To my family and friends

DETERMINANTS OF REGIONAL CONSUMPTION DISPARITIES IN
TURKEY AND STATIAL ANALYSIS

Graduate School of Social Sciences

TOBB University of Economics and Technology

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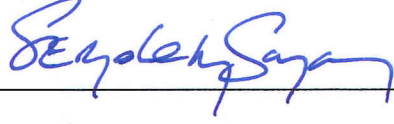of
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I hereby certify that this thesis meets all the requirements of the Graduate School of Social Sciences for a Master's degree.
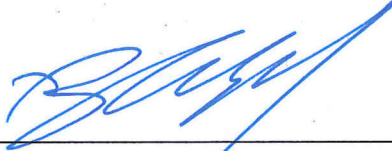
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I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I have therefore fully cited and referenced all material and results that are not original to this work.

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ABSTRACT

DETERMINATS OF REGIONAL CONSUMPTION DISPARITIES IN TURKEY
AND SPATIAL ANALYSIS

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This study investigates differences in households'consumption patterns in 26 regions of Turkey (NUTS Level 2) and for 12 main consumption groups for years 2005-2013 by using TurkStat Regional Dataset. The regional differences in consumer behavior are modeled via Linear Approximation of the Almost Ideal Demand System (LA/AIDS) by Deaton and Muellbauer (1980) and demographic variables are introduced to system using translation method by Pollak and Wales (1981). To estimate models, Augmented mean group estimator technique is employed on panel regressions.

Within the context of the study, expenditure and own price elasticities are calculated separately for each of 26 regions and 12 main consumption groups. Then, the results are reflected on Turkey's map to carry out spatial analysis and regional disparities in each of main item groups are evaluated.

Based on results of expenditure elasticities, one can conclude that consumption pattern for goods in food, alcoholic beverages and tobacco, clothing, health, communication, education, and miscellaneous groups in western areas are the same as consumption pattern of those in eastern areas. However, consumption pattern for housing, furniture, transportation, recreation, and restaurant and hotel commodity groups, are different in the west and the east.

On the other hand, results of own-rice elasticity reveal that households' responses to price changes for food, alcoholic beverages and tobacco, health, communication, education, and miscellaneous commodity groups are the same in western and eastern areas. However, it is observed that demand for items of clothing, housing, furniture, transportation, recreation, and restaurant and hotel groups differs for regions in the west and in the east.

Keywords: Regional Consumption Disparities, Panel Data, Spatial Analysis

ÖZET

TÜRKİYE'DE BÖLGESEL TÜKETİM FARKLILIKLARININ BELİRLEYİCİLERİ VE MEKÂNSAL ANALİZİ

Akdeniz, Merve

Yüksek Lisans, İktisat Bölümü

Tez Yöneticisi: Yrd. Doç. Dr. Ozan Ekşi

Temmuz 2015

Bu çalışma, 2005-2013 yılları için TÜİK Bölgesel Veri datasetini kullanarak, 12 ana mal grubu için Türkiye'nin 26 bölgesindeki (İBBS Düzey 2) hane halkı tüketim alışkanlıklarının farklılıklarını incelemektedir. Tüketici davranışlarındaki bölgesel farklılıklar, Deaton ve Muellbauer (1980) Doğrusal Formda Mükemmele Yakın Talep Sistemi (LA/AIDS) üzerinden modellenmiş ve demografik değişkenler Pollak ve Wales (1981) translation yöntemi kullanarak sisteme tanıtılmıştır. Modelleri tahmin etmek için, panel regresyon analizi için genişletilmiş ortalama grup tahmincisi tekniği kullanılmıştır.

Çalışma kapsamında, 12 ana tüketim grubunun ve 26 bölgenin her biri için ayrı ayrı harcama ve fiyat esneklikleri hesaplanmıştır. Bu sonuçlar mekânsal analiz için Türkiye haritasına yansıtılmış ve ana mal gruplarının her biri için bölgesel farklılıklar değerlendirilmiştir.

Harcama esnekleri, gıda, alkollü içecekler ve tütün, giyim, sağlık, iletişim, eğitim ve diğer grubundaki mallar için, batı bölgelerdeki tüketim davranışının doğu bölgelerde bulunanlarla aynı olduğuna işaret etmektedir. Ancak, konut, mobilya, ulaşım, eğlence, restoran ve otel mal gruplarının tüketim alışkanlıkları, batıda ve doğuda farklıdır.

Öte yandan, , gıda, alkollü içecekler ve tütün, sağlık, iletişim, eğitim, çeşitli mal grupları için, hane halklarının fiyat değişikliklerine tepkilerinin doğu ve batıda aynı olduğu sonucuna varılabilir. Ancak, giyim, konut, mobilya, ulaşım, eğlence, restoran ve otel gruplarına talep, batı ve doğu bölgelerde farklılık göstermektedir.

Anahtar Kelimeler: Bölgesel Tüketim Farklılıkları, Panel Veri, Mekânsal Analiz

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ABBREVIATIONS

AMG   : Augmented Mean Group Estimator

CCE   : Common Correlated Effects Estimator

HEIS   : The New Zealand Household Expenditure and Income Surveys

HFO   : Household Furnishing/ Operations

ISTAT   : Italian National Statistical Agency

LA/AID   : The Linear approximation of the Almost Ideal Demand System

MM   : Multilevel Model

NIPA   : U.S. National Income and Product Accounts

NSSO   : Indian National Sample Survey Organization

NUTS   : Nomenclature of Territorial Units for Statistics

PIGL   : Price-Independent Generalized Linear

PIGLOG   : Price-Independent Generalized Logarithmic

QES   : Quadratic Expenditure System

TurkStat   : Turkish Statistical Institute

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CHAPTER ONE

INTRODUCTION

1.1. Objective of The Study

Studies on consumption expenditure are one of the primary interests of economists and policy makers. This interest is mainly because of the fact that the consumption expenditure of households is always a good indicator of their standard of living.

As one would expect, research on household expenditures looks back to a long tradition in economics. It goes back to the 19th century to the famous work by Ernst Engel which investigates how households distribute their income between expenditure groups. Since then the curve that reflects the effects of the changes in the

households income on the quantity demanded is called as Engel curve. The household expenditure behavior can be analyzed by using Engel curves (Sadoulet and Janury, 1995). In the basis of the Engel curve, it can be deduced that households primarily tend to satisfy their most basic needs and that the expenditure share allocated for compulsory goods within the consumption expenditure decreases as the income level increases (Çağlayan and Astar 2012). Income elasticity of demand are estimated from convenient regression model to Engel curve (Selim 2001).

Engel curve, and specifically Engel elasticity, is an important research subject in both microeconomics and macroeconomics due to the fact that it has important roles both in consumer demand theory and determination of the welfare levels of households and policy implications. Thus, it is an important criterion for measuring the welfare levels of the households in both developed and developing countries. This is not surprising at all since consumption may be considered as the ultimate purpose of economic behavior and thus plays a major role in economic theory. Determining consumer behavior by Engel elasticity enables policy makers to increase living conditions of inhabitants by making reliable policies and by monitoring the temporal changes in the level of welfare. Furthermore, while designing their social policy, countries needs indicators that show how consumption is effected by change in income in the course of time and socio demographic variables to determine sufficiency of present programs and to include applicable targets. The main objective of the study is to study consumption behavior of Turkish households by calculating the expenditure and own-price elasticities of different consumption goods. To that end we use the aggregate data of Turkish Household

Budget Surveys for years 2005-2013 and by specifically taking regional consumption expenditure patterns into consideration. The reason for analyzing expenditure elasticities of consumption goods rather than their income elasticities is many fold. First of all, poverty levels are often calculated based on consumption expenditures, as the inequality in distribution of income result in inequality in consumption expenditure. Moreover, people declare total expenditure more truly than income (Selim 2001). However, there are more detailed reasons to measure household well-being by consumption expenditures.

One of the important reasons to employ expenditure instead of income is that expenditures follows "permanent income hypothesis" (Friedman 1957) asserting that consumption is smoother and less-variable across time than current income since it is not closely bounded to short-term fluctuations in income. It is obvious that consumers can smooth out income fluctuations in the short term, over seasons, and even over a few years. Therefore, household expenditures are accepted to better show permanent income and from this point of view, it is regarded to be a better indicator of economic well-being and respective inequalities (Noll 2007).

Beside, as in rural agriculture, income fluctuates significantly in a year because of seasonal effect and it changes from year to year depending on yield of harvest. Since Turkey is one of the agriculture countries, consumption sustain a practical advantage over income in the measurement of living standards.

Another reason to prefer consumption to income data in household budget studies is that it is hard to measure income in countries which self-employment, including small business and agriculture, is common. Including small business and

agriculture, it is difficult to collect accurate income data, precisely to separate business transactions from consumption transactions under such circumstances (Deaton and Zaidi 2002). To conclude, for the reasons we stated above, in this study we studied disparities by using households' expenditures instead of using households' income.

Although Engel elasticities can be calculated for countries and specifically provinces, in this study, we will investigate Engel elasiticities for regions of Turkey. By measuring consumer expenditure in different regions, in western and eastern regions and between regional groups, it is aimed to investigate regional disparities in household standard of living, which is crucially important for designing appropriate regional development policies besides implementing convenient price policies. Moreover, this study aims to fill the gap in literature among the studies held on Turkey in that although relevant literature presents various studies on regional income differences, there are only a few studies on regional consumption disparities in Turkey.

The study is organized as follows: after brief introduction in Chapter 1, literature review is given in Chapter 2. Chapter 3 explains theoretical structure and Chapter 4 introduces empirical methodology. Chapter 5 presents the results and the discussion. Chapter 6 concludes.

1.2. Importance of The Study

This study is expected to contribute to the empirical literature in two ways: Firstly, there are only a few studies on regional consumption in Turkey although there are many studies on regional income per capita. It should be emphasized that there is a huge literature on regional consumption differences for especially developed countries. However, among the consumption studies previously held on Turkey, we haven't come across any study that contains all regions of Turkey. This study is the first study – to the researcher knowledge – which analyzes the differences in the consumption of 12 main groups for 26 regions (NUTS level 2) and for the period 2005-2013. New control variables derived from the literature, such as population, employment and education, are added to the original LA/AID model. Moreover, the panel data regressions which take into account inter-regional interactions (cross-sectional dependence) are employed to estimate LA / AID model. Namely, recently developed augmented mean group estimator (Eberhardt and Teal 2010, 2011; Eberhardt and Bond 2009) technique, which take cross-sectional dependence in time and spatial dimensions into account, are used.

Secondly, the previous studies with only one exception (Şengül and Sizege 2012) in Turkey cover the period before 2004 since there are no micro data available for the provinces and regions. However, the current study covers the period 2005-2013 for the analysis of the consumption behavior. Thus, we are able to analyze the effects of the funds and grant programs and policies implemented after 2004 in the alleviation of the regional disparities. Hence, the findings of the study may be used to

guide the public policy-makers in designing the regional development policies. They also may be used as demand analyses for the investors who are willing to initiate businesses in different regions.

1.3. Scope of the Study

In this study, differences in consumption expenditures which are made on various groups of goods are analyzed. Briefly, scope of this study is restricted to regional differences in expenditures on goods and services for Turkey. Consumption data studied in this research is collected by Turkish Statistical Institute (TurkStat) and contains the proportion of income spent on 12 groups of goods and services in the total expenditure for each region in NUTS 2 Level. The study is carried out for the post2004 period due to the availability of the NUTS Level 2 data. Yet, this period also allows us to investigate effects of regional EU grants given after 2004 on eliminating regional differences.

1.4. Data

In this study, dataset is mainly obtained from Regional Statistics by TurkStat. It is for NUTS Level 2 which includes 26 regions of Turkey. To explain briefly, the NUTS classification (Nomenclature of territorial units for statistics) is a hierarchical

system for dividing up the economic territory of the EU for the purpose of: the collection, development and harmonization of European regional statistics; socio-economic analysis of the regions; framing of EU regional policies. Although NUTS1 consist of major socio-economic regions, NUTS2, which we used in this study, contains basic regions for the application of regional policies. The NUTS2 division of Turkey as follows:

Table 1 NUTS2 Level Division Of Turkey

TR10	İstanbul
TR21	Tekirdağ, Edirne, Kırklareli
TR22	Balıkesir, Çanakkale
TR31	İzmir
TR32	Aydın, Denizli, Muğla
TR33	Manisa, Afyon, Kütahya, Uşak
TR41	Bursa, Eskişehir, Bilecik
TR42	Kocaeli, Sakarya, Düzce, Bolu, Yalova
TR51	Ankara
TR52	Konya, Karaman
TR61	Antalya, Isparta, Burdur
TR62	Adana, Mersin
TR63	Hatay, Kahramanmaraş, Osmaniye
TR71	Kırıkkale, Aksaray, Niğde, Nevşehir, Kırşehir
TR72	Kayseri, Sivas, Yozgat
TR81	Zonguldak, Karabük, Bartın
TR82	Kastamonu, Çankırı,Sinop
TR83	Samsun, Tokat, Çorum, Amasya
TR90	Trabzon, Ordu, Giresun, Rize, Artvin, Gümüşhane
TRA1	Erzurum, Erzincan, Bayburt
TRA2	Ağrı, Kars, Iğdır, Ardahan
TRB1	Malatya, Elazığ, Bingöl, Tunceli
TRB2	Van, Muş, Bitlis, Hakkari
TRC1	Gaziantep, Adıyaman, Kilis
TRC2	Şanlıurfa, Diyarbakır
TRC3	Mardin, Batman, Şırnak, Siirt

The data used in this thesis is for years 2005 to 2013.Expenditure on goods and services is divided into 12 main groups which are:

1. Food and soft drinks,

2. Alcoholic beverages and tobacco,

3. Clothing and footwear,

4. Shelter, water, electricity, natural gas, and other fuels,

5. Household furnishing, equipment and household operations,

6. Health,

7. Transportation,

8. Communication,

9. Recreation,

10. Education,

11. Restaurants and hotels,

12. Other goods and services.

In this study, percentage share of 12 main consumption items in total expenditure and price indices are derived from web page of TurkStat via online data sets. For all groups of good and services, percentage share of groups in total consumption expenditure and price indices are available for 26 regions. Moreover, gross price indices for regions are also available which are used as deflator in the study. On the other hand, access to regional total expenditure. is not permitted; hence, gross regional value added is used as regional total expenditure.

Regional level data on population, schooling ratio, and employment are collected from annual reports of Ministry of National Education.

CHAPTER TWO

LITERATUR REVIEW

Bhattacharya and Mahalanobis (1967) investigates the distribution of per capita household consumer expenditure on all items estimated from the 13th Round (September 1957-May 1958) of the Indian National Sample Survey (NSS) separately for the rural and urban sectors of the different states of India. For rural, urban and all India, the disparities in consumption pattern is analyzed for between states and within states.

Muellbauer (1977) estimates expenditure and own-price elasticities for household for U.K using two of the basic linear panel models. One of the purposes of the paper is to test general hypothesis that whether household composition effects households'

consumption or not. It estimates PIGL-PIGLOG demand systems by using data set obtained from Family Expenditure Surveys for the period 1968-1973. The household budgets are divided into 10 categories: fuel and light; food; alcohol; tobacco; clothing; durables; miscellaneous goods; private transport; services; public transport. Results show that necessities; fuel and light, food, tobacco, and public transport, are mostly mutually complementary, while the luxury goods, alcohol, clothing, etc. are mutual substitutes. In addition, estimation of model also implies that a young and an older children have generally different effects on the household consumption pattern. To sum up, the results of the estimation suggest small own-price elaticities while the estimated parameters and expenditure elasticities are economically plausible. Moreover, the pooled model is found substantially inferior both on grounds of likelihood and the less rigorous criterion of the R^2's. Although the implied total expenditure elasticities of the pooled and non-pooled models are not systematically different, the own-price elasticities are strikingly and systematically lower for the pooled estimations.

Deaton and Muellbauer (1980) estimates commodity budget shares by using Almost Ideal Demand System (AIDS) regarding postwar annual British data from 1954 to 1974. Consumer expenditures are divided into 8 groups: food; clothing; housing services; fuel; drink and tobacco; transport and communication services; other goods; other services. As a result of the study, it is found that AIDS is capable of explaining high proportion of the variance of the commodity budget shares but, unless allowance is made for omitted variables by the arbitrary use of time trends,

does so in a way which is inconsistent with the hypothesis of consumers making decisions according to the model's demand functions governed by the conventional static budget constraint.

Pollak and Wales (1981) describes, estimates, and compares five general procedures for incorporating demographic variables into complete demand systems. These procedures are demographic translation, demographic scaling, Gorman specification, the Modified Prais-Houthakker Procedure, and economies of scale in consumption. British household budget data for the period 1966-1972 is used in the paper. Study rejects the pooled panel model specification against each of the five procedures, indicating that the number of children does affect consumption patterns. Of the five procedures, only demographic translating could be rejected against the unpooled panel model specification, indicating that the other four procedures are reasonably consistent with the data. These four procedures imply similar responses to changes in prices, total expenditure, and the number of children.

Jorgenson and Slesnick (1987) estimates equivalence scales of U.S. households by combining time series and cross-section observations. The cross-section data on individual expenditures for the year 1973 from the Survey of Consumer Expenditures is combined with time series data on aggregate expenditures from the U.S. National Income and Product Accounts (NIPA) for the years 1947-1982. Moreover, time series data on the distribution of total expenditures over all households among demographic groups is employed based on the Current Population Survey. Based on

the theory of exact aggregation, an econometric model of aggregate consumer behavior is developed. In the model, not the individuals but the households are taken as consuming units. Then, the model is generated by a translog indirect utility function for each consuming units. Consumer expenditures are classified into five commodity groups: energy; food; consumer goods; capital services; consumer services. Demographic characteristics employed in the model are family size, age of household head, region of residence, race, and type of residence.

Nelson (1988) analyzes household economies of scale for U.S. in an isolation of the other factors of household composition. It is assumed that individuals have identical tastes. In the study, only households with heads aged between 35 and 55 are studied. The data is obtained from the 1960/61 and 1972/73 United States Bureau of Labor Statistics Consumer Expenditure Survey, to which regional price variables have been added. Consumer goods are decomposed into 5 categories: food, shelter, household furnishing/ operations (HFO), clothing, transportation. The form of the demand functions is the same as Barten (1964), namely scaling model of incorporating of demographic effects. A quadratic expenditure system (QES) is estimated for these five classes of goods. Results indicate that for own-price elasticities, food, clothing, and transportation are own-price elastic whereas shelter and HFO are own-price inelastic. Moreover, estimated expenditure elasticities show that food and shelter are relatively necessities while the other goods are relatively luxuries. Furthermore, result of the χ^2 test rejects that household size effects have been correctly and entirely incorporated, which is discouraging but consistent with results in the prior

literature.

Chatterjee (1994) analyzes household expenditure behavior in Australia and New Zealand by estimating complete demand systems on pooled cross-section data. The study also estimates effects of demographic variables via using information of household composition. Although there are studies estimating complete demand systems on pure time-series data of Australia and the New Zealand, this is the first study in the literature using preference consistent demand estimation on time varying household budget data for these countries. The data provided by Australian Household Expenditure Surveys for period 1984 and 1988-1989 and by the New Zealand Household Expenditure and Income Surveys (HEIS) for period 1984-1991. The Australian data set consists of expenditure of adult couple households, with 0 to 3, or more children and consumption expenditures are divided into 8 groups: food; beverages and tobacco; clothing and footwear; fuel and power; housing costs; transport; recreation; household furnishings and equipment. On the other hand, The New Zealand data did not give any information about household composition and consumer expenditures are classified into 5 groups: food; housing; household operations; clothing and footwear; transportation. Three alternative techniques are used because of need to extend Australian data set demographically. These methods are demographic scaling due to Barten (1964), demographic translation due to Pollak and Wales (1981), and demographic cost scaling proposed in Ray (1983), referred to as DS, DT, and DCS respectively. Estimation results for The New Zealand are consistent with the U.K. reports in Blundell and Ray (1984). Moreover, all the own

price elasticities are found negative while all the expenditure elasticities of the commodity groups are positive, both as expected from the theory. Furthermore, for Australian data, effects of demographic variables on household expenditure behavior found statistically significant, which is consistent with U.K. evidence presented by Pollak and Wales (1981), Ray (1983), and Indian evidence presented in Ray (1980).

Meenakshi and Ray (1999) analyzes food expenditure of 16 States of India regarding regional differences in consumer preferences and in consumer prices. Although there are a many studies conducted on utility consistent demand analysis of consumer expenditure pattern for developed countries, there are relatively very few studies for developing countries. In this sense, this paper fills the literature gap for developing countries. In the model, Quadratic extension of Deaton and Muellbauer (1980)'s Almost Ideal Demand Model is employed, namely QAI. One significant feature of the study is that it is the first known application of QAI to the data set of a developing country. Another important characteristic of paper is that it explains observed differences in household expenditure pattern by incorporating demographic characteristic of households, namely family size and composition, along economic variables, namely prices and aggregate expenditure. To achieve this, it employs the translation approach of Pollak and Wales (1981). The data set of study is obtained by the expenditure surveys carried out 16 States by the National Sample Survey Organization (NSSO) which reported for rural and urban India separately. Consumer items are divided into 9 categories: cereals and cereal substitutes; pulses; milk and milk products; edible oils; meat, egg, and fish; other food; clothing and footwear;

fuel and light; other nonfood.

Outcomes of the study confirm that cultural and non-economic factors are as crucial as the conventional economic variables in analyzing differences in households' food expenditure pattern. The evidence of test results confirms the expectation of Engel's theory. The shares of food in total expenditure, namely Engel ratios, are higher in the rural areas than in the urban, and are inversely related to income both for across the States and within a state. The changes in the composition of food expenditure have been more evident among the poor than among the rich. Undoubtedly, the allocation of food expenditures for the rich quartile in urban regions was stable. Moreover, it is found that household size and composition, particularly the number of children in the family, are important factors on households' decision of expenditure allocation among food items. When own price elasticities are calculated for principal food items, it is found that all expenditure elasticity magnitudes are close to unity confirming that the share of the principal food items in aggregate food expenditure is invariant to the latter in both rural and urban areas. On the other hand, the own-price elasticities show large differences for both across the items and between the rural and urban areas. To describe it clearly, the demand for milk and milk products, edible oils, is found more sensitive to own price changes in the urban areas compared to rural, while the opposite is true for cereals and cereal substitutes, pulses, meat, and egg and fish.

Bono et al. (2007) analyzes the disparities in the Italian regions by taking consumption behavior into account. ISTAT's Italian Family Budget data set was

used for year 2000 which is collected over Italy's 20 regions and contains the expenditures of approximately 23,000 households. In the model, both households and regions are behaved as units: Households alone constitute Level1 units, then they are grouped into the regions; thus, Level 2 units are constructed from regions. Consequently, a hierarchical data structure was built. Regarding this hierarchical structure, a multilevel model (MM) was used which makes it possible for parameters to vary from region to region. It is important to note that this is the first time MM was used on consumption data. To determine regional disparities, expenditures of households were analyzed based on their region of residence . In the Level 2, the consumption behavior of households was tested with respect to income region classification based on the fact that geographical context is related with regional income distribution. In the model, goods and services consumed by households are divided into 3 groups; expenses for food products (Q1), expenses for living (Q2), and luxury expenses (Q3).

Results of the analysis show that regional context is an important factor on consumption behavior as it is obvious via items of consumption and income-class. As income increases the budget share for food products tends to decrease whereas it tends to increase for luxury items. It is deduced from results of estimation that income has a stronger effect on both Q1 (-0.501) and Q3 (0.331) whereas a lower effect on Q2 (-0.115). On the other hand, when income classes take into account, there are regional disparities between the regions. It is found that there are food consumption disparities in lower-income classes and luxury disparities in higher-income classes.

CHAPTER THREE

HOUSEHOLD CONSUMPTION BEHAVIOR

Studies on household expenditure have significant importance since one of the smallest units in development plans that governments carry out is households and the estimated demand parameters are completely useful in several key policies. Governments aim to design macro level policies to improve welfare of the society by investigating demographic structure and consumption behavior of households. These policies range from the purely behavioral aspects of demand forecasting, to welfare issues of poverty and inequality measurement which depend crucially on the estimated Engel elasticities on demographic demand parameter estimates. Tax designs require reliable estimates of price elasticities of goods. (Chatterjee et al. 1994).

3.1. The Relation between Income and Consumption

Before 19th century, it was a tradition to estimate preference consistent "complete demand systems" on time series of national accounts data for developed countries. However, the analysis of the household budget data was pioneered by Ernst Engel's study on Belgian data in 1857. This study ignored price variation and focused on the estimation of income, namely Engel elasticities, from single survey data. He investigated the relation between the income and food expenditure by analyzing budget data of 200 workers. In his study, he calculated expenditure-consumption equations for various good groups and proposed that the most significant consumption amount in the budget is for food and as income rises, the proportion of income spent on food falls. Moreover, he suggested that the share of expenditures made on clothing and housing is almost constant for every budget. However, as income rises, the proportion of income spent on luxury goods rises. That is, increase in the income lead consumer to shift from necessities to luxuries. Furthermore, change in expenditure on necessary goods, such as food items, is less than change in revenue. In other words, response of necessary goods on %1 increase in income, namely elasticity, is less than %1. On the other hand, response of luxury goods is more than %1. Engel defined food as necessities, and recreation, and culture as luxuries. Since these goods are normal goods, that is consumption of these increase as income increases, income elasticity is bigger than 0 for these goods.

Barten (1964) extended the literature on the estimation of "complete demand systems" on household budget data by incorporating demographic variables

into the demand system. Moreover, as a contribution to Engel's study, he combined different survey periods to contain price and family size variation. This study, as mony other mentioned in Most of these studies was conducted on the data sets of developed countries. Some of these which we mentioned in literature review, such as Muellbauer (1977), Pollak and Wales (1981), Ray (1983) on UK; Jorgenson and Slesnick (1987), Nelson (1987) on USA; Lluch (1971) on Spain; and Chatterjee et al. (1994) on Australia and New Zealand. On the other hand, there are rather few studies on developing countries made utility consistent demand analyses of consumer expenditure pattern.

3.2. Descriptive Statistics

For each of the 12 main item groups defined before, descriptive statistics are obtained from the dataset for 26 regions. First, for a given item group, average percentage share of an item group in total expenditure is calculated for all regions based on data available for years. Then, results are projected to Turkey's map for each of the item groups by using GeoDa software. Although NUTS 2 Level division of Turkey is given in the introduction, a map showing all 26 regions on the Turkey's map can be found in the Appendix A.2.

It should be emphasized that in the statistics, values for expenditure shares are divided into 4 quantiles; that is, all regions grouped under 4 categories. For the following figures, lines in the left columns respectively show the regions which have

the least share in the expenditure to regions which have the most share in the expenditure for given item group. In addition, the numbers in the bracket shows the intervals for quantiles and the numbers in the parenthesis are the number of regions in this quantiles.

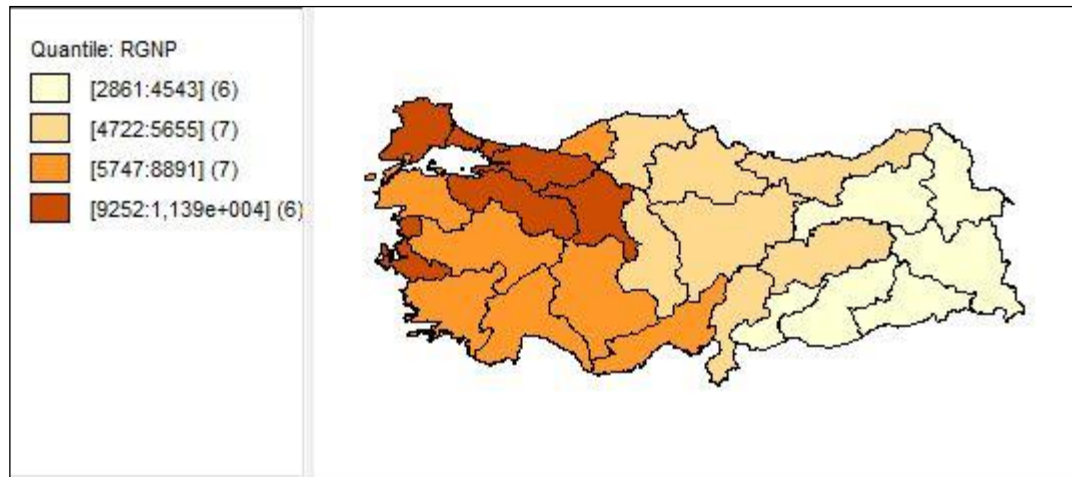**Figure 1 Average Regional Real Value Added**

To start with Figure 1, it shows values of real value added for the regions. It is expected to observe richest regions in the West and the poorest in the East. That is to say, one can see a uniform transition in real values in that the highest values are observed in the West, in TR1, TR2 and TR4, and the lowest values are in the East, in TRA, TRB and TRC.
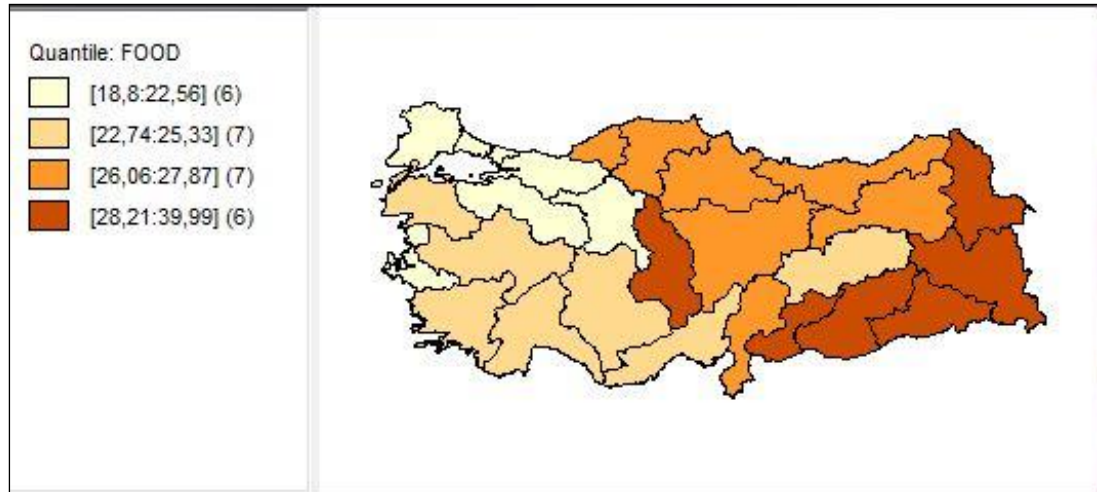
Figure 2 Average Percentage Share of Food and Soft Drinks Expenditure in the Total Consumption Expenditure

It is observed from Figure 2 that share of housing expenditure change between 18.8 percent and 40 percent. Engel stated in his study that percentage share of food items in the expenditure is the highest among the others. Figure 2 confirms that food expenditure is the most important component of consumption for the households in Turkey, which confirms Engel's Law. Moreover, as shown in Figure 2, share of the food expenditure is the highest in the East and the lowest in the North-East. If Figure 2 is interpreted together with Figure 1, it is also verifies Engel Law's that as income increases, share of food expenditure decreases.
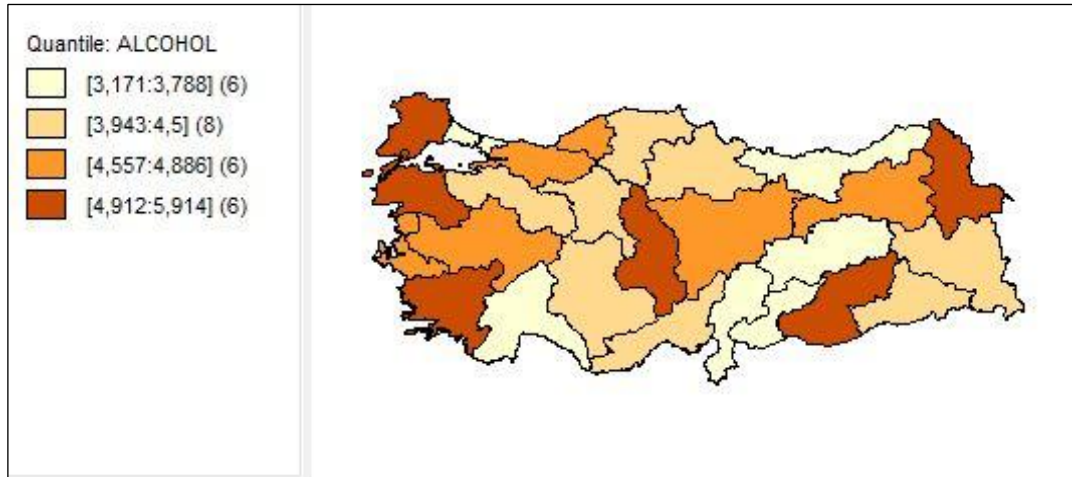
Figure 3 Average Percentage Share of Alcoholic Beverages and Tobacco Expenditure in the Total Consumption Expenditure

Figure 3 shows that share of alcoholic beverages and tobacco expenditure varies between 3.17 percent and 5.91 percent. Following the values, it can be deduced that these items are not significant expenditures in household consumption.

Figure 4 Average Percentage Share of Clothing Expenditure in the Total Consumption Expenditure

Percentage share of clothing in the total expenditure is shown in the Figure 4, which is between 4.56 and 9.44. An accumulation is clearly observed for regions in

east, south, northwest and centre. It might be interpreted that the percentage shares for clothing are close to each other across regions. Thus, one can conclude that Engel's Law holds for clothing group.
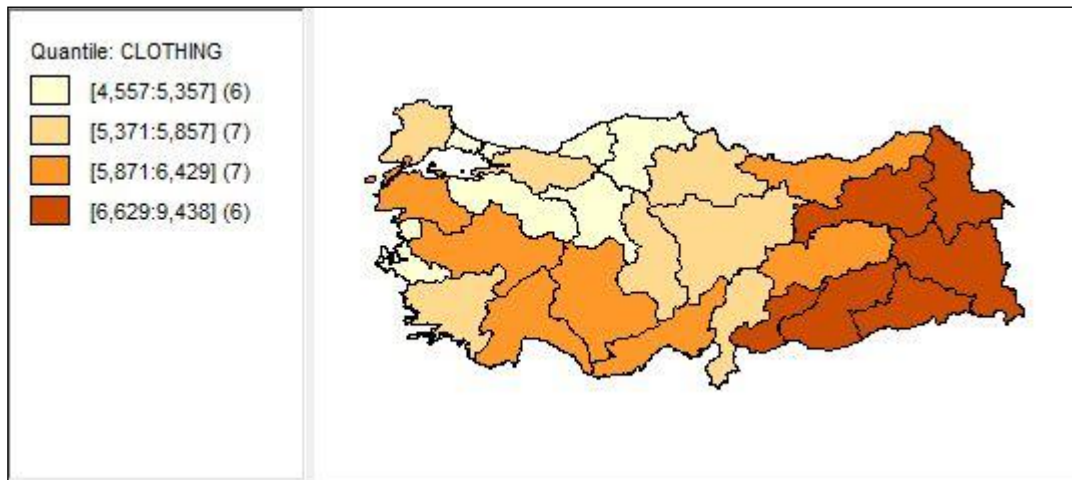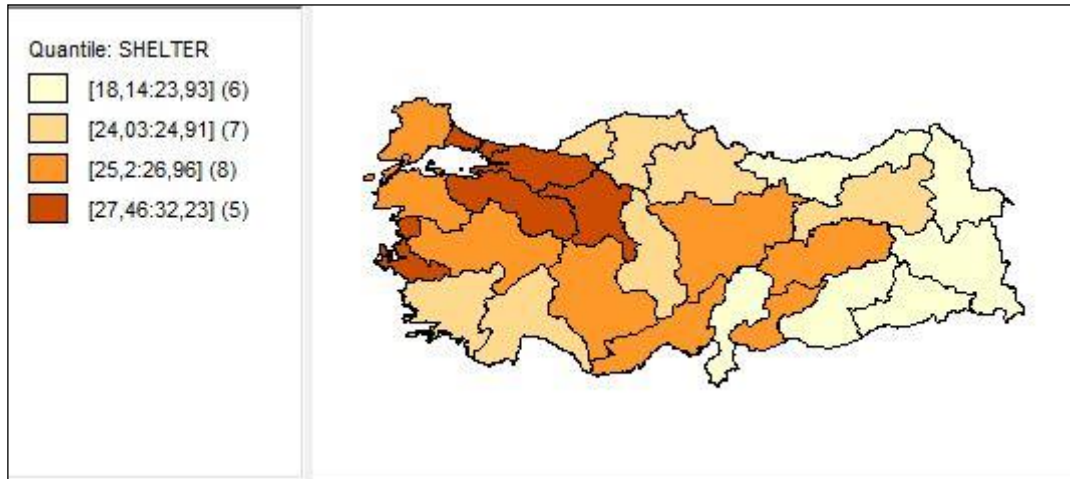

Figure 5 Average Percentage Share of Housing Expenditure in the Total Consumption Expenditure

It is observed from Figure 5 that percentage share of housing expenditure change between 18.14 and 32.23. An accumulation seen in Figure 4 is also observed for regions in northwest, north, and east. However, one cannot conclude that the percentage shares for housing are similar in each region; thus, rejects Engel's Law.
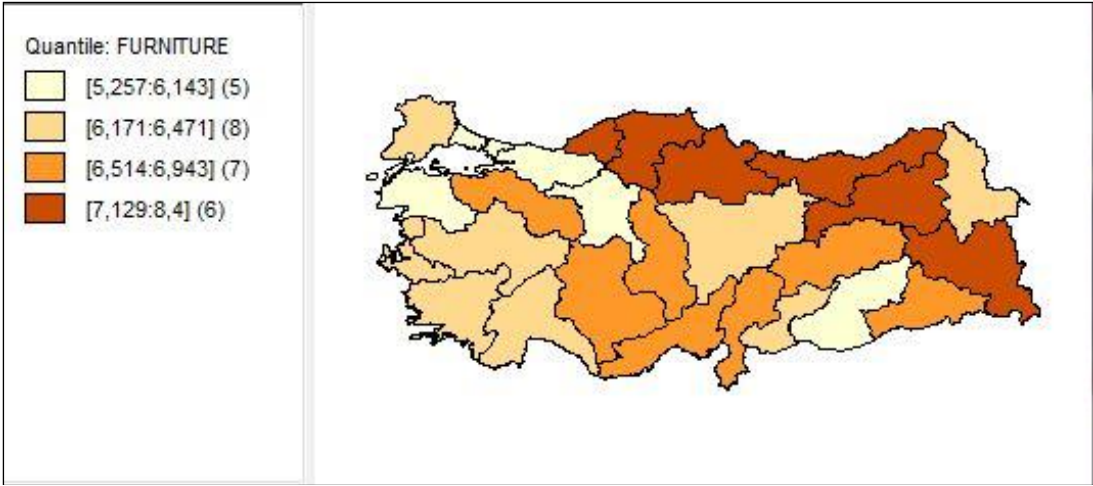
Figure 6 Average Percentage Share of Furniture Expenditure in the Total Consumption Expenditure

In the Figure 6, it is shown that share of furniture expenditure in total consumption varies between 5.26 percent and 8.4 percent. Moreover, it is observed that the share of furniture expenditure in total consumption is highest in the northeastern, lower in the southern and western, and the lowest in the northwestern regions.

Figure 7 Average Percentage Share of Health Expenditure in the Total Consumption Expenditure

In Figure 7, the share of health expenditure in the total consumption starts from 1.16 percent and ends 2.64 percent. It can be concluded that share of health expenditure is insignificant in total expenditure. On the other hand, there is a different pattern in which no accumulation among the regions is observed.

Figure 8 Average Percentage Share of Transportation Expenditure in the Total Consumption Expenditure

In Figure 8, share of transportation expenditure in total consumption varies from 8.31 percent to 16.63 percent. Thus, it is one of the significant expenditure in the households' budget. As one move from high income regions to low income regions, respectively TR1 region to TRC region, one can observe fall in the share of transportation expenditures.

Figure 9 Average Percentage Share of Communication Expenditure in the Total Consumption Expenditure

In Figure 9, share of communication expenditure is change between 3.4 percent and 4.84 percent. Moreover, it is observed that the share of communication expenditure in total expenditure is highest in northern, lower in the central and southern and the lowest in the southeastern regions.
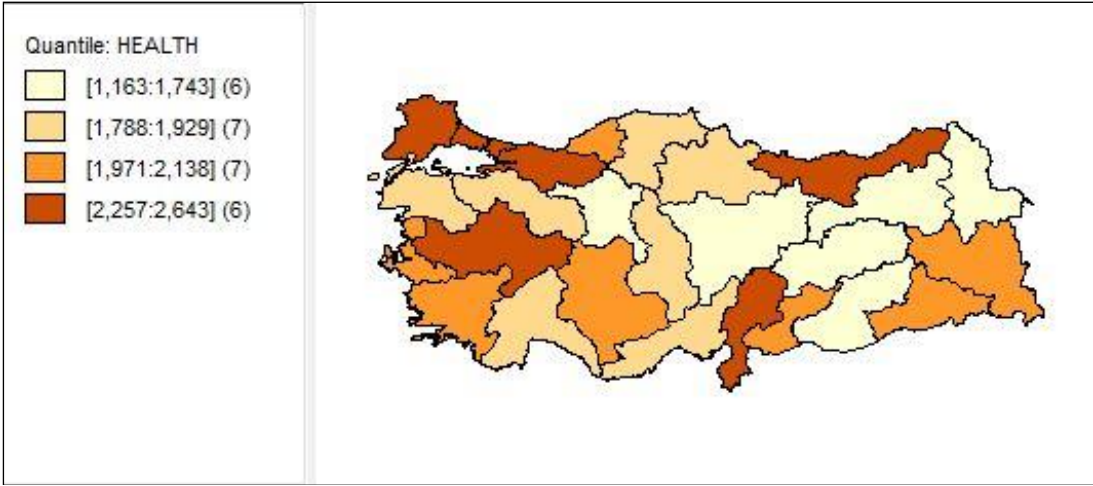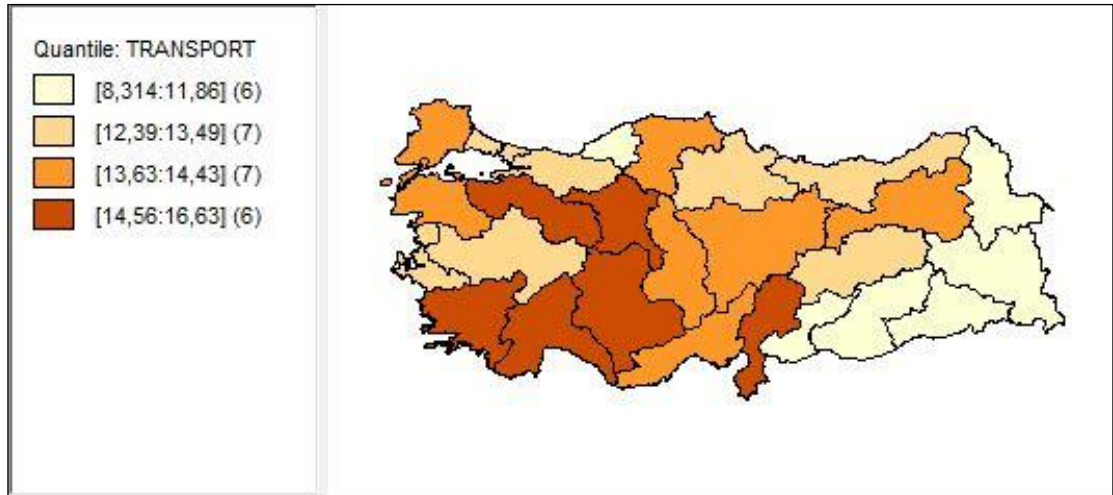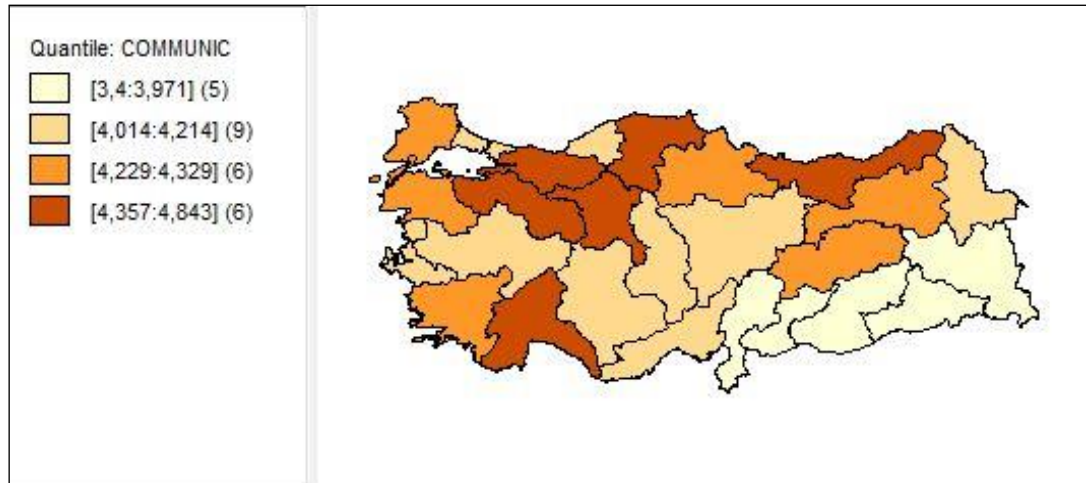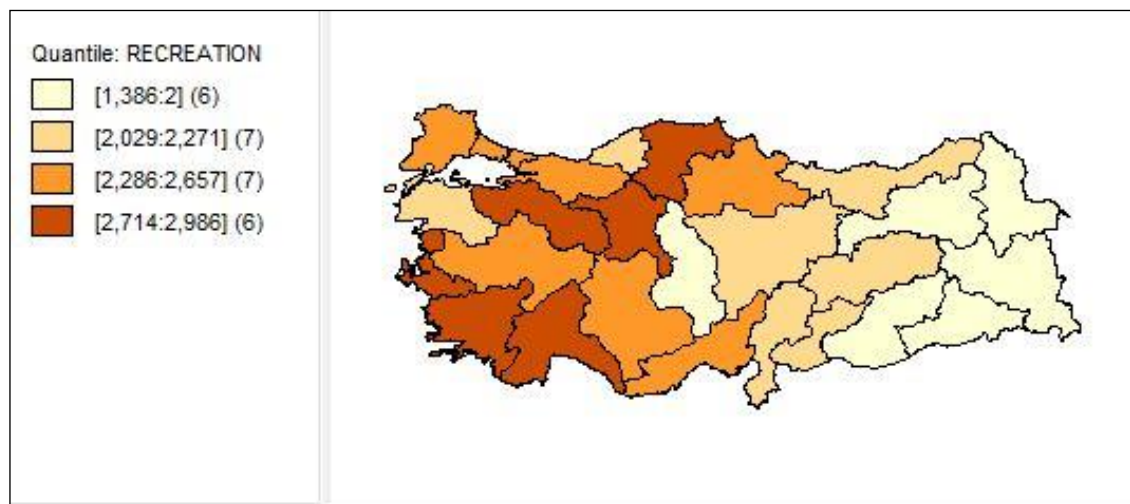

Figure 10 Average Percentage Share of Recreation Expenditure in the Total Consumption Expenditure

In Figure 10, the share of recreation expenditure in the households' total consumption starts from 1.39 percent and ends 2.99 percent. Engel asserted that recreation, and other cultural activities are luxury goods and consumption of these goods increase as income increases. If Figures 10 is evaluated in the light of Figure 2, results are consistent with Engel's theory. It is obviously deduced from the figure that share of recreation expenditures in the total expenditure is falling while moving western regions to eastern regions.
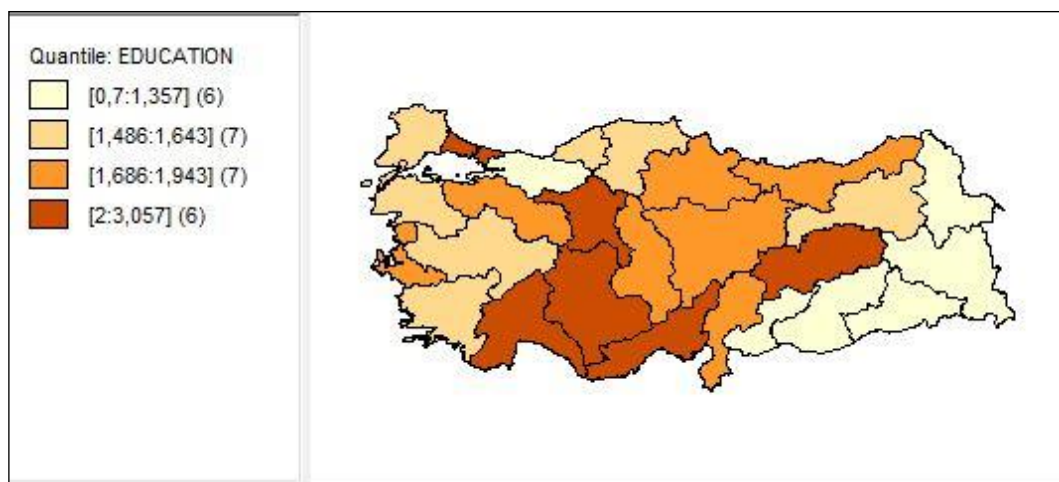
Figure 11 Average Percentage Share of Education Expenditure in the Total Consumption Expenditure

In the Figure 11, it is shown that share of education expenditure in total consumption varies between 0.7 percent and 3.06 percent. Moreover, it is observed that the share of education expenditure in total consumption is highest in the southern, higher in the western, central and northern and the lowest in the eastern and northeastern regions.
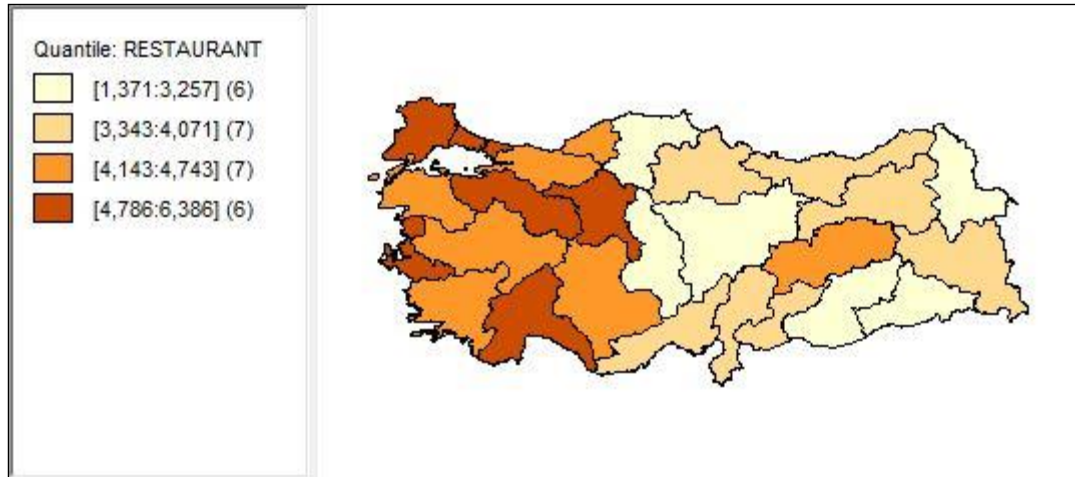
Figure 12 Average Percentage Share of Restaurant and Hotels Expenditure in the Total Consumption Expenditure

In Figure 12, share of restaurant and hotel expenditures change between 1.37 percent and 6.39 percent. As we stated above, restaurant and hotel expenditures are evaluated as luxury goods and consumption of these goods are expected to increase as income increases. If Figures 12 is evaluated in the light of Figure 2, results are consistent with Engel's theory. As one move from high income regions to low income regions, respectively TR1 region to TRC region, one can observe fall in the share of restaurant and hotel expenditures.
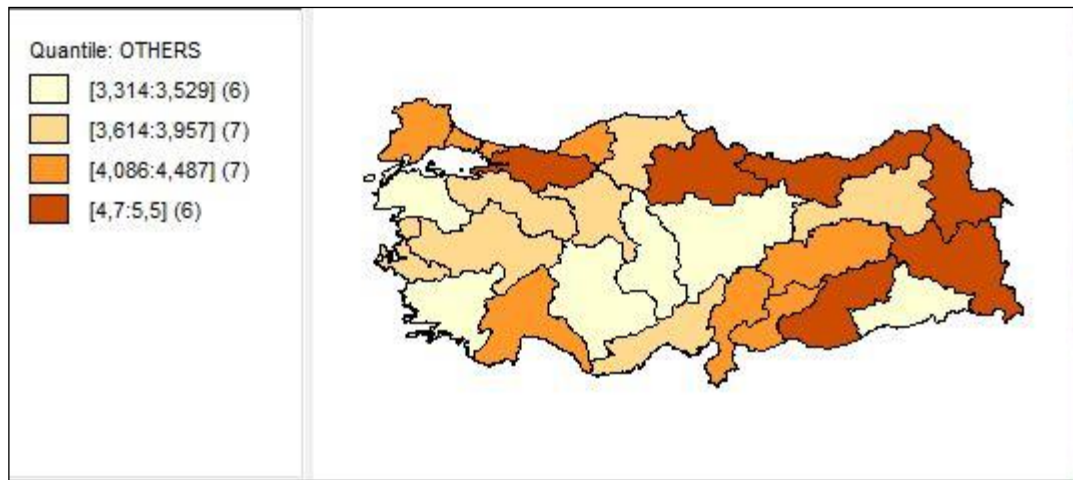
Figure 13 Percentage Share of the Other Expenditure in the Total Consumption Expenditure

In Figure 13, the share of the other expenditure starts from 3.31 percent and ends 5.5 percent. There is a different pattern in which no accumulation among the regions is observed.

CHAPTER FOUR

METHODOLOGY

4.1. Demand Model

In this study, The Linear approximation of the Almost Ideal Demand System (LA/AID) developed by Deaton and Muellbauer (1980) is used to investigate regional consumption differences. By incorporating demographic variables into the model, it can be expressed for panel data for each 12 main group of goods and services:

$$S_{it,l} = \alpha_i + \beta_i \ln\left(\frac{x_{it}}{P_{it}^*}\right) + \gamma_{il} \sum_{l=1}^{m} \ln(P_{it,l}) + \delta_i D_{it} + u_{it} \qquad (4.1)$$

where

$S_{it,l}$: Percentage share of lth item group in total consumption expenditure at region i and period t,

x_{it} : Total expenditure made for groups of goods and services,

P_{it}^{*} : General price index for i[th] region,

$P_{it,l}$: Price index for l[th] item group,

D_{it} : Demographic variables (population, schooling ratio, employment) for i[th] region.

To explain model briefly, model regresses the percentage share of an item group in total expenditure on regional real expenditure, regional price index for that item and demographic variables. However, as we mentioned before, we do not have the data for regional real expenditure. Thus, instead, we divide nominal gross regional value added to general regional price index and we create our regional real expenditure variable. Moreover, demographic translation method by Pollak and Wales (1981) is used to introduce demographic variables to system. It should be emphasized that by incorporating demographic variables, taking effect of regional factors on consumption account and obtaining better estimation of parameters in demand equations are aimed. (Dhar et al. 2003; Mazzocchi 2003).

The calculation for expenditure and own price elasticities are given by Meenakshi and Ray (1999) at $\lambda = 0$ and $\alpha = 1$:

Expenditure Elasticity: $e_{ii} = 1 + \left(\dfrac{\beta_i}{w_i} \right)$ (4.2)

Own Price Elasticity: $e_{ii} = \left(\dfrac{1}{w_i} \right) [\gamma_{ii} - \beta_i] - 1$ (4.3)

4.2. Technique Used In the Demand Model

There are two important points while estimating demand model (4.1). Firstly, cross-sectional dependence in panel-data model must be considered. Otherwise, coefficient estimation would be biased. Secondly, the technique should allow estimating all coefficients for 26 region and 12 item group separately in order to calculate expenditure and price elasticity for each of regions and item groups. One of the panel-data model techniques that hold the above conditions have been chosen, which is augmented mean group estimator (AMG) by Eberhardt and Teal (2010, 2011) and Eberhardt and Bond (2009) which is recently developed.

4.3 Augmented Mean Group Estimator (AMG)

In this method developed by Eberhardt and Teal (2010, 2011) and Eberhardt and Bond (2009), error structure allows that in the course of time, effects of consumption shocks can be different for each region while taking regional interactions into consideration.

AMG technique assumes the following simple model:

$$y_{it} = x_{it}{}'*b_i + u_{it} \tag{4.4}$$

$$x_{it} = a2_i + \lambda_i * f_t + \gamma_i * g_t + \varepsilon_{it} \tag{4.5}$$

$$u_{it} = a1_i + \lambda_i * f_t + e_{it} \tag{4.6}$$

for i=1,...,N ('group', regions) and t=1,...,T (time, years) , where x_{it} and y_{it} are observables, b_i are region-specific slopes on the observable regressors and u_{it} contains the unobservables and the error terms e_{it}. The unobservables in equation (4.6) are made up of standard group fixed effects $a1_i$ which capture time-invariant heterogeneity across regions, as well as unobserved common effects f_t with heterogeneous factor loadings λ_i, which can capture time-variant heterogeneity and cross-section dependence. Note that the factors (f_t and similarly g_t) are not limited to linear evolution over time, but can be non-linear and also nonstationary, with obvious implications for cointegration. For simplicity, the model only includes one covariate and one unobserved common factor in the estimation equation of interest (4.4). ε_{it} and e_{it} are assumed white noise.

The AMG procedure is implemented in three steps:

1. A pooled regression model augmented with year dummies is estimated by first difference OLS, and the coefficients on the (differenced) year dummies are collected. They represent an estimated cross-group average of the evolution of unobservable consumption shocks over time. This is referred to as the "common dynamic process".

2. The group-specific regression model is then augmented with this estimated consumption shocks process: either a) as an explicit variable or b) imposed on each group member with a unit coefficient by subtracting the estimated process from the dependent variable. Each regression model includes an intercept that captures time-invariant fixed effects.

3. The group-specific model parameters are averaged across the panel.

To say it differently, instead of estimating one parameter for all regions, this method allows us to estimate parameters for each region separately. In this method, year dummy variables are added to the original model to consider unobserved common effects and equation is estimated in the first differences. In the second stage, a series obtained from coefficients of dummy variables is added to model as new variable and model is estimated by OLS for each region separately.

CHAPTER FIVE

RESULTS & DISCUSSION

Now, expenditure and own-price elasticities estimated by AMG method are shown in Table 1 and 2 respectively. In addition to tables, elasticities are classified into 3 main categories and maps are created to determine spatial differences by Geoda Software. To achieve this, goods are grouped as inferior, necessity, and luxury goods based on expenditure elasticity. According to price elasticity, goods are grouped as demand elastic, demand inelastic, and Giffen goods.

Table 2 Expenditure Elasticity for 12 Item Groups in 26 Regions by AMG

Sütun1	Food	Alcohol	Clothing	Shelter	Furniture	Health	Trans.	Comm.	Recre.	Education	Resta.	Others
TR10	1,249	1,318	0,991	0,659	1,111	1,010	2,029	1,008	0,784	-0,222	1,086	1,227
TR21	0,254	0,420	1,213	0,562	1,333	-2,028	1,330	0,901	1,322	-1,385	0,460	3,552
TR22	0,805	1,587	1,535	0,968	0,707	1,313	1,431	1,183	1,057	0,341	0,329	-0,271
TR31	0,811	0,950	0,874	0,760	0,668	1,852	0,050	0,616	0,460	2,155	1,130	0,653
TR32	0,306	1,177	1,121	0,788	-0,044	-1,036	-0,930	0,718	1,511	1,654	1,043	-0,592
TR33	-0,133	0,358	0,603	1,776	0,609	-1,013	-1,685	0,593	1,361	-0,487	-1,834	-1,965
TR41	0,901	1,543	1,468	0,851	0,403	0,948	1,371	1,182	0,529	2,490	0,737	3,703
TR42	0,702	1,027	1,171	0,796	1,193	1,889	1,096	0,718	0,032	3,257	1,302	2,421
TR51	1,122	1,746	0,914	1,046	-1,690	1,804	2,184	0,633	-0,332	0,775	-0,669	0,291
TR52	0,495	0,233	2,436	0,817	1,575	2,286	1,173	1,153	-2,527	1,222	2,392	3,557
TR61	1,271	0,975	2,838	0,498	0,971	2,539	3,620	1,495	1,338	1,388	1,325	1,002
TR62	0,799	2,086	1,754	0,520	0,606	1,693	0,011	-0,057	1,365	-4,746	1,517	2,231
TR63	0,037	0,088	-0,776	1,462	2,197	2,402	1,943	0,477	1,614	-1,254	-2,104	2,220

Table 2 (Continued)

Sütun1	Food	Alcohol	Clothing	Shelter	Furniture	Health	Trans.	Comm.	Recre.	Education	Resta.	Others
TR71	2,138	1,887	0,949	0,881	1,329	1,107	-1,709	0,423	0,656	-0,523	1,344	1,597
TR72	0,391	1,486	0,881	1,008	1,279	1,864	0,099	0,565	1,500	3,766	1,124	3,471
TR81	0,525	0,052	0,776	0,869	1,424	0,920	0,769	0,501	0,793	0,788	0,024	2,635
TR82	-1,335	-4,326	3,175	1,621	0,178	4,665	5,115	0,207	0,526	-1,102	-3,480	3,537
TR83	1,149	1,274	1,887	0,177	0,028	2,413	1,739	0,745	1,262	2,073	0,616	-0,292
TR90	0,105	0,852	1,756	-0,145	2,268	1,713	0,260	0,551	1,246	0,469	3,094	4,794
TRA1	0,813	2,247	0,879	6,120	-0,003	11,258	-0,141	0,771	1,521	10,602	11,659	-1,053
TRA2	1,901	1,052	1,414	-0,502	-1,337	6,779	4,098	1,066	3,810	-1,356	0,808	-4,581
TRB1	1,165	-2,637	1,659	1,156	1,753	2,307	0,559	-0,046	1,691	-3,301	0,851	2,193
TRB2	2,188	-0,246	0,575	2,792	-0,941	-9,671	-2,084	1,032	1,920	1,555	-3,437	5,174
TRC1	0,192	1,790	0,993	1,261	-0,042	0,236	1,218	0,884	1,929	6,902	0,421	2,133
TRC2	0,144	-0,502	0,422	2,664	3,329	4,492	0,736	0,733	1,263	-1,190	-0,657	6,914
TRC3	0,901	-2,341	1,724	-0,110	1,115	1,834	-0,498	1,027	1,457	2,679	0,867	1,766

5.1. Results of Expenditure Elasticity

Before starting this section, it should be explained that there are 3 values at the left column of maps. The values reflect that "-1"for inferior, "0" for necessity, and "1" for luxury goods. In addition, the number in parenthesis shows that number of regions that indicates the values.
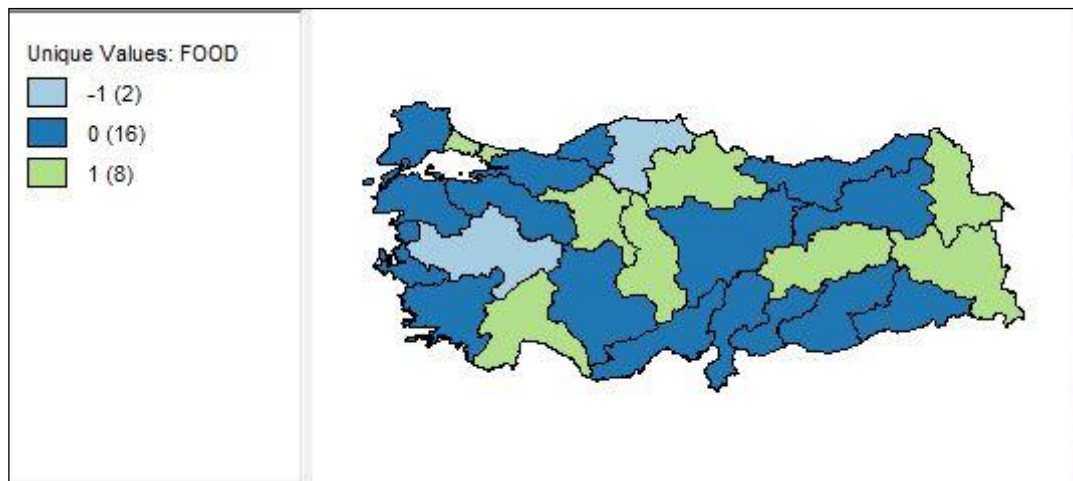

Figure 14 Classification of Expenditure Elasticity for Food and Soft Drinks

Figure 14 shows the results regarding the expenditure elasticity for food. It is observed from table that food is normal good for all regions except for TR33 and TR82. For these two regions, food is inferior good. Moreover, results show that food is necessity for most of the regions, that is; expenditure elasticity is below 1 for regions. On the other hand, for TR10, TR51, TR61, TR71, TR83, TRA2, TRB1, TRB2, food is found as luxury good. This may be explained by that in these regions,

consumption of food group contains luxury foods more than staple foods. That is, diversity in alternatives of food in the developed regions, like TR10, may lead food group be luxury.
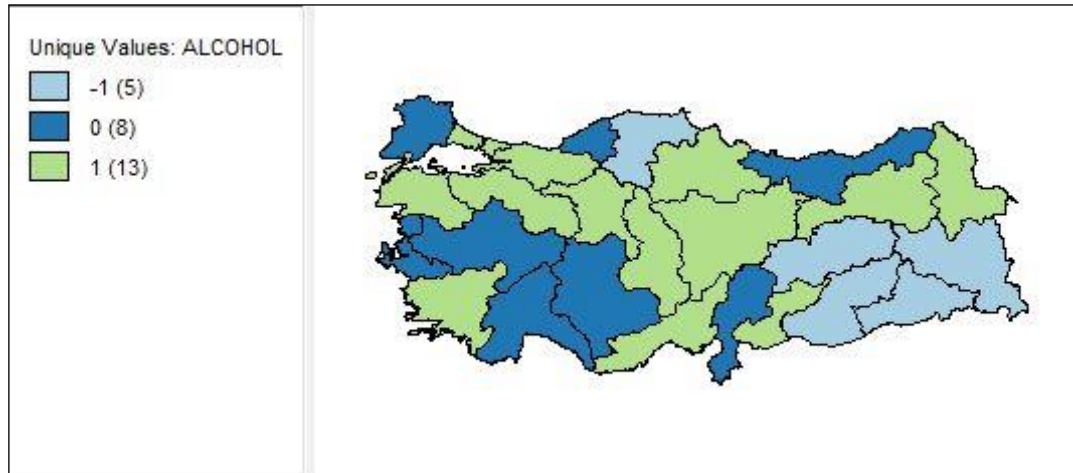

Figure 15 Classification of Expenditure Elasticity for Alcoholic Beverages and Tobacco

In Figure 15, it is found as normal good for all regions except for regions that alcoholic beverages and tobacco are inferior. These regions are TR82, TRB1, TRB2, TRC1, and TRC2. In addition, it can be inferred from the results that items in this group are luxury good. Figure 15 shows that the goods are necessity for regions TR21, TR31, TR33, TR52, TR61, TR63, TR81, and TR90.
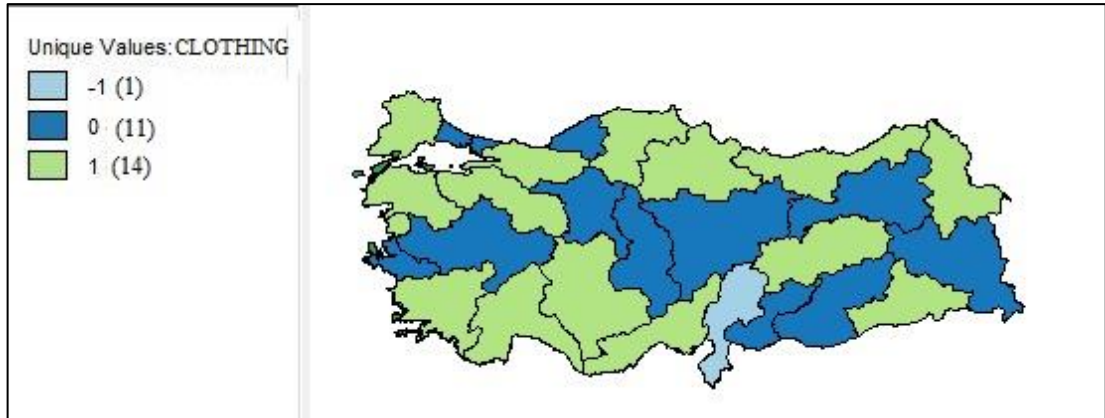
Figure 16 Classification of Expenditure Elasticity for Clothing

For all regions, except for TR63, clothing is a normal food. In detail, clothing is necessity for regions TR10, TR31, TR33, TR51, TR71, TR72, TR81, TRA1, TRB2, TRC1, and TRC2. However, it is found as luxury for the rest of the regions.
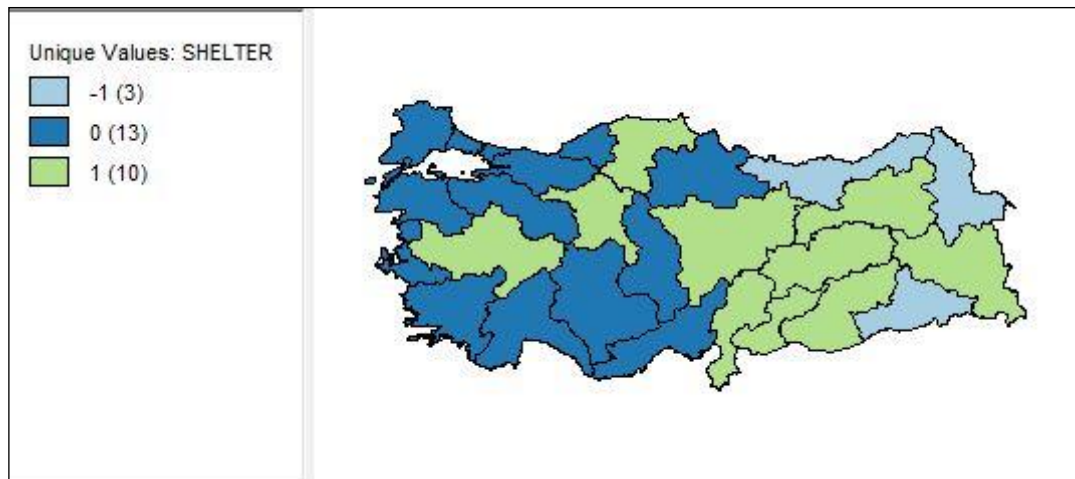

Figure 17 Classification of Expenditure Elasticity for Housing

One can conclude from Figure 17 that housing is a normal good except for TR90, TRA2, and TRC3. Moreover, results support that for expenditure on shelter is luxury for regions TR33, TR51, TR63, TR72, TR82, TRA1, TRB1, TRB2, TRC1, and TRC2. For the rest, housing is a necessity which is consistent with Engel's Law.
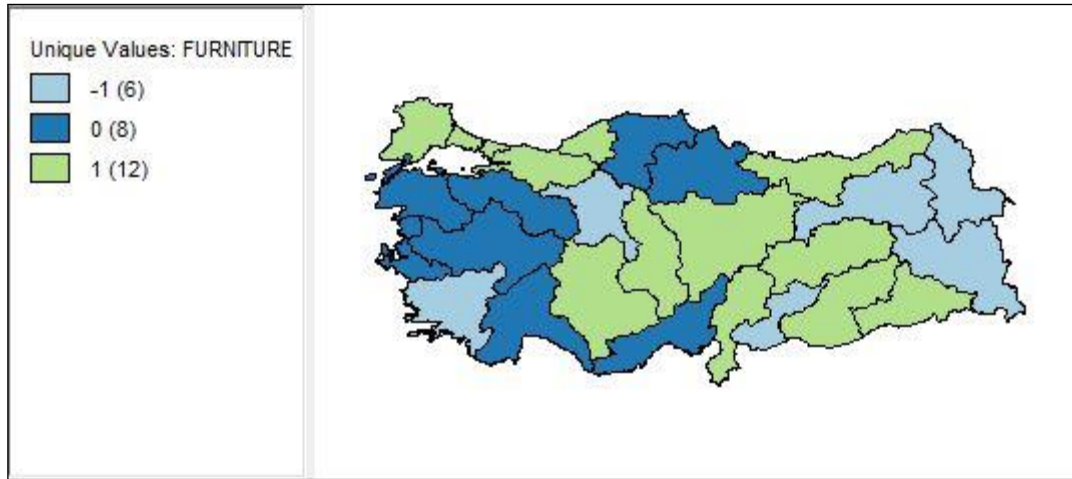
Figure 18 Classification of Expenditure Elasticity for Furniture

Figure 18 shows that furniture is a normal good except for TR32, TR51, TRA1, TRA2, TRB2 and TRC1. In addition, furniture is luxury for TR10, TR21, TR42, TR52, TR63, TR71, TR72, TR81, TR90, TRB1, TRC2 and TRC3. On the other hand, for regions TR22, TR31, TR33, TR41, TR61, TR62, TR82, TR83, furniture is necessity.
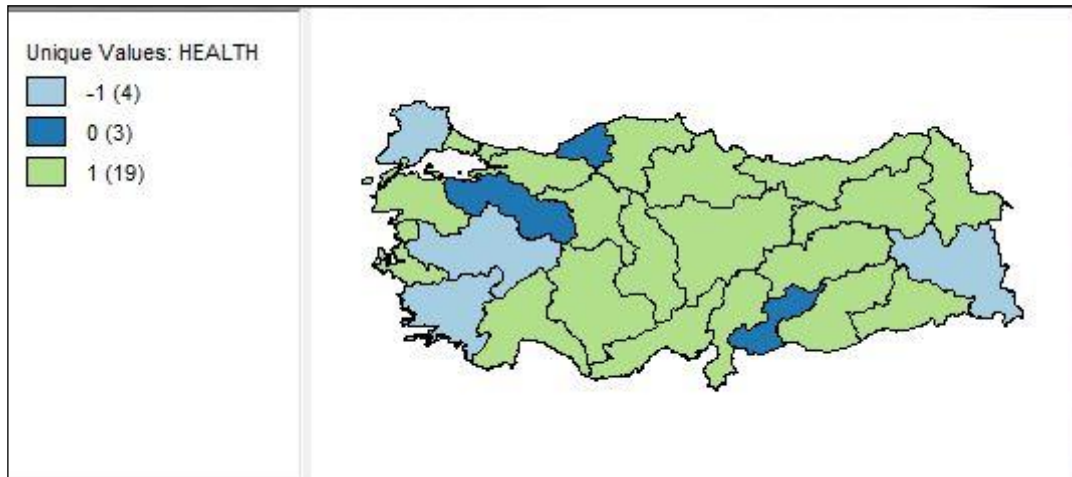

Figure 19 Classification of Expenditure Elasticity for Health

It is found in Figure 19 that expenditures on health are normal with an exception for regions TR21, TR32, TR33, and TRB2. When health expenditure is analyzed, it is revealed that this item group is luxury good for almost all regions. It can be explained by expansion in private health insurance market. When it is compared to the pre-2005 period, probably because recently there are more alternatives, there is higher demand for private health insurance. Therefore, this may lead to a transition on health expenditures from necessity to luxury.
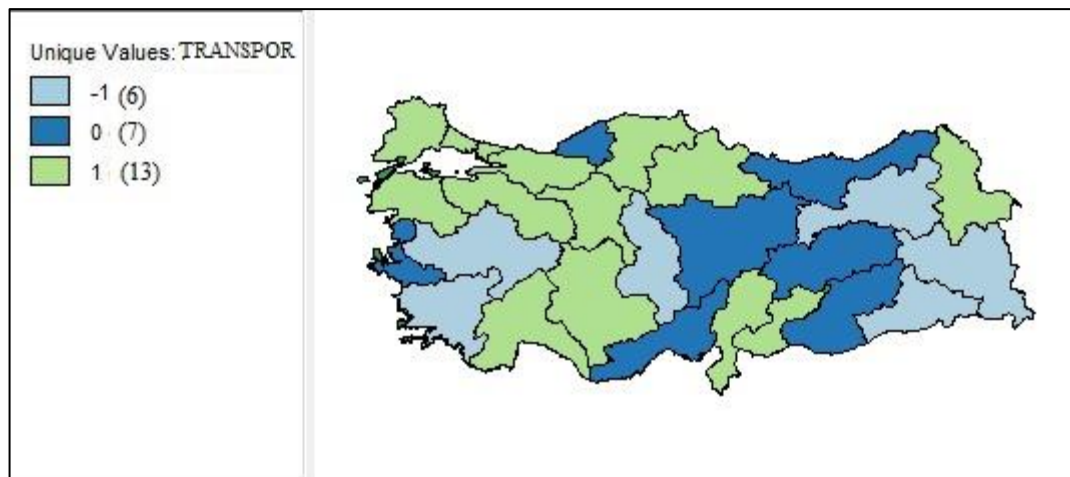
Figure 20 Classification of Expenditure Elasticity for Transportation

Based on the results, it is revealed that expenditures on transportation are normal except for regions TR32, TR33, TR71, TRA1, TRB2, and TRC3. For regions TR31, TR62, TR72, TR81, TR90, TRB1, TRC2, goods in transportation item group are necessary goods. However, it is observed that expenditures on transportation is luxury most of the regions. Since composition of goods in transportation group includes private transportation items like cars, expenditures on fuel etc., these goods may be assessed as luxury and the result may seem reasonable.
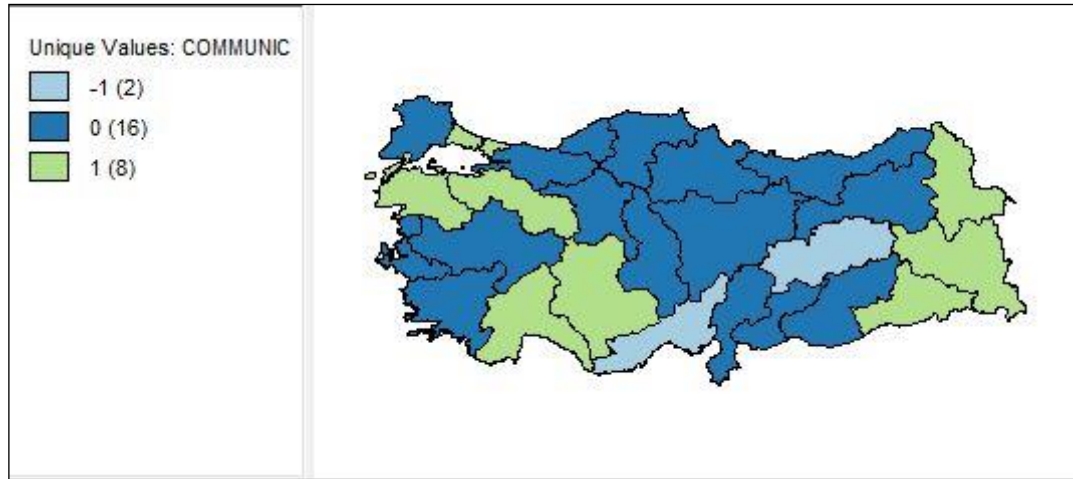
Figure 21 Classification of Expenditure Elasticity for Communication

It is observed from Figure 21 that communication is normal good for all regions except TR62 and TRB1. It is a luxury good for TR10, TR22, TR41, TR52, TR61, TRA2, TRB2, and TRC3. On the other hand, it is seen that expenditures on communication are necessary for the rest, and the most, of the regions.

Figure 22 Classification of Expenditure Elasticity for Recreation

For recreation item group, Figure 22 confirms that it is a normal good except for TR51 and TR52. In addition, it is observed that goods in recreation item group

are luxuries except for regions TR10, TR31, TR41, TR42, TR71, TR81, and TR82. It is consistent with what we expect from Engel's Law.
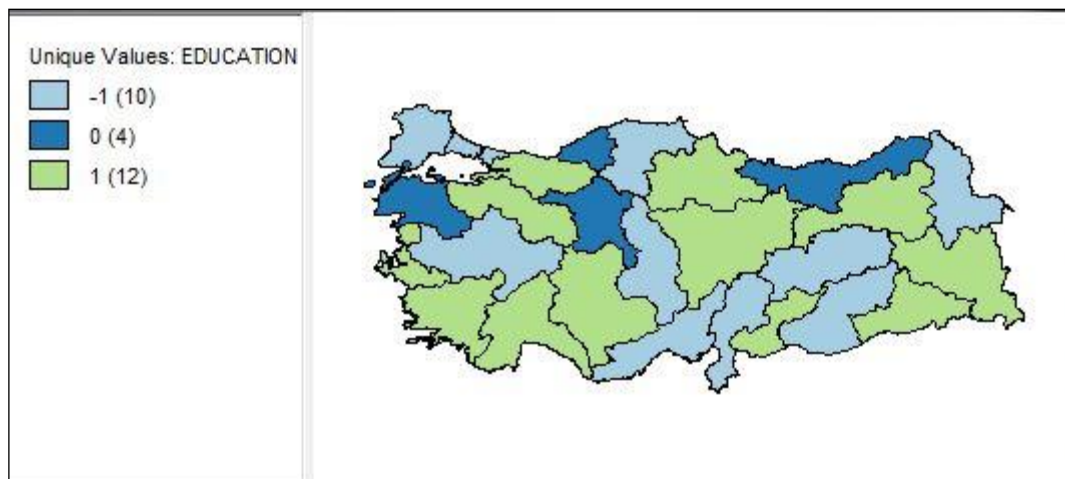
Figure 23 Classification of Expenditure Elasticity for Education
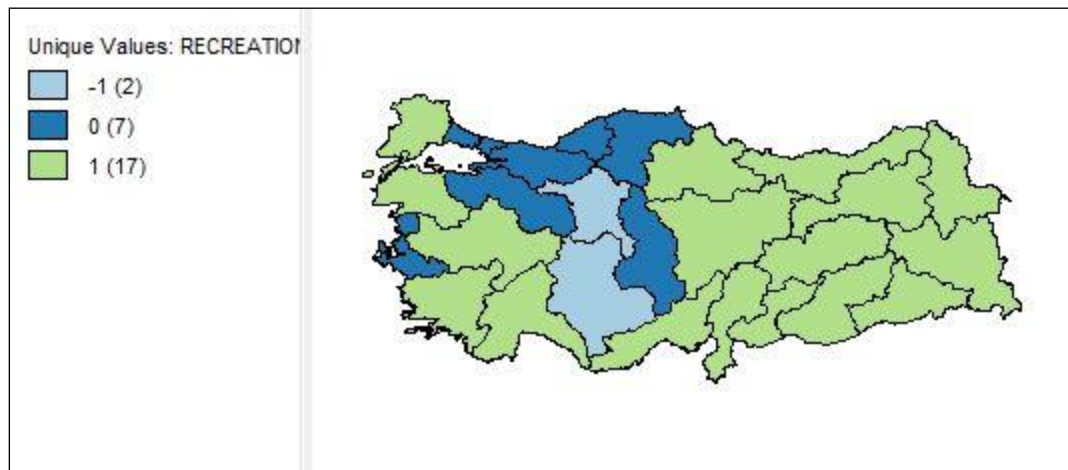
When we look at Figure 23 for education, we observe a different pattern in elasticity when compared to the other item groups. Namely, in this group, there are several regions that response education as inferior good. Although in previous item groups there are only few regions that consider goods as inferior, there are undeniably many regions for education, which are TR10, TR21, TR33, TR62, TR63, TR71, TR82, TRA2, TRB1, and TRC2. This can be explained by government reforms in the education after period 2003. After 2003; textbooks are given to primary school students free of charge by government and after 2006; it is for high school students. Although there is an expansion in per capita income per person, there is a shrink in expenditure made for education. Thus, this may lead to expenditures on education becoming inferior for more regions.
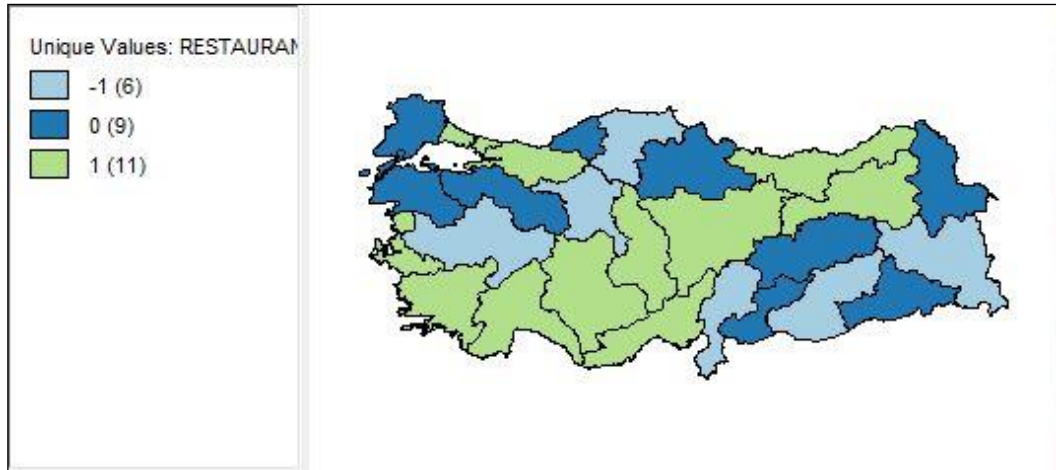
Figure 24 Classification of Expenditure Elasticity for Restaurant and Hotels

It is found in Figure 24 that restaurant and hotel expenditures are found normal with an exception for regions TR33, TR51, TR63, TR82, TRB2 and TRC2. When the expenditure is analyzed, it is revealed that this item group is luxury good for almost all regions. However, it is necessary good for TR21, TR22, TR41, TR81, TR83, TRA2, TRB1, TRC1, and TRC3.
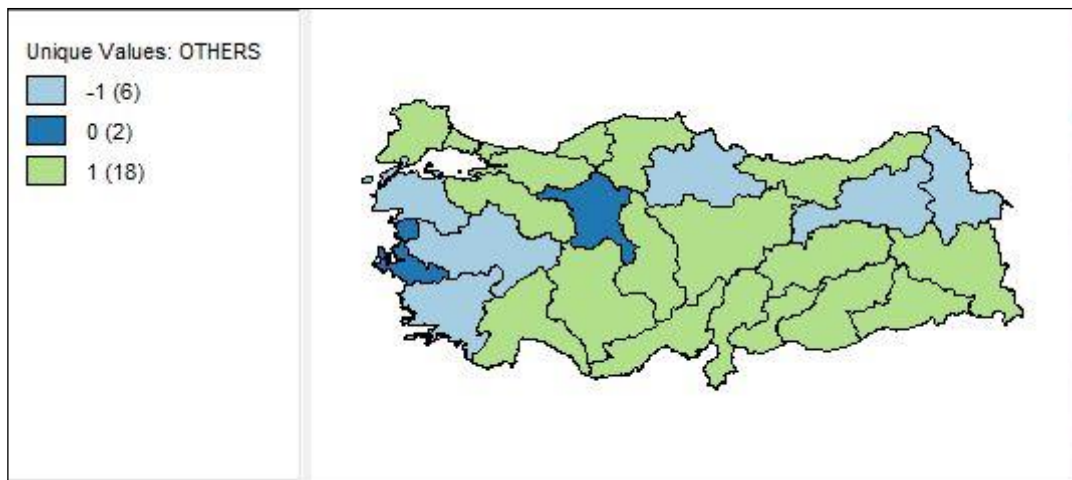
Figure 25 Classification of Expenditure Elasticity for the Other Items

Figure 25 shows that goods in the last expenditure group are normal except for regions TR22, TR32, TR33, TR83, TRA1 and TRA2. In addition, it is observed that these are luxury good for all of the regions. It is as expected since there is wide variety of luxury goods in this expenditure group like personal care, life insurance etc. On the other hand, for regions TR31, TR51, items are found as necessity good.

Table 3 Own-Price Elasticity for 12 Item Groups in 26 Regions by AMG

Sütun1	Food	Alcohol	Clothing	Shelter	Furniture	Health	Trans.	Comm.	Recre.	Education	Resta.	Others
TR10	-0,949	-1,546	-0,505	-0,494	-0,920	-3,889	-2,302	-1,810	-1,140	0,672	-1,091	-0,967
TR21	-1,802	-0,474	-0,065	0,259	-0,320	4,593	0,631	-0,225	-2,010	-4,376	-0,348	-4,422
TR22	-1,301	-1,738	-3,595	-0,385	-1,366	-0,460	-1,426	-0,119	-2,400	-2,535	0,661	0,894
TR31	0,612	-0,783	-0,309	-0,352	-0,911	-3,841	3,337	-1,036	-3,986	-1,864	-1,166	-0,692
TR32	-0,907	-1,185	0,105	-0,670	0,523	3,915	4,051	-0,667	-0,530	-2,196	-0,512	1,036
TR33	1,711	-0,152	-0,661	-1,231	0,194	4,618	6,722	-1,149	0,017	0,000	3,112	2,928
TR41	-1,555	-1,618	-5,323	-0,436	-0,505	-1,079	-1,647	-2,408	-0,384	-0,461	-0,632	-4,142
TR42	-1,427	-1,160	-1,998	-0,274	-1,150	-0,870	-0,055	0,545	2,482	-3,851	-1,466	-2,895
TR51	-0,648	-1,712	-0,926	-0,344	3,037	-2,740	-2,730	-0,830	-0,503	-2,223	0,949	-0,550
TR52	-2,236	-0,345	-4,488	0,313	-1,445	-4,729	0,033	-1,765	-2,847	-1,047	-2,242	-4,583
TR61	-2,039	-1,124	-1,983	-0,181	-1,615	-4,699	-6,109	-1,591	1,482	-1,723	-0,403	-1,189
TR62	-1,493	-2,504	-2,309	-0,298	0,358	-4,197	0,703	-1,089	-0,602	3,620	-1,630	-2,050
TR63	-1,006	-0,284	4,158	-1,616	-3,231	-5,765	-0,797	-1,488	-1,127	-1,396	3,132	-2,052

Table 3 (Continued)

Sütun1	Food	Alcohol	Clothing	Shelter	Furniture	Health	Trans.	Comm.	Recre.	Education	Resta.	Others
TR71	-1,556	-2,256	-0,153	-0,806	-2,586	-4,825	2,728	-1,925	1,032	0,219	-0,906	-2,527
TR72	-1,313	-1,631	0,244	-0,133	-0,669	-1,139	0,340	-1,960	-1,232	-4,323	-0,485	-3,738
TR81	-1,708	-0,143	-1,414	-1,406	-0,707	0,920	0,065	-0,268	-0,096	1,617	1,234	-2,597
TR82	-2,546	4,269	-2,142	-0,967	1,069	-4,404	-6,181	-1,386	1,901	-0,033	3,841	-3,986
TR83	-2,091	-1,095	-2,565	0,440	0,723	-6,821	-1,123	-0,039	0,200	-3,167	-0,624	0,568
TR90	-1,034	-0,980	-4,754	0,668	-3,031	-3,645	1,655	-0,717	-2,374	-3,110	-3,685	-4,531
TRA1	-2,735	-2,605	-2,088	-6,143	0,811	-24,280	-0,017	-1,420	-0,494	-16,804	-17,017	2,386
TRA2	-1,784	-1,119	-1,091	0,192	2,374	-11,402	-3,638	-3,356	-5,758	-1,855	1,464	6,120
TRB1	-2,367	3,030	-2,657	-0,592	-2,337	-3,582	-0,202	2,032	-3,875	4,872	-0,204	-2,428
TRB2	-2,905	-0,025	-1,843	-3,954	1,551	27,210	4,765	-1,396	-2,593	-1,769	4,837	-3,830
TRC1	-3,102	-2,072	-0,679	-0,302	0,579	-1,512	-3,418	0,539	-1,793	-6,426	-1,027	-1,962
TRC2	-0,320	0,725	-0,374	-1,058	-4,233	-7,373	-3,599	-0,936	-4,598	1,679	1,492	-7,467
TRC3	-1,448	3,388	-2,392	-1,067	0,334	-4,715	2,448	3,514	-2,807	-5,722	-0,866	-1,730

5.2. Results of Own-Price Elasticity

To continue with own-price elasticity, results for AMG estimation seem consistent with the theory. That is, price elasticity of item groups is negative except for some statistically insignificant results. It should be remarked that in this chapter, values at the left column of maps reflect that "0"for Giffen goods, "-1" for inelastic demand, and "-2" for elastic demand. In addition, the number in parenthesis shows the number of regions that indicates the values.
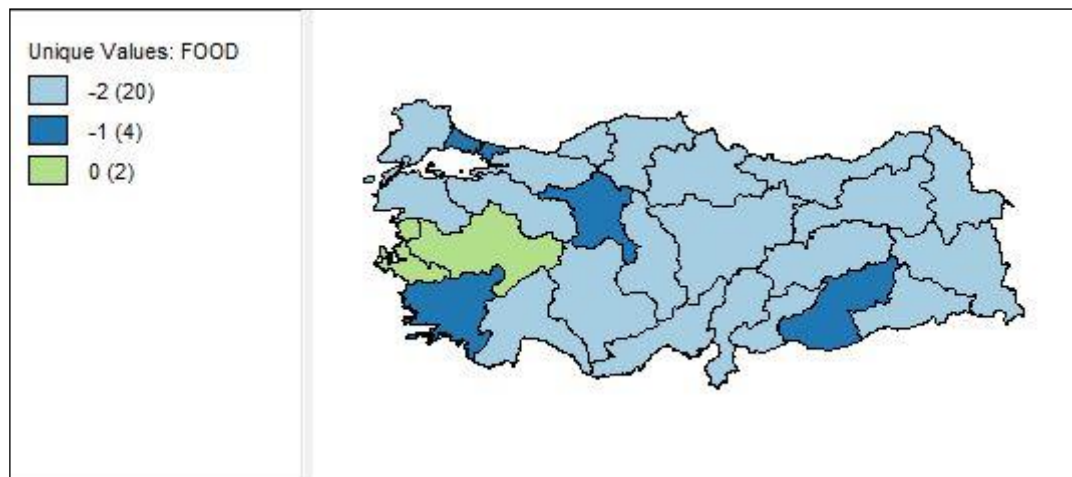

Figure 26 Classification of Own-Price Elasticity for the Food and Soft Drinks

In Figure 26, it is observed that food is ordinary good for almost all regions except for TR31 and TR33. Moreover, demand for food is inelastic for regions TR10, TR32, TR51, and TRC2. For the remaining regions, demand for food is elastic.
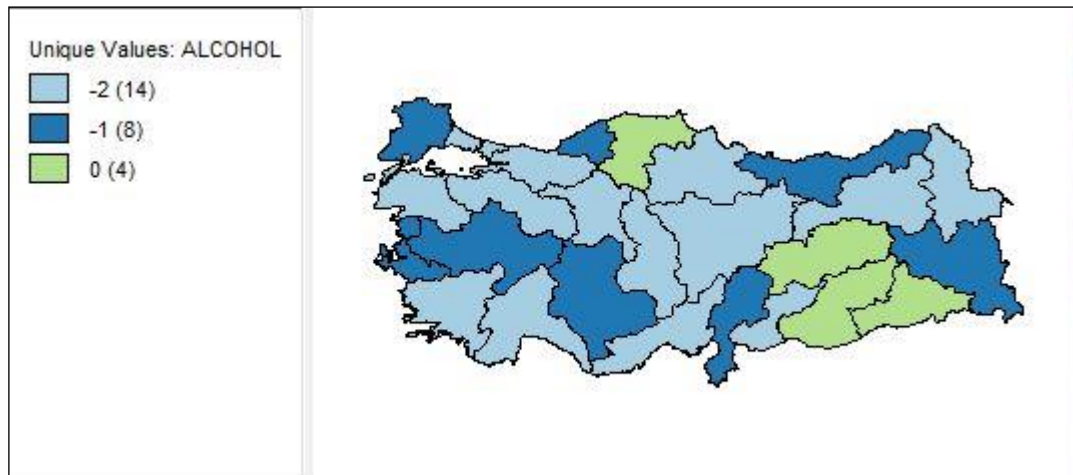
Figure 27 Classification of Own-Price Elasticity for the Alcoholic Beverages and Tobacco

It is found in Figure 27 that alcoholic beverages and tobacco are ordinary good with an exception for regions TR82, TRB1, TRC2, and TRC3. In addition, demand for these goods is elastic for most of the regions. However, the demand is inelastic for regions TR21, TR31, TR33, TR52, TR63, TR81, TR90, and TRB2.
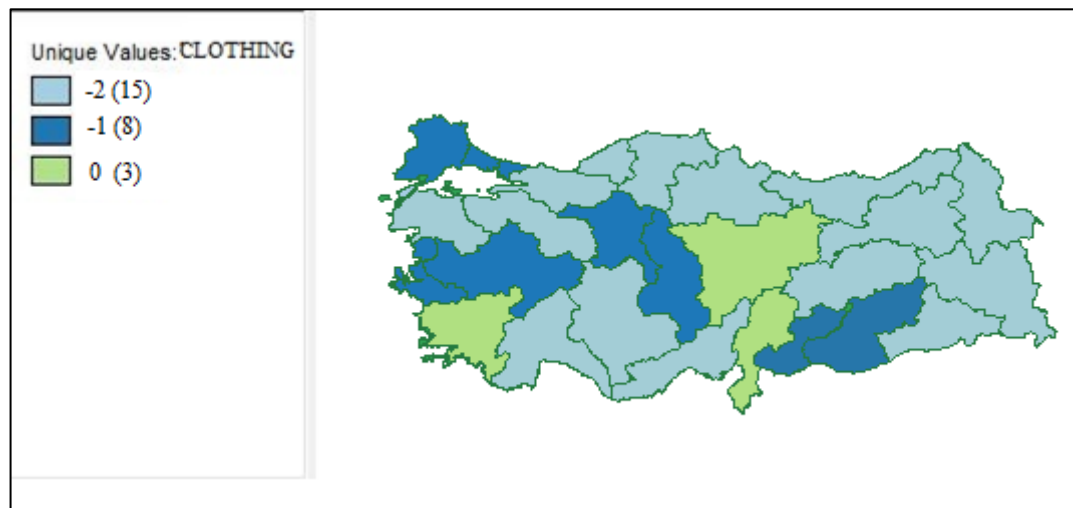

Figure 28 Classification of Own-Price Elasticity for Clothing

Figure 28 show that clothing is Giffen for regions TR32, TR63, and TR72. However, it is normal good for the remaining regions. Demand for clothing is elastic for most of the regions. On the other hand, it is inelastic for regions TR10, TR21, TR31, TR33, TR51, TR71, TRC1 and TRC2.
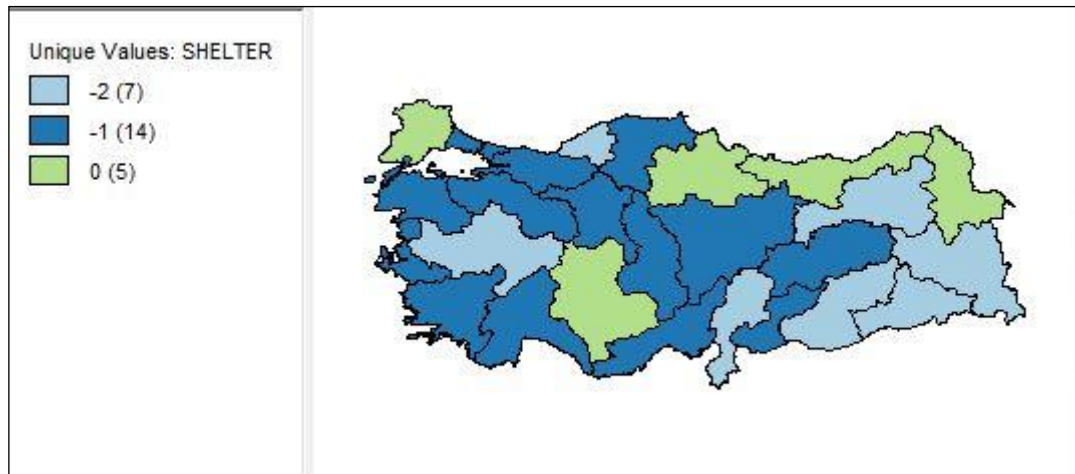

Figure 29 Classification of Own-Price Elasticity for Housing

Based on Figure 29, housing is Giffen for regions TR21, TR52, TR83, TR90, and TRA2. Although one can deduce that demand for housing is inelastic for most of the regions, it is elastic for regions TR33, TR63, TR81, TRA1, TRB2, TRC2, and TRC3.
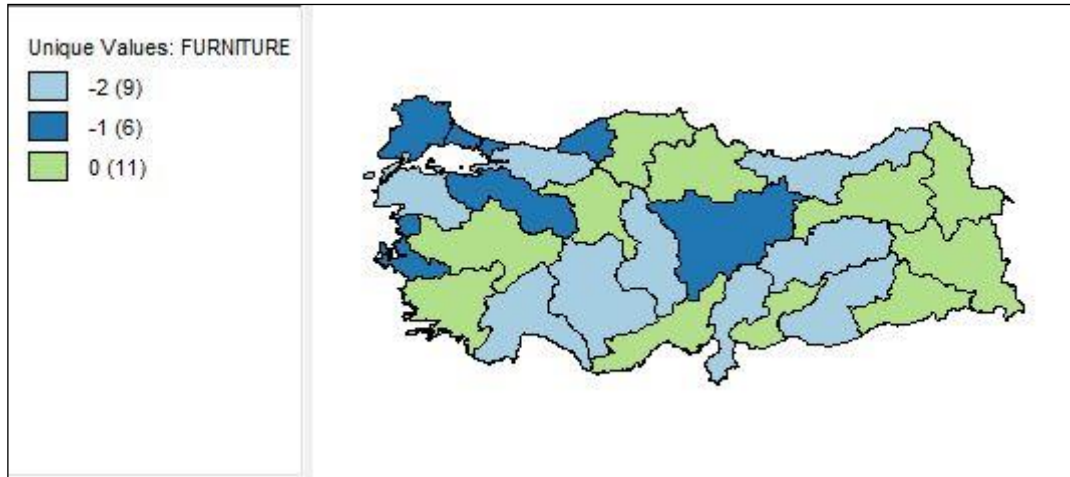
Figure 30 Classification of Own-Price Elasticity for Furniture

To continue with Figure 30, we observed a mixed pattern for furniture group when it is compared to previous groups of good. There are many regions that furniture items are Giffen good, which are TR32, TR33, TR51, TR62, TR82, TR83, TRA1, TRA2, TRB2, TRC1, and TRC3. It may be explained by brand loyalty in developed regions of these. On the other hand, for less developed regions of these, there may be restricted number of firms in these regions, thus; absence of a competitive market may tie up consumers to buy goods even if prices increase. On the other hand, demand for furniture is inelastic for regions TR22, TR42, TR52, TR61, TR63, TR71, TR90, TRB1, TRC2 and it is elastic for TR10, TR21, TR31, TR41, TR72, and TR81.
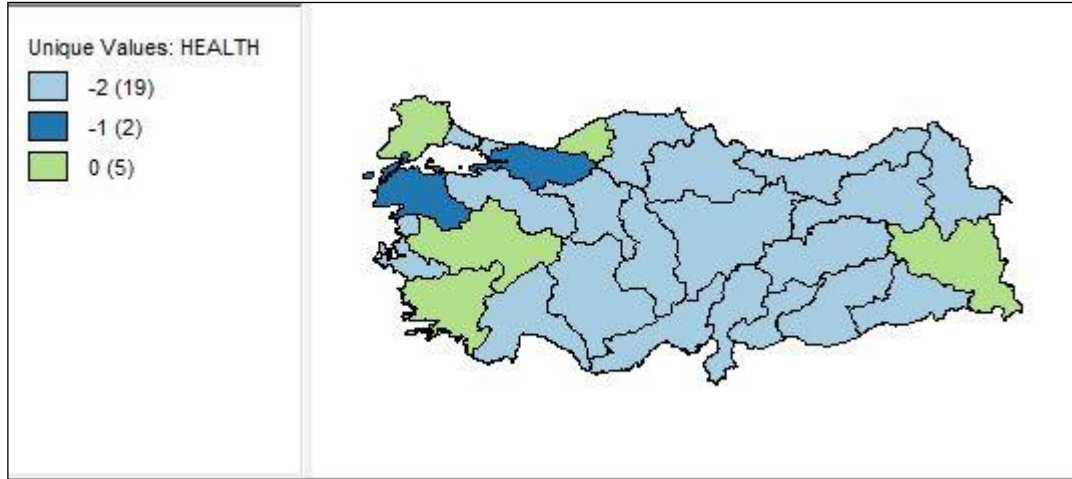
Figure 31 Classification of Own-Price Elasticity for Health

When we look at Figure 31, it is observed that demand for health is inelastic almost all of the regions. This may result from mandatory health insurance policy for labor force. Once head of household have insurance, the rest of family members can benefit from it. Thus, in the budget, we observe no significant payment for basic necessary health services. Hence, it is reasonable that demand for services not included in mandatory health insurance, like plastic surgery, is elastic. However, the demand is inelastic only for regions TR22, TR42. On the other hand, results show that it is Giffen for regions TR21, TR32, TR33, TR81, and TRB2.
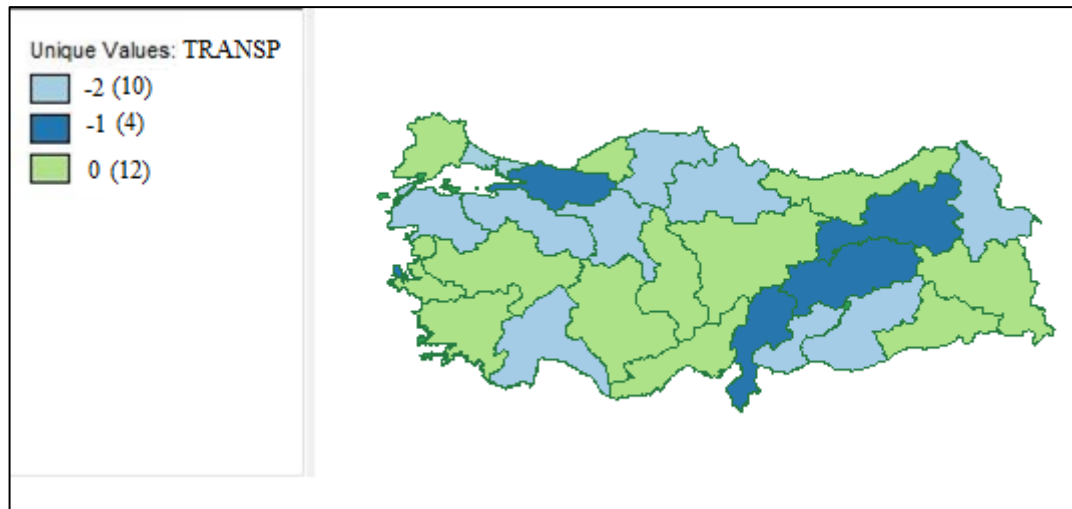
Figure 32 Classification of Own-Price Elasticity for Transportation

In Figure 32 for transportation, we observe similar pattern like furniture group. There are many regions that goods in transportation group are Giffen, which are TR21, TR31, TR32, TR33, TR52, TR62, TR71, TR72, TR81, TR90, TRB2, and TRC3. One may explain this by airport transportation in these regions. If passengers have dependence on airline in these regions, then increase in price may not affect the demand and cause such a result. On the other hand, demand for transportation is inelastic for regions TR42, TR63, TRA1, TRB1, and it is elastic for TR10, TR22, TR41, TR51, TR61, TR82, TR83, TRA2, TRC1 and TRC2. Elasticity of demand may be the result of well-established network of public transportation and contrary for inelastic demand.
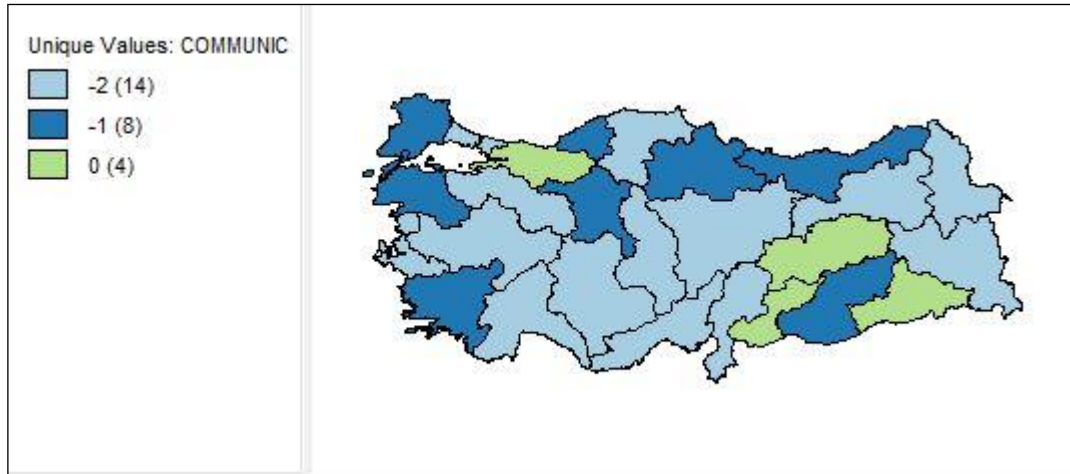
Figure 33 Classification of Own-Price Elasticity for Communication

It can be deduced from Figure 33 that communication is ordinary good for all regions except for TR42, TRB1, TRC1, and TRC3. Moreover, it is observed that demand for communication is almost elastic. On the contrary; it is inelastic for TR21, TR22, TR32, TR51, TR81, TR83, TR90, and TRC2.
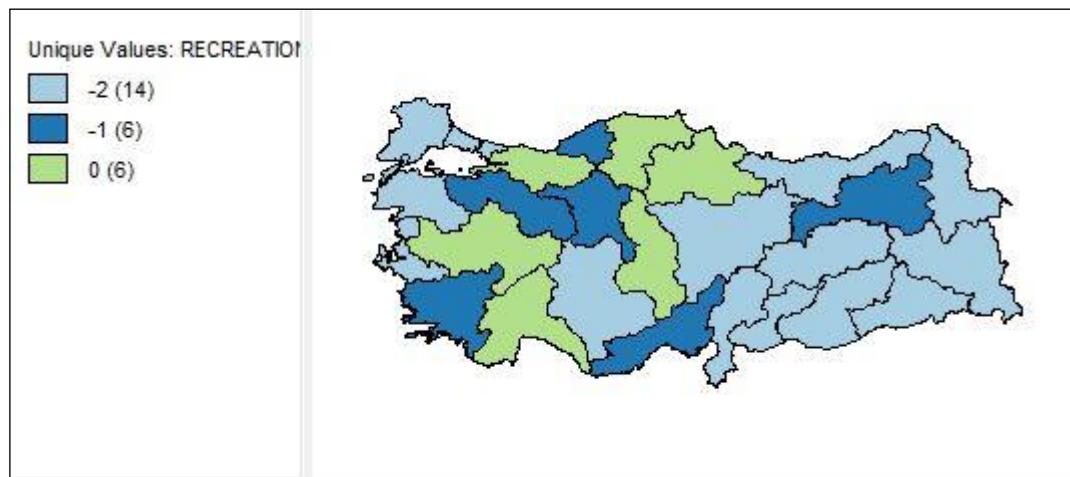
Figure 34 Classification of Own-Price Elasticity for Recreation

Figure 34 shows that demand for recreation is almost inelastic for all regions. However, it is elastic for regions TR32, TR41, TR51, TR62, TR81, and TRA1. On

the other hand, recreation items are Giffen for regions TR33, TR42, TR61, TR71, TR82, and TR83.
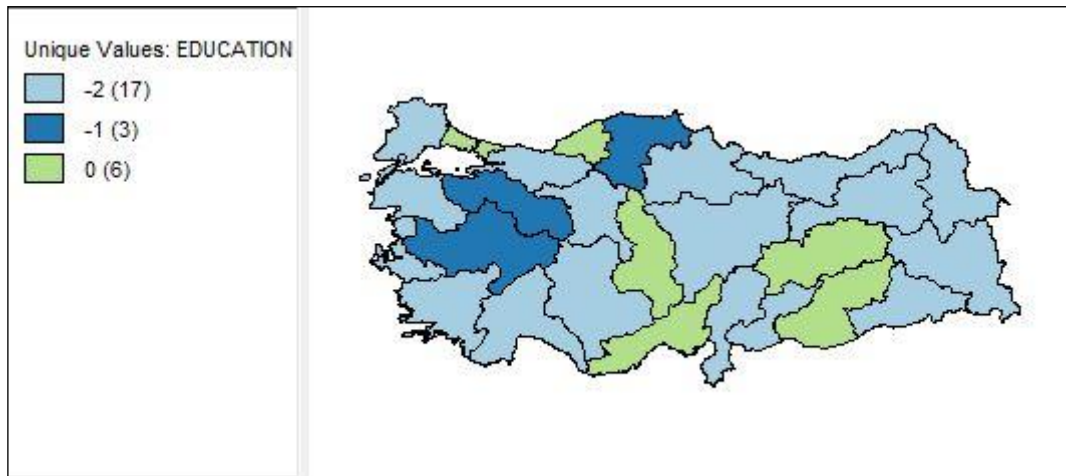
Figure 35 Classification of Own-Price Elasticity for Education

We observe an inelastic pattern when we look at demand for education. However, it is elastic for regions TR33, TR41, and TR82. In contrast, education is Giffen good for regions TR10, TR62, TR71, TR81, TRB1, and TRC2.
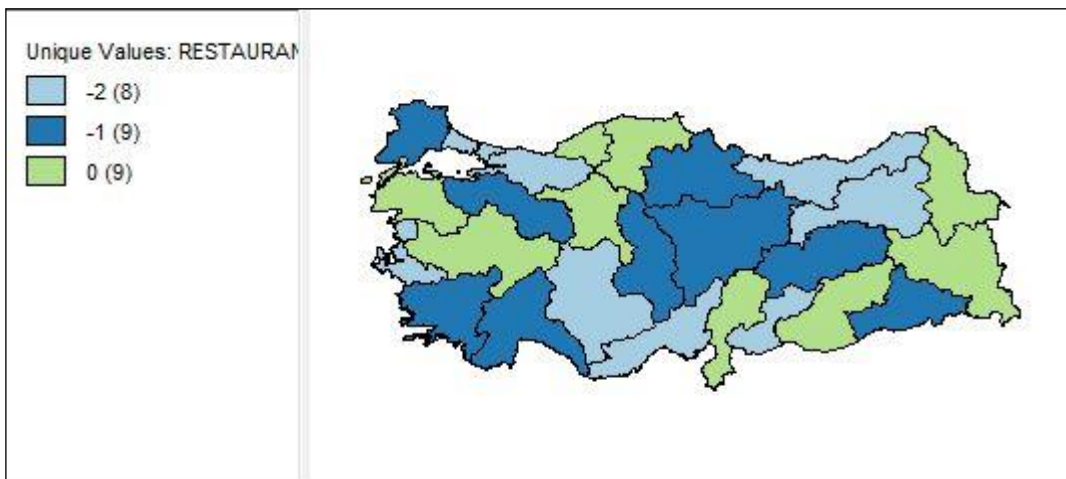
Figure 36 Classification of Own-Price Elasticity for the Restaurant and Hotels

Again a complex price elasticity pattern is encountered for restaurant and

hotels group. In this group, goods are Giffen for regions TR22, TR33, TR51, TR63, TR81, TR82, TRA2, TRB2, and TRC2. On the other hand, demand for these goods is inelastic for TR21, TR32, TR41, TR61, TR71, TR72, TR83, TRB, and TRC3. However, we observe that the demand is elastic for the rest of the regions.
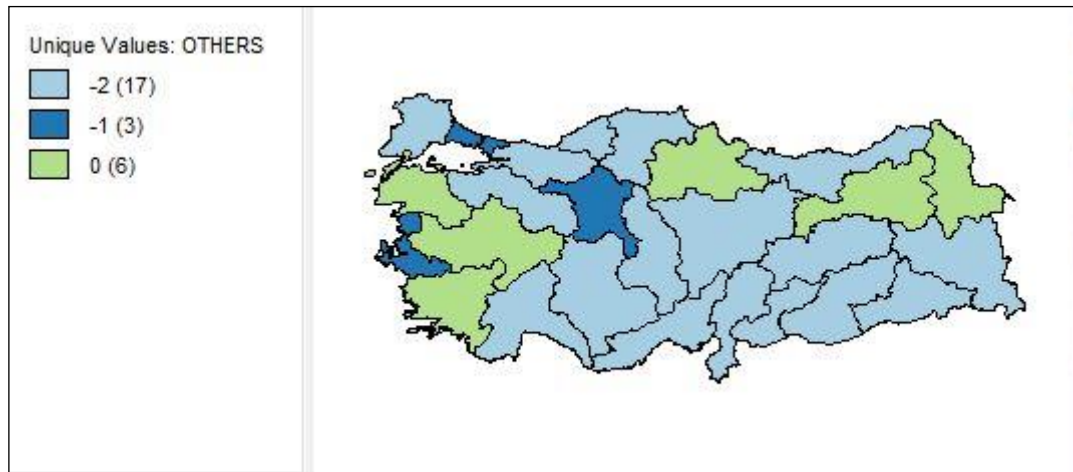
Figure 37 Classification of Own-Price Elasticity for the Other Items

It is observed from Figure 37 that goods in the last expenditure group are ordinary good. Although demand for these goods is inelastic for many regions, it is elastic for regions TR10, TR32 and TR33. On the contrary, for regions TR22, TR32, TR33, TR83, TRA1 and TRA2, goods in this item group are Giffen.

5.3. Final Discussion

To draw a more general conclusion, we divide 26 regions into 2 separate groups based on the income per capita. Figure 38 shows regions having income per

capita below and above of 75 % of the Turkey average. In the figure, first group colored by yellow consists the western regions which are TR10, TR21, TR22, TR31, TR32, TR33, TR41, TR42, TR51, TR52, TR61, TR62, TR71, and TR81. Then, the second colored by red is contains eastern regions which are TR63, TR72, TR82, TR83, TR90, TRA1, TRA2, TRB1, TRB2, TRC1, TRC2, and TRC3.
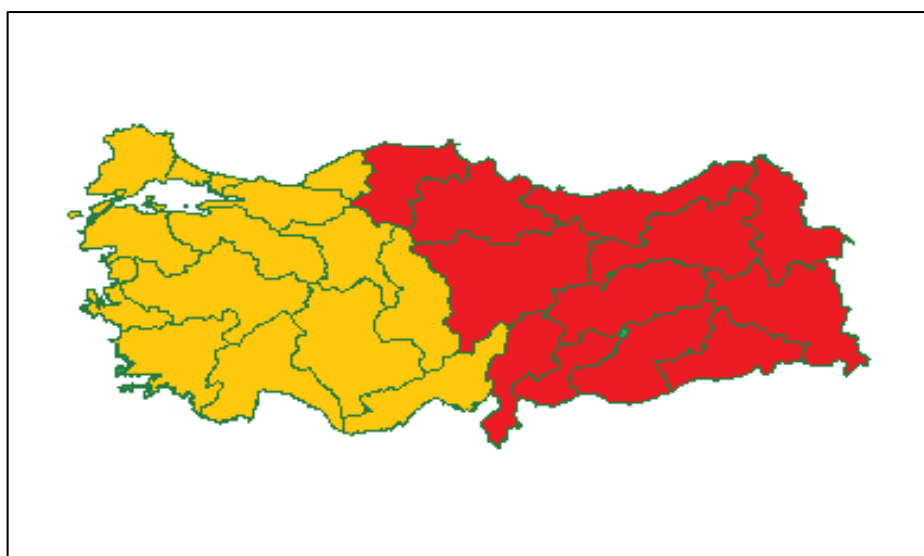
Figure 38 Division of regions according to income per capita

Now, expenditure and own-price eIasticies found in this chapter will be evaluated based on above division. This is because we want to make a final remark about that does consumption patterns in the west regions differ from the consumption patterns of east regions or not.

Starting from the expenditure elasticity, both consumers from the east and the west behave food and communication goods as necessity. Moreover, goods in alcoholic beverages and tobacco, clothing, health, education, and the other group are found as luxury goods for both eastern and western regions. Thus, one can conclude that consumption pattern for these commodity groups in western areas does not differ

from consumption pattern of eastern areas. However, it is observed that items of housing, furniture, and recreation groups are luxury for regions in the west although these items are necessity for regions in the east. In addition, commodities in the transportation and restaurant and hotels groups are luxury for the west while these commodities are necessity for the east. Therefore, consumption pattern for housing, furniture, transportation, recreation, and restaurant and hotel commodity groups, are not the same in western and eastern areas.

When own-price elasticities are investigated, it is found that demand for food, alcoholic beverages and tobacco, health, communication education, and miscellaneous goods are elastic for both consumers from the east and the west. Thus, one can conclude that households' responses to price changes for these commodity groups are the same in western and eastern areas. However, it is observed that demand for items of clothing, housing, furniture, transportation, recreation, and restaurant and hotel groups differs for regions in the west and in the east.

CHAPTER SIX

CONCLUSION

This study analyzes the differences in the consumption of 12 main groups for 26 regions (NUTS level 2) and for the period 2005-2013 for Turkey. The model used in the study is Linear Approximation of the Almost Ideal Demand System (LA/AID) by Deaton and Muellbauer (1980). Demographic variables such as population, employment and education are added to the original model as new control variables using demographic translation method by Pollak and Wales (1981). Augmented mean group estimator technique (Eberhardt and Teal 2010, 2011; Eberhardt and Bond 2009) which take cross-sectional dependence in time and spatial dimensions into account is employed to estimate LA / AID models by panel regressions. The data is derived from web page of TurkStat via online data sets. For all regions and

groups of good and services, percentage share of item groups in total consumption expenditure, their price indices, and gross regional value added are obtained.

In this study, expenditure and own price elasticities are calculated and evaluated separately for each of 12 main consumption group. One can conclude that consumption pattern for goods in food, alcoholic beverages and tobacco, clothing, health, communication, education, and miscellaneous groups in western areas are the same as consumption pattern of those in eastern areas. However, consumption pattern for housing, furniture, transportation, recreation, and restaurant and hotel commodity groups, are different in the west and the east.

On the other hand, one can conclude that households' responses to price changes for food, alcoholic beverages and tobacco, health, communication education, and miscellaneous commodity groups are the same in western and eastern areas. However, it is observed that demand for items of clothing, housing, furniture, transportation, recreation, and restaurant and hotel groups differs for regions in the west and in the east.

To conclude, when it is compared to previous literature, outcomes in this study do not perfectly fit with it. This is mainly because of that based on results of expenditure elasticity; there are many regions that behave some consumption goods as inferior. Moreover, according to results of own-price elasticity, we do not expect to see enormous number of regions that behave certain goods as Giffen. These are the one of the drawbacks of using aggregate data. In relevant literature, studies are dominantly held by using micro data sets. Thus, as a further study, it is aimed to hold this study by employing micro datasets to fix the problems encountered in this study.

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APPENDIX

A.1. TurkStat Classification of Consumption Expenditure

1. **Food and soft drinks:** Bread and cereals, meat , fish , milk, cheese and eggs, fat and oils , fruit , vegetables , sugar, jam, honey, chocolate and confectionery, food products n.e.c., coffee, tea and cocoa , mineral waters, soft drinks, fruit and vegetable juices.

2. **Alcoholic beverages and tobacco:** Spirits, wine, beer, cigarette and tobacco.

3. **Clothing and footwear:** Clothing materials, garments , other articles of clothing and clothing accessories , cleaning, repair and hire of clothing , shoes and other footwear , repair and hire of footwear.

4. **Shelter, water, electricity, natural gas, and other fuels:** Actual rentals paid by tenant, other actual rentals, imputed rentals of owner occupiers, other imputed rentals, materials for the maintenance and repair of the dwelling, services for the maintenance and repair of the dwelling, water supply, refuse collection, sewerage collection, other services relating to the dwelling n.e.c, electricity, gas, liquid fuels, solid fuels, heat energy.

5. **Household furnishing, equipment and household operations:** Furniture and furnishing, carpets and other floor coverings , repair of furniture, furnishing and floor coverings, households textiles, major household

appliances whether electric or not, small electric household appliances, repair of household appliances, glassware, tableware and household utensils, major tools and equipment, small tools and miscellaneous accessories, non-durable household goods, domestic services and household services.

6. **Health:** Pharmaceutical products, other medical products, therapeutic appliances and equipments, medical services, dental services, other paramedical services, hospital services.

7. **Transportation:** Motor cars, motor cycles, bicycles, animal drawn vehicles, spare parts and accessories for personal transport equipment, fuels and lubricant for personal transport equipment, maintenance and repair of personal transport equipment, other services in respect of personal transport equipment, passenger transport by railway, passenger transport by road, passenger transport by air, passenger transport by sea and inland waterway, combined passenger transport, other purchased transport services.

8. **Communication:** Postal services, telephone and telefax equipment and repair, telephone and telefax services.

9. **Recreation:** Equipment for the reception, recording and reproduction of sound and pictures, photographic and cinematographic equipment and optical instruments, information processing equipment, recording media, repair of audio-visual, photographic and information processing equipment, major durables for outdoor recreation, musical instruments and major durables for indoor recreation , maintenance and repair of other major durables for recreation and culture, games, toys and hobbies, equipment for sport, camping and open-air recreation, gardens, plants and flowers, pets and related products, veterinary and other services for pets, recreational and sporting services, cultural services, games of chance, books, newspapers and periodicals, miscellaneous printed matter, stationery and drawing materials, package holidays.

10. **Education:** Pre-primary and primary education, secondary education, post-secondary non-tertiary education, tertiary education, education not definable by level.

11. **Restaurants and hotels:** Catering services, canteens, accommodation services.

12. **Other goods and services:** Hairdressing salons and personal grooming establishments, electric appliances for personal care, other appliances, articles and products for personal care, jewelry, clocks and watches, other personal effects, social protection, life insurance, insurance connected with the dwelling, insurance connected with health, insurance connected with transport, other financial services n.e.c, other services n.e.c.

A.2. NUTS Level 2 Division of Turkey

Legend:

☐ NUTS II regions having an income per capita above 75% of the Turkish average

☐ NUTS II regions having an income per capita below 75% of the Turkish average

★ 15 Growth Centres