

The Effect of Socioeconomic Variables on Provincial Bread Demand Using QAIDS Model

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In this study, the effect of socioeconomic variables on provincial bread demand using the QAIDS model has been investigated. In this model, socioeconomic variables such as age, gender and marital status of the head of household, the education level of the head of household and spouse's head of household, household size, and occupation status of the head household have been used. The virtual variable of the target law of subsidies is also used to study the effects of this policy. To this end, the quadratic almost ideal demand system was applied. This model has been estimated using the consolidated data and Iterated Linear Least Squares Estimator and the information of more than 165,000 urban households in Iran for the years 1386-1394 and for different provinces. The results of the research show that during the studied years, bread is an essential good for all provinces except in Isfahan, Chaharmahal o Bakhtyari, and Kohgilouye. The compensated and uncompensated price elasticities of bread for all provinces are negative and less than one, so the bread is an inelastic good for all provinces. Also, the coefficients related to household size, gender, and marital status of the head of household and the target law of subsidies are positive and significant.

Keywords: Bread Demand, Quadratic Almost Ideal Demand System, Socio-Economic Variables, Iterated Linear Least squares Estimator, Reforming Subsidies.

JEL Classification: Q25, C33, D12

1 Introduction

The bread has a special status in the food basket of Iranian households, especially in the disadvantaged areas, as one of the staple foods and the primary source of energy of the human body. The comparison between the statistics released on the per capita consumption of bread in Iran and that of the world shows that the bread consumption is of great importance in the food basket of Iranian households with that of the other countries. It is the case to such an extent that the median bread consumption per person in Iran has been two times greater than that of the European countries. This food can be the

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body's primary source of energy, proteins, minerals, and B vitamins (thiamine, riboflavin, niacin). It is the case while the price of bread is much lower than those of other foods. Accordingly, bread is considered as the main component of the food baskets of low-income families. Also, bread plays a crucial role in providing them with food security. The consumption of bread supplies a considerable part of the poor households' needs for calories in Iran.

The geographic and cultural extensiveness of Iran has made the consumption of and demand for the goods differ across different areas. One of the faults in general (nation-wide) estimation of the goods demand function that is made regardless of the differences among different areas is to obtain the elasticities and coefficients that are extended to the population in general. However, the studies and investigations into the consumption of different goods including bread show that the lifestyles of individuals also affect their consumption patterns. As a result, this makes them adopt different approaches to demands for various goods.

The information on median bread consumption per person in the urban areas of the provinces of Iran over recent years shows that there is not a considerable difference in bread consumption among different provinces. From among the urban areas, over recent years, the provinces with the least per capita consumption of bread are Qom Province and Kohgiluyeh and Boyer-Ahmad Province where the amounts of bread consumed per person per year are 80.7 kg and 83.9 respectively, and the provinces with the largest per capita consumption of bread are West Azerbaijan Province and Kermanshah Province where the amounts of bread consumed per person per year are 186.6 kg and 169 kg respectively. The bread consumptions of the two last provinces are two times greater than those of the provinces with the least amounts of bread consumption.

Since the households in Iran are heterogeneous due to the difference in number, age-sex structure, level of education, etc. it is necessary to take into account the social factors as well as economic factors affecting the demand for bread to investigate the price and income sensitivity more accurately. On the other hand, it is necessary to investigate the effects of implementing the Law on Targeted Subsidies since January 2011, and as a result the elimination of wheat subsidy, on people's livelihood and bread consumption patterns. Also, the topic of the increase in bread price has been raised repeatedly over previous years and even this year. Hence, it is necessary to investigate all relevant variables and to review the effects of this policy in different areas of the country.

In the present research, we have employed Quadratic Almost Ideal Demand System (QUAIDS) and Iterated Linear Least-Squares (ILLS) to investigate the role of economic and social factors and the effect of implementing the Law on Targeted Subsidies on the level of demand for bread in different provinces of Iran. In the present study, the effects of the socioeconomic factors and implementation of the Law on Targeted Subsidies on the household demand for bread have been tested using the information on more than 165 thousand families living in urban areas in Iran in the period 2007-2015 as fused data. Thus, the present study differs from the similar studies conducted in Iran in terms of modeling, method, and even the statistical population (information on provinces) and volume of data employed in the research (information about provinces).

The present paper has been written in five sections. After the introduction, the theoretical research framework will be discussed. The literature review will be presented in the third section. The model estimation will be presented in the fourth section, and the conclusion and policy recommendations will be presented in the fifth section .

2 Theoretical Foundations

Estimating the demand function and calculating the elasticities of different categories of goods are some of the main tools used to investigate consumer behavior and one of the topics noted by the economic studies. As time goes by, an increasing number of new patterns of demand analysis and more advanced methods to estimate the demands are presented. Familiarity with the theoretical foundations of these patterns and employment of these patterns in experimental studies are of great importance to find more logical and exact instructions in policymaking and planning. One of the major demand systems that have been widely used recently is Quadratic Almost Ideal Demand System (QUAIDS). The present study also makes use of the same demand system. Also, numerous studies show that the effects of household characteristics on their consumption behaviors are of great importance because the households are heterogeneous, and the features of each household are different from those of other households. The reason for this difference relates to the number of members, education age-sex structure, ethnicity, religion (denomination), family values, culture, language, etc. of the households. Generally, it is expected that the characteristics of the households influence the socio-economic behavior of households. Hence, the researchers are recommended to investigate the effects of all these variables on the analysis of demands (Ritonga, 1994). Therefore, the investigation of the

theoretical foundations of the present study is divided into two following sections:

A) Socioeconomic variables

B) Quadratic Almost Ideal Demand System (QUAIDS)

2.1 Socioeconomic Variables

As it was mentioned before, since the characteristics of households are different, it is vital to know the effects of this characteristic on the household behavior concerning the consumption of and demand for the vital goods. Many experimental studies have been conducted into the effect of household characteristics on their consumption patterns. However, generally, the effect of some of the relevant features including the size and the age-sex composition of the households, and the age, sex and education of the heads of households on consumption pattern of the household is rooted in theoretical topics:

1) **Household size:** The estimation of household consumption patterns regardless of the differences in the size of the households will have a very low accuracy due to the differences in sizes of different households. Barnes et al. express that the better experimental model to analyze household consumption pattern is a model that includes the size of the household (e.g., Barnes, R., & Gillingham, R. (1984); Pollak, R.A. & Wales, T.J. (1981); Ray, R. (1982)). The same topic in the economic literature is rooted in the economies of scale. The costs of many goods like edible goods and other nondurable goods increase along with the increase in the size of the household. In return, the costs of durable goods and energy increase less with the increase in the size of the household.

Also, Browning, m. expressed in 1992 that the children affect almost all dimensions of the economic behavior of the household; that is, when the variable of children is included in the regression, they are usually significant. Therefore, the addition of each child to the household followed by the change in the size of the household will affect the consumption behavior of the household. For example, one of the most potent facts about experimental economics is that the shares of the food budget for households with children are higher than those for households without children (Browning, 1992).

Also, Bryant stated in 1990 that the preferences of the households for the goods and services change along with the change in the household size. He showed that the addition of a child to a family, considering that the real prices and incomes are fixed, will change the indifference curve of the households. He also showed that this would lead to an increase in the

expenditures incurred by the households on some of the goods and services and a decrease in some other goods and services. The experimental studies show that the difference in household size has a significant effect on the consumption behavior of households due to the difference in age and sex. In other words, the household composition has a considerable and positive effect on different categories of goods. For example, Majumdar (1988), Smallwood & Blaylock (1981), VolRossi, N (1988), Winter & Beutler (1983), in their studies on the effect of family size based on the age-sex composition on the demand in the United States, found out that all age-sex levels have a positive and significant effect on the consumption of foods by the household. According to their study, adult men have the most significant effect, and the children (aged 10 years and less) have the least impact.

Of course, the effects of household composition differ in different categories of goods. The effect of the household composition on some of the types of goods is strong while it is weak in some other categories of goods. For example, Rossi, N (1988) and Lahiri, S (1990) found out that the size and composition of the household have had a considerable effect on some particular groups of expenditures. Lahiri found out in the study on the role of household income in Egypt that the family size has a significant impact on the consumption of seeds and pulses (main foods in Egypt) in urban and rural areas. Rossi, N. (1988) found out in his study on the shares of the Italian households budget that the effect of household size on the household share of housing and fuel is negative and significant.

- 2) Age of the head of Household: The findings of the researchers show that the total consumption expenditure is based on the age structure of the population. A household adapts its consumption behavior to its real habits and requirements, and the current conditions during its life cycle. As a result, the demographic changes involve changes in consumption (e.g., Stöver, B, 2012). There are many theories in the field of social sciences (e.g., Duvall, 1977; Hill & Mattechisch, 1979), Psychology (e.g., Levinson, D.J., 1978), and economics (e.g., Ando & Modigliani, 1963) expressing that the behavior and individual development differ throughout the life of an individual. Considering these theories, the consumption patterns of the households change during their life cycle, and these changes are proportional to the age of the head of the household.

The younger heads of the households most probably spend a considerable amount of time in the workplace at the beginning of their profession. It is expected that this pattern will continue until the head of the household

retires. For this reason, it is expected that the younger heads of the household spend a less share of the budget on energy in comparison with the older heads of the household (Ritonga, 1994).

- 3) The education level of the head of household: the study on the human capital shows that the economic advantages of education appear at first as the increase in the income and expenditure (Schultz, T., 1963). Some researchers state that education can lead to an increase in productivity in some performance, such as household budget management and better allocation of resources (Grossman & Michael, 1972). Education increases the efficiency of consumption. For example, supposing a fixed income, the households with higher levels of education spend more on services; therefore, these households behave in such a way as if they belong to a class receiving a higher real income (Michael, R., 1972). Smallwood, D. & J. Blaylock (1981), in their study on food expenditure patterns in the United States, found that female household heads with higher levels of education spent less on homemade foods than did female household heads with lower levels of education.

2.2 Quadratic Almost Ideal Demand System (QUAIDS)

There is a long history of the attempt to select a proper form of the function to explain consumer behavior. Concerning the explanation of consumer behavior, the selected functions should be most compatible with consumer theory. Also, the functions should have the theoretical features of the mentioned theory, while they can be estimated and have high predictive power. In this regard, some transformations have been made in consumer behavior over the last two decades, particularly after providing the Almost Ideal Demand System (AIDS).

Deaton, AS, & Muellbauer, J. (1980) studied the demands for eight categories of food for the first time in Britain using the Almost Ideal Demand System (AIDS).

Today, the Almost Ideal Demand System (AIDS) is one of the most widely used patterns in the experimental studies in the world because of being in coordination with demand theory and flexibility in providing the required elasticity. This system has the capability of fusion based on the data relating to the households, the ability to include the population variables and regional features in the demand pattern. The system can also adapt the model variables to the statistical data where the model can conveniently make a linear approximation.

Considering the full application of this model in different studies, the studies seeking to develop the structure of this model, and to remove its faults have increased. The main change in the structure of this model can be considered the conversion of the model to a Quadratic Almost Ideal Demand System (QUAIDS). The shares of the Quadratic Almost Ideal Demand System (QUAIDS) model includes a non-linear density and second-order flexibility as well as the properties of Quadratic Almost Ideal Demand System (QUAIDS) (Banks, J., R. Blundell, and A. Lewbel, (1997). Another advantage of Quadratic Almost Ideal Demand System (QUAIDS) is that it allows the inferior goods to convert to the normal goods and vice versa through changing the level of expenditure, while the expenditure elasticities are constant in Almost Ideal Demand System (AIDS) model.

In the present study, the Quadratic Almost Ideal Demand System (QUAIDS) is employed to describe consumer behavior. It is a third-order system of budget share where all expenditures would be converted to second-grade state when using logarithm. The Quadratic Almost Ideal Demand System (QUAIDS) has been provided based on an expenditure function with the expanded logarithmic form independent from the price level (PIGLOGA) that begins from an indirect function in the following form (Banks, J., R. Blundell, and A. Lewbel, (1997):

$$\ln V(P, M) = \left[\left\{ \frac{\ln(m) - \ln a(P)}{b(P)} \right\}^{-1} + \lambda(P) \right]^{-1} \quad (1)$$

Where m shows the expenditure, and P shows the vector of the prices that the consumer has to pay. In the above function, $\ln a(P)$ is the transcendental logarithmic function that has been presented below:

$$\ln a(P) = \alpha_0 + \sum_i \alpha_i \ln(p_i) + \frac{1}{2} \sum_i \sum_j \gamma_{ij} \ln(p_i) \ln(p_j) \quad (2)$$

In the above expression, p_i is the prices of goods that can be used by the consumer, and $i=1,2, \dots, k$ in the pattern expresses the number of the goods in the demand system. Also, $b(p)$ is the Cobb-Douglas function that adds up the prices.

$$b(p) = \prod_{i=1}^K P_i^{(\lambda_i)} \quad (3)$$

And

$$\lambda(p) = \sum_{i=1}^K \lambda_i \ln P_i \quad \text{where } \sum_{i=1}^K \lambda_i = 0 \quad (4)$$

The Greek letters that have been written in lower case (except for α_0) are the parameters that should be estimated. In practice, α_0 is estimated alongside other metrics.

Supposing that q_i is the number of goods consumed by the consumer, and also considering w_i as the share of the consumption expenditure on i^{th} goods, we have $w_i = p_i q_i / m$. Now, using Roy's theory, the consumption expenditure function for i^{th} goods is obtained as follows:

$$w_i = \alpha_i + \sum_{j=1}^k \gamma_{ij} \ln P_j + \beta_i \ln \left[\frac{m}{a(p)} \right] + \frac{\lambda_i}{b(p)} \left[\ln \left\{ \frac{m}{a(p)} \right\} \right]^2 + \varepsilon_i \quad (5)$$

$i = 1, 2, 3, \dots, K$

Where α , β , γ , λ are the parameters of this relation and w_i shows the budget share of the i^{th} goods for the households, and ε_i is the error term. In the above relation, if λ is equal to zero, the relation expresses AIDS system.

To establish the parameters theoretically and to decrease the number of parameters that are to be estimated, usually the conditions of adding up, homogeneity and symmetry are employed. These conditions have been shown mathematically in the relations 6-8 in.

$$\text{Adding up } \sum_{i=1}^k \beta_i = 0 \quad \sum_{j=1}^k \gamma_{ij} = 0 \quad \sum_{i=1}^k \alpha_i = 1 \quad (6)$$

$$\text{Symmetry} \quad \gamma_{ij} = \gamma_{ji} \quad (7)$$

$$\text{Homogeneity} \quad \sum_{i=1}^k \lambda_i = 0 \quad (8)$$

The three above-mentioned conditions are related to the assumption of rationality of the consumer demand theory. Adding them up states that the sum of estimated expenditures on the different goods should be equal to total expenditures. Homogeneity states that if all prices and income of the household increase to the same extent, the choices a consumer makes about consumption will remain unchanged. Symmetry means that the relative change in the consumption of a commodity due to the change in the price of other commodities (of course, after compensating for the change in real income) should be equal to the proportionate change in the demand for other commodities when the price of the first commodity changes. This type of symmetry resulting from the substitution effect of change in prices of goods is called Slutsky symmetry.

It is assumed that the utility function for the households follows the demand theory to achieve the goals of this research. Also, other factors

proposed in the previous section are effective in the decision-making as well as the economic factors. Therefore, in the experimental modeling, some of the characteristics of the households like household size, age, and literacy of the head of the household, etc. are taken into consideration as well as the economic variables like the prices and household income. Thus, the final equation that will be estimated in this research is:

$$w_i = \alpha_i + \sum_{j=1}^k \gamma_{ij} \ln P_j + \beta_i \ln \left[\frac{m}{a(p)} \right] + \frac{\lambda_i}{b(p)} \left[\ln \left\{ \frac{m}{a(p)} \right\} \right]^2 + \sum_j \delta_{ij} \ln h_j \quad i = 1, 2, \dots, k \quad (9)$$

Where $\alpha_i, \gamma_{ij}, \beta_i$ are the parameters of the model. p_j, m, P, h_j are the price of the goods, household income, Stone's Price Index, and the index of the socioeconomic characteristics of the households.

After the assertion and estimation of the demand models, the price and income elasticities, that are calculated based on the parameters obtained from the model, will be some appropriate tools to account for the consumer behavior concerning the goods in question. Thus, in this section, we try to extract the formulas relating to the price and income elasticities of the model.

After differentiating the above equation in relation to $\ln(m)$ and $\ln P_j$, we have:

$$\mu_i = \frac{\partial w_i}{\partial \ln(m)} = \beta_i + \frac{2\lambda_i}{b(p)} \left\{ \ln \left[\frac{m}{a(p)} \right] \right\} \quad (10)$$

$$\mu_{ij} = \frac{\partial w_i}{\partial \ln(p_j)} = \gamma_{ij} - \mu_i (\alpha_j + \sum_k \gamma_{jk} \ln P_k) - \frac{\lambda_i \beta_i}{b(p)} \left\{ \ln \left[\frac{m}{a(p)} \right] \right\}^2 \quad (11)$$

Thus, price and income elasticities will be as follows:

$$e_i = \frac{\mu_i}{w_i} + 1 \quad \text{income elasticity} \quad (12)$$

$$e_{ij}^u = \frac{\mu_{ij}}{w_i} - \delta_{ij} \quad \text{uncompensated price elasticities} \quad (13)$$

$$e_{ij}^c = e_{ij}^u + e_i w_j \quad \text{compensated price elasticities} \quad (14)$$

Where δ_{ij} is the Kronecker delta, if $i=j$, then $\delta_{ij} = 1$, otherwise $\delta_{ij} = 0$.

3 Review of the Experimental Studies

In this section, we try to present briefly some of the studies conducted both inside and outside the country on the estimation of the demand for bread and other foods using QUAIDS model. Also, we try to provide some of the studies

relating to the examination of the effects of the socioeconomic variables on the consumption of the households and present their results. In this section, also some reviews on the impact of implementing the Law on Targeted Subsidies on the consumption of the households in Iran and the demands over different provinces are presented and their results will be provided too.

3.1 Studies on the Examination of the Effects of Social Variables on Consumption

Grossman, M. (1972) showed through a theoretical and experimental analysis entitled "The Demand for Health" in 1963 that high levels of income do not lead to high levels of health even on the average. In this regard, he argued that high levels of income might lead to high consumption of goods and services that have negative effects on health. He also stated that being highly educated can lead to an increase in productivity in some cases like household budget management, taking care of children, or health care. The data of the present study are based on a health negotiation survey conducted in 1963 by the National Center for Research Theory and Studies Center of Department of Health Chicago University in 1963.

Rossi (1988), in his study entitled "Budget Share Demographic Translation and the Aggregate Almost Ideal Demand System," investigates the share of the Italian households budget in the period 1970-1980 through Almost Ideal Demand System (AIDS). He found out that the effect of household size is significant and negative on the share of household expenditure on housing and fuel.

Lazear, E. P., & Michael, R. T. (1988) in a book entitled "Allocation of Income within the Household" explain an important new model about the distribution of income in the household. They seek to determine the characteristics of the household affecting the expenditure patterns using this model. Lazear and Michael have based their work on the analysis of the surveys of consumer spending in the period 1972-1973, and test the obtained results against the examinations conducted in the period 1960-1961 to be able to confirm the sustenance of the discovered effects. For example, the results they obtained show that each household spends 38 dollars on each child and 100 dollars on each adult on average and the relative and absolute expenditure on each child increases along with the increase in the education level of the heads of households. Also, they found out that the age of the head of the household affects the expenditure on food, durable goods, and services using the consumer spending survey conducted in America in the period 1972-1973.

Rikhana, M. (1991), in a study entitled "The Effect of Agricultural Season on Total Household Expenditures among Rural and Urban Households" used the information from the National Socioeconomic Survey SUSENAS in East Java, Indonesia. He found out that the household size coefficient has a positive and significant effect on the total household expenditures among rural and urban households.

Goungetas and Johnson (1992), in their study on the effect of household size through age-sex composition on food consumption in the United States in the period 1977-1978 using the Food Consumption Survey conducted globally in the mentioned period, also found that age and sex have a positive and significant effect on household food consumption in all groups. The adults had the most significant effect, and children (aged 10 and under) had a smaller effect.

3.2 Studies on Demand Estimation Using Quadratic Almost Ideal Demand System (QUAIDS)

Richard Blundell & Jean-Marc Robin (1999) estimated the demand system of the English households using the Quadratic Almost Ideal Demand System (QUAIDS) function model and the data on a budget of 5000 English urban households in the period 1974-1993. In this paper, the demand system, including 22 goods, has been estimated where seasonal data has been used. They used an almost homogeneous sample consisting of married households having two children. This sample has been selected due to the removal of the demographic differences and concentration on the prices and incomes in this model. They chose 22 nondurable goods including wine, beer, six food groups, home fuel, clothes, home services, personal goods and services, recreational services, fares, tobacco, engine, and gasoline. They selected the households owning cars with at least one parent smoker in order not to face the problem of zero expenditure on tobacco and gasoline.

According to the results of the research, all own-price elasticities are negative, and the food items are price inelastic, all of which are necessary. On the other hand, recreations and hobbies are strongly price and income elastic. The clothes and home necessities and services are in the middle ground.

Boysen (2012) examined the Quadratic Almost Ideal Demand System (QUAIDS) demand function for the foods in the urban and rural areas of Uganda in the period 2005-2006. He conducted a survey of the Ugandan families in the period 2005-2006 to carry out the examination. He found out that during the given period, the sensitivity to food consumption among rural households is higher than that of the urban households in Uganda.

Khorrani Moghaddam (2012) investigated the consumer behavior and calculated the price and income elasticities of the goods receiving subsidies (cooking oil, sugar, bread, and rice) using Quadratic Almost Ideal Demand System (QUAIDS). He has used in his study the data on household expenditure provided by the Statistical Center of Iran in 2007. The system of demand equations has been estimated using the Seeming Unrelated Regression method, and the results obtained from the income elasticities state the higher inclination of the rural consumers with the urban consumers to increase the consumption of the goods, and considering the low elasticity of the products under study, it seems that the mere adoption of the price policies is not adequate to reform the consumption pattern.

Layani (2015) calculated the compensated price elasticities for the foods imported to the country to determine the vulnerability of the urban households resulting from the increase in the price of the imported foods in Iran after the estimation of the Quadratic Almost Ideal Demand System (QUAIDS), and he evaluated the effects of this increase on welfare. The results showed that the total compensated changes calculated in 2012 are equal to 213.101 million dollars because of the global increase in foodstuff prices. Also, according to the obtained results, the degree of lost welfare of urban households is equal to 4.2% of the average income of the households on average.

Ghahremanzadeh (2016) employed Quadratic Almost Ideal Demand System (QUAIDS) to measure and analyze the effects of inflationary prices of the foodstuffs resulting from the implementation of the Law on Targeted Subsidies among the urban households living in Sistan and Baluchestan Province for all food groups in the period 2009-2011. Then, he calculated the compensating variation (CV) as a criterion to measure the consumer welfare changes using the Taylor series approximation and the information obtained from the Quadratic Almost Ideal Demand System (QUAIDS). The results of the calculations showed that the households living in Sistan and Baluchestan Province lost 11008222 rials on the average as a consequence of the increase in the prices of the foodstuffs after the implementation of the Law on Targeted Subsidies (until January 2011).

Akbari (2017), in his study, investigated the demands of urban households living in Sistan and Baluchestan Province for foodstuffs through the raw data and the household expenditures in 2011 using two systems, namely the neural network demand system and Quadratic Almost Ideal Demand System (QUAIDS). Considering the results of both systems, the income elasticity of the goods groups of "bread and cereals," "milk and bird eggs," "legumes and vegetables," "sugar and sugar cube," "drinks" and "condiments" was less than

one where these goods are considered to be necessary and the goods groups of "meat," "oils and fats," "fruits and nuts" are considered as luxury goods.

3.3 Studies on the Elimination of Subsidies and Making Them Target-Oriented

Dinitorkamani (1994) has studied the effect of the removal of bread subsidy on absolute poverty in the period 1977-1989. He concluded that if the bread subsidy is eliminated, the percentage of poverty in the urban community will increase from 45% to about 70%. It means both the increase in the number of people living in absolute poverty and much deterioration of the economic conditions of the 45% of the population who already live below the poverty line. Shoushtariyan and Bakhshoudeh (2007) investigated the effect of liberalizing the wheat market on social welfare using a partial equilibrium model for the wheat market and autoregressive distributed lag (ARDL) estimation. The results showed that though the liberalization of the wheat market in Iran decreases the government expenditures, social costs and exchange costs, but it will increase the total social costs. In total, it is expected that liberalizing the wheat market in Iran will be of social benefit to the community.

Najibi (2004) has calculated the welfare change criteria resulting from the increase in gasoline price in the income (expenditure) deciles in the period 1982-2002 in Iran. The study shows that the direct effect of the increase in the gasoline price is to reduce the welfare of the consumers in the high-income groups to a greater extent than that of the lower-income groups.

Karami et al. (2008), in their study, examined the distribution of the benefits of the current subsidy system in Iran among different income areas and deciles through determining the per capita consumption and considering the prices of the three subsidized and unsubsidized goods including oil, sugar cube, and sugar. The results obtained from this investigation showed that the benefits obtained from receiving bread subsidy in the urban and rural areas of different cities and groups are more than those of cooking oil, sugar cube and sugar. On the other hand, providing subsidies and the relevant benefits among different income areas and groups show that not only the current system of paying subsidy is not target-oriented, but it also deviates from the high-income groups in some cases. Thus, the present system of paying subsidy is not efficient enough and wastes resources. Therefore, it is necessary to take into consideration the target-orientation of food subsidy to prevent the waste of the resources and to decrease the financial burden incurred by the government.

Heydari and Parmeh (2010), concluded in a study entitled, "Estimation of the Effects of Bread and Energy Carrier Prices Reform on the Household Expenditure Basket Using estimation model of Social Accounting Matrix (SAM)" that there will be a minimum increase of 33% in the expenditure of the urban households and a minimum 40 % rise in the expenditure of the rural households upon the elimination of the bread and energy carrier subsidies.

Pirayi and Seyf (2010) in a study entitled, "The Effect of implementation of the Law on Targeted Subsidies on the Social Welfare of Iranians" investigated the question: What is the effect of transferring one monetary unit of the subsidy given to the subsidized goods used mostly by the higher deciles to the subsidy given to the unsubsidized goods mostly used by the lower deciles on the welfare of the community? The results of this research show that the implementation of the Law on Targeted Subsidies improves social welfare.

Hosseinzadeh (2014) investigated the productivity of the effect of the implementation of the Law on Targeted Subsidies on natural gas consumption. The present study is applied in terms of purpose and it is a descriptive-analytical in the method. The results obtained from the current research show that the increase in the price of natural gas to increase its productivity through the implementation of the Law on Targeted Subsidies has not decreased the average daily consumption of natural gas in the residential sector during the period under study for different reasons.

Ahmadi, Mojarradi, and Yadsar (2016) investigated the economic and social effects of the implementation of the Law on Targeted Subsidies on the life quality of the rural households in Urmia County using a survey-analytical method. The statistical population of this research is composed of 71353 rural households living in Urmia County. In this research, 265 individuals were selected from the population as the statistical sample using the Cochran formula through the multistage sampling method. In this research, the information collection tool was a questionnaire whose validity was confirmed by a group of relevant experts, and its reliability was confirmed through Cronbach's Coefficient Alpha. The results of the research showed that the implementation of the Law on Targeted Subsidies had a positive and significant effect on both the economic and social aspects of the life quality of villagers in Urmia County; however, the social effects of the implementation of the Law on Targeted Subsidies outweighed its economic effects.

Paytakhti, Oskoui, and Emami (2016), in a study, investigated the effect of the implementation of the Law on Targeted Subsidies on Iranian urban consumption expenditure patterns using panel data method for the period

2004-2013. The results of the research show that the implementation of the Law on Targeted Subsidies have had a significant effect on 9 groups out of the 14 groups of urban household expenditures. In this regard, the share of 5 expenditure groups, namely food costs, transportation costs, the costs of cultural and recreational services, the costs of ready-made foods, the costs of restaurants and hotels, the costs of subordinate goods and services have increased significantly in the total urban households expenditure upon the implementation of the Law on Targeted Subsidies. In turn, the share of four groups of expenditures including health costs, household communications costs, education costs, and household investment in the total urban household expenditure has decreased significantly. Therefore, it can be said that the implementation of the Law on Targeted Subsidies has affected the urban household consumption expenditure in Iran through the change in the expenditure composition- increase or decrease in each expenditure.

Farazmand and Nateghishahrokni (2017) investigated the effects of elimination of bread subsidy on the demand of the low income and high-income groups in urban areas in Iran using the Almost Ideal Demand System (AIDS). The obtained results indicated that the bread is considered to be of low elasticity and a vital commodity for the urban households concerning the two groups of low income and high-income groups.

3.4 Studies on Differences of Provinces in Demand Estimation

Mousai and Shiyani (2007) estimated the demands of Iranian households to go to the cinema in different provinces in Iran using Almost Ideal Demand System (AIDS) and calculated the price and income elasticities for every single province and the whole country. They used the statistics and information on the household expenditure in different provinces of the country in the period 1984-2005 to estimate the demand function. According to the obtained results, the price elasticity of the whole country is equal to - 0.91, and it has been lower than this unit in different provinces except for Isfahan, Hormozgan, Kerman, Kurdistan, Mazandaran, and East Azerbaijan Provinces, that is, it is not sensitive to the changes in the price.

Khodadad Kashi et al. (2015) used the regional dynamic general-equilibrium model, welfare, and environmental effects of levying an unbalanced tax on carbon for each different area of Iran separately. For this purpose, they first calculated the degree of inclination of various provinces to avoid the harmful effects of pollution and classified the provinces of Iran into eight areas accordingly.

They investigated the effects of different policies in 35 10-year periods and concluded according to the results of the research that internalizing the costs of environmental pollutions through levying a tax on carbon has positive effects on welfare and environment, and these effects will improve through levying the unbalanced tax.

Gahemi and Loui (2017) investigated the effect of inflation and unemployment on religious expenditure. They used the information on 28 provinces of Iran in the period 1997-2014 in their study. The results obtained from the estimation of their model show that inflation and unemployment hurt religious expenditure. Therefore, the provinces with a low rate of inflation have had higher religious expenditure. Also, the increase in the employment rate of provinces of Iran has had a positive effect on religious expenditure.

4 Experimental Modeling

In the present study, the Quadratic Almost Ideal Demand System (QUAIDS), Stone's Price Index, price and income elasticity formulas provided in the previous sections have been used. In the following, the type of the data, the result estimation, and the analysis method will be addressed.

4.1 The Data Used in the Present Study

The present study that aims to investigate the effect of the socioeconomic variables and implementation of the Law on Targeted Subsidies on the bread demands of the urban household in the period 2007-2015 requires two groups of data: 1- The information and microdata of the household budget, 2- The price indices of the goods and goods groups in different urban areas of the country. It should be mentioned that the price of the goods and thus the price of different goods groups are different in different areas of the country where this difference has not been considered systematically in the studies on demand, while the price indices of different goods in different areas of the country have been used in the present study. For this purpose, the price indices of the goods and services consumed by the provinces issued by the Central Bank of the Islamic Republic of Iran have been used.

The information on the expenditure and income of the households also known as household budget is one of the essential and unique information resources used in the experimental investigation on the subjects of Microeconomics (the topics of consumer, demand, income and substitution effects), welfare economy (welfare indices, income distribution, poverty, etc.), and also the socio-economic studies and health economy, education, etc. The information just mentioned is collected through field investigation

annually along with the extensive samples and through the detailed questionnaires from different households (these questionnaires include more than 1000 questions posed to the households where the involved households are paid to provide better and more exact answers) throughout the country at different social, economic (expenditure and income) sections. Thus, it is possible to analyze these factors in the economic examinations using the socioeconomic characteristics of the households while analyzing the economic issues.

In the present study, 11 groups of goods make up the demand equations. Although, one of the equations (equation of other groups of goods) will be eliminated because of imposing aggregate constraints in the final estimation.

4.2 Model Estimation Method

The Iterated Linear Least squares Estimator has been used in estimating the non-linear model of Quadratic Almost Ideal Demand System (QUAIDS). This estimator has been proposed by Blundella, R., J. Robin (1999) to estimate some demand systems such as AIDS and QAIDS. In these models, the behavior of the consumer is inherently non-linear because the assumption of linearity of the expenditure with the total budget and relative prices is not logical.

The experimental demand systems that do not impose certain constraints on consumer preferences, are usually non-linear. Blundell, R., J. Robin proposed the Iterated Linear Least squares Estimator for the simultaneous equation system that is large and non-linear, which are only conditionally linear in some parameters. They showed that this estimator is consistent, and it has some asymptotic properties suggesting the efficiency of an estimator.

They mention that if the equation system to be estimated is as follows:

$$y_{it} = g(x_t, \theta^0)' \theta^0 + u_{it} \quad i = 1, 2, \dots, N, \quad t = 1, \dots, T \quad (15)$$

The estimator ILLS includes an iterated set of the following trend:

The estimator estimates $\theta^{(p)}$ for θ , and estimates $\theta^{(p+1)}$ for $g(x_t, \theta^p)$ using y_t and iterates this to such an extent that a numerical convergence occurs. In other words, this estimator does not estimate the whole system simultaneously, but it estimates one equation in every single stage that is considered a distinct advantage for the large demand systems.

If $\hat{\theta}$ shows the $\theta^{(p)}$ limit, when p tends to infinity, $\hat{\theta}$ is a consistent estimator of θ^0 . Blundella, R., J. Robin (1999) provide a simple definition of the Iterated Linear Least squares Estimator, that is:

If $y_i = (y_{i1}, \dots, y_{it})'$ and $G(\theta)$, then the resultant matrix is formed:

$$G(\theta) = \begin{pmatrix} g(x_1, \theta)' \\ \vdots \\ g(x_T, \theta)' \end{pmatrix} \quad (16)$$

The $(p+1)^{\text{th}}$ iteration of the algorithm, provides us with the following value for the parameter relating to i^{th} equation:

$$\theta_i^{(p+1)} = [G(\theta^{(p)})' G(\theta^{(p)})]^{-1} G(\theta^{(p)})' y_i \quad (17)$$

Thus, any limit obtained from such a recurrent sequence will be a fixed point of the vector with n number of $\Psi_i(\theta)$ functions where the i^{th} part is as follows:

$$(\Psi_i(\theta) = [G(\theta)' G(\theta)]^{-1} G(\theta)' y_i \quad (18)$$

It means that an Iterated Linear Least squares Estimator for the model (15) is a fixed point of $\Psi(\theta)$.

Estimation of constrained equations system of QAIDS:

According to equation (9), the assertion of the functional form is as follows. The constrained equation system has been estimated by implementing the symmetry constraint to the coefficients and also implementing the restrictions of homogeneity and adding up.

$$w_i = \alpha_i + \sum_{j=1}^k \gamma_{ij} \ln P_j + \beta_i \ln \left[\frac{m}{a(p)} \right] + \frac{\lambda_i}{b(p)} \left[\ln \left\{ \frac{m}{a(p)} \right\} \right]^2 + \sum_j \delta_{ij} \ln h_j \quad (19)$$

Where in the above model, i stands for the groups of the goods including rice, meat, dairy products, bread, cereals, other foods, clothes, housing, health, transportation, and other goods. Also, h_j stands for the socioeconomic variables including the household size; spouse's level of education and head of the household; the age, sex and marital status of the head of household; number of working people in the household who receive an income, and finally the dummy variable of provinces and Target-orientation of Subsidies. The results of the QAIDS model estimation using Iterated Linear Least squares have been presented in tables 1 and 2.

Table 1

Results of Quadratic Almost Ideal Demand System (QUAIDS) estimation (1)

parameters	Rice	Meat	Dairy	Bread	Cereals	Other feed
gamma_lnp1	***0.014	-0.005	-0.002	**0.001	-0.001	-0.002
gamma_lnp2	** -0.005	***0.017	***0.005	***0.007	***0.004	**0.006
gamma_lnp3	-0.002	**0.005	***0.009	** -0.002	***0.003	* -0.005
gamma_lnp4	0.001	***0.007	-0.002	***0.006	* -0.001	-0.006
gamma_lnp5	-0.001	0.004	***0.003	-0.001	***0.003	* -0.006
gamma_lnp6	-0.002	*0.006	-0.005	-0.006	-0.006	***0.043
gamma_lnp7	0.001	-0.016	*0.001	-0.003	-0.008	***0.011
gamma_lnp8	0	**0.004	-0.012	-0.01	-0.007	-0.035
gamma_lnp9	-0.001	-0.015	-0.007	-0.007	***0.004	-0.01
gamma_lnp1	**0.006	** -0.007	*0.002	***0.009	***0.002	**0.009
gamma_lnp1	*** -0.012	0	***0.006	***0.006	***0.005	-0.006
beta_lnx	***0.03	***0.04	-0.007	-0.04	***0.002	***0.011
lambda_lnx2	*** -0.004	-0.006	***0	***0.003	-0.001	-0.005
alpha_o0	***0.005	***0.004	-0.005	-0.005	***0.003	***0.008
alpha_o1	***0.012	-0.002	-0.005	-0.004	***0.003	***0.012
alpha_o2	*** -0.006	***0.006	-0.005	-0.002	***0.001	***0.013
alpha_o3	0	-0.002	* -0.001	***0.004	***0.004	0.001
alpha_o4	-0.001	-0.004	-0.002	***0.004	***0.008	***0.007
alpha_o5	***0.004	***0.005	-0.011	***0.002	***0.003	***0.014
alpha_o6	***0.006	***0.028	-0.002	-0.007	***0.008	***0.04
alpha_o7	***0.007	**0.003	-0.005	-0.005	***0.005	0.001
alpha_o8	***0.005	***0.023	-0.009	-0.004	***0.002	-0.008
alpha_o9	***0.003	***0.014	0	-0.001	***0.007	***0.013
alpha_o10	-0.001	***0.007	-0.004	-0.007	***0.005	** -0.003
alpha_o11	***0.01	***0.044	-0.007	***0.01	*0.001	***0.035
alpha_o12	***0.004	***0.016	-0.006	***0.006	***0.003	***0.031
alpha_o13	***0.003	***0.006	-0.005	0.001	***0.001	0.002
alpha_o14	***0.011	***0.036	0.001	-0.009	***0.01	***0.015
alpha_o15	***0.006	***0.024	-0.009	***0.002	***0.001	***0.013
alpha_o16	***0.012	***0.031	*** -0.01	-0.002	***0.002	***0.026
alpha_o17	0	***0.023	-0.009	-0.011	***0.007	***0.049

parameters	Rice	Meat	Dairy	Bread	Cereals	Other feed
alpha_o18	***0.011	***0.018	-0.009	-0.005	***0.006	***0.026
alpha_o19	***0.004	***0.004	***0.001	***0.005	***0.004	***0.017
alpha_o20	***0.011	***0.005	-0.007	-0.008	** -0.001	-0.007
alpha_o21	***0.005	***0.031	-0.006	-0.009	**0.001	-0.014
alpha_o22	***0.008	***0.027	-0.003	0	***0.005	***0.018
alpha_o23	** -0.002	-0.008	-0.001	-0.003	0	-0.016
alpha_o24	***0.007	***0.016	-0.004	***0.004	***0.009	***0.01
alpha_o25	0	-0.005	-0.007	-0.01	-0.001	-0.025
alpha_o26	***0.009	0	-0.004	-0.006	***0.003	-0.004
alpha_o27	0.001	***0.011	-0.009	0	** -0.001	* -0.002
alpha_o28	***0.008	-0.001	-0.005	**0.001	***0.006	***0.01
alpha_o29	*0.002	***0.028	-0.001	***0.006	***0.005	***0.028
alpha_board	***0.001	**0.001	***0.001	***0.004	***0.001	***0.004
alpha_sartahs	***0	***0	***0	***0	***0	-0.001
alpha_hamta	*** -0.001	***0	0	***0	***0	-0.001
alpha_jens	0	***0.003	-0.001	***0.001	-0.001	-0.002
alpha_sen	0	***0	0	***0	***0	***0
alpha_sarfaali	0	***0.002	***0.001	-0.001	***0.001	***0.003
alpha_sarzan	***0.005	***0.004	***0.002	***0.004	***0.002	***0.012
alpha_hadaf	0	-0.004	***0.001	***0.013	**0.001	* -0.002
alpha_cons	*** -0.03	** -0.007	***0.051	***0.12	***0.01	***0.131

***: Significance coefficients at 1% level ** : Significance coefficients at 5% level * : Significance coefficients at 10% level

Table 2

Results of Quadratic Almost Ideal Demand System (QUAIDS) estimation (2)

parameters	clothing	Housing	Health	Transportation	Other goods
gamma_lnp1	0.001	0	-0.001	**0.006	-0.012
gamma_lnp2	*** -0.016	0.004	*** -0.015	-0.007	0
gamma_lnp3	0.001	* -0.012	-0.007	0.002	0.006
gamma_lnp4	** -0.003	*** -0.01	*** -0.007	***0.009	*0.006
gamma_lnp5	** -0.008	-0.007	0.004	0.002	0.005
gamma_lnp6	**0.011	*** -0.035	-0.01	0.009	-0.006

parameters	clothing	Housing	Health	Transportati on	Other goods
gamma_lnp7	***0.035	***0.024	0.001	-0.008	-0.039
gamma_lnp8	***0.024	***0.075	***-0.031	***-0.028	***0.019
gamma_lnp9	0.001	***-0.031	***0.036	0	***0.029
gamma_lnp10	*-0.008	***-0.028	0	*-0.013	***0.027
gamma_lnp11	***-0.039	*0.019	***0.029	***0.027	-0.035
beta_lnx	***0.035	***-0.075	***-0.032	***-0.12	***0.158
lambda_lnx2	***-0.001	***-0.003	***0.008	***0.024	-0.014
alpha_o0	***0.021	***-0.171	***0.031	***0.028	***0.081
alpha_o1	***0.025	***-0.154	***0.039	***0.023	***0.051
alpha_o2	***0.022	***-0.141	***0.02	***0.025	***0.067
alpha_o3	***0.029	***-0.181	***0.033	***0.036	***0.077
alpha_o4	***0.04	***-0.176	***0.026	**0.025	***0.074
alpha_o5	***0.018	***-0.102	***0.019	***0.021	***0.027
alpha_o6	***0.01	***-0.175	***0.025	***0.022	***0.046
alpha_o7	***0.01	***-0.128	***0.037	***0.026	***0.048
alpha_o8	***0.032	***-0.193	***0.033	***0.052	***0.068
alpha_o9	***0.016	***-0.117	***0.015	***0.022	***0.026
alpha_o10	***0.017	***-0.133	**0.03	**0.023	***0.065
alpha_o11	***0.033	***-0.184	***0.015	**0.021	***0.023
alpha_o12	***0.034	***-0.148	***0.007	***0.018	***0.036
alpha_o13	***0.015	***-0.122	**0.02	***0.025	***0.054
alpha_o14	***0.02	***-0.19	***0.032	***0.019	***0.055
alpha_o15	**0.02	***-0.145	***0.012	***0.025	***0.051
alpha_o16	***0.038	***-0.22	***0.018	**0.026	***0.079
alpha_o17	***0.03	***-0.202	**0.02	***0.032	***0.062
alpha_o18	-0.001	***-0.15	***0.009	***0.034	***0.059
alpha_o19	***0.024	***-0.187	***0.016	***0.025	***0.086
alpha_o20	***0.015	***-0.137	***0.025	***0.036	***0.068
alpha_o21	***0.019	***-0.157	***0.014	***0.033	***0.084
alpha_o22	***0.007	***-0.135	***0.011	**0.03	***0.032
alpha_o23	-0.001	***0.035	***0.007	-0.001	***-0.01
alpha_o24	***0.037	***-0.201	***0.017	***0.016	***0.088
alpha_o25	***0.013	***-0.053	**0.04	***0.021	***0.028

parameters	clothing	Housing	Health	Transportation	Other goods
alpha_o26	***0.017	***-0.118	***0.015	***0.028	***0.06
alpha_o27	***0.029	***-0.155	***0.029	***0.036	***0.061
alpha_o28	***0.034	***-0.175	***0.024	***0.033	***0.063
alpha_o29	***0.053	***-0.212	-0.003	***0.032	***0.063
alpha_board	***0.001	***-0.008	***-0.006	***-0.003	***0.003
alpha_sartahtsil	***-0.001	***0.002	***-0.002	***-0.001	***0.005
alpha_hamtahtsil	***0	***0.002	***-0.001	0	***0.001
alpha_jens	***-0.005	***-0.015	*0.002	***0.011	***0.007
alpha_sen	***-0.001	***0.002	*0	***-0.001	***0
alpha_sarfaaliat	0	***-0.02	***-0.015	*-0.001	***0.03
alpha_sarzanashoe	**-0.002	***-0.02	***0.009	***0.005	-0.021
alpha_hadaf	0.001	-0.001	***0.008	***-0.012	*** -0.004
alpha_cons	***-0.053	***0.741	***0.06	***0.217	-0.239 ***

***: Significance coefficients at 1% level **: Significance coefficients at 5% level *: Significance coefficients at 10% level

Resources: study results

Tables 1 and 2 show the results of the model estimation. According to these tables, all own price coefficients in each equation are significant at level 1% (except for the transportation equation where the own price coefficient is significant at 10%). Also, the coefficient of real expenditure logarithm variable is significant at level 1% in all equations indicating the good fitting that is consistent with the demand theories. Also, the results of these tables indicate the importance of the second-order variable of real expenditure for the bread equation. This coefficient is significant at level 1% and it indicates the adaptation of the Quadratic Almost Ideal Demand System (QUAIDS) model with the observations.

The results also show that:

- The γ coefficients express, supposing that the real household income is fixed, the change in the percentage of the budget share allocated to the purchase of the commodity i if the price of the commodity j changes 1%. Accordingly, the coefficient 0.006 in the bread demand function shows that supposing that the income is fixed, the budget share allocated to the bread will increase by 0.06% if the bread price increases by 10%.
- The coefficient of the variable of household size has been obtained as positive and significant for bread. Accordingly, the demand of the

household for bread increases along with the increase in the family size that is entirely natural and under the expectations.

- The effect of dummy variable of the spouse's level of education of the head of the household and also the spouse's level of education has been 0 for the bread that indicates the lack of effect of the level of education on demand for bread.
- The coefficient of variable relating to the sex of the head of the household regarding bread has become positive and significant at 1% level. It means that if the head of the household is male, the bread consumption of the household increases. This topic can indicate the higher welfare of the households with the male head.
- The coefficient of the age of the head of the household is 0 for bread, and it has become significant at a 1% level. It means that the age of the head of the household does not affect the demand for bread.
- Concerning the coefficient of employment of household head, the obtained coefficient for the bread is not significant. Thus, the employment or non-employment of the head of the household does not affect the demand for bread.
- The marital status of the head of the household is one of the social variables whose coefficient has been positive and significant for the bread according to the estimations of the present study. The presence of both parents in the household increases the expenditure on bread. Perhaps, it can be proposed that the family eat a number of meals in the households where both parents are present; therefore, the bread consumption is greater in these families.
- The positive coefficient of implementation of the Law on Targeted Subsidies for bread shows that the expenditure on bread has increased along with the implementation of the Law on Targeted Subsidies, and the expenditures on other groups of foods have decreased.

Now, the price and income elasticities of the provinces can be calculated considering the fitted constrained equations.

Estimation of the price and income elasticities of provinces for bread

According to the information included in the first column of Table 3, the highest share of bread is in the basket of the households living in Sistan and Baluchestan Province that is 0.049 and the households living in provinces of South Khorasan and Kurdistan and Kurdistan, that is 0.034. The least share of

bread is in the basket of the households residing in Chaharmahal and Bakhtiari Province that is 0.014.

The second and third columns of Table 3 show the compensated and uncompensated price elasticities of bread in different provinces. As can be seen in the table, the compensated and uncompensated price elasticities have been negative for all provinces that are under the theoretical expectation and negative relationship between the amount of demand and bread price.

The price elasticity of demand for bread is -0.5 in the whole country that indicates the low elasticity of the demand for bread. It means that, on average, there will be a 0.5% decrease in the demands for bread along with a 1% increase in its price in the urban areas. In other words, there is a low sensitivity to the change in bread price.

The least bread price elasticity has been observed in Chaharmahal and Bakhtiari Province. The smallest decrease in demand will occur among the households living in Chaharmahal and Bakhtiari Province along with the 1% increase in bread price.

The greatest price elasticity of bread has been observed in the provinces Sistan and Baluchestan, South Khorasan, and Kurdistan, respectively. Thus, the greatest decrease in demand for bread consumption will occur among the households of these three provinces along with the 1% increase in bread price.

According to the economic theories, the greater share of an individual's income is spent on a commodity, the price elasticity of the given commodity will be greater. As can be seen, this is completely confirmed by the results obtained in this research, and the greatest price elasticity is observed in the provinces where the bread is the main portion of the consumption basket of the given provinces.

As the numbers in the third column of table 3 show it, the sign of all income elasticities, except for the provinces of Isfahan, Chaharmahal o Bakhtiari, and Kohgiluyeh and Boyer-Ahmad, is positive i.e. the bread is considered as a normal commodity in all provinces except for the mentioned provinces. The normality of bread for households means that the amount of expenditure on bread increases along with the increase in the income of consumers. Considering the figures registered for the income elasticities that are all less than 1, it can be concluded that bread is considered as a necessary commodity in all 28 mentioned provinces. It is the case because the demand for bread will decrease by less than 1%, along with the 1% decrease in income.

However, concerning the three provinces of Isfahan, Chaharmahal and Bakhtiari, Kohgiluyeh and Boyer-Ahmad considering the negative income elasticity, bread is considered an inferior commodity and the consumption of

bread decreases along with the increase in income. It can indicate that the bread has substituted some more expensive foodstuffs because of being cheaper considering the current income levels in these three provinces, and the households in these provinces start to consume less bread and more of other foodstuffs as they incomes increase.

Table 3

The share and income elasticities, compensated and uncompensated provincial price through implementing the constraints of symmetry, homogeneity and adding up

Provinces	Share of bread	Income elasticity	Uncompensated price elasticity	Compensated price elasticity
Markazi	0.021	***0.145	***-0.512	***-0.509
Gilan	0.019	***0.089	***-0.459	***-0.457
Mazandaran	0.02	***0.169	***-0.501	***-0.497
East Azerbaijan	0.03	***0.413	***-0.66	***-0.648
West Azerbaijan	0.031	***0.453	***-0.669	***-0.655
Kermanshah	0.027	***0.365	***-0.622	***-0.612
Khuzestan	0.021	***0.214	***-0.53	***-0.526
Fars	0.018	***0.074	***-0.442	***-0.441
Kerman	0.027	***0.317	***-0.632	***-0.623
Razavi Khorasan	0.026	***0.317	***-0.611	***-0.603
Isfahan	0.015	***-0.08	***-0.354	***-0.355
Sistan & Baluchestan	0.049	***0.589	***-0.786	***-0.757
Kurdistan	0.034	***0.485	***-0.703	***-0.686
Hamadan	0.028	***0.337	***-0.635	***-0.626
Chaharmahal & Bakhtiari	0.014	***-0.203	***-0.281	***-0.284
Lorestan	0.028	***0.376	***-0.632	***-0.622
Ilam	0.024	***0.269	***-0.57	***-0.564
Kogiluyeh & Boyerahmad	0.016	*-0.034	***-0.391	***-0.392
Bushehr	0.022	***0.214	***-0.548	***-0.543
Zanjan	0.033	***0.481	***-0.692	***-0.676
Semnan	0.018	0.011	***-0.458	***-0.458
Yazd	0.019	0.015	***-0.471	***-0.471
Hormozgan	0.024	***0.286	***-0.567	***-0.561
Tehran	0.015	0.017	***-0.346	***-0.346
Ardabil	0.03	***0.433	***-0.661	***-0.648
Qom	0.021	***0.115	***-0.522	***-0.52
Qazvin	0.018	***0.078	***-0.452	***-0.451
Golestan	0.031	***0.411	***-0.675	***-0.662
North Khorasan	0.029	***0.367	***-0.648	***-0.637
South Khorasan	0.034	***0.459	***-0.695	***-0.68
Alborz	0.03	***0.458	***-0.661	***-0.647
whole country	0.025	***0.291	***-0.588	***-0.581

Resources: Study results

The highest income elasticity has been observed in Sistan and Baluchestan Province that is 0.58, showing that the most significant decrease in bread consumption will occur in Sistan and Baluchestan Province along with the 1% decrease in the income of the households of different provinces.

5 Conclusion

The study of consumer behavior and the analysis of the allocation of the limited household income to different goods and services is considered one of the essential and practical subjects in Economics. The estimation of demand function and recognition of the position of some factors such as the amounts and prices is of great importance within the framework of the relevant elasticities relating to recognizing the consumption preferences and prediction of the future needs of the consumers for policymaking and planning. Awareness of the elasticity coefficients of demand for food items can help agricultural planners them a lot to recognize the course of changes in demands for agricultural products in the coming years. The bread as one of the most important sources of calories received by the households of the country and also as the staple food of most Iranians has a significant role in the health of the Iranian community. Thus the exact identification of the factors affecting the demand for bread and the extent to which each of these factors is effective can prove very helpful in policymaking. The present study has been conducted to investigate the effect of the socioeconomic variables and implementation of the Law on Targeted Subsidies on the consumption of bread in different provinces in the period 2007-2015 where the approach of Quadratic Almost Ideal Demand System (QUAIDS) and calculations of different types of income and price elasticities have been used. Considering the importance of bread in the food basket of Iranian households, the findings of this investigation can make many contributions to different sections that are responsible for adjusting the market and providing food security in the country.

The results of the model show that the bread is considered a vital commodity in Iran (with an income elasticity of 0.29), and it is of low elasticity (with a price elasticity of - 0.58).

In the present study, the average share of the bread of urban households in the whole country has been obtained as 0.02; that is, the bread accounts for 2% of the household budget. This amount differs from 0.01 to 0.05 in different provinces.

The income elasticity of bread has been positive and less than 1 in all provinces except for Isfahan, Chaharmahal and Bakhtiari and Kohgiluyeh and Boyer-Ahmad. Thus, it can be concluded that bread is a vital commodity in all 28 mentioned provinces.

The bread price elasticity for the urban households throughout the country has been obtained as -0.58%. It means that if the bread price increases by 1%, we will have about a 0.58% decrease in demand. Thus, bread is considered a low elasticity commodity for the urban community in Iran, and it is not a good solution to change the bread price to change the bread consumption pattern.

The results show that the coefficient of household aspect is positive and significant. The fact that the obtained family coefficient is positive can originate from two factors: 1- The consumption of bread increases along with the increase in the number of family members, 2- The household size increases as moving towards the low-income groups and the bread gets a greater share of the consumption basket of these households.

Considering the coefficient obtained for the married heads of households (that is positive and significant) as it was expected before, the married life of the head of the household increases the bread consumption. Therefore, the consumption of bread increases in families where both parents are present. Probably, this stems from three reasons: 1- Being married increases the household size, 2- The households with the married head are probably more prosperous because it is possible that the number of working people increases in these households (where both man and woman work), 3- In the households where both parents are present, the family will have a higher number of meals. Thus the consumption of bread is greater in these families.

The positive coefficient of the sex of the head of households shows that the demand for bread in the households with a male head is greater than that of the households with a female head, and this is probably because the households with a female head enjoy less welfare. Therefore, the government should protect this vulnerable group of the community by granting special facilities to achieve food security for all members of the community and also to administer justice.

Considering the coefficient obtained for the implementation of the Law on Targeted Subsidies (that is positive and significant), it is concluded that the increase in the price of bread resulting from the elimination of the subsidies not only fails to decrease the demand for bread, but it will lead to a more consumption of this commodity. Thus, it can be concluded that the decrease in the wastes of bread that was stated as one of the goals of the decrease in subsidy in this section was not realized. It can be probably explained by the

argument that because according to the obtained coefficients the effect of the implementation of this law on the demand for meat and other foodstuffs was negative and significant. The consumers cut down on the consumption of the two mentioned groups of goods and replaced bread was substituted for its relatively lower price where this entails the implementation of poverty eliminating policies by the government.

The effect of dummy variables of education of the head of household, the education of the spouse of the head of household, and the age of the head of household on the demand for bread was obtained as zero and significant. It means that the increase in the education level of the heads of households, and also the education of the spouse of the head of household and the age of the head of household have not affect bread consumption pattern.

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