Investigation of Cereals World Price Transmission to Iran Domestic Markets: Application of Armington and Pass-Through Elasticities

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Introduction: Given the importance of cereals in Iranian households' baskets, scarcity and fluctuation of this product can reduce welfare of the society. Since the demand for this product comes from two channels of domestic production and imports, it is vital not only to control and monitor its production but also to take into account the grains global market and trade, as well as the factors affecting the imports of these products. This is because of the fact that any price change can easily be transmitted to the importer countries such as Iran. In this context, this study aims to investigate global maize price transmission to Iran and the possible substitutability between domestic and imported grains by applying Armington and Pass-Through elasticities, Moreover, factors affecting grain imports are studies for the sake of policy implication.

Materials and Methods: For the purposes of this study, the Armington and Pass-Through elasticities four major grains markets, including wheat, barley, maize and rice, were calculated as follow:

$$\sigma = \frac{\partial \ln\left(\frac{q_d}{q_m}\right)}{\sigma \ln\left(\frac{p_d}{p_m}\right)} \quad , \quad H_{m} = \frac{\partial \ln p_d}{\partial \ln p_m} \quad (1)$$

Where d and m stand for domestic production and imports, respectively and p and q denote corresponding prices and quantities for selected products. The main function of estimated armington and Pass-Through elasticities as follow:

$$\ln\left(\frac{q_{im}}{q_{id}}\right) = \alpha_{i0} + \sigma_{i1} \ln\left(\frac{P_{id}}{P_{im}}\right) + \varepsilon_i \qquad i = 1,2,\dots,n \quad (2)$$

$$\ln p_{id} = \alpha_{i0} + \gamma_{i1} \ln p_{im} + \varepsilon_i \qquad i = 1,2,\dots,n \quad (3)$$

In this study, we used the ADF test to test stationary of variables. Realizing static variables in level and first difference, I (0) and I (1), we used ARDL approach to investigate long-run and short-run relation between variables. The following equation was estimated to examine factors affecting the grain imports to the country:

$$lM_t = \beta_1 * lGDP_t + \beta_2 * lP_t + \beta_3 * lE_t + \beta_4 * lT_t + \beta_5 * lDP_t + \varepsilon_t \quad (4)$$

Where lM is log of imports of cereals, lGDP is log of GDP, lP is log of relative prices, lE is log of the exchange rate, lT is log of tariffs on imported cereals and lDP is log of domestic production.The required data include imports and domestic production of grain (wheat, barley, rice and maize), domestic and world price of grain GDP, exchange rate for 1981 to 2011 and were collected from the Statistical Center of Iran and FAO.

Results and Discussion: According to the results of this study, Armington elasticity indicates that the imported wheat is substitute for domestic wheat. The log-run Armington elasticities for wheat, corn and barley are found to be 0.41, 0.314 and 0.076, respectively. The small elasticity for barley shows a kind of independency of its domestic market to the world market. The corresponding elasticity coefficients for rice are -0.341 and -0.193 in the long-run and short-run, respectively. Accordingly, imported rice is complement with domestic rice.

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Findings also indicate that in the long-run the GDP and domestic production have significant effects on import demand of maize, barley and rice. The GDP and tariff rates have significant effect on wheat import demand. Due to the fact that the Iranian state exclusively imports wheat, the tariff rate exhibits an unexpected sign for this product. In the short run, GDP is the most influential variable. According to the results, income has positive and significant effect on the demand for imported maize and in the short-run one percent increase in income results in 1.78 percent increase on maize imports. Furthermore, wheat error correction factor of -0.5 reveals that half of the difference between short-run and long-run equilibrium will be resolved each year. The speed of adjustments for barley, maize and rice are very high. Therefore, any shock to their imports back into balance will return.

Conclusions: Based on the findings of this study, domestic grains are not substitutes for imported grains and thus we cannot rely on imports at least in the short run. Policies that make domestic grains more expensive will result in increasing the share of imports. Reduction of tariffs is recognized as an effective tool for trade liberalization. To support domestic production, the government should seek policies that cause imports to decrease. Tariff barriers can lead to this end; however, the policy needs to be taken together with protectionist policies. In contrast, reduction of tariffs for these products may be imposed if the purpose is primarily to capture domestic demand. Because of the complementary relationship between domestic and imported rice as well as high cost of production, imports of these products is one of the fastest and most common ways to capture the domestic demand, however, the government should support domestic producers by relevant policies such as guaranteed prices and by providing their basic needs at the international level.

Keywords: Armington Elasticity, Foreign Exchange Elasticity, Grain Imports, Iran

Investigation the Possibility of Aggregation Fruits and Nuts, Vegetables, Beans and Vegetable Products: Using Generalized Composite Commodity Theorem (GCCT)

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Introduction: Fruit and nuts, all kinds of vegetables, legumes and vegetable products, including commodity baskets with high proportion of nutritive value, are of great importance for policymakers of the agricultural sector. Therefore, the study of the conditions and factors affecting the demand for these goods can be predisposing advice to control the market and other factors affecting their use. But when it comes to the country at macro level of household demand, the aggregate commodity group beomes important. In cases where it is necessary to apply the fruits or vegetables as a function of household aggregation of a group of goods to be estimated, it is necessary a group of products with the scientific method to get aggregate and form a group variable as fruits or vegetables are included in the econometric model. Therefore, due to problems such as lack of access to information on each product separately, the high cost of collecting the data, missing observations, multicollinearity problem and limited degrees of freedom, we have to use grouping and composite commodities. But it is important that the correct grouping and consistent is made because of incorrect Aggregation, as specified in the error term appears on demand system estimated and Lead to biased estimation of the values of parameters and elasticity's, Which results in an incorrect picture of consumer behavior. Study of composite conditions of Agricultural commodities, as an important topic in economics, had been considered. Because mostly, access to disaggregate of the goods is not possible, and other problems such as multicollinearity occurs by examining the separation in the econometrics model. Study of composite conditions of Agricultural commodities, as an important topic in economics, had been considered. Due to its importance in the study, condition of Aggregation fruit and nuts, all kinds of vegetables and Bean (legumes) are using Generalized Composite Commodity Theorem (GCCT) is investigated.

Materials and Methods: Many efforts have been made by Economists to the necessary conditions for the validity of the Aggregation submitted. The first step was taken by Hicks with proposing a theory of composite commodities. Based on this theory, the goods can be placed in a group and form a single product, they must be equal to the ratio of their prices change over time. In other words, relative prices remain constant. Separability in production and Consumption theory, respectively by Leon Leontief and Sano also attempt to provide the necessary conditions have been aggregation among the goods. Based on this theory, inputs can be in a group that Marginal rate of substitution (MRS) between each pair of these inputs in a group independent from a separate group from the group. Blackorby and colleagues show that the dual condition of the license is limited to the aggregation of the products it provides. Lewbel (1996), the third method called generalized composite commodities theory (GCCT) is provided. Unlike the theory of Separability, do not apply any restrictions on the production technology, and it was for this reason that Lewbel was named the aggregation without separability. According to Lewbel theory, all products which those relative price index is independent group's index, can be classified in a group.Information needed as monthly statistics were collected from the central bank for the period 1383-1391.

Results and Discussion: The results of this study indicates that fruit and nuts, with respect to meeting the test requirements GCCT, fruit trees, cucurbit fruits and dried fruit can be considered as three aggregate groups; And furthermore, these three groups can be aggregated as a fruit and dried fruit group. Also Leaf vegetables, vegetables shrub, and bean (legumes) can be considered as aggregate of four groups, can be considered as four aggregate groups; furthermore, these four groups can be aggregate as a fruit ans dried fruit group; In addition with two kinds of fresh vegetables and vegetable products As a composite group can be considered.

Conclusion: Therefore economic studies have been conducted by using grouping by the Central Bank can be performed, using these Aggregated indices, and the results can be reliable and valid.

Keywords: Beans, Generalized Composite Commodity Theorem, Fruit and Nuts, Vegetables

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Vulnerability Assessment to Drought in Various Provinces, Approach towards Risk Management in the Country

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Introduction: The water crisis is one of the main challenges of the current century. Drought is one of the most costly natural disasters in Iran. During the past 40 years, our country has experienced 27 droughts. It seems a necessary step to deal with the consequences of drought and reducing its effects, thorough understanding and knowledge of each region's vulnerability, which is neglected in our country, unfortunately. It is necessary to study the influencing factors in determining vulnerability and makes it visible. On the other hand, due to the continuing drought conditions intensified in recent years and its impact on different economic sectors, especially the agricultural sector in the country need to assess vulnerability to drought in the country will double.

Materials and Methods: Fuzzy AHP method based on the concept of fuzzy sets introduced by LotfeiZadeh. There are several ways to use fuzzy theory and hierarchical structure proposed merger. Cheng in 1996 suggested a new approach to solve problems using Fuzzy AHP calibration values within the membership and (TFNs). Extent Analysis Method proposed by Chang is one of the common ways to solve problems. In this study, we developed a method based on fuzzy analytic hierarchy Chang that has been developed by Zhu et al. and Van Alhag.

Results and Discussion: Vulnerability to drought conditions is determined by factors such as economic, social and physical sensitivity to the damaging effects of drought increases. This study is designed in the hierarchy. The purpose of this study is assessing the vulnerability of the country to drought. Vulnerability of this study includes economic vulnerability, social vulnerability and physical vulnerability. Economic vulnerability to drought indicates that the economy is vulnerable to external shocks due to drought and the inability of the economy to withstand the effects of the event and recover the situation. Social vulnerability determines the capacity to deal with drought in the community and reflect the effects of drought on people's ability to cope with the event. The physical vulnerability is related to the characteristics and the structure of society, infrastructure and services that are the result of the damage caused by drought. In the present study, the economic dimension of vulnerability, including GDP per capita, value added in agriculture, value added in industry and the impact of drought on the GDP. Under the criteria of social vulnerability, population density, population growth, the rate of literacy, vulnerable populations, the costs of health and safety and the impact of drought on employment were considered. The physical dimensions of vulnerability include the rate of irrigated land and road density since the objective of this study was to assess vulnerability to drought in various provinces of the country, the required data for all provinces except for Alborz province was collected in 1391 from intelligence sources. To determine the importance of different dimensions of vulnerability as well as the sub-phase in each dimension, the questionnaire was used for paired comparisons. As for the tens of experts, specialists and professionals who have expertise using the Delphi method is incorporated. In general, the importance of physical vulnerability is more than economic and social vulnerability. On the other hand, according to the results the economic and social vulnerability is important, too. The results of this study showed that the importance of the physical vulnerability was more than the economic and social vulnerability and economic vulnerability and social importance were the same. In the economic vulnerability sub-criteria of per capita GDP, in the social vulnerability sub-criteria of population density and in the physical vulnerability sub-criteria of road density have the most importance. These findings may reflect the fact that when drought occurs, access to infrastructure, services and markets can considerably reduce the harmful effects of drought. According to the results, Semnan, Tehran and Gilan provinces jointly are economically vulnerable. On the other hand, in terms of criteria for social vulnerability, provinces of Fars, Khuzestan and Gilan were the most social vulnerable and Isfahan, Kermanshah and Ilam are the least vulnerable. Also, according to the results the province of Khuzestan, Fars and Khorasan were the most; and Yazd, Bushehr and Kohgiluyeh Boyer were the least physical vulnerability.

Conclusion: In this study, in order to assess vulnerability to drought in various provinces, , after determining

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the hierarchy and collect relevant data, the importance of each criteria and sub-criteria were determined. In order to determine the importance of different aspects of vulnerability (the economic, social and physical) Fuzzy AHP method was used in each dimension. According to the results of this study, the province of Khuzestan, Fars and Khorasan are the most and Yazd, Bushehr and Kohgiluyeh Boyer were the least physical vulnerability. Since different provinces have significant differences in vulnerability to drought and vulnerability in various aspects of economic, social and physical, in order to achieve drought management based on risk management, recommended in policy and planning make attention the effects of drought in the various provinces.

Testing the Law of One Price under Nonlinearity for Egg Market of Selected Provinces of Iran

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Introduction: Regarding to the ever-increasing consumption of egg and consequently enhancement of its production during recent years, consideration to this output's market integration has special importance. Considering the fact that information on market integration may provide specific evidence as to the competitiveness of market, the effectiveness of arbitrage and the efficiency of pricing could be, likewise, useful to guide subsequent interventions aimed at improving the performance of market. In this context, in present study, validity of Law of One Price (LOP) will be tested in the egg market and among selected provinces.

Materials and Methods: Nonlinearity naturally extracted from local market due to existence of transportation and other transaction costs, so common cointegration test results are not suitable for market integration. In this study, at first, for being sure that series follow nonlinear behavior, Luukkonen et al. (1988) and BDS nonlinearity tests were used. Then for testing Law of One price in the egg market, nonlinear unit root test proposed by Emmanouilides and Fousekis (2012), which is an auxiliary regression for ESTAR model, was used. The data are daily retail prices of egg with the sample period ranging from April 2006 to march 2014 for north-west provinces of Iran including West Azerbaijan, East Azerbaijan, Ardebil, Tehran and Zanjan, which were obtained from State Live Stock Affairs Logistics Incorporated Company.

Results and Discussion: Based on the DF-GLS unit root test, the null hypothesis of unit root for egg price differentials was rejected. So, all series of price differentials are stationary. In the next step nonlinearity of price differentials of egg between two provinces was examined. In BDS test, at the beginning, an ARMA model was estimated then the test was carried out to the residual of estimated model with embedding dimension (m) 2-8 and the dimensional distance ( ) chosen equals to 0.5 and 2 times of standard deviation of the data. Based on the results from this test and Luukkonen et al. (1988) test, null of linearity was rejected and existent of nonlinear relation between series was confirmed. Then, existence of a unit root in price differential series was carried out by nonlinear method. The results showed that mentioned markets are well integrated and LOP holds in all market pairs in a way that strong version of LOP holds for all market pairs except Tehran-Ardebil that weak version LOP holds for them.

Conclusion: Results of this study showed that there is full transmission of shocks among selected provinces and implies that the markets considered are well integrated. It means that arbitrage activities profitably use existent opportunities and enhance economic efficiency. Moreover, the egg markets in selected provinces are taken into account as a unit market so if the government performs any kind of policy in one of these provinces (in the context of considered market), the effects of that policy will be transferred to other provinces and the welfare of consumers and producers in these provinces will be affected. Therefore, it is recommended to policy makers to regard this fact while they are choosing any new policy and to be aware of adopting the policies regionally.

Keywords: Egg, Law of One Price, Market Integration, Nonlinearity, Nonlinear Unit Root Test

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Generic Advertising Optimum Budget for Iran's Milk Industry

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Introduction: One of the main targets of planners, decision makers and governments is increasing society health with promotion and production of suitable and healthy food. One of the basic commodities that have important role in satisfaction of required human food is milk. So, some part of government and producer healthy budget allocate to milk consumption promotion by using generic advertising. If effectiveness of advertising budget on profitability is more, producer will have more willing to spend for advertising. Determination of optimal generic advertising budget is one of important problem in managerial decision making in producing firm as well as increase in consumption and profit and decrease in wasting and non-optimality of budget.

Materials and Methods: In this study, optimal generic advertising budget intensity index (advertising budget share of production cost) was estimated under two different scenarios by using equilibrium replacement model. In equilibrium replacement model, producer surplus are maximized in respect to generic advertising in retail level. According to market where two levels of farm and processing before retail exist and there is trade in farm and retail level, we present different models. Fixed and variable proportion hypothesis is another one. Finally, eight relations are presented for determination of milk generic advertising optimum budget. So, we use data from several resources such as previous studies, national (Iran Static center) and international institute (Fao) formal data and own estimation. Because there are several estimations in previous studies, we identify some scenarios (in two general scenarios) for calculation of milk generic advertising optimum budget.

Results and Discussion: Estimation of milk generic advertising optimum budget in scenario 1 shows that in case of one market level, fixed supplies and no trade, optimum budget is 0.4672539 percent. In case of one market level and no trade, optimum budget is 0.3674844 percent. In case of one market level with trade, optimum budget according to own price trade elasticity of farm input, changed from 0.3675013 to 0.3674941 percent. In case of two market level and no trade at either market levels, optimum budget is 0.5094457 percent. In case of two market levels with trade only at retail, optimum budget according to own price trade elasticity of retail goods are changed from 0.509446 to 0.3674844 percent. In case of two market levels with trade only at farm, optimum budget according to own price trade elasticity of farm input are changed from 0.5094600 to 0.5094951 percent. In case of two market levels with trade at both retail and farm, optimum budget according to own price trade elasticity of retail goods and farm input are changed from 0.5085780 to 0.5117381 percent. This index in variable proportion hypothesis will be changed from 0.4143826 to 0.4164392. Estimation of milk generic advertising optimum budget in scenario 2 shows that in case of one market level, fixed supplies and no trade, optimum budget is 9.639368 percent. In case of one market level and no trade, optimum budget 8.9480986 percent. In case of one market level with trade, optimum budget according to own price trade elasticity of farm input, changed from 8.948178 to 8.948440 percent. In case of two market level and no trade at either market levels, optimum budget is 14.4113143 percent. In case of two market levels with trade only at retail, optimum budget according to own price trade elasticity of retail goods are changed from 14.413087 to 14.447182 percent. In case of two market levels with trade only at farm, optimum budget according to own price trade elasticity of farm input are changed from 14.413301 to 14.413689 percent. In case of two market levels with trade at both retail and farm, optimum budget according to own price trade elasticity of retail goods and farm input are changed from 14.379081 to 14.413792 percent. This index in variable proportion hypothesis will be changed from 13.294219 to 13.323525. Finally, Results indicate that milk generic advertising budget intensity index will be changed from 0.3674844 to 14.4474182 percent with mean of 0.4617576 percent for scenario 1 and 13.445766 percent for scenario 2.

Conclusions: According to the results, we proposed that milk producer should spend 13.44 percent of their production cost to generic advertising. This spending can increase milk consumption and it increase health society. Moreover, it decreases the household care and remedy spending and it increases the profitability of milk

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production firms. Also, government could spend to milk generic advertising from healthy budget of ministry of medical health, care and education or from agricultural promotion budget of ministry of Agri-Jahad.

Degree of Absolute Risk Aversion of Farmers and Determining its Affecting Factors in Sari-Goharbaran

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Introduction: Farming has a significant role in the economy of developing countries. The farming activities face with various dangerous, non-certainties and lots of problems due to natural disasters, price fluctuations in market place and social and behavioral conditions of farmers. Farmers encounter lots of risks in their farming decisions. Generally, there are three kinds of farmers including 1) risk-averse 2) risk-neutral and 3) risk-taker. The majority of previous studies have shown that the most of farmers are risk-averse, but with different rates of risk aversion.

Materials and Methods: Estimating the utility function is one way to quantify the risk. But while there is no certainty and decision making condition is risky, concept of "expected utility" will be considered instead of general concept of utility. In the present study, Direct Elicitation Utility Function (DEU) is used in order to calculating the degree of absolute risk aversion of farmers. In this approach, it is assumed that individual farmers are concerned about the variability of return of production decisions.

The utility function will be shown with U(Y) in which Y is the monetary gross margin of a farmer in specific

$$E[u(y)] = \sum_{j} P_j \, u(y_j)$$

period of time. The expected utility of the farmer is _____ . The expected monetary margin

$$y^* = \sum_{j} p_j y_j$$

will be defined with _____ and certainty equivalent (CE) is the monetary margin that comes from the relation of $U(CE) = E[u(y)]$. In DEU method, several mathematical forms of utility functions can be considered as the utility function of producers. Since in the form of negative exponential utility function, the absolute risk aversion coefficient is constant, in this study, the utility function of producers is $U = -\exp(\rho Y)$, where ρ shows the degree of absolute risk aversion. After calculation of farmers' absolute risk aversion coefficients, the relationship between calculated coefficients and socio-economic characteristics of farmers (such as their age, farm size, family size, education and agricultural experience) were analyzed.

$$r_a = f(age, farm\ size, family\ size, education, agricultural\ experience)$$

Results and Discussion: In compliance with relation $U(y_0) = E[u(y)]$ and considering the negative exponential utility function, can be proved:

$$-\exp(-\rho CE) = P_1(-\exp[(-\rho X_1)]) + P_2(-\exp[(-\rho X_2)]) + P_3(-\exp[(-\rho X_3)]) + P_4(-\exp[(-\rho X_4)])$$

Where X_1 to X_4 are four probable levels of farmers' gross revenues and P_1 to P_4 are the probabilities of these revenues. Utilizing DEU method, the rates of absolute risk aversion of farmers (high risk aversion, weak risk aversion and medium risk aversion) were calculated for 169 farmers in Sari-Goharbaran. According to the results, 41 farmers (24.2 percent) were weak risk averse, 81 farmers (47.9 percent) were medium risk averse and 47 farmers (27.8 percent) were high risk averse. Findings of the study showed that most of the farmers are medium risk averse. The second part of the findings showed that there is a significant relationship between farmers' age, farm size, family size and farming experience and the rate of absolute risk aversion. As it was shown in the table 3, the age of farmers has positive relation with the degree of absolute risk aversion of farmers and the family size, farming experiences as well as farm size have negative relation with that degree. Also, according to the t-statistic, estimated coefficients were statistically meaningful at 95% and 99% which means if the farmer's age increases by one year, then the degree of risk aversion of farmers rises by 95% confidence level, *ceteris paribus*. In addition, it can be stated that if the farming experiences increase by one year, the absolute risk aversion coefficient declined by 0.34 unit, by 99% certainty. Similarly, by increasing the number of family

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members and size of farms by one unit, the degree of risk aversion of farmers reduced to 0.37 and 0.98 unit respectively as well.

Conclusions: As the results advocate, the majority of farmers are in the class of average risk averse. Therefore, some measures should be taken to decrease the degree of risk aversion of farmers. This can carried out by the farmers as well as the agricultural sector policy makers. Utilizing the risk reduction techniques, such as crop diversification, insurance, establishing commodity derivatives and futures markets, farmers can reduce their risks. According to one of the results of this study, stating that whenever the farm sizes have risen, the degree of risk aversion has dropped, it is suggested that policy makers try to integrate lands in the agricultural sector. Also, as it is revealed that, by enhancing the experience of the farmers, their degree of risk aversion declines, so, through the educational and prompter classes, the farmers experience can be enhanced, despite the fact that education directly has no significant effect on the degree of risk aversion.

Estimation of Willingness to Pay for Healthy Pistachio Consumption in Kerman

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Introduction: To respond to the more food need for the growing population of the planet, today, agricultural production using new technologies which have increased their products but this increase in production, has been faced with environmental problems such as pollution of soil and water resources, the development of new plant pests and diseases, malnutrition and disease due to decreased food quality. Nowadays, sustainable and organic food production seems vital more than ever facing with environmental, social, economic impacts of modern agriculture. Organizations and special policies have been formed for food production in developed countries. Organic production is associated with high price risk in Iran. So, in this study, the willingness to pay for healthy pistachio in Kerman is estimated to determine its true value using CVM to guide producers in order to evaluate the economic production.

Materials and Methods: In economic theory, changes in consumer welfare are estimated with surplus estimation and compensatory changes that reflect the willingness to pay for goods. One of the common ways to measure the willingness to pay is contingent valuation method. One of the most important parts of the CVM is to determine the extraction way of goods and services value. Information extraction method is different in CV studies including A) making recommendations, B) payment card (PC), C) Open -closed format (OE) and D) dichotomous choice (DC). Dual two-dimensional method (DB) is widely used with a great popularity due to statistical performance in recent years. Of course, there are some criticisms on this method that in some cases, it was observed that the answers to the first and second questions are incompatible. So, another form of dual method was introduced in 2002 by Cooper et al which is called OOHB which has been used in this study. Normally, in contingent valuation models, a parametric method with certain assumptions about the distribution function and form is used to estimate the parameters E.g.Logit and probit models. Parametric methods with assumptions based on proper function and accurate distribution cause efficiency estimators comparing to nonparametric methods, however, if these assumptions are not correct, it causes biased and inconsistent estimators. There are weak theoretical recommendations to select its function form and distribution. So in this study, the semi-parametric estimator of free distribution (SNPDF) is used to avoid estimators' inconsistency. Due to the above, the model used in this study follows as:

$$\Delta V = \sum_{a \in V} \beta_\alpha \ln a + \sum_{a \in V} u_a \cos s_a (\ln a) + \sum_{a \in V}' v_a \sin \square s_a (\ln a) \tag{1}$$

In which the vector V includes variables such as income, age, education, family size, gender, family history of cancer and price. $s_a(\ln a)$ is a transfer function which in $a \in V$ values shows the function less than 2 .This is necessary to prevent the rotation of the model. Therefore, the results not only show the variables of income, age, education, household size, gender, family history of cancer and the price but also show non-linear relationships between variables. Required data was collected through questionnaires and face to face interview with 87 people in 2014 and statistical analysis was done by GAUSS 9 software.

Results and Discussion: The results showed that 87 responders, 68 (78.16 percent) tended to pay more to buy healthy pistachio and 19 (21.84 percent) did not tend to pay more. 65.4 percent of people who did not tend to pay the proposed fee were women and 34.6 were men. The lowest and the highest bid in the questionnaire format was 380,000 and 550,000 Rials, respectively. The results of SNPDF using a questionnaire format of OOHB is given in Table 1.

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Table 1- SNPDF model results to estimate the tendency to pay for healthy pistachio consumption

Variable	Coefficient	t-statistic
C	-14.84	-1.195
Age (A)	2.19 e-5	2.397
Sex (S)	1.461	0.5549
Family size (N)	-0.001918	-2.928
Family history of cancer (C)	0.02268	3.036
Education level (E)	0.4901	3.475
Income (I)	0.002289	1.843
Bid price (B)	-0.001012	-2.294
u_A	-0.4419	-1.967
v_A	0.08898	0.935
u_S	-0.5585	-0.829
v_S	-0.243	-2.748
u_N	-1.967	-1.537
v_N	0.935	0.2351
u_C	0.829	1.405
v_C	2.748	0.2546
u_E	1.893	0.8776
v_E	3.485	0.157
u_I	0.3157	1.893
v_I	0.9575	3.485
u_B	-0.451	-1.825
v_B	-0.2914	-0.7364
Log-L	-709.3	
McFadden's R^2	0.4147	
Madalla's R^2	0.5256	
Cragg&Uhler's R^2	0.3889	
Average willingness to pay (Rials)	486000	

As you can see, the variables of education level, age, income, and family history of cancer, family size, and the proposal level are statistically significant. According to the results, the sign of bid price variable is negative and expected and represents that with the increase or decrease of bid price, the possibility of the bid acceptance decreases or increases. The age variable has a positive sign and shows that with the increase or decrease of age, the willingness to pay increases or decreases. The income variable has a positive and expected sign which means that with the increase or decrease of income, the possibility of the bid acceptance decreases or increases. The education level variable is positive and expected because by increasing the level of education, the importance of health care for people will be clearer. The variable coefficient of family size is estimated to be negative which shows that with the increase or decrease of family members, the possibility of willingness to pay decreases or increases. The variable coefficient of family history of cancer is positive and significant which shows that the higher family history of the cancer, the more willingness to pay. The story doesn't end here with semi-parametric method but the significance of some of u_j and v_j coefficients suggests that SNDP model could explain nonlinear relationships ignored in the parametric model.

Conclusions: As the results show, the average willingness to pay for a kilogram of healthy pistachio in Kerman is estimated 486,000 Rials while the price for a kilogram of non-healthy pistachio is 360,000 Rials on average. The tendency of people towards healthy product consumption shows that people care about their own health.

Keywords: Contingent Valuation, OOHB Method, Healthy Pistachio, SNPDF Estimator