

Investigating the Effect of Real Effective Exchange Rate on the Iranian Pistachio Export

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Abstract: Increase in the exchange rate may not always promote export of non-oil production and exports of various goods; rather they might have different reactions to the exchange rate. Hence, in this study we tried to examine the effect of real effective exchange rate on Iranian pistachio export. The required data were collected from statistical yearbook of Iran's foreign trade, statistical yearbook of the International Monetary Fund, United Nations Food and Agriculture Organization, and various publications of the central bank of Iran for the period of 1974-2008. The results showed that the real effective exchange rate, income of importer countries and domestic production have positive effects on export of pistachio but the effect of the domestic price index to the global pistachio export price index ratio was negative. Hence, it is recommended in order to produce more the crop as well as reduce the domestic price adopted employing advanced production & processing methods, extending the cultivation levels and improving the performance per hectare so that promote the ways of pistachio export.

Keywords: Real Effective Exchange Rate, Non-oil exports, Pistachio, Iran.

INTRODUCTION

Iran's foreign trade is known with export of single product and high dependency on oil revenues. Since the advent of oil until today in Iran, the export proportion of this product from total exports has been increasing [7]. However, according to the volatility and uncertainty in oil revenues, today's expanding non-oil exports as an unavoidable necessity is binding. On the other hand, some of the other experts believe that the agricultural sector in terms of enjoying extent of land and climate diversification has a high potential in world markets. So by relying on this capability, we can hope to promote non-oil exports. Inflation has been one of the fundamental problems in the Iranian

economy, especially in recent years [16]. Meanwhile, if the value of foreign currencies doesn't rise, appreciation of internal currency expected is one of the consequences. This dire problem could disturb the relative prices and markets mechanism for allocation of resources in the country. As well it could be accompanied with losing more exchange resources of central bank. So at this situation, the external balance of payments deficit is a common matter. Hence over the mentioned periods, we always have experienced frequent increases in effective exchange rates of exports and imports so that the authorities have tried for promotion of exports through increasing the exchange rate [7].

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Even so, the question which now can be posed is that: Does increase exchange rate lead to increase in the non-oil exports? This study tried to be answered this question about one of Iran's agricultural products (pistachio).

Pistachio has a special and importance status among the agricultural products of Iran. This product is known the most important non-oil export product after carpet product so that it brings remarkable foreign exchange earnings for Iran. In addition, given the fact that in one hand the production trend of the product and on other hand the quality of Iranian pistachio is familiar and high, so its export levels enjoy high potential as far as Iran has accepted the first rank of the export in the world [10]. Thus, it seems necessary, recognizing the factors affecting the export of this product and the effect of exchange rates on its exports.

The effects of exchange rates on economic performance have been discussed in various studies. Hojabr kiani [8] studied the effects of some variables on agricultural exports by using Islam and Subramanian's model (1989). The results showed that the real exchange rate deviations relative to the its long-term equilibrium direction, the real exchange rate fluctuations and the pressure of domestic demand for exportable goods have negative effects on agricultural exports and relative price of agricultural products. While the sudden changes in agricultural production and technological progress have positive effects on agricultural exports. Shaham [15] studied the effects of exchange rate on the agricultural crops export. The results of this research showed that income and cost of living index in importer countries were the important factors on the Iran's agricultural crops exports. Applying preferential-competitive policies and exchange rates in the open market are the effective trading and exchange policies on agricultural exports. In addition, implementing preferential and multi rates systems

don't have any significant effect on the growth of agricultural exports. Torkamani [18] examined the short and long term effects of exchange rate on export price of Iranian pistachios. They used the export price equation which is extracted under the condition of maximizing profits of monopolistic firm. By the way, their results showed that changes in exchange rates in the short and long terms are the most important affective factors on the export price of Iranian pistachios. In addition, pistachio export prices are affected by the value of exports of this product. In addition, in the short term there is a negative relationship between domestic production and export of pistachio prices. Karami [9] studied the effect of fluctuations of exchange rate on the exports of agricultural products in different countries. The findings demonstrate that fluctuations of exchange rates have different impacts on the exports of pistachios and dates in different countries. Therefore, commercial policies of agricultural products to different countries should consider the effects of exchange rate fluctuations in targeted country. Ehsani [6] investigated the effect of exchange rate volatility on the exports of Iranian products. In this study two indexes including conditional standard deviation and moving average standard deviation were used for quantifying the exchange rate volatility. The results showed that the effect of exchange rate on exports is positive but this rate instability has a negative effect on exports. The results of Alper [1] study showed that exchange rate changes have important impacts on Canadian agriculture. These effects briefly could be divided such as: price, partial products, input and household incom fluctions. Dollar devaluations can cause changes in relative prices of agriculture and non-agricultural sectors in the economy as well as improving terms of trade in favorite of agricultural sector. Moreover, the results of general equilibrium models indicated that all sectors of agriculture will benefit from

exchange rates, but these effects are quite different in various parts of the economy. Finally, this study stated that changes in macroeconomic policies and exchange rate volatility policies may be one of the important reasons of agricultural prices and incomes instability in Canada. Bolkesjo [5] examined the effects of exchange rates on the trade of international forest products. The results showed that in the short time elasticity value of export is more than the elasticity of exchange rate; this is while elasticity of imports relative to the exchange rate is moderate. In the long term, the elasticity of exports and imports reduce but its value still significant. Yazici [19] with study and comparison of trade balance reaction relative to the exchange rate changes in three sections including: agriculture, industry and mining in Turkey concluded that the reactions of these three sections relative to the local currency depreciation have been in case of increasing-decreasing and increasing cycles. However, there is an identical response of these three sections to the exchange rate deviations in short run, but their long run reactions are different. It means although the trade balance of minning and industry sector promoted but it had a negative response relative to agriculture sector.

There are various reactions in different economic sectors relative to the exchange rate and its deviations. The main point that should be regarded is the nominal form of exchange rate used in most of respective economic studies while its real value can explain the results appropriately in terms of considering the prices differences and the weight of trade partners. Therefore, this study applied the real effective exchange rate to estimate the export function of Pistachio.

MATERIALS AND METHODS

The real effective exchange rate consists of the weighted real exchange rate index which the index

weights include volume of business with partners and competitors of country. According to the following equation calculated the real effective exchange rate index (Godarzi, 2004):

$$REER_t = \frac{\sum_{i=1}^m W_{it} E_{it} P_{it}^*}{P_t} \quad (1)$$

Where, P_{it}^* is the price index in i country, P_t is price index in Iran, E_{it} is exchange rate between country i and Iran (defined as the number of Rials per unit of foreign currency), and W_{it} is the weight of country i . the bilateral exchange rates (E_{it}) defined as follows:

($E_{it} = E_t^{US} \cdot E_{it}^{US}$) where E_t^{US} is required Rials per each unit of US dollar and E_{it}^{US} is the accounted exchange rate between US dollar and currency of country i . Consumer Price Index (CPI) is the respective criterion to measure the prices index of Iran and its competitors. In order to measure the weight of country i (W_{it}) used the import magnitude of country i in total Iranian import ratio. Generally, the function of agricultural exports is shown as follows (Noori and Yazdani, 2000; Mohammadi and Naghshinehfar, 2006):

$$X = f\left(\frac{P_d}{P_w}, Y, ER, PRO\right) \quad (2)$$

Where, $\frac{P_d}{P_w}$ is the ratio of domestic prices to world prices, Y is the importer countries income, ER is the exchange rate and PRO indicates the domestic production of product. Econometric model of export supply in pistachio is as follows (we used from the real effective exchange rate at the final form):

Where, XP is the Iranian pistachio export value,

$$XP = \beta_0 - \beta_1 \left(\frac{P_{DP}}{P_{WP}}\right) + \beta_2 Y + \beta_3 REER + \beta_4 PROP \quad (3)$$

P_{DP} and P_{WP} are international prices and domestic prices of pistachio respectively, Y is the weighted average of eight main Pistachio importer countries GDP from Iran (including Australia, Canada,

China, France, Germany, India, Italy and Russia), REER is the real effective exchange rate and PROP is the domestic production of pistachio.

Auto Regressive Distributed Lag method (ARDL)

Generally, methods such as Engle-Granger, in studies which deal with small samples (low number of observations) due to failure dynamic interactions between variables in the short-run, they don't have necessary credibility. Meanwhile estimates of this invalid model are bias. So applying hypothesizes tests by using ordinary statistic like t statistic couldn't be justified [12]. Due to this reason use of methods which have short-term dynamics and caused to gain precisely coefficients in model are becoming popular. At all, the dynamics model is model which involves variables lags as follows:

$$Y_t = aX_t + bX_{t-1} + cY_{t-1} + u_t \quad (4)$$

To decrease estimation bias of model coefficients in small samples is good as much as possible being considered greater lags as following function:

$$\phi(L, P)Y_t = \sum_{i=1}^k b_i(L, q_i)X_{it} + c'w_t + u_t \quad (5)$$

The Above model titled an extensive auto regressive distributed lag pattern which:

$$\phi(L, P) = 1 - \phi_1 L - \phi_2 L^2 - \dots - \phi_p L^p \quad (6)$$

$$b_i(L, q_i) = b_i + b_{i1}L + \dots + b_{iq}L^q \quad (7)$$

$i = 1, 2, \dots, k$

Where: L is lag operator and W is a vector of fixed variables such as: intercept, dummy variables, time trend or exogenous variables with fixed lag [12].

The model should be estimated for all states and for all possible amounts. In a sense model should be

fitted in the order of (m+1). M is maximum lag which determined by researchers and K also is number of explained variables. At the next stage according to one of the following criteria, suitable equation specified: Akaike, Schwarz-Bayesian, Hannan-Quinn and adjusted R square [4]. Pesaran [14] offer that Schwarz-Bayesian criterion for specifying lags of model is the best standard because it doesn't unhand greater degree of freedom. To account the coefficients of long term model applied the dynamic model. The long term coefficients concerning the X variables are computing as follows:

$$\theta_i = \frac{\hat{b}_i(1, q_i)}{1 - \hat{\phi}(1, p)} = \frac{\hat{b}_{i0} + \hat{b}_{i1} + \dots + \hat{b}_{iq}}{1 - \hat{\phi}_1 - \dots - \hat{\phi}_p} \quad (8)$$

$i = 1, 2, \dots, k$

So now the following hypothesis tested to investigate that is this long term correlation spurious?

$$H_0 : \sum_{i=1}^p \phi_i - 1 \geq 0 \quad (9)$$

$$H_a : \sum_{i=1}^p \phi_i - 1 < 0$$

Null hypothesis shows non-cointegration or long term relation. The main condition to tend short term dynamics linkage toward long term equilibrium is that the sum of coefficients be less than one. To execute the respective test one number should be deducted from the sum of lagged coefficients of dependent variable. As well it is divided by the sum of coefficients standard deviation:

$$\frac{\sum_{i=1}^p \hat{\phi}_i - 1}{\sum_{i=1}^p S_{\hat{\phi}_i}} \quad (10)$$

If the absolute value of t statistic be more than the absolute value presented by Banerjee, Dolado and Mestre, the null hypothesis is rejected and accepted long-term relationship [17]. Because Auto Regressive Distributed Lag approach doesn't focus on the order of variables stationary which be I(0) or I(1), so it has a great advantage relative to other approaches.

For providing the Information for this study the External Trade Statistics Yearbook of Iran, Statistical Yearbook of the International Monetary Fund, United Nations Food and Agriculture Organization, and various publications of central bank of Iran, respectively are used which published during 1974-2008.

RESULTS AND DISCUSSIONS

The first step in estimating a time series model is stationary examination. In general, where a time series process is stationery that its expected value

and its variance are fixed over the time. As well co-variance quantity within the two terms only has a dependency on interval or lag value, and it not has any relation with the real value of co- variance [12]. Due to testing variable stationary this study employed Augmented Dickey-Fuller test. The results showed that except the logarithm ratio of domestic price to world price of pistachio, other variables of the case study aren't stationary in level, they'll become stationary after taking first difference. Because there is a varied combination of stationary (I(1) & I(0)) among the variables, it should be selected appropriate approach to find a co-integration relationship. An ARDL approach was used to analyze the short-term and long-term relations between variables [14]. The detailed results of the assessment of model coefficients are shown in table (1).

Table 1: Elaborative results gained from estimating model coefficients by using ARDL Approach (1,0,1,0,1).

Variable	coefficient	t statistic	prob
LXP(-1)	0.14	1.27	0.217
$L\left(\frac{P_{DP}}{P_{WP}}\right)$	-0.35 **	-2.69	0.012
LY	0.12	1.54	0.164
LY(-1)	0.09 **	2.21	0.029
LREER	0.33 *	1.94	0.067
LPROP	0.11	1.58	0.159
LPROP(-1)	0.15 ***	7.45	0.000
C	-0.28	-1.64	0.112
	R ² = 0.88	F = 348.22	

***, **, * significant in level 1%, 5%, 10%

Source: Author's findings

Classics hypotheses (non-autocorrelation, correct model specification, non-autocollinarity, normal distribution of residual terms and

Heteroscedasticity) should be tested under diagnostic statistic. The results of these tests are shown in table (2).

Table 2: Diagnostic Tests

The classics hypotheses	LM test		F test	
	statistic	probe	statistic	probe
Serial Correlation	1.25	0.264	0.67	0.424
Functional Form	2.77	0.098	1.64	0.216
Normality	0.314	0.853	-	-
Heteroscedasticity	0.79	0.373	0.76	0.388

Source: Author's findings

As it shown in table (2), by consideration of the probability of all calculating sample functions which are more than 0.05 percent; we can make sure that model support classics hypotheses. Now after the dynamic estimation, the test of existence or non-existence of long-term relation should be done. For doing this test, the sum of non-stop indices of the dependent variable is deducted from one, and then it should be divided by its standard deviation. Given this fact that the number of

absolute value is greater than the number of critical absolute value of Banerjee, Dolado and Mestre table, the zero hypotheses, based on non-existence of long-term relation is rejected. So, it can be concluded that there is a long-term relation between the model variables. After proving a long-run relation existence between variables, we present long-term indices result from the model estimation.

Table 3: results gained from estimating long-run coefficients by ARDL(1,0,1,0,1)

Variable	coefficient	t statistic	prob
$L\left(\frac{P_{DP}}{P_{WP}}\right)$	-0.45 **	-2.38	0.032
LY	0.019 **	2.11	0.047
LREER	0.33 **	2.21	0.035
LPROP	2.01 ***	3.19	0.005
C	0.18	1.29	0.214

***, **, * significant in level 1%, 5%, 10%

Source: Author's findings

The results of this table represent that in long-run, the effect of variable ratio of domestic prices to Iran's pistachio export variable is too bad so that 10 percent increase in this ratio, will reduce Iran's pistachio export closed to 4.5% on average. Where 10 percent increase the income of importing countries; the amount of that product export will be increased about 19 percent on average. Where the effective exchange rate ups 10 percent causes to enhance the export near to 3.3 percent on average. But the most impact related to the domestic pistachio production which the supply elasticity of

export relative to that variable is closed to 2.01 percent on average. The existence of co-integration between a set of economical variable will provide a statistical base for the use of Error Correction Models (ECM). These models are increasingly well known in empirical studies. The most important reason for its fame is that it makes a relation between the short-term instability of variables and their long-term equilibrium quantities [12]. The results obtained from the assessment of error correction model indices are shown in table (4).

Table 4: Results gained from ECM coefficients.

Variable	coefficient	t statistic	prob
$dL\left(\frac{P_{DP}}{P_{WP}}\right)$	-0.35 **	-2.69	0.012
dLY	0.12	1.54	0.164
dLREER	0.32 **	1.94	0.067
dLPROP	0.33 **	2.27	0.031
dC	-0.28	-1.64	0.112
dECM(-1)	-0.48 **	-2.79	0.009

***, **, significant in level 1%, 5%, 10%

Source: Author's findings

As also seen in the above table, the real effective exchange rate, short-term effect on Iran's pistachio exports will be positive. Furthermore, an increase in the income of importing countries in short term has an increasing effect on the export of this agricultural product. The Error correction coefficient is near to 0.44% which states that is statistically significant as well. So, if the model loses its equilibrium in each period 48 percent of disequilibrium adjusted, it'll take time more than two years in order to reach model to equilibrium again.

CONCLUSIONS AND SUGGESTIONS

The findings of present study showed that the product coefficient has the most positive effect on pistachio export. Therefore it is advised that the production of that crop could be raised through increasing cultivation acreage, improving production ways as well as extending performance per each hectare. This proposal as an appropriate tool for increasing the export of agricultural products has been also emphasized in the paper of Biriya [3]. The real effective exchange rate has had a positive and significant effect on the supply of pistachio export. So that, if this value increase 10 percent caused to incline Iranian pistachio export about 3.3 percent on average. The study of Azizi [2] which employed the nominal exchange rate also showed

that exchange rate variable at the logarithmic form is significant while at the linear form, the variable is not significant as far as has a significant impact on the pistachio export of Iran. As well, according the study of Biriya [3], the positive effect of nominal exchange rate has been confirmed on the exports of pistachio, date and saffron products. Moreover, the research of Shaham [15] also demonstrated that the exchange rate has a significant impact on the exports of agricultural products in Iran. So appreciating the real effective exchange rate can accompany with export increase. But according to the different effects of exchange rate changes on various products and the adverse effects of exchange rate determination recommended to use other tools to expand exports.

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