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Investigating the Effective Factors on Iran's Pistachio Export Demand
(Assuming Continuation of U.S. Pistachio Price Behavior)

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Abstract

Among Iranian agricultural products, pistachio has many fans around the world due to continuous presence in international markets and specific quality. In 2011, Iran and the United States of America have respectively, 36 and 26, 7 percent of exports of this product in the world.in the present, united states of America is a serious competitor of Iran in the pistachio global market, so its price behavior is considered as a key factor in Iranian pistachio export. Maintaining and increasing the market share of this product requires appropriate policies in international markets. In this regard, the study evaluates efficient factors affect Iranian pistachio export demand in 52 export target markets during 1999-2011 by panel data model.

According to the obtained results, the price elasticity of pistachio demand is the strongest determinant of Iranian pistachio exports. Exchange rate, the average export price for other similar products and target markets GDP have significant and direct effect on Iranian pistachio export demand. In this stud, the relationship between the American pistachio export price and Iranian pistachio exports has not been observed.

Keywords: Iranian pistachio exports, target market, export demand function, U.S. pistachio exports, Hybrid Data model (Panel Data)

INTRODUCTION

The importance of non-oil exports in Iran, explains the necessity of studying agricultural products in this country. So we should analyze the effects of these exports on developments and growth. Pistachio is one of the most important agricultural products. According to Ministry of Agriculture statistics in (2011), pistachio is in the twelfth ranking in terms of production volume. Area under crops in this year was 477566 hectare which is on the highest priority among Iranian agricultural products. This product is one of the most favorable nuts all around the world which is called "green gold" due to its economical and nutritional value (Aghdayi 2009).

Pistachio is produced by limited number of countries all around the world. Since 1999 to 2011 Iran was the main and largest producer of pistachio; the United States, Turkey, China, Syria, Italia and Greece were the other main producer after Iran. In 2010, Iran with 38% and the United States with 25% of total rate of pistachio exports were the leaders in this market. The main target markets of Iran pistachio exports in 2011were Hong Kong, Arabia and Russia which allocate about 28, 12, 11, 9, 6 percentage of Iranian pistachio exports respectively. According to Food and Agricultural Organization of United Nations, 35% of total pistachio exports all around the world in 2008 belonged to Iran which decreases 9% in comparing to 2007. Generally, pistachio export rate since 1999 to 2011 have had many fluctuations. In 2009, Iran was in the first rank among 20 pistachio producing countries, while its export rate was lower than US in the same year. The growth in some countries exporting rate such as US, and also the emergence of new competitors such as china and turkey, causes the Iran share of market to decrease; while the backgrounds of exporting pistachio in Iran is longer than America and other countries.

Currently, America is the new competitor for Iran in global market of exporting pistachio. In 1982, about 14.5% of global pistachio exports belonged to America. This rate in recent years have increased and in 2011 reach 26, 7%. It appears that America is competing with Iran seriously to obtain greater share of market and it concentrates on advertisement and the quality of package designs. In this situation analyzing the behavior of other competitors in global marketing is essential. And the importance of analyzing behavioral pricing of competitors especially America is evident and the question is that whether this behavioral pricing is considered as a limiting factor for Iran exporting rate or not. It should be mentioned here that although Iran has a long backgrounds of exporting pistachio, it never had a serious planning for it (Amir teymouri and Chizari 2007). According to this information, this paper aims to find effective factors on global demand for Iran pistachio.

Generally, many factors are influential on Iran exports demands for pistachio in global market that considering them requires future policies to be taken. With respect to previous information, the following questions come to one's mind:

- Do the changes in national income rate of pistachio importing countries affect Iran pistachio exporting rate?
- Is there any correlation between America pistachio price and Iran pistachio exporting volume in global market?
- To what extend the price elasticity of pistachio demand affect Iran pistachio exporting?
- Does the exchange rate have the significant correlation on Iran exporting pistachi0o?
- Do the similar products to pistachio affect exporting demand in global market?

In following sections these questions are studied as research hypothesis, and determinant factors on global demand for Iran pistachio are identified and evaluated.

THEORETICAL BASIS AND RESEARCH LITERATURE

Pistachio production in Iran and the world

With respect to Food and Agricultural Organization statistics, producing pistachio in recent years has increased. Currently, more than 20 countries in the world produce about one million tons of pistachio each year. Among these countries Iran has the most important contribution in comparing with other countries; in a way that in 2011, about half of the world pistachio production belonged to this country. America with the share of more than 20% is the second country. Table 1, Shows the amount of pistachio produced by each country in 1999 to 2011.

Table1. Pistachio production in 5 country in 1999 to 2011 (Million tons)

2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	Year / country
472097	446647	446647	446647	315500	250000	229657	184899	306192	249000	249000	112000	304000	**Iran**
201395	236775	161025	126100	188696	107955	128367	157397	53980	137440	73030	110220	55790	**U.S.**
112000	128000	81795	120113	73416	110000	60000	30000	90000	35000	30000	75000	40000	**Turkey**
74000	58000	45000	40000	38000	36000	34000	32000	30000	28000	26000	22000	29000	**China**
55610	57471	61484	52600	52066	73183	44642	21200	47600	52840	37436	39923	30133	**Syria**
944873	954082	817610	805284	805284	593370	514359	444110	542037	517586	431624	376816	475598	**World**

Reference: Food and Agricultural Organization

PISTACHIO EXPORTS IN INTERNATIONAL MARKET

Iran, America, Hong Kong, Germany and Netherlands are the largest pistachio exporters in the world in 2011. With respect to the fact that Hong Kong and America are the main important export destinations for Iran pistachio, we should say that the exported pistachio to these two countries is exported once again and the pistachio value added for Iran is obtained by them. Pistachio exported in 5 important exporting countries in 1999 to 2011 is provided in table2.

Table2. Exported pistachio in 5 important countries since 1999 to 2011 (tones)

2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	Year / country
130,137	153,259	76,124	136,893	193,350	163,463	137,712	138,723	184,946	135,314	115,335	101,257	101215	**Iran**
105,890	103,579	113,363	101,144	60,004	48,571	50,050	35,692	23,770	21,150	21,592	15,652	13642	**America**
63,961	54,871	30,036	28,951	32,167	21,904	16,545	10,440	13,860	10,227	13,903	12869	15,316	**Hong Kong**
15,189	18,593	13,200	17308	21,759	17,307	14,690	14,986	12,715	11,960	15,726	12412	14,149	**Germany**
10,507	18,329	13,451	16,555	13,413	10,619	10,251	7,039	4,853	1,622	537	578	1,745	**Netherlands**
361,387	402,844	304,888	378,715	388,610	290,918	269,824	235,564	280,213	214,811	201,037	164,198	168,972	**world**

Reference: Food and Agricultural Organization

According to this table, since 2010 to 2011, about 38% and 36% of world pistachio export belonged to Iran. America exports as a main competitor for Iran cover 29% of the world pistachio exports in 2011. Hong Kong with about 18% of world exports is the third great pistachio exporter in international market.
As we see in table2, in some years pistachio exports rate declined in Iran, because in these years new competitors appeared and Iran lost part if its market share. Some experts believe that climate changes, weather conditions and productive period of two years for pistachio production were also important factors and caused fluctuations in pistachio production in different countries.

THE BACKGROUNDS OF PISTACHIO PRODUCTION IN IRAN AND AMERICA

Iranian Pistachio is one most important product in export market of the world and in some years Iran had have had a great share of this market. But global statistics shows that in recent years, the growth in some countries rate of pistachio export lead to decreased share of Iran. It is while pistachio production in Iran has a longer background in comparing to other producers such as America. Pistachio tree was introduced to America in 1954 for the first time and it was not until 1976 that its business industry was created in this country. Since 1906 to 1976, America purchased pistachio from Iran, the first and largest pistachio producer but later due to political situation, Iran pistachio exports to America was stopped. In these years America pistachio industry grew so fast, in a way that in 1982 entered international trade. In recent three decades pistachio import and export in this country improved a lot and now is a great rival for Iran (Zhang et al 2012).

DEMAND FUNCTION FOR EXPORTS

Theoretically and generally, export is a function of prices and exchange rate. When prices increase the export rate is decreased. In other hand, if all factors are stable and the prices of domestic productions are higher than outer productions, then export rates decreased. So when exchange rate increase the export rate increase too. In economic literature, export of productions is a function of importing countries income and its exporting price in competitor countries besides the factors which were mentioned above. If the income of importing countries increase or if export price in competitor countries increase, it is expected that export demand rate increase. In some economic texts in order to extract export rate, the variables of similar production export prices and production rates in country are applied. With increased export rate of substitute goods and growth in production rate in country it is expected that the global demand for desired product increase. Therefor we can say that the demand for various production exports in global market is a function of different factors. In following sections we provide more information of this field.
Among researches which were conducted in the late nineties, we can mention an article whit title of “Analyzing Effective Factors on Iran Export Pistachio” written by Maasoumeh Rezaie (2000). The writer in this literature investigate the importance of non-oil exports and analyze supply and demand functions of exporting products by three stage least squares estimation. The results of estimating show that price elasticity of pistachio demand is about 1. Considering the low rate of price elasticity of pistachio demand, Rezaie said that it is because the low importance of exchange rate in pistachio exports rates. Moreover, according to the results export demand compared to applicant countries income is elastic.
In one other research (Azarinfar 2004) with title of “Analyzing the export demands for some agricultural production”, we analyze streaming export and its effective factors on export demands for product such as apricots, raisins, pistachio and dates and as well we determine the coefficients of elasticity of these products demand. The researcher also studied four important exporting countries in definite period of time to investigate pistachio exporting demand in Iran. The results show that exporting demand for pistachio in Iran has a positive significant correlation with exchange rate and gross domestic product rate of countries such as Italy, Japan, England and Germany; but this variable according to Iran pistachio exporting price in mentioned country shows a negative significant correlation. The results show that demand elasticity coefficient for these products express the elasticity of exporting demand for pistachio, date, raisins and apricots.
In the same article written by Mahmoudzadeh and Zibaie (1383), the global process of producing and exporting pistachio and effective factors on Iran pistachio export is studied. Using recent studies which were conducted in 1379 to 2002 and also applying variables of exchange rate and retails real prices, they understood that exchange rate in short term and long term has no significant effect on pistachio export. But variable coefficient of retail prices is positive and significant in long term.
Abounoori et al (2007) studied other factors which affect exporting pistachio and their findings show that by decreasing exporting price we can increase pistachio export. The exchange rate variable has also a positive significant effect on this product export.
Another research with title of “An Analysis of the effective factors on Iran pistachio export” was conducted. Considering the countries that are memberships of the Economic Cooperation and Development Organization as target markets of pistachio exports, Jafre and Farajollahi (2011) studied pistachio production process in 1981 to 2009. They finally concluded that the exchange rate has a positive and significant effect on pistachio export

supply and even 1percent increase in it, increase pistachio export to 0.77 percent. In addition, per capita income for European countries has a positive significant effect on pistachio export rate.

Table3. The most influential effects on pistachio export based on previous research

The most influential effects on pistachio export	Conducted research
Exchange rate	Rezaie (2000), Azarinfar (2004), Mahmoudzadeh and Zibaie (2004), Abounouri et al (2007), Jafreh and Farajollahi (2011), Saghaian and Zhang (2011), Zhang et al. (2012)
The income of importing countries	Rezaie (2000), Azarinfar (2004), Abounouri et al (2007), Jafreh and Farajollahi (2011), Saghaian and Zhang (2011), Zhang et al. (2012(
The export price of pistachio	Rezaie (2000), Azarinfar (2004), Mahmoudzadeh and Zibaie (2004), Jafreh and Farajollahi (2011), Saghaian and Zhang (2011), Zhang et al. (2012(
The export price of similar products	Saghaian and Zhang (2011), Zhang et al. (2012)
The export price of competitor producers	Saghaian and Zhang (2011), Zhang et al. (2012
The production volume	Jafreh and Farajollahi (2011)
The Value Added of exported pistachio	Rezaie (2000)
The volume of pistachio production	Jafreh and Farajollahi (2011)
The Value Added of exported pistachio	Rezaie (2000)

In other research with title of “the Analysis of Time Series for America Pistachio Export Demand in Northern America” Saghaiean and zhang (2011) studied the effective factors on America pistachio export demands to other northern America countries such as Mexico City and Canada. Using data which are belonged to 1989 to 2009, a logarithmic econometric model is estimated. According to the results there is a positive significant correlation between gross domestic products of Canada and America pistachio exporting demand in this country. We also see this correlation between the exporting price of similar products and America pistachio exporting demands in Canada. Variable export price for Iran pistachio and exporting price for similar products to be exported to Mexico City has positive significant correlation with America pistachio exporting demand in this country.

Finally there is a negative significant correlation between real exchange rate and pistachio exporting demand in Mexico City.

Zhang et al (2012) investigated the role of America in pistachio world production and in the world trade of it and they identify the effective factors on America pistachio exporting demand. Using a comprehensive econometric model and applying panel data (combined data) they investigate the effects of different variables in America pistachio exporting rate. The results showed that America pistachio exporting rate, real exchange rate and food security index has a negative significant effect on America pistachio exporting demand. But the variables of Iran pistachio export price and gross domestic product of importing countries have positive effects on this product exporting rate in America, according to the results of this research, there is not any significant correlation between average exporting rate of similar products and America pistachio export.

DEVELOPMENT OF HYPOTHESIS AND CONCEPTUAL PATTERN

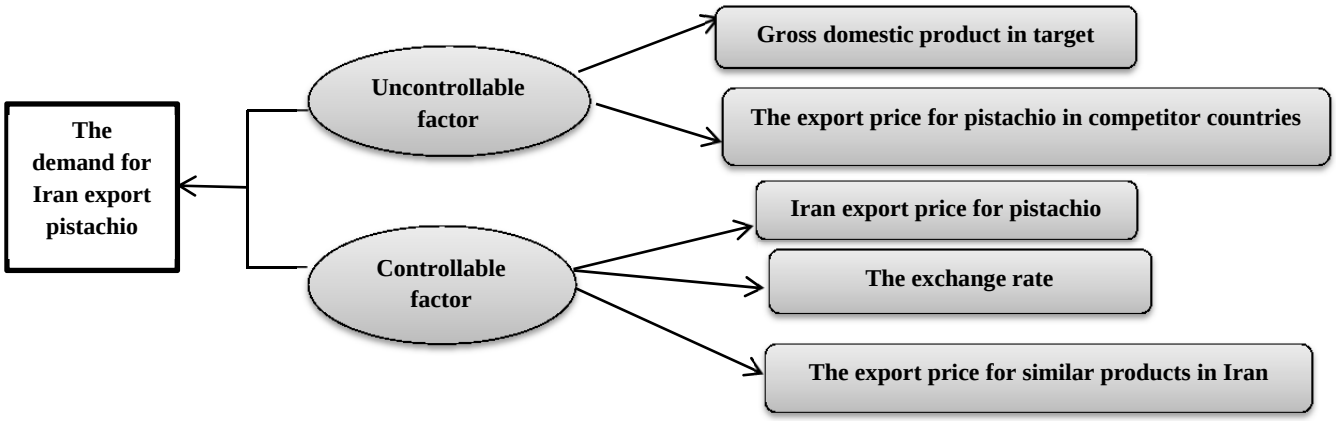
As it was mentioned before, many factors are involved in exporting demand rate and due to current limitations, in each research some of which are studied. In table3, the most influential factors in pistachio exporting rate are shown based on previous studies.

According to what has been said about important and effective variables in pistachio export demands which were used in previous researches, five influential factors in global demand for Iran pistachio is imagined that the effects of one of each in 1999 to 2011 are studied in this research. These factors include: the income of countries which import pistachio, the exporting price of pistachio in competitor countries, Iran pistachio export price, the exchange rate and export price of similar products. So, the following hypotheses are presumed:

1. Iran pistachio export demand is directly affected by the income of target countries.
2. Iran pistachio export is affected by pistachio pricing in competitor countries.
3. The most effective determining factor for Iran pistachio export is price elasticity of pistachio demand.
4. Iran pistachio export is directly affected by the real exchange rate.
5. Iran pistachio export demand is directly affected by the average export price of similar products.

In the following sections, the effects of each introduced variables in form of research hypothesis are studied with respect to the conceptual model and then the above hypothesis are examined.

All influential variables in pistachio export are divided into two groups of controllable and uncontrollable category in the research conceptual model. In figure 1, the conceptual model of the research is provided.



METHODOLOGY

o study Iran pistachio export demand we should use a model that includes the most effective factors in export. In current study the panel data pattern is used that its background is seen in Zhang et al studies. With respect to the fact that in this research some variables possesses time dimension and some other possesses both local and time dimensions we use panel data pattern to analyze them. Combining the observations of spatial and temporal series we can analyze the changes. In this pattern the economic fundamental variables and indexes which are influential in pistachio export are considered. In this comprehensive econometric model a logarithmic function is used, which increase the value comparability for different scales, provides exact estimations and simplify the interpretation of coefficients.

The panel data pattern in this research is as follow:

$Ln(Qi,t)=\beta 0+\beta 1*Ln(EPi,t)+\beta 2*Ln(CEPi,t)+\beta 3*Ln(PNUTSi,t)+\beta 4*Ln(GDPi,t)+\beta 5*Ln(RERi,t)+ \varepsilon\_(it)$

In the above equation, i=1, 2… 52 is the indicator of sectional units and t=1, 2,…, 13 is the indicator of time period of study. Sectional units in this study are target markets of Iran pistachio export and time period is since 1999 to 201. The number of target market is thirteen and time period is thirteen years.

The independent variables are: the price of Iran pistachio export in target countries (EPi, t), the export price of pistachio in competitor countries ((CEPi, t), the average export price of other similar products (PNUTSi, t), the gross domestic product in target countries (GDPi, t) and real exchange rate between country i and Iranian Rials (RERi, t). dependent variable is Iran pistachio export demand (Qi, t). to estimate the average price for similar products (PNUTSi, t), walnuts and hazelnuts are chosen, because they are nuts and they were supplied in international markets in mentioned time period. With respect to the fact that Iran and America is the largest pistachio producers in the world and other countries have a little contribution in pistachio export, we can say that the America is the most important rival for Iran. So we can say that the variable of pistachio export price in competitor countries is related to pistachio price behavior in America. So, the pistachio export price in America is introduced as a applied variable in the proposed model.

The panel data pattern which is used in this research includes 676 data that is obtained by multiplying the number of years (13 years) in the number of export target markets (68 markets). The related data to variables are gathered from different resources. To get information about the amount and the export price of pistachio, hazelnuts and walnuts we use statistics from Tehran Chamber of Commerce and Ministry of Agriculture. The export price of America pistachio is extracted from Food and Agricultural Organization. The gross domestic product in target markets is obtained from the America Agricultural sector. To obtain the exchange rate of these markets the statistics which are extracted from central bank, Iran customs administration and America Agricultural Sector are used. In addition, because of inaccessibility to some countries exchange rate other electronic information database is applied. The statistic population for this research is all the export pistachio markets of Iran in 1969 to 201. These markets are recognized based on the data that are extracted from Iran Customs Administration and Tehran Chamber of Commerce, Industry, Mines and Agriculture. In order to increase the reliability of the research results, we do not have any samples in statistic population. So the number of pistachio export markets in mentioned period time is 68. Some markets were not the main ones so they were eliminated, and then the number of these markets decreased to 52.

THE ANALYSIS OF DATA AND RESEARCH FINDINGS

With respect to the fact that stationary data prevent spurious regression between research variables, we should make sure that data are stable before analyzing them. Unit root test is one of the common tests which are used for identifying the stationary of time series data. This test is conducted for each time series and is explained in following section.

Unit root test for each time series is conducted in three levels of 1, 5 and 10 percent. Here, significance level is 10 percent. Test method is in a way that if the absolute value of t which is obtained from data is 10% less than the value of t in table in significance level, data are not durable and they need to be durable. In this way, we can make the data durable by first order differencing and Dickey-Fuller test. The summary of obtained results from unit root test for all research variables are provided in table4.

Table 4

Variables	t	p-value			
			Level %1	**Level**%5	**Level**%10
The volume of Iran pistachio export	-7.558187	0	-3.441280	-2.866254	-2.569339
The export price for Iran pistachio	-15.01385	0	-3.440074	-2.865722	-2.569054
The export price for America pistachio	-8.659681	0	-3.439867	-2.865630	-2.569005
The average price of similar products	-7.168565	0	-3.439896	-2.865643	-2.569012
gross domestic product	-6.208774	0	-3.439925	-2.865656	-2.569019
The exchange rate	-6.107300	0	-3.440275	-2.865810	-2.569102

As we see in above table, the absolute value for t in all variables is higher than t in table in levels of 1, 5 and 10 percent. So related data to the variables of the model are durable and do not have a unit root, therefor the spurious regression is not obtained in these variables.

Chow and Hausman test

After making sure that the data are durable, Chow and Hausman test is conducted. In most economic and financial studies short time series are considered, because the lifetime of economic market is short and all its data are not available. So applying the fixed effects model is justifiable in such research. To test fixed effects model we use time constant fixed effect model in this research. In evaluating the model by time constant fixed effect pattern, y-intercept is chosen for each year (to examine the differences of y-intercepts or validate the use of panel data chow test is applied). The chow test hypotheses are as follow:

H_0: there is no difference between y-intercepts of data (Aggregation model)

H_1: there are differences between y-intercepts (panel model)

In fact, null hypothesis express that the model is homogenous and data are based on time series (opposite hypothesis is based on panel data).

Table 5

Redundant Fixed Effects Tests
Pool: Untitled
Test period fixed effects

Effects Test	*Statistic*	*d.f.*	*Prob.*
Period F	*2.790774*	*(12,596)*	*0.0010*

Period fixed effects test equation:
Dependent Variable: Q?
Method: Panel EGLS (Period weights)
Date: 04/24/13 Time: 14:47
Sample: 1378 1390
Included observations: 13
Cross-sections included: 52
Total pool (unbalanced) observations: 614
Use pre-specified GLS weights

Variable	*Coefficient*	*Std. Error*	*t-Statistic*	*Prob.*
C	*8.816942*	*1.057091*	*8.340761*	*0.0000*
EP?	*0.214325*	*0.101917*	*2.102930*	*0.0359*
CEP?	*0.004699*	*0.018542*	*0.253414*	*0.8000*
PNUTS?	*0.071385*	*0.019946*	*3.578936*	*0.0004*
GDP?	*0.232843*	*0.055026*	*4.231501*	*0.0000*
ER?	*-0.233424*	*0.037745*	*-6.184194*	*0.0000*

Weighted Statistics

R-squared	*0.087736*	*Mean dependent var*	*13.16922*
Adjusted R-squared	*0.080234*	*S.D. dependent var*	*2.855787*
S.E. of regression	*2.229561*	*Sum squared resid*	*3022.333*
F-statistic	*11.69476*	*Durbin-Watson stat*	*0.342703*
Prob(F-statistic)	*0.000000*		

Unweighted Statistics

R-squared	*0.083624*	*Mean dependent var*	*12.89267*
Sum squared resid	*3057.262*	*Durbin-Watson stat*	*0.353486*

As we see in table 5, the p-value in Chow test is 0.0010. With respect to the fact that the significant level in in this research is 95%, so: p-value<α=0.05. Therefor null hypothesis based on equality of y-intercepts is not confirmed. In other words, the research model is panel and panel data model should be applied to estimate that. In the next step, the fixed effects model is tested against random effects model that is Hausman test. To that, the panel data model is run by random effects model. In random effects model, y-intercepts are random and independent of explanatory variables, while in the fixed effects model, y-intercepts are fixed and indefinite parameters. In Hausman test, null hypothesis is based on a condition that there is no correlation between random effect and endogenous. In other words these hypotheses express random effects. In this step, Hausman test is conducted for identifying the fixed effects or random model. And the output software is provided in table 6.

Table 6

Correlated Random Effects - Hausman Test
Pool: Untitled
Test period random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Period random	34.796879	5	0.0000

** WARNING: estimated period random effects variance is zero.

Period random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
EP?	-2.767537	0.186882	0.261645	0.0000
CEP?	-0.012438	0.005802	0.000087	0.0501
PNUTS?	0.087381	0.070051	0.000013	0.0000
GDP?	0.329603	0.262633	0.000250	0.0000
ER?	-0.192687	-0.214844	0.000017	0.0000

Period random effects test equation:
Dependent Variable: Q?
Method: Panel Least Squares
Date: 04/24/13 Time: 14:52
Sample: 1378 1390
Included observations: 13
Cross-sections included: 52
Total pool (unbalanced) observations: 614

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	38.44453	5.279146	7.282338	0.0000
EP?	-2.767537	0.520388	-5.318217	0.0000
CEP?	-0.012438	0.021205	-0.586562	0.5577
PNUTS?	0.087381	0.020533	4.255731	0.0000
GDP?	0.329603	0.057863	5.696232	0.0000
ER?	-0.192687	0.038034	-5.066114	0.0000

Effects Specification

Period fixed (dummy variables)

R-squared	0.140593	Mean dependent var	12.89267
Adjusted R-squared	0.116080	S.D. dependent var	2.332917
S.E. of regression	2.193339	Akaike info criterion	4.437605
Sum squared resid	2867.199	Schwarz criterion	4.567181
Log likelihood	-1344.345	Hannan-Quinn criter.	4.487994
F-statistic	5.735384	Durbin-Watson stat	0.350657
Prob(F-statistic)	0.000000		

As we see in table 6 the p-value is 0.0000. With respect to the fact that the significant level is 95% and p-value<α=0.05, the null hypothesis is not confirmed because there is no relationship between individual effects and explanatory variables. To estimate the model we should use the fixed effect model, so the research model is evaluated by panel data pattern of fixed effects type. Using this model and durable data, the regression equations of variables are analyzed and output software is provided in table7. This table shows the coefficients of regression equations, the significant level and estimations standard errors.

Table 7

Dependent Variable: Q?
Method: Pooled EGLS (Period weights)
Date: 04/24/13 Time: 14:46
Sample: 1378 1390
Included observations: 13
Cross-sections included: 52
Total pool (unbalanced) observations: 614
Linear estimation after one-step weighting matrix

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	34.98695	5.012225	6.980322	0.0000
EP?	-2.381612	0.495715	-4.804400	0.0000
CEP?	-0.011372	0.020506	-0.554578	0.5794
PNUTS?	0.086561	0.019875	4.355352	0.0000
GDP?	0.297032	0.056426	5.264138	0.0000
ER?	-0.212084	0.037336	-5.680403	0.0000
Fixed Effects (Period)				
1378--C	-4.664660			
1379--C	-4.638500			
1380--C	-4.993495			
1381--C	-1.173398			
1382--C	-0.512950			
1383--C	-0.166314			
1384--C	1.129856			
1385--C	1.652670			
1386--C	1.757859			
1387--C	1.849581			
1388--C	2.139182			
1389--C	2.554891			
1390--C	2.920346			

Effects Specification

Period fixed (dummy variables)

Weighted Statistics

R-squared	0.136269	Mean dependent var	13.16922
Adjusted R-squared	0.111633	S.D. dependent var	2.855787
S.E. of regression	2.191174	Sum squared resid	2861.542
F-statistic	5.531164	Durbin-Watson stat	0.332436
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.138969	Mean dependent var	12.89267
Sum squared resid	2872.617	Durbin-Watson stat	0.346812

As we see in table7, Durbin–Watson statistic as a final result of regression model is very low. This value shows that there is an autocorrelation in the model and random components of the model are correlated with each other during years. The value of this statistic should be 1.5 to 2.5. To eliminate autocorrelation in this model we can add an autoregressive variable or AR (1) to explanatory variables and then test the new model with the six explanatory variables. According to the results which are obtained by testing the new model, Durbin–Watson statistic is 2.27. With respect to the fact that this value is close to 2 and also the improvement of coefficient of determination or R^2 (0.64) we can say that there is not an autocorrelation in the new model. In order to choose the best method for eliminate autocorrelation in the model one other method should be analyzed and according to obtained statistics we reach a conclusion. In this step we use the variable AR (2) to eliminate the autocorrelation. The results which are obtained by estimating the model after AR (2) is added show that Durbin–Watson statistic is about 1.98 and coefficient of determination is improved, so we can say that there is not any autocorrelation in the model.

Among different methods for eliminating autocorrelation, there is a method in priority that according to its results the criteria of Akaike, Schwarz and Hnan- Queen become less and the value of R^2 or the coefficient of determination is higher. According to obtained results, the coefficient of determination value in second method AR (2) is higher compared to the first method AR (1) and the criteria of Akaike, Schwarz and Hnan- Queen Value are lower. So applying AR (2) to eliminate autocorrelation is on the priority and the output is considered as standard for later conclusions. In this way the model has a twice correlation and totally is explained with 7 variables and a consistent component. The results of model estimations after the variable AR (2) is added to explanatory variable is provided in table 8.

Table 8

Dependent Variable: Q
Method: Least Squares
Date: 07/19/13 Time: 08:20
Sample (adjusted): 1378 1390
Included observations: 567 after adjustments
Convergence achieved after 6 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PNUTS	0.005629	0.002475	2.274665	0.0233
GDP	0.151185	0.078722	1.920483	0.0553
ER	0.008275	0.003840	2.154792	0.0316
EP	-0.159360	0.093974	-1.695788	0.0452
CEP	-0.005052	0.013635	-0.370510	0.7111
C	10.08821	0.932552	10.81785	0.0000
AR(1)	0.613573	0.040542	15.13421	0.0000
AR(2)	0.202752	0.039411	5.144612	0.0000

R-squared	0.660701	Mean dependent var	13.07518
Adjusted R-squared	0.656452	S.D. dependent var	2.212509
S.E. of regression	1.296817	Akaike info criterion	3.371711
Sum squared resid	940.0894	Schwarz criterion	3.432951
Log likelihood	-947.8802	Hannan-Quinn criter.	3.395611
F-statistic	155.5020	Durbin-Watson stat	1.989961
Prob(F-statistic)	0.000000		

Inverted AR Roots	.85	-.24

According to relationships between variables in out model, the following results are obtained:

- F statistic is 155. 5020 which is relatively a high value. Thus, null-hypothesis on the insignificance of model is not confirmed, so the model is significant. In other hand with respect to the fact that: p-value= 0.0000< 0.05, null-hypothesis on the insignificance of regression model is not confirmed, so the model is significance.
- The coefficient of determination is 0.660701. this value shows that 66% of changes in dependent variable are made by the explanatory variables, in other words 66% of changes in Iran pistachio export are explained by the variables of Iran pistachio export price, the pistachio export price in America and the average price of other similar export product such, gross domestic product and exchange rate.
- With respect to the fact that the research model is a multiple logarithmic function, we can interpret elasticity by estimating the coefficient. The elasticity of Iran pistachio export compared to gross domestic product in target markets of pistachio export is 0.151. This value shows that for each billion riyals increase in gross domestic product of target markets, the volume of Iran pistachio export increase to 0.151kg. Based on table 8, likelihood estimation for the variable of gross domestic product in target countries is 0.0553 and lower than 0.1. So we can say that this variable at 10% has a significance effect on pistachio export demand in international markets. In addition, as it mentioned before the estimated value for target countries income for β_4 is a positive value. So this variable has a direct significance effect on Iran pistachio export. With respect to this information hypothesis 1 is confirmed and Iran pistachio export demand is directly influenced by target countries income.
- Based on results which are obtained from table8, the coefficient of the pistachio export price in competitor countries (β2) is a negative value and the likelihood estimation is 0.7111. With respect to the fact that this number is larger than 0.05 or 0.1, the null-hypothesis on insignificance of the model is confirmed and America pricing for pistachio as the main competitor for Iran pistachio export is not influential, so the second hypothesis is not confirmed.
- As we see in table 8, the elasticity of Iran pistachio export compared to its export price is 0.159. in other words if the price of 1kg of Iran pistachio decrease to 1Riel in international markets, the volume of Iran export pistachio increase to 0.159kg. According to mentioned table, the obtained likelihood estimation for this variable is less than 0.05. So the variable price for Iran pistachio export has an adverse significance effect on the export value.
- Price index of Iran pistachio export (β_1) is estimated higher than other coefficients, so this variable has the most important effect on the pistachio export volume. In short, we can say that the most effective factor of Iran pistachio export is price elasticity of pistachio demand. So the third hypothesis is confirmed.
- According to table8, the elasticity of Iran pistachio demand compared to the real exchange rate is 0.0082. It means that there is a positive correlation between exchange rate and the volume of Iran pistachio export, in

a way that by increased exchange rate the volume of pistachio exports increases as well. As it is indicated in this table, the likelihood estimation for this variable is less than 0.05. So, the significance effect of exchange rate on Iran pistachio is confirmed. On the other hand, the estimated coefficient of this variable (β_5) is a positive value, so the exchange rate affected the Iran pistachio volume and the forth hypothesis is confirmed.

- According to table 8, derivative of Iran pistachio export compared to the average export price for other similar products (Walnuts and hazelnuts) is 0.0056. In other words, by 1 Riel increase in the price of similar products, pistachio export volume increase to 0.0056. As the coefficient of average export price for similar products is a positive value and its likelihood estimation is lower than 0.05, so the price for walnuts and hazelnuts at international markets has a significance correlation with the volume of Iran pistachio export and the fifth hypothesis is confirmed.

In table9, the results of testing each hypothesis are provided.

Table 9

	Hypothesis	results
1	The demand of Iran pistachio export is affected by income	Confirmation
2	Iran pistachio export is affected by pistachio pricing in competitor ountries	disapproval
3	The most influential factor in pistachio export is price elasticity of pistachio demand	Confirmation
4	Iran pistachio export is affected by exchange rate	Confirmation
5	The demand of Iran pistachio export is affected by the average export price	Confirmation

DISCUSSION AND CONCLUSION

Considering the importance of agricultural products and significance role of Iran in the global export of pistachio and in order to adapt efficient strategies to maintain and increase market share of this product in international markets, this research aims to study the efficient factors in Iran export demand during 1999 to 2011. In this study a comprehensive econometric model is applied and the research hypotheses are analyzed by panel data patterns. In this way, the effects of variables such as income, target countries, pistachio pricing in competitor countries, price elasticity for pistachio demand, and exchange rate and export price of similar products on the global demand of Iran pistachio are studied. The results show that the above variables affect the global demand for Iran pistachio. The most important variable is export price which has an adverse significance effect on pistachio demand. In addition, research hypothesis tests showed that the pistachio price in competitor countries in global demand of Iran pistachio is not influential and is not a limiting factor.

In research that zhang et al has conducted, the results have been obtained and there have been a negative significance correlation between Iran pistachio and its demand in America. Abounouri et al (2007) have confirmed this correlation between the export price for Iran pistachio and its export demand. Rezaie (2000) proved that pistachio export price is a determining factor for the volume of its demand. A significant correlation between gross domestic product of importing countries and pistachio demand is seen all the research that were mentioned earlier. As well the positive significant correlation between the exchange rate and Iran pistachio export is confirmed in mentioned research. In contrast with this research the results of some studies which had been conducted by Rezaie, Saghaian and Zhang showed that there is a positive significant between the exchange rate and pistachio export demand. The results of studies which were conducted by Mahmoudzadeh and zibaie (2004) showed that there is not a positive significant correlation between the exchange rate and Iran pistachio export. Zhang et al (2012) confirmed that there is a positive significant correlation between Iran pistachio export prices and America pistachio demand. They also proved that there is not a significant correlation between the average price of similar products and America pistachio demand. While based on the results of this research there is significant correlation between the average export price for similar products and Iran pistachio export. Saghaian and Zhang (2011) in their research have confirmed that there is a positive significant correlation between the export prices of similar products in Canada and export demand of America pistachio in Canada.

According to the results which are obtained from tests of research hypothesis, the following suggestions are applied:

- According the emergence of new competitors in the pistachio international markets and the fact that they achieve part of the market share, it seems that the strategy of high pricing for pistachio export is not helpful. According to results which are obtained from this research, pricing factor is a tool for increased demand for Iran pistachio export, in a way that by decreased prices the export demand for Iran pistachio increase. So the application of penetration pricing for Iran pistachio is good strategy. In this method, attracting customers

and market penetration is applied by increased prices. And then besides the increased quality of export pistachio, the prices gradually increase too.

- Countries that have a high gross domestic product are considered better countries for Iran pistachio export. So it is recommended that to choose the target markets of pistachio export more carefully. The access to the potential target markets with high national income that purchase Iranian products with higher prices compared to other importing countries can leads to the improvements in pistachio export. Although pistachio is more expensive than other nuts, because of high income in European countries they use it more than other nuts (Karim and Vardan, 2003).
- The continuous presence in international community can lead to the improvements in target markets.
- Iran can control the rivals export markets of countries such as Hong Kong and Germany by discovering new target markets and strengthen its status in the world.
- The exchange rate influences the volume of pistachio export, fixed change rate or little changes in exchange rate compared to the annual changes in budget which is spent on producing pistachio leads to decreases in pistachio export. So it is recommended to apply effective policies to support pistachio export and prevent unusual fluctuations in the market.
- Considering the effects of export prices for walnuts and hazelnuts in Iran pistachio export, it is recommended that policy makers take into account the price export of these products to adapt suitable export strategies. Price decreases in walnuts and hazelnuts lead to the decreased demand for pistachio export.
- The emergence of powerful countries such as America in pistachio international markets requires consideration of global marketing. Applying advanced technologies in producing, packing and also employing professionals in advertising and marketing are factors which help America to be successful in exporting pistachio during recent years (Zhang et al, 2012). Considering production standards to produce good quality products, packing, advertisements and marketing, choosing a commercial brand and etc. can help to distinguish Iranian pistachio from other countries pistachio.

According to the importance of effective factors on the export of non-oil products, future studies can lead managers to adapt good strategies for exporting products and identify the managers' strengths and weaknesses in making commercial policies.

REFERENCES

1) Azarinfar, Y; the Analysis of Export Demand for Agricultural Products, Master Thesis, Shiraz University, Iran, 2009.
2) Abrishami, M; Iran pistachio (historical study), Tehran, University Publication Center, 1994.
3) Abounour, A; Kazemzadeh; L. the Estimation of Supply and Demand for Iranian Date Export by Applying Systems of Equations, Journal of Agricultural Economics and Development, 2006.
4) Tehran Chamber of Commerce, Industry, Mines and Agriculture, Statistics of Exports and Imports, available at: http://www.tccim.ir/ImpExpStats.aspx?slcImpExp=Import&slcCountry=&sYear=1394&mode.
5) Amirteymouri, S; Chizari, A; Analysis the Status of Iran Pistachio Export, Challenges and Approaches, the First Conference of Producing and Packing Pistachio, Ferdowsi University of Mashhad, Iran, 2007.
6) Jafreh, M; Farajollahi, G; the Analyses of the Effective Factors on Iran Pistachio Export, Journal of Economic Sciences, 2011.
7) Khalilian, S; Farhadi, A, Influential Factors on Export Supply of Iranian Agricultural Products, Journal of Agricultural Economics and Development, 2004.
8) Rezaie/ R, the Analysis of Influential Effects on Pistachio Exports, Master Thesis, Agricultural University, Tarbiat-e modarres University, Iran, 2000.
9) Souri/ A, Econometrics with the application of Eviews7, Tehran, Farhangshenasi Press, 2012.
10) Gachrati/ D, Foundations of Econometrics (Volume II), Tehran, Institute of Tehran University Press, 2008.
11) Mohammadzadeh, M.; Zibaie, M. (2004) the Analyses of the influential effects on Iran pistachio export, Journal of Agricultural Economics and Development.
12) Ministry of Agriculture, Department of Planning and Economy, Statistics and Information, available at: http://www.maj.ir/portal/Home/Default.aspx.
13) Aghdaie, A.S. (2009). Investigating Effective Factors on Iran's Pistachio Expotation. International Journal of Marketing Studies, Vol. 1, No.2.
14) Arize, A.C. (2001). Traditional Export Demand Relation and Parameter Instability. Journal of Economic Studies, 28(6), 378-396.
15) Eenoo, E., Peterson, E. and Purcell, W. (2000). Impact of Exports on the U.S. Beef Industry. In Proceedings of the NCR-134 Conference on Applied Commidity Price Analysis, Forecasting, and Market Risk Management, 17-18 April, Illinois, Chicago.
16) Food and Agriculture Organization of the United Nations. (2013). Statistics Division. Retrieved from http://faostat3.fao.org/home/E
17) Fountas,S ,and D. Berdin. (1998). Exchange rate volatility and export: The case of Irland. Applied Economics Letter, 5: 301-304.
18) Hussein, A. (2009). Structural Change in the Export Demand Function for Indonesia: Estimation, Analysis and Policy Impliocations. Journal of Policy Marketing, 31: 260-271.
19) Karim, K. MH and E. U. E. Vardan. (2003). Global Pistachio Production and Marketing Challenge. University of S & B, Iran. (http://economics.ca/2003/papers/0460.pdf and accessed in October 2011)
20) Nanag, David M. (2010). Analysis of export demand for Ghana's timber products: A multivariate co-integration approach. Journal of Forest Economics.
21) Zheng, Z. and Saghaian, S. (2011). Time-Series Analysis of U.S. Pistachio Export Demend in North America. Journal of Food Distribution Reseach.
22) Zheng, Z., Saghaian, S., Reed, M. (2012). Factors Affecting the Export Demand for U.S. Pistachio. International Food and Agribusiness Management Review.