

Effects of trade liberalization on agricultural crops sales: A case study of rice crop in Iran

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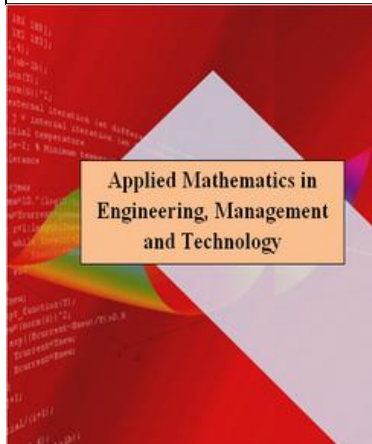
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Abstract:

Joinery releasing diplomacies is impressing on the overall instruction of economy. As most of researchers believe, Joinery releasing should redound to creation a free joinery system in which all the joinery distortions be omitted. In this research; imports, request and internal proffer of rice crop is under survey. Data used are related to time period of 1355 to 1389. This period is obtained from different information resources, like FAO Information Center and agriculture and ministry of commerce and custom yearly statistics. Proffer, request and imports functions about rice crop is calculated. For surveying short time and long time relations among the variables, it is used from error correction model and self-explanation model with prevalence suspensions. The results show that releasing don't impress internal proffer of rice. While in short time, most of variables have meaningful effect on rice proffer. The results from error correction model calculation showed that nominal aid rate has not a meaningful effect on rice proffer in short time. The results from rice request function calculation tell that increasing the cost of rice as a

surrogate good for rice in long time and releasing cause to increase the rice internal request. But in short time, the variables of rice and wheat producing price have a meaningful effect on internal request; while the indicator of international trade level is not meaningful for internal request and also the function of rice imports request showed that request for rice imports increases with releasing.

Keywords: Joinery releasing, error correction model and self-explanation model with prevalence suspensions, rice

1.Introduction

Following useful Uruguay Round negotiations and the signing of the 1994 General Agreement on Tariffs and Trade and the establishment of the World Trade Organization (WTO), the previous supportive processes in some economic sectors such as agriculture went through some changes. Accordingly, great efforts were made to liberalize agricultural products trade similar to what was done in terms of industrial goods. These efforts finally resulted in the emergence of some consensus among the WTO members in the field of agricultural products. The implementation of agreements and commitments related to international trade of agricultural products has some important implications for how the agricultural sector is going to be developed in member and non-member countries. Such implications are also significant for countries such as Iran that are exporters or importers of agricultural products. There are different opinions about usefulness or harmfulness of the effects of the liberalization. For instance, some argue that globalization has some potential that can accelerate the industrialization of developing and transiting countries, creating a significant benefit for such countries. In such cases, a country's success in taking advantage of the benefits of liberalization and globalization is dependent on the economic structure, rules and regulations governing the country, its ability to supply commodities in the international markets and its active participation in business. Besides, trade liberalization policies affect the structure of an economy and many researchers believe that trade liberalization should lead to the creation of a free trade system in which all trade distortions are removed and the government intervention in economic activities are limited. Similarly, Iran is one of the countries that have paid attention to this policy whose main

important aim is to prevent the use of production facilities in the public sector in the form of increased production return, increased competition, and efficiency (Bakhshudeh, 2001).

Tayebi and Ranjbar (2004) examined the export demand structure in Iran using AIDS Demand Model from 1978 to 2001. The results of the study indicated that whenever the intensity of trade liberalization policies on imported good is reduced it is possible that the share of domestic sales will reduce which is for the benefit of imports and the G10 of the second business partner.

Esmaili and Rahmati (2008) examined the effects of economic globalization on the value added in the agricultural sector. They observed that Iranian agricultural economy is positively interacting with the global economy. As a result, the globalization process positively influences this sector of Iranian economy.

Many studies such as a study done by Bullassa (1971) suggested that there is a direct relationship between trade liberalization and economic growth.

Krueger (1978) and Bhagawatig (1978) suggested that trade liberalization is indicative of any policy to reduce the anti-export supports. Anwar and Schmidt (1994) analyzed the effects of taxes on the sales of Pakistani Basmati Rice in the context of partial equilibrium analysis. The results of their study showed that rice producers have lost a large part of their excess welfare, while consumers benefit from this situation. Besides, the Treasury has some revenues from foreign exchanges in addition to taxes received which will benefit the country as a whole. Diao et al., (2002) simulated a regional CGE model to examine the effects of china's membership in the World Trade Organization on its rural economy. The results of the study suggested that after China's membership in the WTO, the welfare has been prompted in general. However, the gap between different sectors and regions has been widened largely. Besides, it was noted that the imposition of long range trade liberalization policies and the removal of trade barriers in the agricultural and non-agricultural sectors will benefit the Chinese agricultural sector at the national level. McDonald et al., (2003) used a general static equilibrium model to examine the impacts of tariff barriers and other trade barriers for the cotton crop by all countries on global welfare. The simulation results showed that the removal of barriers to cotton trade in cotton by all countries resulted in a relative increase in global welfare. Although it is benefitting some developing countries but many countries do not enjoy such welfare resources. However, in general the elimination of trade barriers in international trade in cotton crop will increase the cotton global trade (Macdonald et al., 2003).

Goldberg and Pawnick (2004) examined a study in Columbia and examined the experimental relationship between the inequality of wages and trade liberalization in Colombia. They used the data at the family level. They found that there is a positive and significant relationship between tariffs and bonuses.

Mishra and Kumar (2005) conducted a study in India using micro-data. They observed a negative and significant relationship between the changes in trade policies and the changes in wages and inequality of wages. However, using autocorrelated data, Dout (2003) observed a negative and significant relationship between the growth rate of wages and changes in wages and tariffs in different sectors in India. Egbigeb et al., (2006) examined the relationship between exchange rate changes, trade liberalization, and tax revenues in 22 African countries from 1980 to 1996. The results of the study suggested that the relationship between trade liberalization and government tax revenues is sensitive to two indices used for the trade liberalization. Besides, it was found that there is no significant relationship between trade liberalization, total tax revenues, trade tax revenues, and consumption tax revenues. On the other hand, there is a relatively strong correlation between trade liberalization and income taxes. Finally, exchange rate and inflation rate are negatively correlated with income revenues.

2. Research methodology

Eviews Software was used to investigate the effects of trade liberalization on the sales of rice crop and to perform data analysis in the present study. First the statistical characteristics of the variables under study were estimated using Augmented Dickey Fuller Test to find out whether they are stationary or not. In addition, error correction model (ECM) and Autoregressive Distributed Lag (ARDL) model were used to examine the long and short term relationships between the variables. There are different views on how to measure explanatory variables and effects of trade liberalization in agriculture. Since the main purpose of the present study is to examine the effects liberalization of rice, it has been attempted to identify indicators appropriate to the agricultural sector and to analyze the process of rice liberalization. Trade liberalization has different effects on different sectors of the economy, especially on the agriculture. Therefore, some criterions must be used to measure such effects. One of these assessment criteria is Level of International Trade (LIT). Then export

functions, domestic supply and the demand for rice are estimated by time series data. The reason for using time series data is that it provides the possibility of analyzing the effects of price changes on the demand and supply of a given product over time.

3.The supply function of agricultural products

The supply function of agricultural products in general is considered as follows:

$$S_x = F(P_x, P_y, P_{t-1}, A, C', T)$$

Where, S_x is the supply of the product in question, P_x is the price of the product, P_y is the price of the substitute product, P_{t-1} is the price in the previous year, A is the are under cultivation, C the production costs, and t is the time variable.

Furthermore, Level of International Trade (LIT) was added into the model in order to study the effects of globalization and liberalization. Accordingly, the supply model of agricultural products would be as follows (Najafi, 2001):

$$S_x = F(P_x, P_y, P_{t-1}, A, C', T, LIT)$$

4.Domestic demand function

Domestic demand function for agricultural products is generally as follows:

$$D_x = f(p_x, p_y, m)$$

5.Level of international trade (LIT)

Criteria for measuring globalization and liberalization of international trade (LIT) have been used in the area of international relations in an industry (sector) specific shows. This index is calculated as follows:

$$LIT = (X_t + M_t) / (Y_t + M_t - X_t)$$

Where, LIT is the level of international trade, X_t is exports, M_t is imports, and Y_t is the domestic production within an industry or sector. Lower values of LIT indicate that international communication in the form of imports and exports is not an important aspect of the industry. In other words, an industry (sector) is participating in trade less given its production level. In contrast, higher values of LIT indicate that international communication is regarded as an important component within a given industry or sector. The high level of international communication in a sector may be due to some factors for instance advantages in imports or exports. For example, oil and gas industry in oil exporting countries is a prominent example of export privilege gained by such countries not because of high competition and technology but due to the abundant oil resources in these countries. On the other hand, such countries have to export oil more frequently than other countries in order to satisfy their needs. Therefore, a high LIT in oil sector does not indicate that such countries possess a globalized oil industry. Besides, import advantage can be found in countries that are not able to produce for instance agricultural products due to harsh climatic conditions and thus they have to imports products for their domestic consumption. Similarly, a high LIT does not indicate that these countries are moving along with globalization.

6.Import function for agricultural products can be written as follows:

$$M = f(p_w / p_d, GDP, E, T) \quad (1)$$

Where, M is the value of imports, P_w is the international prices, P_d shows domestic prices, GDP is gross domestic product, E is the exchange rate, and T is the Tariff rate.

7.(ARDL) model methodology

ARDL model is able to estimate simultaneously short-term and long-term components. This method also can solve the problems associated with variable exclusion and autocorrelation. In addition, as these models are often free from problems such as serial correlation and endogeneity; the estimates obtained from them are unbiased and efficient (Seddiqi et al., 2000).

ARDL model can be written as follows:

$$a(L, p) y_t = a_0 + \sum_{i=1}^k \beta_j(L, p)x_{it} + u_t, \quad i = 1, 2, \dots, k \quad (2)$$

Where, α_0 is intercept, Y_t is the dependent variable, and L is the lag factor which will be defined as follows:

$$L^j y_t = y_{t-j} \quad (3)$$

So: (4) and (5):

$$a(L, p) = 1 - a_1 L - \dots - a_p L^p$$

$$\beta_i(L, q) = \beta_{i0} + \beta_{i1} L + \beta_{i2} L^2 \dots + \beta_{iq} L^q$$

Where, X_{it} is indeed the n th independent variable. The relationships presented in following sections will be true in the long run between the variables under study (4):

$$y_t = y_{t-1} = \dots y_{t-p}, \quad x_{i,t-1} = \dots = x_{i,t-1} = x_{i,t-q} \quad (6)$$

In the equation, q refers to q th lag related to i th variable so that the long term relationship between the variables can be written as follows:

$$y = \alpha + \sum_{i=1}^k \beta_i x_i + v_i \quad (7) \quad \alpha = \frac{\alpha_0}{\alpha(1, p)} \quad (8)$$

$$\beta_i = \frac{\beta_i(1, q)}{\alpha(1, p)} = \frac{\sum_{j=0}^q \beta_i}{\alpha(1, p)} \quad (9) \quad v_i = \frac{u_i}{\alpha(1, p)} \quad (10)$$

Error correction equation for the ARDL model can be written as follows:

$$\Delta y_t = \Delta a_0 - \sum_{j=2}^p a_j \Delta y_{t-j} + \sum_{j=0}^k \beta_{i0} \Delta x_{it} - \sum_{i=1}^k \sum_{j=2}^q \hat{\beta}_{i,t-j} \Delta x_{i,t-j} - a(1, p) ECT_{t-1} + u_t \quad (11)$$

Where, Δ is the first difference operator and $\hat{a}_{j,t-j}$ and $\hat{\beta}_{ij,t-j}, \hat{a}_i$ are the estimated coefficient. Besides, $a(1, p)$ is the coefficient of the error correction component which measures the adjustment rate. A two-step procedure can be used to estimate the long-term relationship. In the first step, the existence of a long-term relationship between the variables used in the model will be examined. If it is confirmed that there is a long-term relationship between the variables; short-and long-term parameters will be then calculated.

Suppose that there is a long-term relationship between x , y , and z . Without having any prior knowledge about the long-term relationship between the variables it will be useless to estimate three correction regression equations as one of there variables in each equation will be considered as the dependent variable (Seddiqi et al., 2000).

Then F test can be used to test the existence of the long-term relationships. When such a relationship exists, F test will indicate which of the variables should be normalized. The null hypothesis to test the inexistence of the first relationship is as follows:

$$\Delta y_t = a_{0y} + \sum_{i=1}^n b_{iy} \Delta y_{t-i} + \sum_{i=1}^n c_{iy} \Delta x_{t-1} + \sum_{i=1}^n d_{iy} \Delta z_{t-1} + \gamma_{1y} y_{t-1} + \gamma_{2y} x_{t-1} + \gamma_{3y} z_{t-1} + \epsilon_t \quad (13)$$

$$\Delta x_t = a_{0x} + \sum_{i=1}^n b_{ix} \Delta y_{t-i} + \sum_{i=1}^n c_{ix} \Delta x_{t-i} + \sum_{i=1}^n d_{ix} \Delta z_{t-i} + \gamma_{1x} y_{t-1} + \gamma_{2x} x_{t-1} + \gamma_{3x} z_{t-1} + \epsilon_{2t} \quad (14)$$

$$\Delta z_t = a_{0z} + \sum_{i=1}^n b_{iz} \Delta y_{t-i} + \sum_{i=1}^n c_{iz} \Delta x_{t-i} + \sum_{i=1}^n d_{iz} \Delta z_{t-i} + \gamma_{1z} y_{t-1} + \gamma_{2z} x_{t-1} + \gamma_{3z} z_{t-1} + \epsilon_{3t} \quad (15)$$

Similarly, F test can be repeated to prove the existence of the second and third long-term relationships. F test used in these test has a non-standard distribution which is dependent on the three factors i.e. the degrees of co-integration of variables used in the ARDL model (first-degree or second degree co-integration), the number of regressions used in the model, and the presence or absence of the intercept and trend in the model.

The two series of critical values were calculated by Boys and Boys (1997) to take decisions in order to reject or not reject the null hypothesis. The first assumption is that all co-integrated variables are of zero order while the second assumption is that all co-integrated variables are of first order. If the computed F value is out of critical limit, the final decision can be taken without the knowledge of the degree of co-integration of variables. In addition, in the case of the establishment of a long term relationship between the variables in the first stage, a two-part model is used to estimate parameters used in the model. In the first part, the degree of co-integration of variables will be determined by Akaike and Schwartz indices and the selected model is estimated by least squares method in the second part of the method.

8.Results of the study

Table 1: LIT value for rice production from 1976 to 2012

| Year | LIT | Year | LIT |
|------|-----|------|-----|
| 55 | %56 | 72 | %15 |
| 56 | %15 | 73 | %18 |
| 57 | %10 | 74 | %19 |
| 58 | %12 | 75 | %22 |
| 59 | %13 | 76 | %29 |
| 60 | %17 | 77 | %41 |
| 61 | %18 | 78 | %44 |
| 62 | %22 | 79 | %42 |
| 63 | %23 | 80 | %46 |
| 64 | %19 | 81 | %44 |
| 65 | %17 | 82 | %42 |
| 66 | %24 | 83 | %56 |
| 67 | %17 | 84 | %54 |
| 68 | %31 | 85 | %55 |
| 69 | %22 | 86 | %56 |
| 70 | %23 | 87 | %58 |
| 71 | %16 | 88 | %57 |
| 89 | %58 | 90 | %57 |
| | | 91 | %56 |

Source: research findings

As shown in Table 1, during the time period from 1977 to 1980 which is contemporary with the occurrence of the Islamic Revolution, LIT has declined in a descending order. In other words, the commercialization process was reversed during this time period and it was less related in global markets. However, LIT has increased during this period due to trade liberalization and the rice market was more associated with global markets.

LIT indicator which shows the extent of the status of rice crop in global markets:

$$LIT = \frac{(x_t + m_t)}{(y_t + m_t - x_t)}$$

Since the base year in the above equation is 1997, X_t is the real value of rice export in million Rials, mt is the real value of rice import in million Rials, Y_t is the real value of gross rice production Rials in million Rials. The lower values of LIT indicate that a given sector has less participated in trade given its production level. Although LIT is a very good index, it does not show the globalization requirements and does not provide the sufficient conditions for globalization and its measurement. The value of LIT has been determined for the time period from 1976 to 2000 and the index has fluctuated greatly and decreased from 1975 to 1981. During this time period under study the value added of the rice crop has increased with moderate fluctuations while the imports have declined with high fluctuations. Therefore, rice trade has decreased significantly during the period under study. However, due to the policies adopted with regard to GDP in these years, LIT has indicated that the rice commercialization and its relationship to global markets have gone under recession. However, LIT has increased from 1995 due to the rise in the rice production.

The decrease in the LIT from 1977 to 1993 has been due to several reasons:

1. The rice production has decreased noticeably after the Islamic Revolution and the imposed ware against Iran.
2. Rice imports have reduced significantly leading to the shrinkage of total exports and imports compared to the GPD. The rice imports have increased significantly from 1993 to the end of the war. In addition to the quantitative rise in exports, the value added has continuously increased. These events have caused an increase of LIT, so it can be said that the rice crop has moved in line with globalization policies during the period under study.

9. Level of International Trade (LIT)

Table 2: Results of the rice supply estimation based on (2, 2, 0, 2, 2) ARDL model

| Variables | Coefficients | S.E | T-statistics |
|---|--------------|--------------|--------------|
| Intercept | 165/3 | 540/13 | /306 |
| Rice supply with a lag | 0/903*** | 0/1537 | 5/87 |
| Rice supply with two lags | -0/718** | 0/1840 | -3/90 |
| The farm price of wheat | -0/309 | 0/8079 | -/3824 |
| The price of wheat to a lag | 2/16** | 0/6935 | 3/11 |
| The price of wheat with two lags | -5/15*** | 1/063 | -4/84 |
| The farm price of rice | 2/67** | 0/903 | 2/95 |
| Nominal protection rates | -311/34 | 189/23 | -1/64 |
| Nominal protection rates with a lag | -180/3 | 140/10 | -1/28 |
| Nominal protection rate for the two interrupt | -310/3 | 168/94 | -1/83 |
| Level of international trade. | -298/02 | 291/75 | -1/02 |
| Level of international trade with a lag | 867/3** | 299/67 | 2/89 |
| Level of international trade with two lags | -1112** | 247/31 | -4/49 |
| | =225/69F | /993 $R^2 =$ | 2/13D.W= |

Source: Research findings (*, **, and *** are level of significance at 1, 5, and 10, respectively)

Table 3: Results of long-term relationship for rice supply

| Variable name | Coefficients | S.E | T-statistics |
|------------------------------|--------------|--------|--------------|
| Intercept | -188/2 | 755/07 | -/249 |
| Wheat production cost | -4/05** | 1/19 | -3/40 |
| Rice production cost | 3/0028 | /97 | 3/09 |
| Nominal protection rates | -983/8* | 419/6 | -2/343 |
| Level of international trade | -655/7 | 510/9 | -1/28 |

Source: Research findings (*, **, and *** are level of significance at 1, 5, and 10, respectively)

The liberalization does not greatly affect the domestic supply of rice. Since the production rate and the wheat price has a negative and significant affect on the rice supply in the long-term it suggests that rice producers have not been supported during the period in question. Given that the price of rice produced in Iran is lower than the price of rice imported and a major part of domestic demand for rice is satisfied through imports, supporting the domestic producers can lead to an increase in the rice production rise especially that rice is of significance in Iranian food diet. Therefore, it is expected that liberalization will result in the reduction in domestic supply. Of course, this finding is significant at 75% level of significance.

Table 4: Estimation of the rice domestic supply and independent variables based on (2, 2, 0, 2, 2) ARDL error correction model

| Variables | Coefficients | S.E | T-statistics |
|---|--------------|-----------------------|--------------|
| The first order supply difference | /82** | 0/19 | 4/31 |
| The first order difference of the price of wheat | -0/31 | 0/81 | -/38 |
| Second order difference of the price of wheat | 5/16** | 1/06 | 4/86 |
| The first order difference of the price of rice | 2/68** | 0/90 | 2/97 |
| The first order difference of nominal protection rate | -343/11 | 189/23 | 181/3 |
| The second order difference of nominal protection rate | 310/39 | 168/94 | 1/83 |
| The first order difference of level of international trade | -298/02 | 291/76 | -1/02 |
| The second order difference of level of international trade | 1112** | 247/32 | 4/49 |
| The first order difference of the intercept | 145/34 | 530/14 | /27 |
| Error correction component | -0/82 | 0/16 | -5112 |
| | =19/07F | =0/903 R ² | =2/13D.W |

Source: Research findings (*, **, and *** are level of significance at 1, 5, and 10, respectively)

Table 4 shows the results for the short-term relationship of the rice domestic supply model. As shown in the table, the first-order difference for variables such as supply, wheat production price, the level of international trade and the first-order difference of the rice price have a significant effect on the rice supply. Thus it can be seen that most of the variables have a significant effect on rice supply in the short term. However, they have a negative effect in the long-term and this effect is not significant. This may happen in the short term due to the price increase. Besides, nominal protection rate has no significant effect on rice supply. The value of error correction coefficient is equal to 0.82. Accordingly, it can be said that adopted influential policies will affect the rice production after two years.

10. The function of domestic demand for rice

Based on theoretical expectations and market conditions and the fact that rice is considered as an important food element in people's daily lives, the function of domestic demand for rice is regarded as a function of the price of rice, wheat prices as a substitute for rice, the level of the international trade, and the level of national income in Iran. The function of domestic demand for rice became also static with a single difference. Besides, as the wheat was selected as a substitute for rice and since the function of the price of rice was non-static, the ARDL co-integration method was used in the present study.

Table 5: The relationship between the rice domestic supply and independent variables based on (2, 2, 0, 2, 2) ARDL error correction model

| Variables | | Coefficients | S.E | T-statistics |
|--|--------------|--------------|--------------|--------------|
| Intercept | β_0 | -35996/6* | 2835/9 | -12/69 |
| Domestic demand with a lag | β_1 | -/219 | 0/2282 | -/95 |
| Rice production cost | β_2 | -7/73** | 2/95 | -2/62 |
| Rice production cost with a lag | β_3 | -20/04** | 6/91 | -2/90 |
| Wheat production cost | β_4 | 6/20 | 4/49 | 1/38 |
| Wheat production cost with a lag | β_5 | 6/39 | 3/89 | 1/64 |
| Wheat production cost with two lags | β_6 | 10/62 | 5/43 | 1/95 |
| Level of international trade | β_7 | -46/718** | 1630/4 | -/286 |
| Level of international trade with a lag | β_8 | 4/76 | 1812/1 | /002 |
| Level of international trade with two lags | β_9 | 2/78 | 2170/2 | /0012 |
| Iran's national income | β_{10} | /140 | 0/085 | 1/64 |
| Iran's national income with a lag | β_{11} | -/109 | 0/074 | -1/47 |
| Iran's national income with two lags | β_{12} | 0/056 | 0/057 | /98 |
| Dummy variable | β_{13} | 1/30** | 353/09 | /003 |
| | | =14/03**F | =0/903 R^2 | =2/5D.W |

Source: Research findings (*, **, and *** are level of significance at 1, 5, and 10, respectively)

Table 6: The relationship between the rice domestic supply based on (2, 2, 0, 2, 2) ARDL error correction model

| Variable name | Coefficients | S.E | T-statistics |
|--------------------------------|--------------|--------|--------------|
| Intercept | -4917/2 | 3172 | 1/55 |
| Rice production cost | -22/77*** | 5/57 | 4/08 |
| Wheat production cost | 19/04** | 5/62 | 3/38 |
| Level of international trade | 5806/4* | 2841/5 | 2/043 |
| Iran's national income | %71 | %68 | 1/04 |
| Dummy variable of slope change | -1067** | 281/07 | 3/79 |

Source: Research findings (*, **, and *** are level of significance at 1, 5, and 10, respectively)

Since the value of β_7 and β_2 coefficients at the above table are statistically significant at the confidence level of 95%, the null hypothesis indicating that $\beta_2 = \beta_4 = \beta_7 = \beta_{10} = 10$ was not confirmed. Accordingly, it is expected that there is a significant long-term relationship between the independent variables used in the study and domestic demand for rice. Table 5 shows the long-term relationship between the independent variables and domestic demand for rice. As shown in the table, a long-term increase in the price of wheat as a substitute for rice as the most important food element and the trade liberalization will increase the domestic demand for rice. An increase in the domestic price of rice will also significantly reduce the domestic demand for rice. As the long term relationship for the supply of rice indicates, the liberalization will reduce the domestic demand for rice in the long-term. On the other hand, the liberalization will increase the amount of rice produced domestically. Accordingly, it is expected that the import demand will also increase due to the liberalization. This will be discussed further in what follows. An increase in Iran's national income as an indicator of the revenue of consumer did not contribute significantly in explaining changes in domestic demand for rice. In order to better explain the channel through which the variables under study are influencing the domestic demand, the short-run relationship between these variables and the demand for rice was examined (See Table 7). Of the various variables used in the short-term, the production cost of rice and wheat only had a significant effect on the domestic demand for rice but ILT did not have a significant effect. D72 was a dummy variable used to explore the changes in domestic production of rice and to find out if it is static or not. In addition, the value of error correction coefficient was 1.2 which suggests the short term changes made during one deviation period in the supply will be adjusted based on the values of changes made in the long term. The liberalization is expected not influence significantly the domestic demand. Besides, it is predicted that the adopted policies and the changes made in amount of foodstuff consumed are among the most important factors affecting the domestic demand for rice.

The value of R^2 coefficient indicates that over 74% of changes in the domestic demand for rice can be explained by the variables employed in the present study. The F value also shows the significance level of the whole mode at 99% level of confidence.

Table 7: The relationship for the rice supply in short term based on (2, 2, 0, 2, 2) ARDL error correction model

| Variables | Coefficients | S.E | T-statistics |
|--|--------------|---------|--------------|
| First order difference of the intercept | -5996/6 | 3835/9 | -1/56 |
| The first order difference of the price of rice | -7/73** | 2/96 | -2/61 |
| First order difference of the price of wheat | 6/20 | 4/50 | 1/37 |
| The second order difference of the price of wheat | -10/63 | 5/44 | -1/95 |
| The first order difference of the ILT | -467/19 | 1630/4 | -286 |
| Second order difference of the ILT | -2785/9 | 2170/2 | -1/28 |
| First-order differences of Iran's national income | 0/14 | 0/09 | 1/55 |
| Second-order differences of Iran's national income | 0/06 | 0/06 | 1 |
| Dummy variable | 1301/2*** | 353/09 | 3/68 |
| Error correction component | -1/22 | 0/23 | -5/30 |
| F = 7.44*** | =0/749 R^2 | =2/5D.W | |

Source: Research findings (*, **, and *** are level of significance at 1, 5, and 10, respectively)

It is expected that the trade liberalization of rice will raise the domestic demand for rice imports in Iran. Besides, it was noted that the liberalization will reduce the domestic supply but it will increase the domestic demand for rice. Accordingly, the rice in the domestic demand can be responded by the rise in the demand for rice imports. Accordingly, given that reduction of prices and less incentive for rice production it is recommended that to increase investments in research, promotion, and the development of new technologies in order to increase the producers' competitive ability and reduce production costs.

11.Import demand

Theoretically, the import demand is considered as a function of Iran's national income, exchange rate, the ratio of world prices to domestic prices, domestic production, and the level of international trade. Consequently, the ratio of world prices to domestic prices was found to be static by including the d67 dummy variable in to the model used in the study. This dummy variable represents the changes in the variable slopes after 1988. Table 8 shows the estimation of the linear model of import demand. Tariff and non-tariff barriers were excluded from the import demand model as they were extremely co-linear. Moreover, the national income was used differentially in the model due to its high co-linearity with most variables. The most interesting thing was unexpected signs for variables such as the domestic production and the ratio of world prices to domestic prices that are also significant. The values of correlation coefficients between variables such as imports, world prices, and domestic production were positive and higher than 0.5. Therefore, it can be said that in the period under study the rice importation level has changed exogenously and has not been affected by variables used in the model. Moreover, a high significance level of the time procedure is indicative of the effectiveness of other variables over time. The importance of rice as a main foodstuff for Iranians is one of the factors affecting the demand for imports. Accordingly, to respond to the rice producers' demand in Iran and to meet domestic consumption needs, the government has tried to pay more attention to rice imports.

Table 8: Results of the import demand function

| Variable name | Coefficients | S.E | T-statistics |
|--|--------------|----------|--------------|
| Intercept | -2701/40** | 314/80 | /58 |
| First-order difference of Iran's national income | 0/017 | %13 | 1/30 |
| Rice production cost | %23 | 312/5 | /0007 |
| Level of international trade | 3298/5*** | 39/95 | 82/56 |
| Rate of exchange | -0/120*** | /15 | /8 |
| The price of wheat | 89/15** | 5/82 | 15/31 |
| Domestic production of rice | 1/77 | 82/10 | /021 |
| Time procedure | 48/44*** | 2/13 | 22/74 |
| Dummy variable | 2/6 | 60/2 | /04 |
| F = 27.63*** | $R^2 = /992$ | =2/27D.W | |

Source: Research findings (*, **, and *** are level of significance at 1, 5, and 10, respectively)

12.Overall results of rice trade liberalization

Table 9: Annual mean of welfare effects of trade liberalization on rice production, consumers, and society from 1976 to 2012 (million USD)

| Description | 1976-1981 | | | 1981-2012 | | | 1976-2012 | | |
|--------------------------------|------------|-------------|--------|------------|-------------|--------|------------|-------------|---------|
| | Production | consumption | total | Production | consumption | total | Production | consumption | total |
| Changes in government spending | -4230 | -14281 | -18511 | 461825 | -2382740 | 284456 | 364231 | -1572071 | 1936302 |
| Change in welfare level | 6033 | -13999 | -7966 | - | -1918281 | -5 | - | -1095624 | -396591 |
| Changes in foreign exchanges | -1120 | -5532 | -5532 | 881746 | -1291464 | 103653 | 699033 | -662629 | 874402 |
| Social costs | | 1129 | 1129 | 298642 | 926916 | -5 | 211773 | 926916 | 926916 |
| | | | | - | | 150901 | - | | |
| | | | | - | | 06 | - | | |
| | | | | | | 926916 | | | |

As shown in Table (9), if the liberalization of the rice market had been performed from 1976 to 1981, annual government spending would have been reduced by 18 billion Rials annually, much of which would be related to the subsidy system of rice consumption. Besides, the rice liberalization for the period from 1981 to 2012 could have been resulted in average annual cost reduction of 2844 billion Rials; 67.5 % of which is related to the consumption policies. It can be also said that the overall welfare level would be reduce due to the liberalization. In other words, the reduction of consumers' welfare is higher than producers' welfare. As was mentioned earlier, the incurred social costs are caused by changes in rice related policies. Besides, concerning foreign exchanges during from 1976 to 1981, the government has saved up 5.5 billion Rials in imports, caused mainly by the consumption policy changes. The rate of savings form imports as a consequence of the possibility of the trade liberalization from 1976 to 2012 has been estimated to be equivalent to 874 billion Rials. If the total reduction in the government spending and foreign exchanges is considered as one of the positive effects of the liberalization and the reduction of the social welfare as the negative effect of liberalization, we come up with another picture of the liberalization. During the period from 1981 to 2012 the average annual changes in the government expenditure and foreign exchanges are amounted to 4,434,671 million Rials and the total change in the social welfare is 1963451 Rials whose difference is positive and equal to 2471220. As a result, the liberalization from 1981 to 2012 has increased the level of social welfare. Similar results have been obtained from 1975 to 1981 and, therefore, for the whole period under study.

Accordingly, concerning the issue of economic globalization it is necessary to gain knowledge of the rules and restrictions governing the economic structure in order to move toward the realization of the global economy. One of the requirements concerning the potentials of the agricultural sector and the diversity of products is that the needed investments be made in products that have a competitive edge over the other products. Besides, Iran has to take some initiatives in order to be able to join the world Trade Organization successfully.

13.Recommendations

To respond to the rice producers' demand and the consumption needs, the government must pay more attention the rice imports. Moreover, in order to increase the producers' competitive power and to reduce costs, some investments need to be made in the research, promotion, and development of new technologies. Given the payment of subsidies to agricultural sector in various forms, it is essential that the issue of liberalization of agricultural products and the purposefulness of subsidies paid to rice production be also taken into account by

policy makers. However, it can be said that the government have to identify and support low-income and vulnerable groups and to remove legal barriers to rice trade liberalization by the cooperation with the Iranian Parliament in accordance with the provisions made in the 4th Economic, Cultural, and Social Development Plan and prior to the rice trade liberalization. Finally, the rice trade liberalization must be performed selectively, gradually, and according to the inflation conditions in the society.

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