AN ALMOST IDEAL DEMAND SYSTEM: AN APPLICATION TO THE DIFFERENT COMMODITIES FOR TURKEY
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Abstract

The paper aims to develop income and price elasticities of household food (milk), alcoholic (beer) and cigarette consumption for Turkey by applying the Almost Ideal Demand System (AIDS) to the data between 2002 and 2013 Household Budget Survey.

In this study, data of the Household Budget Survey (HBS) will conducted and calculated by the Turkish Statistical Institute (Turkstat). Income and Price elasticities will be estimated within the framework of the Almost Ideal Demand System (AIDS) approach in Turkey.

Findings for the price elasticities for AIDS model will be searched with consistent by the economic theory. At that time, price elasticities are negative according to the calculations of these price elasticities.

Keywords: almost ideal demand system, income, price elasticity

1. INTRODUCTION

The problem in this study stems from the fact that what household demand parameters by milk, beer and cigarette groups would be in Turkey. In addition, as for the importance of this study for Turkey, it reveals the expectation that despite advanced technological developments in the globalized world of today. Especially, famine, food insecurity and food consumption will continue to be an important problem in the world and in Turkey in the future, just like it is today.

In this study, calculation of price and expenditure elasticities drawn from the Almost Ideal Demand System was aimed, by using expenditure data relevant to the milk, beer and cigarette groups included in the Household Budget Surveys (HBS) between 2002 and 2013. The main goal of this study is to analyze the consumption behavior of the households living in Turkey. As it is known, despite the fact that household consumption expenditures are composed of different commodity groups, budget shares for expenditures represent an important part of them. With in this study, it is possible to monitor, via the price and expenditure elasticities of milk, beer and cigarette groups for which the most and the least expenses were made by the consumers.

The Almost Ideal Demand System (AIDS) was selected for the study use for its following advantages: The AIDS model provides arbitrarily the first order approximation for any demand system. It provides definite estimations of axioms of choice. It aggregates consumers perfectly. It has a functional form which is consistent with household budget data. It is easier to make estimations in the form of linear approach and easily used to test homogeneity and symmetry constraints (Blanciforti and Green, 1983).

There are numerous studies analyzing the demands for expenditure groups in world countries, whereas the number of the studies conducted in this regard in Turkey. In the large majority of these few studies, cross section data are used, yet studies conducted with time series data remain insufficient. There are a few studies analyzing the demands for food items in Turkey that are as follows: Şahinli and Fidan (2012), Şahinli (2010). In our data was established as a cross-section data set in this study. The econometric model was estimated according to this organized and established Household Budget Surveys (HBS) data. In our study, price and expenditure elasticities relevant to whole Turkey were obtained between 2002 and 2013. Price and expenditure elasticities were found in line with the parameters estimated from the AIDS. According to the results obtained, consumer demand estimation of the households living in Turkey was analyzed.
Studies conducted related with the Almost Ideal Demand System in Turkey and out of the country were examined. Elasticities obtained in the other studies carried out, on the other hand, are as follows: Deaton and Muellbauer (1980), Blanciforti and Green (1983), Blanciforti, Green and King (1986), Hutasuhut et al. (2001), Pollak and Wales (1987),

In Turkey, on the other hand, there are econometric studies on demand analysis that results of some of these were as given below: Şahinli and Fidan (2012), Şahinli (2010).

2. MATERIAL AND METHODS

Material

TurkStat has launched a continuous survey application in 2002. The essential changes in definition and concepts of the survey arise in 2002 survey which is the first survey after 1994. The consumption expenditure values of the households per month are listed from the least amount to the most amount within the month, the households were divided in five equal parts and quintiles were formed and share of expenditure of each group was calculated. Since the quintiles are formed separately for urban and rural settlements, values for Turkey can not be obtained from the total of the urban and rural values. It is also caused by the fact that each level of settlement was listed independently; the household quintiles were formed and sub features within these groups were calculated separately (Turkstat, 2015).

The HBS data between 2002 and 2013, the method of which is given above by the Turkstat were used in this study. This survey data were organized and changed with relevant to the researcher’s aim and objective.

Household Income and Consumption Expenditures Survey of between 2002 and 2013 were obtained from Turkish Statistical Institute and general sum of total monthly consumption expenditures and expenditure values regarding milk, beer and cigarette were taken.

12 month-consumer prices index figures were used from the TurkStat’s Price Statistics database. Consumer Price indexes were used. After that price data were converted into real price values according to the model specifications.

The data set created for study use was distributed by milk, beer and cigarette groups. Moreover, the data which were regions in the cross section and 11 year-observations of 2002 and 2013 in the time section were combined.

Methods

If the basic model is written for each commodity, the following equations might be obtained. In this section, how to make an estimation parameter of an almost ideal demand systems are shown as follows:

\[ w_1 = \alpha_1 + \gamma_{1.1}\ln p_1 + \gamma_{1.2}\ln p_2 + \gamma_{1.12}\ln p_{12} + \beta_1\ln \left(\frac{x}{P^*}\right) + u_1 \]
\[ w_2 = \alpha_2 + \gamma_{2.1}\ln p_1 + \gamma_{2.2}\ln p_2 + \gamma_{2.12}\ln p_{12} + \beta_2\ln \left(\frac{x}{P^*}\right) + u_2 \]
\[ w_3 = \alpha_3 + \gamma_{3.1}\ln p_1 + \gamma_{3.2}\ln p_2 + \gamma_{3.12}\ln p_{12} + \beta_3\ln \left(\frac{x}{P^*}\right) + u_3 \]

\[ (1) \]

In this equation,

- \( w_i \) represents the budget share of ith good,
- \( p_j \) is price of the jth good,
- \( x \) is total expenditure on all goods
- \( P^* \) is price index.
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Price elasticity belongs to AIDS model are calculated as follows:

\[ e_{ii} = -1 + \frac{\gamma_{ij}}{w_i} - \beta_i \]  
Marshall’s Price elasticity (Uncompensated)  

\[ e_i = 1 + \frac{\beta_i}{w_i} \]  
Expenditure (Income) elasticity

3. EMPIRICAL RESULTS

The estimation of model parameters was calculated by The Least Squares method. Estimation of the model was made by using Eviews 7.0 econometrics package program. The data relevant to the milk, beer and cigarette groups which take place in the Household Budget Survey of between 2002 and 2013 were applied to the An Almost Ideal Demand System.

Table 1. An almost ideal demand system statistics

<table>
<thead>
<tr>
<th>Groups</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk</td>
<td>0.917</td>
</tr>
<tr>
<td>Beer</td>
<td>0.314</td>
</tr>
<tr>
<td>Cigarette</td>
<td>0.939</td>
</tr>
</tbody>
</table>

Calculated R² and DW values of the almost ideal demand system are given. While the lowest R² value %31.4 was in the beer group, the highest R² value %93.9 was in the cigarette group (Table 1).

Price and expenditure elasticities values with relevant to milk, beer and cigarette groups for AIDS model is calculated for estimated parameter values that are as follows in Table 2.

Table 2. Price and expenditure elasticities

<table>
<thead>
<tr>
<th>Groups</th>
<th>Price Elasticity</th>
<th>Expenditure Elasticity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk</td>
<td>-0.99991</td>
<td>0.99845</td>
</tr>
<tr>
<td>Beer</td>
<td>-0.36979</td>
<td>1.16327</td>
</tr>
<tr>
<td>Cigarette</td>
<td>-1.03428</td>
<td>0.99765</td>
</tr>
</tbody>
</table>

Price Elasticity can be calculated by the percent change in the quantity demanded by the percent change in price. Price Elasticity measures the responsiveness of a change in demand, after a change in price. When the Price Elasticity of a good is greater than one in absolute value, the demand is said to be elastic; it is highly responsive to changes in price.

Goods which are elastic, tend to have some or all of the following characteristics: a. They are luxury goods, expensive and a big % of income e.g. sports cars and holidays. b. Goods with many substitutes.
and a very competitive market. Demands with an elasticity less than one in absolute value are inelastic; the demand is weakly responsive to price changes.

Goods which are inelastic tend to have some or all of the following features: a. They have few or no close substitutes, e.g. petrol, cigarettes. b. They are necessities and addictive. c. They cost a small % of income or are bought infrequently. Demands with an elasticity equal to one in absolute value are unit elastic; the demand is smoothly responsive to price changes.

According to the AIDS model, price elasticities are suitable for economic theory that is values of price elasticities are negative. While milk and beer price elasticities are inelastic, cigarette price elasticity is elastic.

When the price elasticity of the milk is considered, in case of 1% increase milk, this might be interpreted as demand for milk will grow by 0.99991%, demand for beer will grow by 0.36979% and demand for cigarette will grow by 1.03428%.

While the lowest price demand elasticity was observed in beer, the highest price demand elasticity was observed in cigarette. In line with this, it is possible to say that consumers are more responsive to price changes. Price elasticities are calculated to be negative as expected in accordance with the economic theory.

Expenditure elasticity was calculated for each variable according to the estimated parameter values by using elasticity formulas with relevant to the Almost Ideal Demand System. Expenditure elasticities belong to the commodity groups are given in Table 2. Expenditure elasticity reveals how the demanded amounts of the products would differ in the face of income changes. In line with expenditure elasticities, properties of the products are defined. Those with an expenditure elasticity higher than 0 are normal goods, whereas those with one less than 0 are inferior goods.

According to the Table 2, values are examined belong to commodity groups, we emphasized that found to be 0.99845 for milk, 1.16327 for beer, 0.99765 for cigar. It is understood from these that these group elasticities are normal goods.

According to the calculated expenditure elasticity belong to the milk, assuming all the other variable constant, in case of an average increase of 1%, it is possible to say that milk expenditure will increase by 0.99845%, in case of an average increase of 1% in beer, it is possible to say that beer expenditure will increase by 1.16327%, in case of an average increase of 1% in cigarette, it is possible to say that cigar expenditure will increase by 0.99765%.

4. CONCLUSION REMARKS

Although expenditure elasticities between 2002 and 2013 had positive values, price elasticities were found negative in accordance with the expectations of the economic theory. Price elasticities were found in line with the parameters estimated from the AIDS. Findings for the price elasticities for AIDS model are consistent with economic theory. At that time, price elasticities are negative.

While the lowest price demand elasticity was observed in beer, the highest price demand elasticity was observed in cigarette. In line with this, it is possible to say that consumers are more responsive to price changes. Price elasticities are calculated to be negative as expected in accordance with the economic theory.

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REFERENCES


