.25	9357	9285	2298.64	2279.96	-247.64	-229.90	-12.08	<b>-11.22</b>
2008	2800	0.35	9667	9574	3419.80	3386.90	-619.80	-586.90	-22.14	<b>-20.96</b>
2009	<b>3050</b>	<b>0.25</b>	<b>9677</b>	<b>9577</b>	<b>2448.51</b>	<b>2423.21</b>	<b>601.49</b>	<b>626.79</b>	<b>19.72</b>	<b>20.55</b>

Model data

SW	PW	obs
5946.000	3.600000	1979
5500.000	4.800000	1980
6610.000	5.700000	1981
6660.000	6.400000	1982
5956.000	8.000000	1983
6207.000	8.300000	1984
6631.000	8.700000	1985
7556.000	11.10000	1986
7600.000	12.10000	1987
7265.000	15.00000	1988
6010.000	19.30000	1988
8012.000	19.80000	1989
8793.000	22.50000	1990
10179.00	28.40000	1991
10732.00	35.40000	1992
10870.00	49.60000	1993
11228.00	91.80000	1994
10015.00	95.90000	1995
10045.00	100.0000	1996
11955.00	148.3000	1997
8673.000	182.4000	1998
8088.000	178.6000	1999
9459.000	188.4000	2000
12450.00	216.1000	2001
13440.00	237.0000	2002
14568.00	257.3000	2003
14308.00	287.2000	2004
14664.00	311.9000	2005
15886.60	330.0000	2006
7956.600	338.0000	2007
NA	342.0000	2008
7956.600	338.0000	2007

NA	342.0000	2008
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Output of E-Views software for the model

Dependent Variable: LNSW			
		Method: Least Squares	
Date: 07/27/11 Time: 20:56			
Coefficient	Std. Error	t-Statistic	Prob.
7834.556	832.6592	9.409079	0.0000
15.87907	5.560506	2.855688	0.0083
0.720009	0.168744	4.266863	0.0002
Mean dependent var		0.621467	R-squared
S.D. dependent var		0.592349	Adjusted R-squared
Akaike info criterion		1908.546	S.E. of regression
Schwarz criterion		94706196	Sum squared resid
F-statistic		-258.6346	Log likelihood
Prob(F-statistic)		1.524172	Durbin-Watson stat
		-.72	Inverted MA Roots

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