



Investigating Factors Affecting Pistachio Exports in Iran during 2001-2019

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ABSTRACT

The rate of pistachio export in Iran has decreased since 2010 onwards while the United States exports has risen sharply at the same time period. Thus, the present study aimed to investigate the factors which may affect negatively on exports of Iran's pistachio. For this purpose, the macroeconomic variables and pistachio exports data of the desired period were used. Autoregressive distributed lag (ARDL) model was used for this study. The results indicated that economic growth, appreciation of the exchange rate and bank facilities remained positive and had significant effect, while liquidity growth has a significant negative effect on pistachio export. The coefficient of ECM (-1) for pistachio is -0.0642. The low amount of error correction coefficient indicated the low rate of adjustment in pistachio exports. Only 6% of the imbalance error of pre-period adjusted in each period. Therefore, solely relying on short-run policies will not be beneficial. Based on the obtained result, it is recommended to provide financial resources for pistachio producers and exporters, domestic liquidity should be directed toward productive economic activities, domestic inflation should be deflated and adjusted with exchange rate and real appreciation of the exchange rate, should be considered by improved exchange market management.

Introduction

Pistachio is one of the most important agricultural product in Iran (Norozi *et al.*, 2019; Sharifkhan *et al.*, 2020). Due to the high value of pistachio in nonpetroleum exports, comparative advantage in production and exports, area under cultivation, and job creation in different provinces of Iran, it has a special place in the agriculture economy of Iran. The exports value in Iran during 2017-2018 were 1175 and 1273 million dollars, respectively and Iran had 34 and 37.4% share of the total pistachio exports in the world (Iran Trade Development Organization, 2019). The average pistachio exports in Iran during 2002 - 2019 was 137105 tons. At the same period, the average

pistachio production in Iran was 181588 tons (Islamic Republic of Iran Customs and Iranian pistachio Association, 2019). As seen above around 75% of produced pistachio, was exported during 2002-2019. In Fig. 1, the detailed information and trend for pistachio produced/ exported are shown:

Since exchange resources are among the most important and key factors in achieving development, and agricultural products exports has a significant share in non-petroleum exports, it seems highly necessary to study the factors affecting pistachio export in Iran. In addition, it is necessary to predict the future of Iran pistachio exports. Furthermore,

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providing appropriate solutions and policies in this regard can maintain and develop the competitiveness of the product in the global market. This study conducted on pistachio exports and factors affecting it

in Iran using autoregressive distributed lag (ARDL) during 2001-2019.

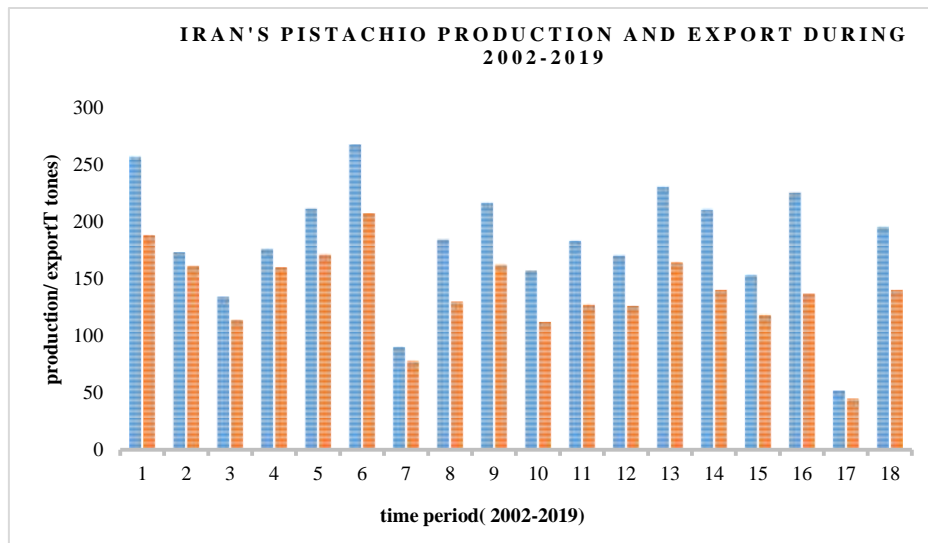


Fig. 1. Pistachio production and exports in Iran during 2002-2019

Source: (Islamic Republic of Iran Customs and Iranian pistachio Association, 2019)

Review of the literature

Pistachio production, real bank facilities, and actual price of exports have had a positive effect on pistachio exports, while pistachio production productivity and war dummy variable have had a negative effect. Pistachio area planted grown by 5.12% against negative growth rate for pistachio production and exports. The average global demand for export will grow by 12.5%. The average global supply will grow by 36.7% over the same period of time. The growth rate of pistachio domestic consumption in producing countries will grow by 74.4% from the first period to the second. The average price of the product will grow by 52.5% over the same period. Product and market distributions effect have been the most important factors influencing exports during 2000-2010, while the market distribution and competitive effect during 1996-1999 have had the largest share in exports in Iran. Further, 30 %of farmers were suffering from absolute poverty while 57 %from relative poverty. Average productivity, maximum productivity and productivity growth rate had declined during the studied period. (Sedaghat 2008a; 2008b; sedaghat 2009; sedaghat 2010; sedaghat 2018; sedaghat 2019)

Iran has had a competitive advantage in pistachio export during 1975- 2012 and ranked as first considering both agricultural and non-petroleum exports. The ratio of domestic prices to the global prices of pistachio and real exchange rate have had significant positive effect on pistachios export share. In addition, the Iranian pistachio production fluctuations, drought dummy variable and Americans export share have a significant negative effect on the export share of Iranian pistachio. High economic rents are created in the pistachio export sector and has reduced the efficiency of pistachio market. Future investigation revealed that the created rent is not due to trade, but it is due to financial resources and returns to the owner of these resources. (Mahmoodi and Jalili 2016; Refifei *et al.* 2017; Abdollahi, 2008)

Kazerauni and Mojiri (2010), analyzed the impact of domestic currency depreciation on the bilateral trade balance of Iran with its six major trading partners using Auto Regressive Distributed lag model (ARDL). The results indicated that there is J-curve effect in the short – run between Iran and China and UAE and in the long run between Iran and UAE, while such a

relationship is absent between Iran and other countries neither in short-run nor in the long run. Jooste *et al.* (2013), investigated the effect of financial policy shocks on South Africans economy. For this purpose, the SVECM error correction model and VAR time change parameters were used. The results indicated that increasing the government expenditures has a positive effect which is less than usual, the effect of government expenditures on GDP is not significant in the long run and an increase in tax leads to a decrease in GDP in the short run.

Most of the studies were conducted on pistachio exports which brought above as the literature reviews were before 2010 which exports in Iran did well compare to our main competitor in the world market. As we are facing new challenges after 2010 in case of pistachio exports, it is clear that we need to implement a new research on this subject.

Materials and Method

The data were completed by different sources, i.e. Iranian pistachio association, Iranian trade development organization, Islamic republic of Iran customs during 2001-2019.

In order to ensure the results of estimation models, economic tests such as collinearity, stationary, convergence and auto-correlation were performed. The general form of the used model is as follows

(kazerouni and Mogiri, 2010) and (Emeka and Ahamkelvin, 2016).

ARDL (p,q):

$$Y_t = \mu \sum_{j=1}^p Y_j Y_{t-j} + \sum_{j=1}^q \beta_j X_{t-j} + u_t$$

$$Y_t = \mu + Y_1 Y_{t-1} + \beta_0 X_t + \beta_0 X_{t-1} + \beta X_{t-1} + u_t$$

In this model y_t represents the independent variable of pistachio exports and X_t represents the explanatory variables including economic growth, agricultural bank facilities, exchange rate, and liquidity.

The type of chosen model to achieve the desired goal depends on the reliability of the variables and the degree of their integration, thus determining the type of applied model requires a research on the stability of variables in the econometric model. At first, the stationary of variables were examined using an Augmented Dickey Fuller test and then, the effect of the economic growth, exchange rate growth, bank facilities growth and liquidity volume growth on pistachio exports growth was examined using ARDL model.

Results

Investigating the variables stationary based on ADF test is indicated in Table 1.

Table 1. Investigating the stationary statuses of the variables based on ADF (2001-2019)

| The variables name | ADF Statistics With intercept | ADF statistics With intercept and Trends | ADF statistics the difference between first order With intercept |
|---|----------------------------------|--|--|
| Pistachio exports logarithm (ln EX) | -2.8521 | -2.9825 | *-4.5841 |
| Exchange rate logarithm (ln E) | *-4.4343 | *-4.8212 | -3.6585 |
| Bank agricultural facilities logarithm, horticultural sector (ln L) | *-4.3512 | *-3.5212 | *-4.5841 |
| Bank agricultural facilities logarithm, agronomy sector; (ln L) | *-3.2581 | *-3.5212 | -3.6585 |
| Liquidity Logarithm (ln M) | *-5.9875 | -4.1949 | -5.3426 |
| Gross domestic production logarithm (ln GDP) | -9285.4 | -3.9323 | -5.8529 |

Source: research findings
*significant at the level of 5%.

As it is clear from the results of the unit root test, all of the variables are stable except export growth. Based on the results summarized in Table 1, it can be concluded that all of the variables in the model are I(0) except export growth. Since the variables of this research are I(0) and I(1), thus ARDL method is used for studying variables relation.

ARDL short- run dynamic pattern

The number of optimal lags for each explanatory variables can be determined using one of the Akaike

(AIC), Schwartz-Bayesian (SBC), Hannan-Quinn (HQC) or the reduced coefficient of determination (R-bar squared). Since the data are annual, the maximum lag usually was considered to be 1 or 2 and since the number of data examined were less than 100, the Schwartz-Bayesian -Bayesian criterion was used, so that much degree of freedom was not lost. The number of optimal lags determination using Schwartz-Bayesian criterion is presented in Table 2.

Table 2. Determination of optimal lags numbers using Schwartz – Bayesian criterion for pistachio

| Length of lag | Ln Ex | Ln GDP | Ln E | Ln M | Ln L |
|---------------|-----------|-----------|-----------|------------|-----------|
| 0 | -0.124138 | -0.357038 | -0.719854 | -0.6288589 | -0.278452 |
| 1 | -0.152476 | -0.425851 | -0.325584 | -0.425892 | -0.845126 |
| 2 | -0.132722 | 0.251721 | -0.425158 | -0.528154 | -0.75589 |

Source: Research findings

The results of Table 2 show that Schwartz –Bayesian criterion is minimal for the variables of pistachio exports logarithm, gross domestic production logarithm, and agricultural bank facilities for horticulture products logarithm at the first lag, while it

is minimal for the appreciation of exchange rate and liquidity growth in zero lag. Finally, based on this pattern the ARDL (1, 1, 0, 0, 1) model was selected for further analysis. The results of estimation dynamic ARDL model is given in Table 3.

Table 3. The results of dynamic ARDL model (1, 1, 0, 0, 1)

| Variables | Coefficients | Standard deviation | T Statistics |
|-------------|--------------|--------------------|--------------|
| Ln Ex(-1) | 0.0325 | 0.0258 | *6.258 |
| Ln GDP | 0.0312 | 0.0287 | *6.329 |
| Ln GDP (-1) | 0.0285 | 0.0321 | *7.546 |
| Ln E | 0.0215 | 0.0125 | *4.482 |
| Ln M | 0.0194 | 0.0158 | *-3.648 |
| Ln L | 0.0241 | 0.0221 | *4.528 |
| Ln L (-1) | 0.0162 | 0.0112 | *4.321 |
| intercept | 0.0215 | 0.0248 | *3.258 |
| F-statistic | 25.85* | | |
| R2 | 0.96 | | |

Source: research findings

*Significant at the level of 5%

As the results of the dynamic ARDL model indicate, all the variables of model are significant. In addition, the significance of F statics at the level of 95% is involved in the significance of whole pattern and determination coefficient of 96% indicates the high explanatory power of the pattern.

Since in terms of absolute value, the obtained t statistic is at 95% confidence level and it is higher than the critical quantity provided by Banerjee, Dulado and Mestr (-3, 28) , it can be concluded that there is a long-run interactive relationship between the

variables of pistachio export growth model. Table 4 shows the results of this long-run relationship.

Table 4. Results of estimation of long- run relationship for pistachio ARDL (1, 1, 0, 0,1) pattern.

| Variables | Coefficients | Standard deviation | T Statistics |
|---|--------------|--------------------|--------------|
| GDP growth (Ln GDP) | 0.0152 | .0798 | *2.852 |
| Exchange rate growth(LnE) | 0.0548 | .0932 | *2.804 |
| Liquidity growth(LnM) | -0.0789 | .0785 | *-2.463 |
| Agricultural bank facilities growth(LnL) | 0.0132 | .0521 | *3.256 |
| intercept | 0.0581 | 0.0421 | *3.825 |

Source: research findings
*Significant in the level of 5%

Based on Table 4, the estimated long- run coefficient for GDP growth, exchange rate growth and agricultural bank facilities growth are all positive and indicates that these variables have a direct/positive relationship with the value of pistachio export growth in the long run. However, the estimated long- run coefficient for the liquidity growth is negative and indicates that it has indirect/negative effects on pistachio exports growth.

The coefficient of ECM (-1) for pistachio is -0.0642. The low amount of error correction coefficient indicates the low rate of adjustment in pistachio exports. Only 6% of the imbalance error of pre- period is adjusted in each period. Therefore, solely relying on short- run policies will not be beneficial. The relevant results are shown in Table 5.

Table 5. Results of ECM test for pistachio

| Variable | Coefficient | Standard Deviation | T Statistics |
|----------|-------------|--------------------|--------------|
| ECM(-1) | -0.0642 | 0.0732 | 6.825* |

Source: research findings
*Significant at the level of 5%

Discussion

In case of exchange rate growth, it can be stated that, the estimated coefficient of this variable as expected is positive and shows the direct effects of exchange rate on pistachio export. In other words, exporters are encouraged to export pistachio by the devaluation of Iranian currency (Rial). Agricultural bank facilities growth has had a positive effect on pistachio, indicating that the pistachio exports become more by providing much credits to the agricultural sector and in turn to the pistachio sector. The liquidity growth had negative effects on pistachio exports and it means that, the pistachio exports decreases. as liquidity increases. The reason is that the managers in Iran cannot manage the liquidity well and the liquidity facilitate inflation and stagnation which decreases the exports as whole and pistachio exports as well. The

results of this study were confirmed by Sedaghat (2008) and Rafiei *et al* (2017). The obtained results show that ECM (-1) coefficient is - 0.0642 for pistachio. The low amount of error correction coefficient indicates the low rate of adjustment in pistachio export. In other words, the only 6%of the imbalance error of pre-period is adjusted in each period. Thus, completely relying on short- run policies cannot be beneficial.

Suggestions for policy making

1. In order to improve the pistachio exports, financial resources should be provided to the producers /exporters by injecting cheap bank facilities at the best time, which is needed especially at the post-harvest

period, which buyers/ exporters need financial supports.

2. The liquidity in the country should be directed towards productive economic activities than non-productive ones for reducing inflation and stagnation.

3. Domestic inflation should be deflated and adjusted with nominal exchange rate, leading to a real exchange rate increase by a better exchange market management.

4. It is necessary to develop pistachio exports based on an appropriate long- run strategy than short-run strategy.

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