Are Boys Really Favored in Patriarchal Societies? Evidence From Turkey

by

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Abstract

Gender bias in expenditure patterns has been an issue of concern over the last two decades, starting with the pioneering work of Deaton and Subramanian (1991). The main argument was that if systematic patterns of discrimination exist, they would be reflected in the household expenditure pattern. Early studies focused on low income and lower middle income countries. This literature is motivated by higher child mortality among girls and the "missing girl" phenomena. However, most studies have failed to find significant evidence in household spending of discrimination against girls. This study differs from previous papers by investigating expenditure patterns in an upper middle income country – Turkey. Household level data set obtained from the Turkish Statistical Institute Household Budget Survey for 2003 through 2005 were used to investigate intrahousehold gender discrimination among children in rural and urban Turkey. Following the existing literature, we estimate Engel curves for child goods and adult goods. Despite the widespread impression of a patriarchal culture in Turkey, the expenditure patterns of Turkish families show little evidence of discrimination against girls. The pattern of spending on adult goods indicates that girls are favored, in the sense of capturing a larger share of household resources. For child goods, a more mixed pattern of both boy and girl bias is revealed. The results are show to be robust to parametric and semiparametric estimation of the Engel curves.

Keywords: Intrahousehold resource allocation, Gender bias, Engel curve, Engel approach, Rothbarth approach, Outlay equivalent ratios.

JEL Classification: C11, C14, C51, D13, D31

Özet

Deaton ve Subramanian'ın (1991) öncülük yaptığı araştırma ile harcama düzeninde cinsiyet ayrımcılığı/yanlılığı son yirmi yılın önemli çalışma konusu olmuştur. İktisat yazınında ki bu konudaki erken çalışmalar düşük ve düşük-orta gelirli olan ülkeler üzerinde yoğunlaşmıştır. Araştırmalarda konu olan ülkelerdeki kız çocuklarında göreceli olarak daha yüksek çocuk ölüm oranları ve "kayıp kız" fenomeni bu çalışmaların gerekçesini oluşturmuştur. Ancak, yapılan çalışmaların çoğu hanehalkı harcamalarında kız çocuğa yönelik ayrımcılığa işaret eden kayda değer bulguya ulaşamamıştır. Düşük gelirli ülkelerde hanehalkı içerisinde harcama düzenine yönelik yapılan önceki araştırmalardan farklı olarak bu çalışma, üst-orta gelirli ülke olarak sınıflandırılan Türkiye üzerine yapılmıştır. Bu çalışmada Türkiye İstatistik Kurumu'ndan elde edilen 2003, 2004 ve 2005 yılı Hanehalkı Bütçe Anketleri kullanılarak, kırsal ve kentsel alanlarda hanhehalkı içinde çocuklara yönelik cinsiyet ayrımcılığı araştırılmıştır. Bu konudaki çalışmaları takiben, çocuk malları ve yetişkin malları için Engel eğrilerinin tahminleri yapılmıştır. Sonuçlar, yaygın ataerkil kültür anlayışına rağmen, Türk ailelerinin tüketim düzenlerinde kız çocuğuna yönelik ayrımcılığın az olduğunu göstermektedir. Yetişkin mallarındaki tüketim düzeni incelendiğinde hanehalkı kaynaklarından tasarruf edilerek bu kaynakların kızların ihtiyaçları için kullanılarak kız çocukların belirgin bir biçimde kayrıldığı, gözlemlenmektedir. Çocuk mallarında yapılan harcamalarda ise hem kız çocuklarının hem de erkek çocuklarının kayrıldığı, dolayısıyla karışık bir düzen olduğu görülmüştür. Elde edilen sonuçlar hem parametrik hem de semiparametrik Engel eğrilerinin tahminlerinde tutarlı olduğunu göstermiştir.

Anahtar Sözcükler: Hanehalkı içerisinde kaynak bölüşümü, cinsiyet ayrımcılığı, Engel eğrisi, Engel metodu, Rothbarth metodu, Harcama eşdeğerliliği oranı.

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Abbreviations

CASS	Chinese Academy of Social Science
CLSS	China Standards of Living Survey
HBS	Household Budget Survey
HIPS	Hacettepe Institute of Population Studies
IHDS	Indian Human Development Survey
NCAER	National Council of Applied Economic Research
NSS	National Sample Survey
OER	Outlay Equivalent Ratio
OLS	Ordinary Least Squares
SSB	State Statistic Bureau of China
TURKSTAT	Turkish Statistical Institute
UNDP	United Nations Development Programme

To my loving family...

1 Introduction

Turkey, since its foundation as a nation state in 1923, despite its modernization efforts which are characterized by expansion of capitalist relations, industrialization, urbanization, individuation and improvements in civil and human rights, still carries patriarchal characteristics. This controversy is most evident when one realizes the fact that although Turkey was a pioneering country in the world to give right to vote and be elected to women as early as in 1931, there still exists an unequal status between men and women. The unequal treatment of women is mostly observed in the practice of arranged marriages; existence of dowry practices; their rather low labor market participation; and relatively lower educational attainment. It is often claimed that in patriarchal societies, the roots of gender discrimination is sown within the family where male child is favored when it comes to allocation of family resources. In fact, a recent United Nations Development Programme (UNDP) report (2008) on Turkey states that being a nonexistent young women in Turkey is worse than nonexistence and attracts our attention to discriminatory practices for adolescents as:

> "The situation of adolescents in Turkey is complicated by gender disparities that still reflect and emphasize frequently the traditional preference of men and boys over women and girls" (60).

However, with the rapid urbanization and the related transformation in the economy as experienced recently in Turkey, one would expect erosion of this gender discrimination among the children over time. Furthermore, in recent years, the Turkish government enhanced its efforts regarding elimination of gender discrimination among children by increasing the number of years compulsory

primary school education from five to eight years. This policy by itself reduced the existing 8% gender gap in primary education in 2001, to 4% in 2007; and 17% gender gap in secondary education in 2001 to 8% in 2007. Governmental campaigns promoting girl schooling such as "Come on girls you are going to school" have also contributed to this positive development.

The objective of this study is to investigate intrahousehold gender discrimination among children in rural and urban Turkey by using household expenditures obtained from Turkish Statistical Institute (TURKSTAT) Household Budget Survey for 2003 through 2005. Following, Deaton and Subramanian (1991) who state that :

> "If systematic patterns of discrimination exist, one should expect them to leave traces in the household consumption pattern" (1)

we resort to Engel Curve method to detect how household expenditure on a particular good changes with household gender composition. As the proceeding literature review will reveal, our study improves upon the existing literature on the following grounds. First this is the only study in Turkey which applies Engel Curve approach to examine the differential treatment by age and sex, concentrating on the intrahousehold distribution of of expenditures. Second, merger of three consecutive Household Budget Surveys for the years 2003, 2004 and 2005 allowed us to work with 42,867 observations which is comparably higher than the number of observations used in related studies in the literature. This further enhanced efficiency of the parameter estimates, and hence the precision of the hypothesis tests conducted. Third, the Turkish Household Budget Survey not only allows us to examine a broad range of expenditure categories such as: health, education, milk, meat, fruit and vegetable, clothing, toys, books,

personal care, jewelery and watch, cultural activities, restaurants and hotels, alcohol and tobacco, but also lets us to differentiate between those expenditures pertaining to adults and to children separately for goods such as clothing and footwear which the previous literature failed to identify. Fourth, although the Engel curve method for detecting discrimination among children has been applied to lower middle income countries, upper middle income countries seem to be neglected. This study expands the range of countries for which child discrimination is sought by including Turkey, which is classified among upper middle income class. Last of all, we believe that this study puts considerably more effort on testing the robustness of its results previous studies.

Although the combined effect of traditional values, modernization initiatives and government policies to eradicate the alleged gender discrimination among boy and girl child make Turkey an interesting laboratory to test the existence of gender discrimination among children, an extensive literature survey revealed that there exist no study which adopts the Engel curve method to the Turkish data. Existing studies on gender discrimination in Turkey have either concentrated on labor markets examining the significance of gender wage gap as in Palaz (2002) and Aktas and Uysal (2012) or the impact of women's labor force participation, especially in unpaid family labor in small holder agriculture on the well being of girl child as in Berik and Bilginsoy (2000). The latter study is particularly important in showing mothers' participation in labor force as an unpaid agricultural family labor increases relative survival chances of girls. This is because more equitable health care and nutrition is provided to girls, "as they come to be seen as valuable in the household" (874).

There are also studies which examine the differences in medicare provision to girls and boys as in Aksit (1989), Cerit and Unalan (1988), none of which suggest significant gender difference. In a similar vein, Hancıoğlu's (1994) work

with Turkish Demographic and Health Survey of 1993 on infant child mortality and morbidity is also inconclusive on the existence of gender bias.

Aytaç and Rankin (2003) on the other hand, using a nationally representative sample focus on the impact of modernity and traditionality on junior high school attainment of children in Turkey, concentrating on the factors that may explain gender inequality in education. Using a logistic regression approach to estimate the likelihood of graduating from high school for boys and girls, they find that modernization in fact is a key element in eleviating gender differences among boys and girls in the attainment of education. Their findings indicate that while there exists a persistent gender difference in educational attainment for those adolescents who live in rural areas or less developed regions with less educated parents, with extremely religious fathers as well as for girls with working mothers and with younger siblings. This gender difference in educational attainment seems to have disappeared for those who live in developed regions/metropolitan areas and for those children with more educated fathers and mothers.

The remaining of this study is organized as follows: The next chapter provides a literature survey on studies testing gender discrimination with the expenditure data through two different approaches. Chapter 3 explains the data used in the study. Chapter 4 is reserved for the presentation of the empirical methodology used. Chapter 5 presents the results. Finally, chapter 6 concludes.

2 Literature Review

Starting with Deaton's (1987) path breaking study, there has been an increasing interest in exploring the existence of gender bias in intrahousehold allocation of consumption or expenditure. In testing the gender bias hypothesis, the literature followed two methodologically different approaches in estimating an extended version of the the Engel curve which links the demand for a particular good and the demographic composition to total expenditure. The demographic composition is defined as the fraction of household members in various age-gender classes.

Existence of significant number of households incurring zero expenditure on a particular commodity (and hence zero budget share), mostly education, led one strand of literature to follow the hurdle model. In this approach, concentrating only on a particular commodity, education, the household first decides on whether the children in the household consume that commodity at all, a decision making process modeled by probit, and then for those who decide a positive expenditure, decision on how much to spend is modeled by Ordinary Least Squares (OLS). The Engel curve approach on the other hand, uses unconditional OLS (including in the model the zero expenditures for all goods analyzed) with the intention of testing for the total influence of demographics on expenditure including both the effects on zero consumption decision, as well as, the effects on the amount of consumption once the decision on positive consumption is made.

While the studies which used hurdle approach concentrated on only education expenditures in testing the gender bias, the studies that used Engel curve approach have embraced a larger number of commodities for the same purpose. Furthermore, while the hurdle approach fails to distinguish between two categories, adult and child goods, with Engel curve approach using Rothbarth's

method (1943), adult goods can also be analyzed separately in order to provide additional and supporting information on the cost of a child within a certain age group and gender classification. In what follows, we provide a brief literature review of these studies which followed two distinct approaches.

2.1 Studies that use Engel and Rothbarth Approaches

In their pioneering work, Deaton and Subramanian (1991) using the 38th round of the National Sample Survey (NSS) from the Maharashtra state sample conducted in 1983, estimate the Working-Leser specification to test the gender bias on household expenditure patterns. Their data set which consist of 5,500 urban and 5,630 rural households include 10 distinct food expenditure items without allowing one to distinguish between specific adult and child consumption shares as well as education and health expenditures. Their results reveal that, for food items (except for milk) gender differences are mainly between adults rather than children where adult women consume more basic food stuff. In expenditure items, which one can identify as child goods such as education and milk, they found pro male bias for 10-14 year age group for education only in rural areas and 0-4 year age group for milk in urban areas. While the results indicate no evidence of gender difference in medical expenditures in rural areas, in urban areas 5-9 year old male group seem to have been favored. Deaton and Subramanian (1991) also adopt the Rothbarth technique which requires Engel curve estimation over adult goods only, with the objective of computing Outlay Equivalent Ratios (OER) from the regression coefficients obtained, as suggested by Deaton (1989), in order to identify whether a boy is costlier than a girl. Although Indian NSS data is not the best one to identify potential adult goods, Deaton and Subramanian choose pan and tobacco, alcohol,

male clothing, female clothing, leather footwear, amusement and personal care as adult goods and compute outlay equivalent ratios. Their subsequent testing procedure reveals that, of the items listed above as adult goods except for alcohol, pan and tobacco are not really adult goods which explain unexpected signs that they found for the outlay equivalent ratios. The only indication of gender discrimination among children is for the 0-4 age group where the girl child is discriminated for tobacco and pan expenditures, which finds its expression as greater consumption cuts for an additional boy at this age group.

Burgess and Zhuang (2000), tried to explore the phenomena of son preference and the consequent problem of excess female mortality in China. Using 1990 Rural Household Sample Survey for two provincial sub samples representing a poor (Sichuan) and relatively better off region (Jiangsu), this study tests whether gender biases tend to erode with modernization employing the methodology proposed by Deaton and Muellbauer (1986); Deaton and Subramanian (1991). Furthermore, by bringing together rural household data with census data for the same provinces, the paper inspects whether gender related biases in the allocation of household resources explain the observed outcomes in the census data which finds its expression as sex ratios, age specific mortality and enrollment rates. Making use of 5,380 households from Sichuan and 3,364 households from Jiangsu, Burgess and Zhuang (2000) adopt the Working-Leser Engel curve specification with seven age sex class each split by gender, concentrate on food, calorie, health (split as health goods and health services) and education (split as education goods and education services) shares as left hand side variables with the belief that differential treatment of boys and girls with regards to these items will have irreversible effects on their welfare which can be captured as an outcome from the 1990 census data. Their results signal no gender bias in children for food expenditures for age categories 0-4, 5-9, and 10-14 in either

province. The same results hold for calories as well. As for the education goods, their results suggest pro-male bias in 10-14 age group in Sichuan and in 15-19 age group in Jiangsu. Pro-male bias is also observed on education services for 15-19 age group in both of the provinces but being more pronounced in Sichuan, which is a relatively poorer province, which signals the impact of modernization on eleviating gender differences in consumption patterns. The impact of modernization is even more evident on health goods expenditures where there is a pro-male bias for 0-4 age group in poorer district Sichuan but no gender difference in none of the age groups in a richer district Jiangsu. For health services on the other hand, no gender discrimination is evident in either province. In adopting the Rothbarth framework which relies on the identification of adult goods only, their data set failed to propose any good but alcohol and tobacco. This choice of adult goods which is validated for Jiangsu, was not as clear for Sichuan where test results were more mixed. Within this framework, the study reports mostly negative outlay equivalent ratios for child groups as theoretically expected. Although the magnitude of outlay equivalent ratios are suggestive pro male bias in overall spending in poorer district Sichuan, but not in Jiangsu; the F-test conducted reveal no significant difference in the same age groups. The strength of the study lies in its establishment of the link between biases in health and education spending and the corresponding biases in age specific mortality and enrollment ratios which is obtained from census data. Therefore, authors conclude that, gender biases in spending leads to gender biases in outcomes.

Following the foot steps of Burgess and Zhuang (2000), Lee (2008) reinvestigates the gender bias hypothesis for China, this time using a household level data set obtained from the China Standards of Living Survey (CLSS) conducted in 1995. Although this study suffers from a small sample size of 576 households, the sample selected allows the study to identify seven adult goods

listed as alcoholic beverages; cigarettes; eating out; jewelery; stationary products; entertainment and lottery tickets as opposed to two adult goods identified in the previous study. Furthermore, the test on the nature of the adult goods validate that all goods considered are in fact fulfill the definition of adult goods. However, one important shortcoming of this study is its failure to consider the consumption patterns related to child goods. The results recommends that expenditure on adult goods are insensitive to the number of young children in the household, and furthermore, the test on outlay equivalent ratios refutes the existence of gender bias in rural China.

One other study that looks into the effects of gender on expenditure patterns in rural China is that of Gong, Soest and Zhang (2005). They used Rural Household Income Expenditure Survey of the State Statistic Bureau of China (SSB) and Chinese Academy of Social Science (CASS) conducted in 1995. Although the data collected contains detailed information on income, expenditures, consumption from self production as well as financial assets, labor market status of the household members, for 7,798 households in rural areas of 19 Chinese provinces, authors only focus on nuclear families with households consisting of two parents and one or more children, which reduces the sample size 5,541 households. Following the previous literature, they first estimate the traditional Working-Leser Engel curve specification for alcohol and tobacco, which they chose as the only typical adult good, food and educational goods. The strength of this study lies in its scrutiny of the functional form of parametric specification which led the authors to conduct semi-parametric partial linear estimation of Engel curves in order to check the robustness of their initial results as well as for the decision on the most appropriate specification for the functional forms of the Engel curves.While their tests conclude that the linear Engel curves are not appropriate for food expenditures, in both the parametric

and semi parametric estimation of the Engel curves they find little evidence of gender discrimination in food and alcohol expenditures. For the educational expenditures, deviating from the usual convention in the literature, they include in the partial linear model number of boys and girls attending to school rather than the total number of boys and girls in a given age group. This of course makes the estimates conditional on the enrollment decisions. For this category, while they fail to find significant difference in the educational expenditures for the younger age groups, for the older age groups 16-18 and above, their results indicate lower expenditures for girls than boys. Gong, Soest and Zhang (2005) enhancing on other studies in the literature, not only investigated the decision of having more than one child where they clearly showed that the probability of having a second child significantly increases if the first child is a girl, but also test whether parents' decision to send a child to school depend on the sex of the child using both a parametric probit model and a semi parametric model. In all the specifications tried, they conclude that there exist a discrimination against girls where boys are more likely to be sent to school than girls while there is little evidence of bias in the expenditure of the rest of the goods.

2.2 Studies that use Hurdle Approach

Kingdon (2005) uses Household Survey Data of National Council of Applied Economic Research (NCAER) conducted in 1994 which covered 33,230 households across 16 major states in India. The strength of the data set lies on its education expenditure coverage where educational expenditure is reported for each individual aged 35 or less. An important weakness of the data set on the other hand is that, it did not collect comprehensive information on total household expenditure but only food, health and education expenditure. Therefore,

the study which concentrates on detecting gender bias in the intrahousehold household allocation of educational expenditures had to rely on share of educational expenditures in the sum of food, health and educational expenditures rather than total household expenditures. Kingdon (2005) limits the observations to households who have children of school going age (5-19) which yields 25,954 households. In analyzing the gender bias, the study first concentrates on individual level data by thoroughly exploring means of descriptive statistics. The second stage of this study inspects if the incorrect functional form is responsible for failure of the conventional Engel curve approach in detecting gender bias. Lastly, they investigate if the reason behind the failure of the Engel curve approach in detecting gender bias is due to aggregation of data at the household level. From the individual level data, realizing that 31% of the households did not incur education spending, the study asked the question if the households with all-girl children are actually responsible for lower rates of school participation. They found that all-girl households are nearly 19 percentage points more likely to report zero education spending than at least one-boy households and that, this difference is statistically significant. This evidence led them to conclude that there exists a correlation between the gender composition of household child population and the households' decision to incur positive educational spending. The study then concentrates on the households that have positive educational expenditure, using individual level data, they not only show that school enrollment for girls are significantly worse than for boys but also find that per child educational expenditures are lower for girls than boys. Kingdon (2005) then goes on to the estimation of traditional Engel curve method where no significant gender discrimination is detected which led him to further explore why gender biases observed at the individual level are washed out at the household level. Using hurdle model, and hence separating house-

holds' decision whether to spend money on child's education and the decision on how much spend conditional upon spending a positive amount on education, this study shows that there is more scope for detecting gender discrimination.

In a more recent study, Ziemmermann (2011) reconsiders gender bias in intrahousehold resource allocation in India with the same considerations as in Kingdon (2005). This study uses the Indian Human Development Survey (IHDS) from 2005 which includes nationally representative 41,554 households from 1503 villages and 971 urban neighborhoods. The data used both individual and household level responses on education, employment, health, and fertility. Since the studies' focus is on gender differences in educational attainment and expenditures, this limits observations to those households with children which leads to a final sample size of 32,263 household. Ziemmermann (2011) also explores the robustness on gender bias results with respect to aggregation level of data as well as the statistical methodology adopted. The study demonstrates the existence of gender discrimination against girls for children aged 5-9 which increases by age, leading to wide spread gender bias once children reach 15-19 age group and that, this result is robust to the aggregation level of data i.e, all-India versus state level data and household versus individual level data. After estimating the traditional Engel curve using unconditional OLS regression as well as probit and conditional OLS specifications at the national level as well as for 16 major Indian states separately, the overall conclusion is that Engel curve does not fail to detect gender bias in the intrahousehold household allocation of resources especially in large samples.

Himaz (2009) using data from a sample of 982 households with 2,578 children conducted by Young Lives in 2006 for Andhra Pradesh in India estimate both the Engel curve and the hurdle model to detect gender bias in educational expenditures. Since the data used includes sub categories of educational expen-

ditures such as school fees, uniform costs, books, transport and extra tuition fees, this allowed for further detailed examination of gender bias. The results from Engel curve estimation demonstrates that there exists a pro-male bias in the age group 10-14. With the hurdle model, the study was able to show that part of this bias is due to households' decision to enroll more boys than girls as well as to spend more on boys once the decision on school enrollment is made. For older age groups, the hurdle model shows that there is a pro-male bias for the school participation decision for the age group of 15-19, however once the participation decision is made, there exists no gender bias in the level of expenditure for boys and girls. This result is is also valid for the quality of education that the boys and girls attain since girls are as likely to be sent to private schools as boys. Examination of subcategories of education expenditures revealed no gender bias except for participation and in extra tuition fees.

3 Data

The data used in this paper is drawn from the 2003, 2004 and 2005 Household Budget Survey (HBS) for Turkey conducted by TURKSTAT. The Household Budget Survey is a crucial source providing information on socio-economic structure; standards of living; and consumption patterns of households. In addition it is a useful tool that helps the policy makers determine the the needs of the society, and to verify the effectiveness of the socio-economic policies adopted. HBS displays households' consumption patterns, income levels according to their socio-economic groups by classifying them as the residents of urban and rural and provinces, disseminates invaluable information on consumption habits, allocation of resources on various goods and services, socio-economic characteristics of the household, employment status of household members as well as the total income of the household and the source of income.

In terms of geographical coverage HBS classifies all settlements in Turkey in two strata as urban and rural areas. HBS adopts the definition of rural and urban settlements of State Planning Organization and defines urban settlement as residences where the population is 20,001 and more, and rural settlement as residences where the population is 20,000 and less.

2003 HBS is conducted on different 1,512 urban and 648 rural households every month which sums up to 25,920 households for the entire year. 2004 and 2005 surveys interviewed 720 households from each of the urban and rural residences on a monthly basis which totaled to 8,640 households for the entire year. This study which appends 2003, 2004 and 2005 HBSs, uses data on all the reported 42,867 households where 12,619 are classified as rural households and 30,248 as urban households.

Each survey is conducted between 1st of January and 31th of December. HBS collects the data on a national sample of household that resides within

Turkish Republic borders. Households are selected randomly from a frame where the frame provides a list of all households and household members. However, the institutionalized population such as people living in elderly houses, rest homes, prisons, military barracks, hotels and hospitals with special characteristics are excluded from the listing. The sampling frame of the survey is obtained from two sources. The first source is Census of Building that has been conducted by Turkish Statistical Institute in 2000 and data from 2000 Numbering Study Building List-Form 1 which provides information for those residences that have access to municipality services. Second source is the listing of 1997 Census, which provides information on residences were municipality services are not provided (villages). The sampling method used is a stratified two-stage cluster where at first stage, the selection is from a list of clusters of households and in the second stage, households themselves are selected. Clusters, that are obtained from the frame are randomly selected with probability proportional to the population. Once the clusters are chosen, households are selected from the address update listing. In situations where selected household cannot attend the survey, substitution principle takes place. In the presence of non response[1], the survey is not conducted with that specific household.

To reduce the incidence of non-sampling errors, households are required to maintain expenditure diaries on a daily basis over the course of an entire year. These diaries are presented to the head of the household prior to the survey and explained thoroughly how to keep records. The household renews the log book every week through the month. In order to confine the international standards and country conditions, these multifunctional, comprehensive, long term surveys are organized by qualified units for collecting, checking and processing the data.

[1] In cases when the household declines to participate in attend the survey, or not present at home during the survey period, as well when they start the survey but decline to complete it, when they move to another house during the survey period, when they fail to respond due to health problems.

The survey provides three main groups of variables. First, household socio-economic status. Second is the household consumption expenditures. The concept of household expenditure used in this paper is the value of annual consumption of goods and services. Consumption variable consists of purchases of items such as; consumption from self production; consumption during the month from self produced and stocked; individuals that obtain goods and services from their work place; purchase of goods for gift/help purposes. Total household expenditure thus consists of food, alcohol and tobacco, clothing, housing expenditures, health, transportation, communication, cultural activities, education, restaurant, hotel, and services expenditures. Third, the survey also collects information on household members including their number, age, sex, and occupation[2].

[2]For further detail on the Household Budget Survey see chapter "Definitions and Concepts and Method Applied in Household Budget Survey" from the data booklet of Turkish HBS.

4 Methodology

4.1 Parametric Approach

Demand analysis in cross-section studies is crucial in explaining behavioral differences in intrahousehold allocation of resources. Behavioral differences are driven by household characteristics which are constituted of demographic composition of the family and the total expenditure. The most common method that links the demand for a particular good q_i, to total expenditure x is called Engel curve and it takes the form;

$$q_i = g_i(x) \tag{1}$$

where equation (1) suppresses the household demographic composition and prices are absorbed in the functional form. Since cross section analysis assume that there is no price variation (i.e., prices that households face are identical), the homogeneity property of demand functions does not hold, whereas adding-up requirement still remains significant. Therefore, equation (1) can be multiplied by p_i to obtain the expenditure for the i^{th} good, $p_i q_i$, as a function of total expenditure x, which is referred as Engel curve.

Various functional forms has been tried for the Engel curve specification such as double logarithmic, semi logarithmic ($q_i = \alpha_i + \beta_i log x$) , log reciprocal ($log\ q_i = \alpha_i - \beta_1 x^{-1}$) as proposed by Prais and Houthakker (1955), as well as more complex forms as the cumulative distribution function of the lognormal distribution. However, these functional forms failed to satisfy the adding-up criteria which questioned the theoretical plausabilities of these models. The first functional form that is in conformity with the underlying utility function was proposed by Working (1943) and used by Leser (1963) which established

a linear relationship between the share of the budget devoted to each good w_i and the logarithm of total expenditure,

$$w_i = \alpha_i + \beta_i \log x \tag{2}$$

where α_i and β_i are parameters to be estimated. Adding up requirement is satisfied when $\sum \alpha_i = 1$, and $\sum \beta_i = 0$ which leads to sum of budget shares being unity i.e., $\sum w_i = 1$. Hence, if equation (2) is estimated for each of the expenditure items by OLS, the parameter estimates will satisfy the adding up requirement automatically. This model is also nested in the Almost Ideal Demand System developed by Deaton and Muellbauer (1980) as well as in the Indirect Translog Model of Jorgenson (1980).

Since Turkish Household Budget Survey does not collect information on individual consumption levels within the household, one can indirectly trace systematic gender based allocations within the gender composition of the family and its aggregate consumption patterns. Therefore, the Working Leser Engel form is extended to include household demographic composition where the demographic variables are decomposed in to different age classes (n_k) which are further separated by gender (γ_{ik}) in order to detect how the children of same ages but of opposite sexes affect intrahousehold allocation of resources:

$$w_i = \alpha_i + \beta_i \ln(x/n) + \eta_i \ln\, n + \sum_{k=1}^{K-1} \gamma_{ik}(n_k/n) + \tau_i z + u_i. \tag{3}$$

In this specification, w_i is the budget share of good i, x is total expenditure, n is household size, n_j is the number of people in the age-sex class j where there are K such demographic categories in total, and u_i is the error term for the i^{th} good. The dummy variable z is added to capture the general time effects since three consecutive year cross-section data are merged for the estimation of the

model.

In Working's Engel curve specification, β_i scrutinize whether the goods are luxury, for those goods which take a larger share in the budget as total expenditure increases, necessity, those that are taking a smaller share in the budget as the household gets better off, and inferior, which is designated by a decrease in demand (absolutely) as the expenditure or the income of the household increases. For those goods that are luxury, $\beta_i > 0$ which implies the total expenditure elasticity being greater than unity, and necessity when $\beta_i < 0$ implying a total expenditure elasticity less than unity[3]. The K demographic categories adopted in this study categorize the demographic variables of the households by age and sex.

In estimating (3), the selected 12 demographic categories partition six age categories 0-4, 5-9, 10-14, 15-25, 26-54, 55 and above with respect to gender as males and females. Of the K selected categories only $K-1$, i.e., 11 ratios, n_k/n, are formed to be included in the regression where the male aged 26-54 category is the omitted variable. The coefficient γ_{ik} shows the marginal effect of increasing n_k/n by replacing men aged 26-54 by a person of type k on the budget share while holding everything else constant. The sign and the magnitude of the coefficient γ_{ik} also shows commodity i^{th}'s relevance to a particular age and gender category i.e., for the adult males one should expect the γ_{ik} coefficient for alcohol and tobacco to be significantly positive. In this study, both the demographic variables and household size are treated exogenous variables. One possible explanation for this is that unobserved factors that effect fertility may be correlated with unobserved factors that determine consumption preferences. However, it is impossible to include these unobserved factors with the cross-section data.

[3]Note that, household size, n, is included in addition to the total expenditure so that household scale (η_i) has a detached effect from total expenditure on the demand of good i.

To test gender bias, a series of F-tests are employed with the null hypothesis being the equality of coefficients by gender, $\gamma_{ij} = \gamma_{ik}$ where j and k reflects boys and girls in the same age category. When the null hypothesis is rejected i.e., that there exist a gender bias, the parameter estimates of the original model is referred to in order to detect the direction of bias. In this regard, this study employs six F-tests, where five of them compute one degree of freedom tests concerning each age category separately, while the last test is a four degree of freedom test for the hypothesis that there are no gender differences among all children (those aged under 14).

4.1.1 Engel Approach

One of the most straightforward and widely used method in identifying equivalence scales is defined by Engel (1857) where the identifying assumption is based on the premise that households with same budget shares devoted to food but varying demographic composition are equally well off. Hence, by comparing coefficients of demographic variables, one can compute the cost of a children for the household. This study extends this terminology by exploring how the household demand is influenced with household demographic/gender composition. Pro-male bias is evident as families devoting significantly more budget share of that particular good for the son of the family compared to the daughter i.e, $\gamma_{ij} > \gamma_{ik}$ where j and k reflect boys and girls in the same age class respectively.

The first group of goods were chosen such that differential allocation of these goods within the family may have irreversible effects for the future of the child. While selecting these goods, only the goods that are or may be consumed exclusively by children are considered and these are named as child goods. Hence,

child goods include books, toys games and hobbies, child footwear, child clothing, fruit and vegetable, meat, education, and health. The data set employed is rich enough to disaggregate the adult category 15-54 into 15-25 and 26-54 in order to capture the gender bias in human investment in terms of higher education. In fact, this is an important source of information for a middle income country, a point disregarded in previous empirical applications.

4.1.2 Rothbarth Approach

The second approach is based on the extension of Rothbarth method (1943) for measuring the cost of a child. According to this method, expenditures on adult goods is an indicator of welfare of parents. Hence, if additional child into the family reduces the consumption of adult goods (negative income effect), this will naturally lead to a welfare loss for the parents.

This method can only be employed if one can define a set of goods that are consumed exclusively by adults, and that children have only income effects (no substitution effects). Deaton (1989) extended this methodology and formulated a test on the gender hypothesis using household expenditure. As mentioned above, since budget shares add up to unity, a reduction in the budget for a good, for example adult good, will be offset by increased budget share devoted to another good such as child good. Therefore, adults by decreasing their own consumption goods, will channel their resources for the needs of their children. Hence, gender discrimination favoring boys will be apparent if these negative income effects are significantly greater for boys (being more negative) than for girls in the same age category, which implies that parents make more room in the family budget for boys compared to girls.

The procedure starts with the extension of the Working's Engel curve spec-

ification. The estimation now is only limited to a set of adult goods which are identified as: alcohol and tobacco, restaurant and hotel, cultural activity, women footwear, men footwear, women clothing, men clothing, women personal care, jewelry and watch expenditures. Then, outlay equivalent ratio (OER) is defined as;

$$\pi_{ij} = \frac{\partial q_i / \partial n_j}{\partial q_i / \partial x} \div \frac{x}{n} \tag{4}$$

where i refers the adult good and j is the demographic category. The ratio, π_{ij}, expresses the effect of an additional person in the j^{th} demographic category on consumption on adult good i in terms of the increase in total expenditure which produces the same change in expenditure on that commodity, written as a function of per capita expenditure (Burgess et.al, 2000, 7). In other words, given the estimation results, OER calculates the equivalent reduction in the income when a child of a certain age and gender group is introduced to the family. Once the regression equation (3) is estimated by OLS, π_{ij} ratios are calculated using coefficient estimates for η_i, β_i and γ_i as:

$$\pi_{ij} = \frac{(\eta_i - \beta_i) - \gamma_{ij} - \sum_{k=1}^{K-1} \gamma_{ik}(n_k/n)}{w_i + \beta_i} \tag{5}$$

where the γ_{ik} for the male 26-54 demographic category is zero. Estimates of the confidence intervals of each π_{ij} ratios are obtained by bootstrapping the sample 99 times. Instead of calculating OER for each household, the OERs are computed at the mean values of the data i.e., means of (n_k/n) and w_i.

If adult goods are identified correctly, we would expect the OER's to be significantly negative for the children indicating that presence of a child depress the spending of the adults. For adult category on the other hand, we would expect the ratios to be large and positive. OERs also reflect the direction of bias

such as discrimination against girls would be expressed as π_{ij} being significantly more negative compared to π_{ik} for adult good i, where j and k reflects the boys and the girls in the same age category.

The intuition of equation 5 is presented in Figure 1. Since the identified adult goods are normal goods, the Engel curves are upward sloping. The effect of an additional child on the share of an adult good is known from the estimated γ coefficients which corresponds to B in the figure. The slope of the Engel curves are also obtained from the estimated β coefficients, which corresponds to $\triangle$ in the figure. Therefore, making use of the slope (rise over run) the equivalent reduction in per capita income can be calculated, A.

As mentioned earlier, the method relies on two premises; first, if goods that are defined are indeed adult goods and second, if children cause no substitution effects on the consumption of these goods. If these two requirements are satisfied, the OERs will be equal for all adult goods. Deaton (1989) proposed a test of an additional implication of the same assumptions. The testing procedure starts with estimating

$$p_i q_i = b_{0i} + b_1 X_G + c_{ij} n_j + d_i Z + v_i \tag{6}$$

where expenditure on each individual adult good is regressed on total expenditure of adult goods X_G, the same set of demographic categories n_j, and on the array of control variables, Z. The method relies on the premise that children can affect spending on adult goods through only the total expenditure (an income effect). Therefore, after controlling the total expenditure on adult goods, children will have no effect on expenditure of individual adult goods (there are no substitution effects). Therefore, the test to verify the nature of the adult goods is simply a joint significance test of the children category. One issue of this method is the bias that results from regressing expenditure on individual adult

goods to total expenditure of adult goods which is caused by the measurement error in these two variables. To overcome this problem, total food expenditure is used as an instrumental variable for total expenditure on adult goods.

4.2 Semiparametric Approach

The linear specification of Working (1943) and Leser (1963) has been widely used for the Engel curve due to the convenient features satisfying the requirements of utility functions, in particular, adding up. However, recent studies have argued that linear specification for Engel curve may not be convenient for some commodities, (see for relevant examples, Banks et. al, 1997, Blundell et. al,1999, Lewbel et. al, 1991). Banks et. al, (1997) for example, showed that for the U.K data, linearity of the Engel curves for the food category are not rejected, however for other goods such as alcohol and clothing expenditures, nonparametric analysis of Engel curves required the inclusion of quadratic terms of the logarithm of the total expenditure in the model.

Nonparametric approach that has been used to observe the behavior of the functional form has the advantage of preventing model misspecification since it does not force any functional form specification on the model. However, the infeasibility of this approach comes with curse of dimensionality caused by large number of control variables (including demographic categories) but limited observations. Gong et. al, (2005) explains this problem as "Fully nonparametric estimator then suffer from the curse of dimensionality: due to the slow rate of convergence of the estimator, the estimates will not be accurate in finite samples" (517). Since this study aims to investigate the gender bias in intrahousehold allocation of resources, the right hand side variables include detailed information of male and female categories in various age categories. Hence, with the sample

of 42,867 observations, the dimension of the explanatory variables get sufficiently large leading to infeasibility of the nonparametric estimation technique.

To avoid the curse of dimensionality, this study used a semiparametric partial linear model where the plausibility of the model comes with the flexible functional form in the relationship between logarithm of per capita expenditure, $\ln(x/n)$, and budget share of the i^{th} good, w_i. The extended partial linear model that encompasses Working's (1943) Engel curve specification takes the form:

$$w = \beta' z + f(x/n) + \varepsilon \tag{7}$$

where the family demographic composition variables γ, household size n and the time dummies τ enter through the parametric part $\beta' z$. Therefore, the F-test for gender differences in intrahousehold resource allocation concerns the β vector. The nonparametric component of the model is $f()$, which is an unknown function and since it is consisted of only one variable, the curse of dimensionality is resolved.

This partial linear regression model for the Engel curve specification is estimated using Yatchew's (2003) differencing method. According to this method, the regression effect is removed with the premise that x's that are close will have corresponding values of the regression function that are close. Therefore, before the estimation, the data is reordered so that the nonparametric variable, per capita total expenditure, is in an increasing order. Hence, first differencing equation (7) will remove the nonparametric component $f()$:

$$w_i - w_{i-1} \cong \beta'(z_i - z_{i-1}) + (\varepsilon_i - \varepsilon_{i-1}). \tag{8}$$

Since the differencing method removes the nonparametric component of the

model, the inferences on β as well as the F-tests to explore gender differences is computed as if there were no nonparametric variable $f()$ in the model in the first place. The differencing technique is used both for the Engel Approach for child goods as well as for the Rothbarth approach for adult goods. The same F-tests that are used for parametric models are conducted over the first differenced demographic categories to check the robustness of the results.

After estimating the β coefficients from equation (8), the study uses semi-parametric estimation technique to make inferences on $f()$ as if β were known:

$$w_i - z_i\hat{\beta}_{diff} = z_i(\beta - \hat{\beta}_{diff}) + f(x_i/n) + \varepsilon_i \cong f(x_i/n) + \varepsilon_i. \tag{9}$$

This step of the estimation concerning the component $f()$ is crucial for the calculation of OERs since under the semiparametric identification of the model, the OER takes the form of:

$$\pi_{ij} = \frac{\partial q_i/\partial n_j}{\partial q_i/\partial x} \div \frac{x}{n} = \frac{\eta_i - f'(\frac{x}{n})\frac{x}{n} + \gamma_{ij} - \sum_{k=1}^{K-1}(\frac{n_k}{n})}{w_i + f'(\frac{x}{n})\frac{x}{n}} \tag{10}$$

Therefore, $f'(x/n)$ which is in equation (10) is estimated from (9) by locally linear least square estimation technique. Hence, the consistency and the optimal rate of convergence properties will hold because $\hat{\beta}_{diff}$ will converge sufficiently quickly to β that the approximation in the last part of equation (9) will leave the asymptotic arguments unaffected (Yatchew 2003, 8).

5 Results

5.1 Engel Approach

Tables 1 and 2 list the summary statistics for the variables that are used in the regression analysis for both rural and urban provinces of Turkey respectively. Both tables include eighteen budget shares, as well as the explanatory variables included in each of the regression analysis. In this section, the first nine goods that are considered as child goods will be tested for gender differences in the intrahousehold resource allocation while the remaining goods will be discussed in section 5.0.2.

For the rural area statistics, fruit and vegetables constitute the key elements in the budget share, accounting 11% of the total expenditures. Expenditures on meat have the second highest share comprising 5% of the budget. Books and toys games and hobbies on the other hand, are those child goods with the lowest share in households' budget, accounting for 0.09% and 0.04% of the total expenditures respectively. Expenditure patterns for the child goods are similar across the urban and rural provinces except for the book expenditures. While the book expenditures share is 0.18% of the budget in urban provinces, this expenditure item comprises the lowest portion of the budget (0.09%) in rural areas. As in rural, urban provinces also spend most of their resources on fruit and vegetable that accounts 7% of the budget, followed by expenditures on meat with a share of 4%, while toys, games and hobbies with 0.08% share in total expenditures receive the least share.

Although 64% of the rural households and 77% of the urban households record purchases on milk, meat and on fruit and vegetables, only 6%, 6%, 12% and 24% of households record purchases on education, books, child footwear and child clothing respectively in the rural provinces. The positive response rates

for those expenditure items are 14%, 12%, 12% and 29% respectively for the urban provinces. Although substantial fraction of households do not consume these goods, this study still concentrates on these expenditure items since these are the key items where the discrimination against girls is strongly expected. Contradictory to the rather minimal response rates, i.e., positive expenditures, observed in other studies, health expenditures in Turkey, with 41% rural and 45% urban households recording positive expenditures, constitute the second highest positive response rate after the basic food commodities.

The results from estimates of equation (3) for nine child goods are presented in Table 3 and Table 4 for rural and urban provinces respectively. Among these nine goods, for both the rural and urban households, only milk and fruit and vegetables have been identified as necessities, with respective negative β coefficients. The respective β coefficients for the necessity good milk are -0.08 in rural and -0.04 in urban provinces and the corresponding β estimates for fruit and vegetables are -0.038 in rural and -0.030 in urban provinces. For the remaining goods, the positive β coefficients are indicative of luxuries for both the rural and urban households. The demographic coefficients γ_{ik} are also important since the sign and the magnitude of this coefficient shows commodity i^{th}'s relevance to a particular age and gender category. In this respect, one should note that for goods such as: toys, games and hobbies; child footwear; and child clothing, positive and significant γ coefficients tend to rise until the age of 14 for both sexes, indicating an increased demand (except for toys games and hobbies) until this age. The rather insignificant and/or close to zero γ coefficients for such goods after the age category 10-14 confirm that these are in fact child goods.

The gender bias in intrahousehold resource allocation for rural and urban household are tested through a series of F-tests reported at the bottom panel of

Table 3 and Table 4 respectively. The first four rows (under Table3 and Table 4) tests the equality of male and female coefficients for five age ranges; 0-4, 5-9, 10-14, 15-25 while the fifth row tests the joint significance of children demographic variables with the null hypothesis that there are no difference among children (those aged under 14). For the rural provinces, significant F-statistics together with the the direction of the γ coefficients reveal that young girls are favored in book expenditures. Coefficient estimates for 0-4 demographic category for book expenditures are 0.002 for girls and zero for boys indicate that families spend more on books when a young girl comes to the family compared to a boy of the same age. The positive and relatively larger γ coefficient for heath expenditures, 0.003 for girls of age category 15-25 once compared with -0.007 for boys at the same age group, indicates that girls are favored in terms of health expenditures[4]. On the other hand the significant F-tests shows that, families devote more of their resources to boys for expenditure items toys, games and hobbies (coefficient for males 0.002 and 0.001 for females); child clothing (coefficient for males 0.0039 and 0.0029 for females) both at the age category 5-9, as well as on meat (0.010 for males and -0.005 for females) and health expenditures (0 for males and -0.014 for females) for the ages between 10-14. Although more pronounced gender biases are expected to be found for the remaining goods, in spite of larger point estimates of the demographic coefficients, the F-statistics do not indicate any significant gender difference. For instance, although coefficient for milk expenditure for 0-4 age category are relatively larger for boys 0.011 compared to girls 0.009, test statistics reveal that there is no suggestion that milk is provided more generously to boys at these age categories. The same conclusion holds for education expenditures, while one would expect strongest gender differences in the consumption of this good. Although, the coefficient

[4]This is because, the share of this expenditure type increases when a girl of this age group is introduced to the family and decreases for a boy of the same age category.

estimates show that girls of 5-9 age category have a greater positive effect on the increased share of education expenditure (0.005 for girls and 0.001 for boys), test statistics reveal that there is no significant gender difference in education expenditures. The last F-test reveal that for all child goods, except for meat expenditures, there is significant gender difference among children of different age groups. This can be interpreted as children of different ages and gender have different needs which are reflected on the demand patterns of these goods.

For the urban provinces, the results indicate existence of gender bias for goods such as: child footwear; fruit and vegetables; toys, games and hobbies; and health. However, for some commodities such as books; child clothing; and meat the gender bias detected in the rural areas, seem to have disappeared in the urban provinces. According to the significant F-statistics and γ coefficients, more is spent on fruit and vegetables, and health expenditures for females aged 15-25 as compared to males of the same age group. These are reflected in the γ coefficients as -0.004 for females and -0.009 for males in the consumption of fruit and vegetable and 0.007 for females and -0.004 for males in the health expenditures. On the other hand, results indicate that, there exists a gender bias in favor of boys in such expenditure items as: toys games and hobbies for both the age groups 0-4 and 5-9; and child footwear for the age category 10-14.

The overall results that are summarized in Table 5 indicate that for both the rural and urban provinces, there is no strong pattern in the direction of the bias. These results are striking since the pioneering works that used Engel method failed to show any significant gender difference on the whole, even in countries where outcome data such as sex ratios, mortality rates were strongly suggesting gender bias. On the other hand, the results obtained in this study reveals statistically significant gender differences in the consumption of many child goods. This may be in fact a result of a larger sample size that is used as

well as the quality of the data set as mentioned earlier[5].

5.1.1 Rothbarth Approach

Table 1 and Table 2 also record the summary statistics for the adult goods in urban and rural provinces respectively. Not surprisingly, in both the regions the largest share of the budget is devoted to alcohol and tobacco expenditure with a budget share of 5.3% and 4.6% for rural and urban areas. This expenditure item is also the one where 60% of households reported positive expenditure shares. Restaurants and hotel expenditures ranked second in terms of its share in households' budget comprising 2.7% of the budget in rural areas, and doubling to 4.1% in urban provinces, which can be considered as an indicator of modernity. On the other hand, men footwear and men clothing take relatively higher budget shares 0.6% and 1.3% relatively to women foot wear and women clothing 0.4% and 1.5%, an outcome which one expects to observe in patriarchal societies. Demand patterns for all the goods are again consistent in both the rural and urban provinces. Expenditure item, women personal care is ranked first among the commodities that are frequently purchased with, on the average, 82% of the households reporting positive expenditure shares. On the other hand, due to infrequent purchase of jewelry and watches, this item comprise the lowest budget share 0.03% and the lowest reported positive expenditures share of 8% on the average.

Table 6 and Table 7 report the estimation results for nine potential adult goods consumed both in rural and urban provinces respectively. Outlay equivalent ratios (OER) that are calculated from these parameter estimates, and

[5]See Deaton, (1989) for Thailand and Cote D'Ivoire, Ahmad and Morduch (1993) for Bangladesh, Subramanian and Deaton 1991 for India, Rudd (1993) for Taiwan, and Deaton (1997) for Pakistan, Gong et. al, (2005) for China.

asymptotic standard errors that are obtained through bootstrapping method, are listed in Table 8 and 9 for rural and urban provinces respectively. While the majority of the OER (π_{ij}) ratios are negative for children, for some demographic categories they are not. In particular, for the rural provinces the demographic category of 10-14 showed positive effects in consumption of women footwear, men footwear, men clothing and women clothing. However, one should note that the positive OERs occur when the demographic category is genderly related to the consumption of that particular good. For instance the OER ratio for girls in the consumption of women footwear is positive while for the same age category it is negative for boys. Therefore, these unexpected signs may be due to children of older ages consuming adult goods. Positive OERs on the restaurant and hotels and cultural activities also indicate that there seems no reason to suppose that children do not get access to these goods. Positive values of OER for 0-4 and 5-9 age categories in alcohol and tobacco consumption on the other hand, may suggest two possibilities: either some boys and girls begin to drink wine early in life, or families with young boys and girls drink more wine (Lee 2008, 91). In contrast to the negative π_{ij} ratios for children, one should expect these ratios to be positive for adult demographic categories, at least for some of the adult goods. Except for the expenditure on cultural activities, adult males do indeed show positive OER for alcohol and tobacco, restaurant and hotels, men footwear, men clothing, jewelry and watches categories. One should also note the strong relevance of alcohol and tobacco, and restaurant and hotels expenditures to adult male categories with significant and relatively large effects compared to adult females (who induce consistently negative effect on the consumption of these goods). Adult females on the other hand have the expected positive signs for the OERs except for women personal care expenditures.

The formal tests suggested by Deaton (1989) also verified that unexpected

signs for some OERs due the fact that some goods that are considered as adult goods were in fact not adult goods. These tests results that check for the validity of potential adult goods are reported in Table 10. For rural provinces the test reveals that four out of nine adult goods are indeed adult goods while for urban provinces, only two category of adult good is verified. Accordingly, adult goods for rural provinces are constituted of alcohol and tobacco; restaurants and hotels; and cultural activities; jewelry and watches and for urban households the verified adult goods are alcohol and tobacco; jewelry and watch expenditures. This is perhaps an advancement compared to the previous literature since their findings were limited only to one category[6]. The signs of the OER's for rural provinces are as expected for those expenditure items that are validated as adult goods. For the urban provinces on the other hand, the wrong sign of the OERs still remains where boys and girls aged 0-4 and girls aged 5-9 have large and significant effect on the consumption of alcohol and tobacco and on jewelry and watch expenditures. Lee (2008) attribute these incorrect signs of OERs in children groups to sampling variations.

To make these income effects more interpretable, we conduct F-tests that are reported in the bottom panel of Table 6 and Table 7. The test results reveal that, in rural provinces the presence of 15-25 demographic category exert negative effects on the alcohol and tobacco, restaurants and hotels and in cultural activities consumption. In regression (3), the γ coefficients from the budget share devoted alcohol and tobacco are -0.106 for females and -0.035 for males in the 15-25 age category. For the same demographic category, the coefficients from restaurants and hotels are -0.051 for females and -0.022 for males. Hence, these results suggest that, for the 15-25 demographic category, adults reduce

[6]Deaton et. al, (1989) for Thailand could not verify the validity of adult goods. Deaton et. al, (1991) verified only tobacco as an adult good for India. Burguess (2000) validated alcohol, tobacco and tea as valid adult goods and Gong et. al, (2005) could only define one category of adult good, alcohol and tobacco.

their consumption of alcohol and tobacco as well as restaurants and hotels and divert more resources to the females compared to males i.e., females in this age category are favored. In addition, budget share devoted to restaurants and hotels, show significant F-statistics for the 5-9 demographic category. According to the parameter estimates, the female coefficient of this demographic category is -0.039 while for the male is -0.051 indicating that for this age group, families reduce more of their restaurant and hotel expenditures in order to channel their resources for the needs of the male rather than the female. The last F-statistics show significant values for restaurants and hotels, and cultural activities categories respectively, indicating for all adult goods, except for alcohol and tobacco expenditures, there is significant gender effects among children.

Significant F-statistics indicate that for urban households, there exists a strong female bias for 15-25 age category in the alcohol and tobacco expenditure. The female demographic coefficient γ of this age group is -0.058 while the male the coefficient is -0.025 indicating that urban households also cut more of their adult expenditure for girls to accommodate their needs compared to boys of the same age.

Summary results showing the direction of the gender biases are presented in Table 11. The overall picture suggests that there is a strong pattern in the 15-25 female demographic category revealing that females of this age group are favored in the family. In other words, teenage girls are costlier for their parents. These results in fact are striking since the previous evidence that used Rothbarth method to detect gender bias in China, Pakistan, India, Taiwan, Bangladesh, Cote d'Ivoire and Thailand have failed to find significant gender difference although the outcome data were highly suggestive of son preference[7].

[7]See Burgess (2000), Lee (2008) and Gong et. al, (2005) for China, Deaton (1997) for the review of results.

5.1.2 Robustness analysis with semiparametric methods

The robustness of the results are validated with semiparametric analysis. Table 12 and Table 13 reports the estimated coefficients and F-statistics obtained by differencing method for Engel Approach and Table 14 and Table 15 reports the results on Rothbarth Approach for both rural and urban provinces of Turkey. These results indicate the direction of the biases remain consistent with the parametric analysis.

For the Engel Approach, in addition to the same results with regards to the direction of the gender biases with parametric estimation, the semiparametric estimation showed some additional significant gender differences. Although the significant gender differences in child clothing and health category disappeared in semiparametric analysis, additional gender differences are found in areas of milk, meat expenditures in rural provinces. The F-tests and the relevant coefficient estimates indicate that for 15-25 demographic category, milk is provided more generously for females whereas in the 5-9 and 10-14 category, families spend more on meat for boys rural provinces. For urban, the results obtained from parametric and semiparametric estimations are also inline. Additional gender biases are detected in toys, games and hobbies, and child foot wear categories. The coefficient estimates of the 15-25 demographic category showed that toys, games and hobbies are provided more generously for females while families spend more for boys aged 10-14 on child foot wear.

The OERs for semiparametric estimation are presented in Table 16 and the coefficient estimates for the Rortbarth method are reported in Table 14 and 15 for rural and urban provinces respectively. For rural households, although the significant gender difference that are found in restaurant and hotel expenditures have disappeared, the rest of the results are are consistent with the parametric analysis. For urban, the results are also inline with the parametric estimation

of alcohol and tobacco expenditure share. Therefore one can conclude that,the results of both the Engel and Rothbarth methods are not sensitive to the choice of the Working Leser form.

6 Conclusion

This study analyzed intrahousehold gender bias in consumption patterns for rural and urban provinces of Turkey using TURKSTAT's Household Budget Survey for the years 2003, 2004 and 2005. The study was based on extended version of the Working-Leser Engel curve. In estimating this curve the two different approaches that have been adopted are the Engel approach that uses child goods and, the Rothbarth approach that uses adult goods. The reason for using two different approaches is due to the premise that budget shares of all the goods add up to unity. Therefore, when the budget share of a particular good increases, economies are made elsewhere in the budget, leading to decreased budget share of another good. For instance, if families spend more on educational expenditures, then the adult consumption on alcohol and tobacco will decrease in order to divert the resources for the needs of the children. Hence, gender bias in intrahousehold resource allocation will be evident if more resource is spend or devoted more on a particular gender of a certain demographic category. The study also compared parametric and semiparametric estimates of Engel curves to test the robustness of the conclusions reached in the parametric estimation of both the Engel and the Rothbarth approaches.

The results based on Engel approach are indicative of significant gender bias. However the pattern of the gender bias indicates that there is no clear pattern. In rural settings, girl bias is evident on book and health expenditures. On the other hand, the existence of boy bias is evident in expenditure items such as toys games and hobbies; child clothing; meat; and health. In urban provinces on the other hand, girl bias is evident in health and fruit and vegetable categories. Boy bias still remains in similar goods; toys, games and hobbies and child footwear.

In the Rothbarth approach, the set of selected potential adult goods are estimated. From the estimated coefficients OERs are calculated which show

equivalent reduction in the size of the income when a child of a certain demographic and gender category is introduced into the family. In theory, one should expect an additional child in the family to depress the adult consumption leading to negative OER and vice verse for an additional adult. However, unexpected signs for some of the OER's questioned the validity of the selected adult goods. The verification test on the adult goods revealed that only alcohol and tobacco; restaurants and hotels; cultural activities; jewelry and watch for rural and alcohol and tobacco; and jewelry and watch expenditures for urban are in fact adult goods. Hence, verified OERs showed expected signs. F-statistics for testing gender bias among all the demographic categories revealed strong evidence that families favor teenage girls. This result is evident in substantial savings in some adult expenditures where families reduce more of their alcohol and tobacco, restaurant and hotel, and cultural activities consumption to devote more resources for girls aged 15-25 in rural provinces. For the urban areas, the results also support girl bias in alcohol and tobacco expenditures for the 15-25 demographic category.

Semiparametric analysis are robust to the results of the parametric approach. In addition to the previous findings, semiparametric analysis revealed couple of more expenditure items where gender differentials are significantly observed. For the Engel approach, The F-tests and the relevant coefficient estimates indicate that, milk is provided more generously for females whereas, families spend more on meat for boys in rural provinces. For the urban areas, the results obtained from the parametric and semiparametric estimations are also in conformity. Additional gender biases are detected in toys, games and hobbies, and child foot wear categories. Semiparametric analysis for the Rothbarth method showed that, the results are also consistent with the parametric analysis.

Despite of the wide impression of a patriarchal culture in Turkey, the results

obtained in this study are striking. While in the Engel method both boys and girls are favored significantly at some ages and for some goods, in the Rothbarth method results reveal that teenage girls are favored the most in both of the urban and rural provinces. Moreover, being the first study that examines gender discrimination in intrahousehold allocation in Turkey, this study is also important methodologically as it suggests that Engel and Rothbarth methods do have the power to detect gender bias in intrahousehold allocation given sufficient sample size. This result is striking since in the previous literature, attempts to detect gender discrimination have been unsuccessful. Although outcome data of the selected countries were strongly indicative of son preference, authors blamed Engel and Rothbarth approaches as being incapable of depicting the existent biases.

Although the outcome data that is available publicly is on aggregate levels, it would be interesting to compare the results obtained in this study with such outcome data that is available in gender categorization. Besides, the data set used in this study did not include individual level data. Therefore, it could have been interesting to replicate the same study for individual level data and compare the results. This study can be further improved by investigating how the age and gender related ordering of the children effects household resource allocation. Further studies might be conducted on the boy preference of families in Turkey. More intuitively, investigating whether families decide to stop after giving birth to a male child. If this is the case, it would worthwile to compare the welfare of a girl, where the female population is high in the family, to welfare of boy, where the population of the household is relatively lower.

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Appendix A.

What follows derives equation (5) from equations (3) and (4);

$\pi_{ij} = \frac{\partial q_i / \partial n_j}{\partial q_i / \partial x} \div \frac{x}{n}$

$\frac{\partial q_i}{\partial n_j}$:

$\frac{p_i}{x_i} dq_i = -\beta_i \frac{dn_j}{n} + \eta_i \frac{dn_j}{n} - \sum_{k=1}^{K-1} \gamma_{ik} \frac{n_k}{n} \frac{dn_j}{n} + \gamma_{ij} \frac{dn_j}{n}$

$\frac{p_i}{x_i} dq_i = (\eta_i - \beta_i + \gamma_{ij} - \sum_{k=1}^{K-1} \gamma_{ik} \frac{n_k}{n}) \frac{dn_j}{n}$

$\frac{dq_i}{dn_j} = (\eta_i - \beta_i + \gamma_{ij} - \sum_{K=1}^{K-1} \gamma_{ik} \frac{n_k}{n}) \frac{x_i}{p_i n}$

$\frac{\partial q_i}{\partial x}$:

$-\frac{p_i q_i}{x_i^2} dx + \frac{p_i}{x_i} dq_i = \beta_i \frac{dx}{x_i}$ multiplying both sides with x_i

$-w_i dx + p_i dq_i = \beta_i dx$

$dx(w_i + \beta_i) = p_i dq_i$

$\frac{dq_i}{dx} = \frac{(w_i + \beta_i)}{p_i}$

$\frac{dq_i / dn_j}{dq_i / dx} \div \frac{x}{n} = \frac{(\eta_i - \beta_i + \gamma_{ij} - \sum_{k=1}^{K-1} \gamma_{ik} (n_k / n)) \frac{x_i}{p_i n}}{\frac{w_i + \beta_i}{p_i}} \div \frac{x}{n}$

$\frac{(\eta_i - \beta_i) - \gamma_{ij} - \sum_{k=1}^{K-1} \gamma_{ik} (n_k / n)}{w_i + \beta_i}$.

Appendix B.

The final form of equation (10) comes from the following derivation:

$\frac{p_i q_i}{x_i} = w_i = f(\frac{x}{n}) + \eta_i \ln\, n + \sum_{k=1}^{K-1} \gamma_{ik}(n_k/n) + u_i$

$\frac{\partial q_i}{\partial n_j}$:

$\frac{p_i}{x_i} dq_i = -f'(\frac{x}{n})\frac{x}{n^2} dn_j + \eta_i \frac{dn_j}{n} + \sum_{k=1}^{K-1} \gamma_{ik} \frac{n_k}{n} \frac{dn_j}{n} + \gamma_{ij} \frac{dn_j}{n}$

$\frac{p_i}{x_i} dq_i = \eta_i - f'(\frac{x}{n})\frac{x}{n} \frac{dn_j}{n} + \eta_i \frac{dn_j}{n} + \sum_{k=1}^{K-1} \gamma_{ik} \frac{n_k}{n} \frac{dn_j}{n} + \gamma_{ij} \frac{dn_j}{n}$

$\frac{dq_i}{dn_j} = \frac{x_i}{p_i n}(\eta_i - f'(\frac{x}{n})\frac{x}{n} + \gamma_{ij} - \sum_{k=1}^{K-1} \gamma_{ik} \frac{n_k}{n})$

$\frac{\partial q_i}{\partial x}$:

$\frac{p_i}{x_i} dq_i = \frac{p_i q_i}{x_i^2} dx - f'(\frac{x}{n}) \frac{dx}{n}$

$\frac{dq_i}{dx} = \frac{x_i}{p_i}[\frac{w_i}{x_i} + f'(\frac{x}{n}) \cdot \frac{1}{n}]$ multiplying right side with$x$ and $\frac{1}{x}$;

$\frac{dq_i}{dx} = \frac{1}{p}[w_i + f'(\frac{x}{n})\frac{x}{n}]$

$\pi_{ij} = \frac{\partial q_i / \partial n_j}{\partial q_i / \partial x} \div \frac{x}{n} = \frac{\eta_i - f'(\frac{x}{n})\frac{x}{n} + \gamma_{ij} - \sum_{k=1}^{K-1}(\frac{n_k}{n})}{w_i + f'(\frac{x}{n})\frac{x}{n}}$.

Figure 1: Outlay equivalent ratio

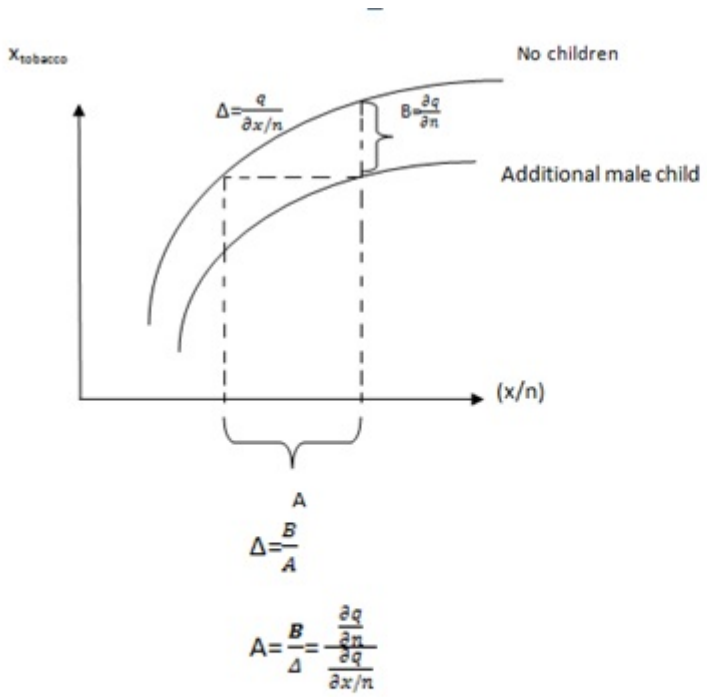

Table 1: Summary statistics, rural

Turkey, Rural 2003-2005

Budget Sares	Obs.	Mean	Std. Dev.	Min	Max	*p(0)*
Books	12619	0.000905	0.006672	0	0.227918	0.94849
Toys Games and Hobbies	12619	0.000462	0.002664	0	0.096811	0.919249
Child Footwear	12619	0.003333	0.012572	0	0.433276	0.876852
Child Clothing	12619	0.007443	0.021158	0	0.335056	0.764482
Fruit and Vegetable	12613	0.107238	0.060714	0	0.701716	0.001585
Milk	12613	0.015293	0.020028	0	0.445407	0.171725
Meat	12613	0.05104	0.083756	0	0.874131	0.188446
Education	12619	0.00498	0.032121	0	0.713338	0.937238
Health	12619	0.019741	0.056973	0	0.80398	0.590459
Alcohol and Tobacco	12619	0.053869	0.066884	0	0.545185	0.416673
Restaurants and Hotels	12619	0.027075	0.045188	0	0.698688	0.415009
Cultural Activities	12619	0.011403	0.034912	0	0.849525	0.569538
Women Footwear	12619	0.004229	0.013044	0	0.297177	0.794279
Men Footwear	12619	0.008524	0.021707	0	0.26861	0.782788
Men Clothing	12619	0.01714	0.036865	0	0.416219	0.610667
Women Clothing	12619	0.012142	0.028712	0	0.375783	0.675965
Women Personal Care	12619	0.013413	0.01723	0	0.271934	0.238371
Jewelry and Watches	12619	0.003288	0.03034	0	0.876094	0.943181

Explanatory Variables	Mean	Std. Dev.
ln(*x*/*n*)	4.813091	0.733419
Ln *n*	1.393434	0.535115
Ratio of males		
0-4	0.03557	0.085244
5-9	0.043011	0.093207
10-14	0.046515	0.097396
15-25	0.076826	0.133147
55+	0.110333	0.187227
Ratio of females		
0-4	0.033369	0.084253
5-9	0.03969	0.088482
10-14	0.043271	0.094766
15-25	0.095842	0.140311
26-54	0.187242	0.150581
55+	0.11581	0.202785
Time dummies		
d04	0.202789	0.402093
d05	0.203978	0.402969

Note:-p(0) is the proportion of households reporting zero consumption or purchase of the good

Table 2: Summary statistics, urban

Turkey, Urban 2003-2005

Budget Sares	Obs	Mean	Std. Dev.	Min	Max	*p(0)*
Books	30248	0.001831	0.010074	0	0.880752	0.880752
Toys Games and Hobbies	30248	0.00088	0.004589	0	0.857346	0.857346
Child Footwear	30248	0.002848	0.010895	0	0.884025	0.884025
Child Clothing	30248	0.00786	0.020438	0	0.71089	0.71089
Fruit and Vegetable	30237	0.074705	0.041765	0	0.001785	0.001785
Milk	30237	0.010197	0.011964	0	0.134621	0.134621
Meat	30237	0.042893	0.061645	0	0.089758	0.089758
Education	30248	0.011983	0.04663	0	0.861809	0.861809
Health	30248	0.01744	0.049518	0	0.772888	0.55121
Alcohol and Tobacco	30248	0.0469	0.058038	0	0.615727	0.390472
Restaurants and Hotels	30248	0.041265	0.054554	0	0.63878	0.287457
Cultural Actıvıtıes	30248	0.016871	0.035278	0	0.695462	0.350436
Women Footwear	30248	0.004856	0.01478	0	0.275711	0.790069
Men Footwear	30248	0.006003	0.018351	0	0.30538	0.839394
Men Clothing	30248	0.013983	0.032851	0	0.434207	0.624074
Women Clothing	30248	0.015332	0.031653	0	0.394886	0.563938
Women Personal Care	30248	0.016642	0.019324	0	0.319023	0.149729
Jewelry and Watches	30248	0.003428	0.027904	0	0.748702	0.91897

Explanator	Mean	Std. Dev.
ln(x/n)	5.271672	0.751935
Ln n	1.278975	0.464489
Ratio of males		
0-4	0.035344	0.09123
5-9	0.042848	0.097888
10-14	0.043116	0.097792
15-25	0.082706	0.148256
55+	0.073969	0.161975
Ratio of females		
0-4	0.034094	0.090959
5-9	0.039414	0.094658
10-14	0.041292	0.096199
15-25	0.099963	0.154239
26-54	0.216882	0.162707
55+	0.09092	0.206884
Time dummies		
d04	0.197864	0.398396
d05	0.197864	0.398396

Note:-p(0) is the proportion of households reporting zero consumption or purchase of the good

Table 3: Engel method showing effects of composition on selected child goods, rural

	Books	Toys Games and Hobbies	Child Footwear	Child Clothing	Fruit and Vegetables	Milk	Meat	Education	Health
	coef/t	coef/t	coef/t	coef/t	coef/t	coef/t	coef/t	coef/t	coef/t
ln *(x/n)*	0.001***	0.000***	0.001***	0.003***	-0.038***	-0.008***	0.021***	0.007***	0.009***
	(8.181)	(6.677)	(4.159)	(10.393)	(-41.051)	(-25.488)	(16.767)	(10.667)	(9.197)
ln *n*	0.000	-0.000	0.000	0.002***	-0.010***	0.000	0.019***	0.004***	0.008***
	(0.454)	(-1.328)	(0.540)	(3.947)	(-6.120)	(0.212)	(8.486)	(4.675)	(4.840)
ratmale 0-4	0.000	0.004***	0.011***	0.023***	-0.006	0.011***	0.019*	-0.003	0.013*
	(0.035)	(7.517)	(5.889)	(8.103)	(-0.834)	(4.552)	(1.866)	(-1.008)	(1.716)
ratmale 5-9	0.003***	0.002***	0.017***	0.039***	-0.002	-0.004*	0.020**	0.001	0.004
	(3.240)	(6.123)	(9.319)	(11.728)	(-0.365)	(-1.840)	(2.102)	(0.195)	(0.560)
ratmale10-14	0.004***	0.001***	0.016***	0.029***	0.011	-0.002	0.019**	0.015***	0.000
	(4.235)	(3.098)	(8.390)	(10.320)	(1.605)	(-0.791)	(2.009)	(3.586)	(0.033)
ratmale 15-25	0.002**	0.000	-0.000	-0.002	-0.006	-0.001	0.004	0.017***	-0.007
	(2.345)	(1.034)	(-0.473)	(-1.416)	(-1.259)	(-0.586)	(0.494)	(4.847)	(-1.300)
ratmale 55+	-0.000	0.000	0.000	0.001	0.031***	0.005***	0.035***	-0.003*	0.010**
	(-0.567)	(0.273)	(0.492)	(1.117)	(7.291)	(3.894)	(5.412)	(-1.724)	(2.093)
ratfemale 0-4	0.002***	0.003***	0.009***	0.026***	-0.007	0.009***	0.009	-0.003	0.008
	(2.701)	(5.402)	(6.117)	(8.689)	(-0.956)	(3.653)	(0.847)	(-0.861)	(1.067)
ratfemale 5-9	0.003***	0.001***	0.016***	0.029***	-0.009	-0.001	0.016	0.005	-0.003
	(3.495)	(3.823)	(8.558)	(9.360)	(-1.223)	(-0.293)	(1.488)	(1.462)	(-0.515)
ratfemale 10-	0.005***	0.001**	0.012***	0.027***	0.009	-0.001	-0.005	0.014***	-0.014**
	(4.640)	(2.194)	(7.534)	(9.472)	(1.294)	(-0.331)	(-0.575)	(3.658)	(-2.241)
ratfemale 15-	0.002***	0.000	-0.000	0.000	0.002	0.001	0.006	0.017***	0.003
	(2.673)	(1.526)	(-0.278)	(0.006)	(0.429)	(0.826)	(0.736)	(3.981)	(0.466)
ratfemale 26-	0.002**	0.000	-0.000	0.003**	0.027***	0.007***	0.008	0.006**	0.000
	(2.273)	(1.305)	(-0.081)	(2.201)	(4.452)	(3.998)	(0.915)	(2.006)	(0.007)
ratfemale 55+	0.001	0.000	-0.000	0.002**	0.032***	0.007***	0.028***	0.002	0.022***
	(1.037)	(0.709)	(-0.305)	(2.448)	(6.232)	(4.719)	(3.636)	(0.737)	(3.976)
d04	-0.000	0.000	0.000	0.000	0.002	0.001***	0.002	-0.000	-0.002*
	(-1.372)	(0.953)	(0.208)	(0.810)	(1.279)	(2.937)	(1.248)	(-0.011)	(-1.791)
d05	0.000	0.000	0.000	0.001**	0.003**	-0.000	-0.004**	-0.002**	-0.002
	(0.382)	(0.882)	(0.103)	(2.143)	(2.432)	(-0.698)	(-2.151)	(-2.230)	(-1.301)
constant	-0.005***	-0.001***	-0.004***	-0.018***	0.292***	0.049***	-0.087***	-0.039***	-0.038***
	(-5.610)	(-4.726)	(-3.062)	(-9.559)	(43.181)	(23.544)	(-9.545)	(-9.146)	(-5.335)

F-tests

	Books	Toys Games and Hobbies	Child Footwear	Child Clothing	Fruit and Vegetables	Milk	Meat	Education	Health
	F/Prob>F	F/Prob>F	F/Prob>F	F/Prob>F	F/Prob>F	F/Prob>F	F/Prob>F	F/Prob>F	F/Prob>F
0-4	8.64**	1.34	0.79	0.41	0.01	0.6	0.85	0.03	0.45
	0.0033	0.2477	0.3743	0.5233	0.9035	0.4381	0.3559	0.8531	0.5004
5-9	0.08	5.23**	0.18	5.69**	0.68	1.52	0.17	2.01	1.21
	0.7808	0.0223	0.6679	0.0171	0.4097	0.2182	0.6791	0.156	0.2711
10-14	1.15	0.47	3.19	0.32	0.08	0.15	6.22**	0	5.63**
	0.2837	0.4928	0.0741	0.5722	0.7712	0.7014	0.0127	0.9528	0.0177
15-25	0.04	0.47	0.04	2.09	2.8	1.56	0.09	0	3.97**
	0.8513	0.4943	0.8405	0.1484	0.0942	0.2117	0.7697	0.9987	0.0463
All Children	8.57**	14.23**	3.77**	3.34**	2.8**	11.73**	2.13	9.94**	4.06**
	0	0	0.002	0.0051	0.0155	0	0.0584	0	0.0011

note: *** p<0.01, ** p<0.05, * p<0.1

Table 4: Engel method showing effects of composition on selected child goods, urban

	Books	Toys Games and Hobbies	Child Footwear	Child Clothing	Fruit and Vegetables	Milk	Meat	Education	Health
	coef/t	coef/t	coef/t	coef/t	coef/t	coef/t	coef/t	coef/t	coef/t
ln *(x/n)*	0.001***	0.001***	0.001***	0.003***	-0.030***	-0.004***	0.007***	0.015***	0.009***
	(14.541)	(11.938)	(8.402)	(14.890)	(-79.323)	(-30.083)	(13.279)	(23.411)	(15.300)
ln *n*	0.001***	-0.000	0.001***	0.002***	-0.005***	-0.002***	0.015***	0.013***	0.006***
	(3.282)	(-0.280)	(3.854)	(5.067)	(-6.403)	(-10.949)	(13.934)	(16.056)	(5.284)
ratmale 0-4	-0.001**	0.005***	0.007***	0.024***	-0.016***	0.021***	-0.004	-0.010***	0.025***
	(-2.186)	(12.601)	(8.836)	(14.610)	(-5.380)	(19.725)	(-0.916)	(-3.342)	(6.115)
ratmale 5-9	0.004***	0.004***	0.014***	0.033***	-0.009***	0.001	-0.000	0.009***	0.015***
	(6.467)	(8.420)	(15.533)	(19.248)	(-3.365)	(1.610)	(-0.024)	(2.784)	(3.902)
ratmale 10-14	0.006***	0.001**	0.014***	0.027***	-0.007***	-0.002**	-0.003	0.032***	0.002
	(7.019)	(2.489)	(13.190)	(16.181)	(-2.613)	(-2.141)	(-0.809)	(8.804)	(0.547)
ratmale 15-25	0.003***	-0.000	-0.000	-0.000	-0.009***	-0.002***	-0.004	0.030***	-0.004
	(4.152)	(-1.428)	(-0.443)	(-0.374)	(-4.643)	(-3.594)	(-1.349)	(10.054)	(-1.250)
ratmale 55+	-0.000	-0.001***	0.000	-0.001	0.030***	0.002***	0.029***	-0.005***	0.009***
	(-0.501)	(-4.151)	(0.556)	(-1.219)	(15.766)	(4.186)	(8.936)	(-2.729)	(3.044)
ratfemale 0-4	0.000	0.004***	0.008***	0.024***	-0.017***	0.022***	-0.008*	-0.008***	0.025***
	(0.099)	(8.364)	(10.331)	(15.939)	(-5.857)	(19.806)	(-1.903)	(-2.762)	(5.969)
ratfemale 5-9	0.005***	0.002***	0.013***	0.037***	-0.008***	0.001	-0.000	0.009***	0.012***
	(6.652)	(5.468)	(13.717)	(20.870)	(-2.648)	(0.739)	(-0.113)	(2.934)	(3.145)
ratfemale 10-14	0.007***	0.001**	0.011***	0.028***	-0.005*	-0.002**	-0.010**	0.034***	0.005
	(7.561)	(2.070)	(11.031)	(15.982)	(-1.957)	(-2.161)	(-2.265)	(8.894)	(1.238)
ratfemale 15-25	0.003***	0.000	-0.001**	-0.000	-0.004*	-0.001**	-0.008**	0.025***	0.007***
	(5.295)	(0.492)	(-1.964)	(-0.463)	(-1.880)	(-2.285)	(-2.454)	(7.938)	(2.633)
ratfemale 26-54	0.001	-0.000	0.000	0.000	0.010***	0.001*	0.003	0.009***	0.000
	(1.405)	(-0.766)	(0.227)	(0.496)	(4.589)	(1.821)	(0.996)	(3.720)	(0.146)
ratfemale 55+	-0.000	-0.000*	0.000	0.001	0.022***	0.004***	0.018***	0.002	0.016***
	(-0.365)	(-1.676)	(1.312)	(1.186)	(11.234)	(6.509)	(5.921)	(1.043)	(5.589)
d04	-0.000**	0.000	0.000**	0.001*	0.001	-0.000	0.001	-0.001	0.001
	(-2.286)	(0.829)	(1.995)	(1.940)	(1.031)	(-0.844)	(1.318)	(-1.100)	(1.643)
d05	-0.001***	-0.000*	-0.000	-0.001**	0.004***	0.000	-0.004***	-0.003***	-0.001
	(-4.313)	(-1.881)	(-1.601)	(-2.107)	(7.244)	(0.139)	(-3.839)	(-4.022)	(-1.630)
constant	-0.008***	-0.003***	-0.005***	-0.015***	0.234***	0.030***	-0.013***	-0.093***	-0.043***
	(-11.682)	(-8.258)	(-7.660)	(-12.245)	(80.610)	(34.417)	(-3.346)	(-20.849)	(-9.901)

F-tests

	Books	Toys Games and Hobbies	Child Footwear	Child Clothing	Fruit and Vegetables	Milk	Meat	Education	Health
	F/Prob>F	F/Prob>F	F/Prob>F	F/Prob>F	F/Prob>F	F/Prob>F	F/Prob>F	F/Prob>F	F/Prob>F
0-4	2.58	7.5**	0.94	0	0.16	0.68	0.81	0.52	0.01
	0.1085	0.0062	0.3329	0.9954	0.6913	0.4088	0.368	0.4718	0.9226
5-9	0.09	15.54**	0.76	1.68	0.37	0.57	0.01	0.04	0.7
	0.7701	0.0001	0.382	0.1946	0.5456	0.4487	0.9354	0.8431	0.4029
10-14	0.42	0.65	4.63**	0.28	0.29	0	1.76	0.3	0.53
	0.518	0.4215	0.0314	0.5952	0.5915	0.946	0.1842	0.5829	0.4662
15-25	0.04	3.35	3.36	0.01	7.43**	2.58	1.21	2.11	20.3**
	0.8488	0.0672	0.0666	0.9117	0.0064	0.108	0.2721	0.1459	0
All Children	36.26**	34.68**	12.91**	9.26	4.78**	180.61**	1.33	61.18**	12.28**
	0	0	0	0	0	0	0.2473	0	0

note: *** p<0.01, ** p<0.05, * p<0.1

Table 5: Summary results of the Engel method

Rural			**Girl Bias**					**Boy Bias**			
			0-4	5-9	10-14	15-25		0-4	5-9	10-14	15-25
Books			X								
Toys Games and Hobbies									X		
Child Clothing									X		
Meat										X	
Health						X				X	
Urban											
Toys Games and Hobbies								X	X		
Child Footwear										X	
Fruit and Vegetable						X					
Health						X					

Table 6: Rothbarth method showing effects of composition on selected adult goods, rural

	Alcohol and Tobacco coef/t	Restaurants and Hotels coef/t	Cultural Activities coef/t	Women Footwear coef/t	Men Footwear coef/t	Men Clothing coef/t	Women Clothing coef/t	Women Exenditures coef/t	Jewelry and Watch coef/t
ln *(x/n)*	-0.010***	0.007***	0.011***	0.002***	0.002***	0.009***	0.008***	0.002***	0.007***
	(-10.574)	(8.767)	(12.176)	(10.321)	(6.946)	(14.422)	(16.979)	(8.630)	(7.364)
ln *n*	0.002	-0.001	0.004***	0.001**	0.003***	0.009***	0.006***	0.000	0.006***
	(1.313)	(-0.414)	(3.612)	(2.200)	(5.256)	(9.204)	(6.853)	(0.189)	(5.434)
ratmale 0-4	-0.100***	-0.044***	0.013***	0.003**	-0.006**	-0.016***	0.012***	0.034***	-0.006
	(-11.209)	(-6.915)	(2.883)	(2.016)	(-2.246)	(-3.669)	(3.237)	(11.760)	(-1.490)
ratmale 5-9	-0.091***	-0.051***	0.015***	0.007***	-0.007**	-0.014***	0.019***	0.001	0.000
	(-11.307)	(-8.787)	(3.588)	(4.129)	(-2.497)	(-3.392)	(5.926)	(0.361)	(0.010)
ratmale10-14	-0.101***	-0.054***	0.019***	0.008***	-0.000	0.000	0.016***	0.002	-0.007**
	(-12.624)	(-9.856)	(4.411)	(4.440)	(-0.033)	(0.015)	(4.790)	(0.999)	(-1.970)
ratmale 15-25	-0.035***	-0.022***	0.011***	0.002	0.005**	0.016***	0.010***	0.002	-0.001
	(-4.998)	(-4.430)	(3.061)	(1.616)	(2.127)	(3.905)	(3.527)	(1.237)	(-0.237)
ratmale 55+	-0.062***	-0.032***	-0.001	0.002**	-0.001	-0.002	0.006***	-0.002**	-0.003
	(-10.968)	(-7.869)	(-0.459)	(2.217)	(-0.693)	(-0.586)	(3.260)	(-2.168)	(-0.896)
ratfemale 0-4	-0.090***	-0.043***	0.011**	0.007***	-0.008***	-0.005	0.017***	0.033***	-0.003
	(-10.186)	(-6.689)	(2.319)	(3.687)	(-3.005)	(-1.020)	(4.755)	(11.430)	(-0.627)
ratfemale 5-9	-0.099***	-0.039***	0.016***	0.005***	-0.010***	-0.018***	0.026***	0.001	-0.002
	(-11.765)	(-6.197)	(3.481)	(3.033)	(-3.972)	(-4.360)	(6.948)	(0.327)	(-0.491)
ratfemale 10-14	-0.112***	-0.053***	0.027***	0.012***	-0.002	-0.012***	0.032***	0.001	-0.001
	(-14.267)	(-9.807)	(5.243)	(6.938)	(-0.579)	(-2.930)	(8.623)	(0.741)	(-0.271)
ratfemale 15-25	-0.106***	-0.051***	0.002	0.015***	-0.009***	-0.015***	0.052***	0.010***	0.002
	(-15.804)	(-10.003)	(0.559)	(9.066)	(-4.614)	(-4.541)	(15.090)	(5.386)	(0.408)
ratfemale 26-54	-0.108***	-0.067***	0.006	0.011***	-0.011***	-0.023***	0.031***	0.002	-0.005
	(-14.211)	(-10.998)	(1.386)	(5.547)	(-5.095)	(-6.994)	(9.858)	(1.179)	(-1.279)
ratfemale 55+	-0.119***	-0.066***	0.000	0.008***	-0.009***	-0.020***	0.022***	-0.003**	0.002
	(-19.903)	(-13.846)	(0.132)	(6.041)	(-5.497)	(-8.107)	(8.974)	(-2.129)	(0.479)
d04	0.003**	-0.000	0.000	-0.000	-0.000	-0.002*	0.001	0.000	-0.001
	(2.086)	(-0.014)	(0.192)	(-0.194)	(-0.487)	(-1.846)	(1.333)	(1.037)	(-0.947)
d05	0.004***	0.002**	0.001	-0.000	-0.001	-0.001	0.001*	0.000	0.000
	(2.657)	(1.961)	(1.547)	(-0.876)	(-1.194)	(-1.563)	(1.873)	(1.133)	(0.099)
constant	0.177***	0.038***	-0.052***	-0.012***	-0.000	-0.026***	-0.054***	-0.001	-0.035***
	(21.388)	(5.942)	(-9.049)	(-8.669)	(-0.018)	(-6.249)	(-16.529)	(-0.554)	(-5.826)

F-tests

	Alcohol and Tobacco F/Prob>F	Restaurants and Hotels F/Prob>F	Cultural Activities F/Prob>F	Women Footwear F/Prob>F	Men Footwear F/Prob>F	Men Clothing F/Prob>F	Women Clothing F/Prob>F	Women Exenditures F/Prob>F	Jewerly and Watch F/Prob>F
0-4	1.05	0.02	0.21	3.89**	0.35	5**	1.77	0.13	0.77
	0.3053	0.8884	0.6462	0.0485	0.5525	0.0254	0.1839	0.7219	0.3814
5-9	0.87	3.83**	0	1.27	1.46	0.88	3.04	0	0.28
	0.3503	0.0502	0.9467	0.2605	0.2277	0.3485	0.0813	0.9834	0.5956
10-14	1.93	0.01	2.22	5.17**	0.24	6.77**	17.9**	0.06	6.01**
	0.1647	0.9197	0.1361	0.023	0.626	0.0093	0	0.8047	0.0143
15-25	112.5**	41.63**	6.04**	91.64**	38.25**	53.77**	182.35**	22.21**	0.85
	0	0	0.014	0	0	0	0	0	0.3563
All Children	1.76	2.2**	2.28**	5.51**	3.57**	4.49**	7.2**	57.88**	2.41**
	0.1179	0.0516	0.0437	0	0.0031	0	0	0	0.0341

note: *** p<0.01, ** p<0.05, * p<0.1

Table 7: Rothbarth method showing effects of composition on selected adult goods, urban

	Alcohol and Tobacco coef/t	Restaurants and Hotels coef/t	Cultural Activities coef/t	Women Footwear coef/t	Men Footwear coef/t	Men Clothing coef/t	Women Clothing coef/t	Women Exenditures coef/t	Jewelry and Watch coef/t
ln *(x/n)*	-0.014***	0.008***	0.013***	0.002***	0.002***	0.008***	0.009***	0.003***	0.005***
	(-26.880)	(15.267)	(29.357)	(15.887)	(13.190)	(24.432)	(28.807)	(17.316)	(12.118)
ln *n*	-0.001	0.003**	0.004***	0.001***	0.002***	0.008***	0.008***	0.002***	0.004***
	(-0.634)	(2.495)	(6.306)	(4.655)	(6.013)	(12.241)	(12.076)	(4.597)	(7.051)
ratmale 0-4	-0.056***	-0.019***	-0.003	0.004***	-0.009***	-0.022***	0.013***	0.048***	0.002
	(-11.628)	(-4.125)	(-1.173)	(3.904)	(-5.733)	(-8.202)	(4.973)	(25.826)	(0.849)
ratmale 5-9	-0.060***	-0.025***	0.018***	0.004***	-0.009***	-0.018***	0.011***	0.001	-0.001
	(-13.341)	(-5.745)	(6.245)	(3.366)	(-6.805)	(-6.749)	(4.695)	(0.492)	(-0.439)
ratmale10-14	-0.072***	-0.042***	0.021***	0.005***	0.003*	-0.014***	0.008***	-0.003***	0.001
	(-16.869)	(-9.805)	(7.353)	(4.388)	(1.654)	(-5.608)	(3.435)	(-2.615)	(0.408)
ratmale 15-25	-0.025***	-0.008**	0.007***	0.001	0.007***	0.010***	0.002	0.001	0.001
	(-7.220)	(-2.376)	(3.314)	(1.576)	(5.119)	(4.437)	(1.226)	(0.909)	(0.355)
ratmale 55+	-0.046***	-0.049***	-0.007***	0.002**	-0.003***	-0.010***	0.003**	-0.002***	-0.000
	(-15.873)	(-19.402)	(-4.123)	(2.227)	(-3.156)	(-6.035)	(2.250)	(-2.695)	(-0.294)
ratfemale 0-4	-0.063***	-0.025***	0.002	0.004***	-0.008***	-0.019***	0.014***	0.047***	0.005**
	(-13.291)	(-5.518)	(0.675)	(3.386)	(-5.582)	(-6.906)	(5.530)	(24.731)	(1.966)
ratfemale 5-9	-0.059***	-0.029***	0.013***	0.005***	-0.008***	-0.022***	0.014***	0.000	-0.001
	(-12.719)	(-6.662)	(4.838)	(4.731)	(-5.541)	(-8.587)	(5.727)	(0.257)	(-0.422)
ratfemale 10-14	-0.072***	-0.041***	0.015***	0.011***	-0.008***	-0.023***	0.022***	0.002*	0.001
	(-16.451)	(-9.721)	(5.805)	(9.058)	(-6.083)	(-9.587)	(9.437)	(1.725)	(0.563)
ratfemale 15-25	-0.058***	-0.029***	0.002	0.017***	-0.009***	-0.023***	0.047***	0.015***	-0.001
	(-16.682)	(-8.547)	(0.723)	(13.921)	(-8.361)	(-11.130)	(20.727)	(12.004)	(-0.583)
ratfemale 26-54	-0.064***	-0.050***	-0.008***	0.014***	-0.009***	-0.025***	0.037***	0.009***	0.000
	(-17.679)	(-13.779)	(-3.576)	(11.736)	(-7.561)	(-11.250)	(14.850)	(7.312)	(0.022)
ratfemale 55+	-0.080***	-0.068***	-0.010***	0.008***	-0.009***	-0.022***	0.022***	0.000	0.001
	(-28.308)	(-24.709)	(-5.806)	(9.786)	(-9.323)	(-13.013)	(12.410)	(0.458)	(0.610)
d04	0.005***	0.001	0.001	0.000	-0.001***	-0.001	0.000	-0.000	0.000
	(5.668)	(1.089)	(1.457)	(0.570)	(-5.161)	(-1.579)	(0.600)	(-0.098)	(0.208)
d05	0.006***	-0.000	-0.000	-0.001**	-0.001***	-0.004***	-0.002***	-0.001**	0.000
	(6.891)	(-0.288)	(-0.484)	(-2.560)	(-4.536)	(-7.287)	(-3.351)	(-2.485)	(0.315)
constant	0.169***	0.025***	-0.059***	-0.016***	-0.002	-0.023***	-0.060***	-0.010***	-0.030***
	(36.818)	(5.726)	(-18.768)	(-14.251)	(-1.396)	(-8.944)	(-24.455)	(-6.641)	(-10.318)

F-tests

	Alcohol and Tobacco F/Prob>F	Restaurants and Hotels F/Prob>F	Cultural Activities F/Prob>F	Women Footwear F/Prob>F	Men Footwear F/Prob>F	Men Clothing F/Prob>F	Women Clothing F/Prob>F	Women Exenditures F/Prob>F	Jewerly and Watch F/Prob>F
0-4	1.64	1.41	3.1	0.26	0.02	1.45	0.14	0.54	1.28
	0.201	0.2352	0.0782	0.61	0.8804	0.2292	0.7085	0.4644	0.2586
5-9	0.11	0.82	2.19	1.89	1.14	3.03	1.51	0.06	0
	0.7457	0.3659	0.1389	0.1694	0.286	0.0817	0.2199	0.8098	0.9648
10-14	0	0.03	2.91	26.08**	46.82**	15.6**	39.31**	18.55**	0.03
	0.9943	0.8539	0.0882	0	0	0.0001	0	0	0.8542
15-25	103.24**	39.67**	6.86**	238.71**	179.73**	264.65**	579.13**	180.24**	1.06
	0	0	0.0088	0	0	0	0	0	0.3037
All Children	4.36**	8.47**	21.41**	9.07**	14.46**	4.35**	8.4**	294.14**	1.39
	0	0	0	0	0	0	0	0	0.2258

note: *** p<0.01, ** p<0.05, * p<0.1

Table 8: Outlay equivalent ratios, rural

		Males: Age Group						Females: Age roup					
		0-4	5-9	10-14	15-25	26-54	55+	0-4	5-9	10-14	15-25	26-54	55+
Adult goods													
Alcohol and Tobacco		-0.03368	0.217392	-0.042047	1.696273	2.633931	0.997005	0.230177	-0.001141	-0.348714	-0.17584	-0.247666	-0.539962
Restaurants and Hotels		-0.170411	-0.324486	-0.38214	0.336225	0.823647	0.113509	-0.149461	-0.058077	-0.370294	-0.318693	-0.675543	-0.661479
Cultural Activities		-0.187761	-0.092271	0.032333	-0.263838	-0.651538	-0.691695	-0.267892	-0.080173	0.345608	-0.582474	-0.445935	-0.63692
Women Footwear		-0.673499	-0.143125	-0.016397	-0.877083	-1.205939	-0.838384	-0.145443	-0.419446	0.599754	1.1419	0.459397	-0.037299
Men Footwear		0.000889	-0.033689	0.785596	1.384053	0.796178	0.657781	-0.23687	-0.469789	0.60634	-0.370384	-0.55056	-0.334783
Men Clothing		-0.251343	-0.14915	0.477279	2.730895	0.47442	0.406594	0.260788	-0.328841	-0.058059	-0.202068	-0.553743	-0.428565
Women Clothing		-0.490666	-0.138341	-0.314861	-0.584778	-1.021463	-0.72708	-0.266144	0.14997	0.41315	1.35609	0.407411	-0.018273
Women Personal Care		1.342885	-0.522332	-0.4584	-0.448083	-0.565874	-0.696707	1.270902	-0.524972	-0.486	-0.010231	-0.429667	-0.729379
Jewelry and Watch		-0.509354	0.105175	-0.614021	0.013929	0.10077	-0.147139	-0.192422	-0.099068	-0.010651	0.251624	-0.386412	0.28049
Confidence Intervals													
Alcohol and Tobacco	5%	-0.272742	-0.011275	-0.299677	1.47615	2.386587	0.776677	-0.047696	-0.272999	-0.604371	-0.380957	-0.495902	-0.767607
	95%	0.192598	0.456547	0.179076	1.910525	3.012979	1.223056	0.506236	0.248312	-0.114792	-0.032776	0.038514	-0.310281
Restaurants and Hotels	5%	-0.358928	-0.460034	-0.514836	0.225851	0.654093	-0.004797	-0.323623	-0.213432	-0.485786	-0.420465	-0.816903	-0.791973
	95%	-0.043454	-0.179162	-0.244428	0.45456	1.009409	0.248802	0.001515	0.089467	-0.239423	-0.197045	-0.498903	-0.515628
Cultural Activities	5%	-0.34363	-0.262053	-0.157426	-0.407294	-0.799124	-0.853773	-0.435919	-0.2751	0.089209	-0.693164	-0.616235	-0.772618
	95%	0.047586	0.121093	0.218887	-0.108727	-0.407125	-0.530265	-0.098952	0.141991	0.612928	-0.41955	-0.258393	-0.43143
Women Footwear	5%	-0.897807	-0.377314	-0.363904	-1.115337	-1.54275	-1.091418	-0.476339	-0.684984	0.273348	0.907242	0.218147	-0.293151
	95%	-0.392138	0.156861	0.276097	-0.672115	-0.894371	-0.594536	0.155529	-0.1399	0.960348	1.376768	0.766272	0.212305
Men Footwear	5%	-0.541827	-0.424137	0.337225	0.956562	0.469601	0.3781	-0.742884	-0.894003	0.096632	-0.685001	-0.988468	-0.596946
	95%	0.516	0.330386	1.147843	1.72761	1.139508	0.904351	0.252143	-0.056175	1.117787	-0.115334	-0.22927	-0.063287
Men Clothing	5%	-0.535395	-0.44019	0.249301	1.003403	0.194195	0.20319	0.066658	-0.545798	-0.274293	-0.416646	-0.829429	-0.643193
	95%	-0.040219	0.034329	0.828003	1.443682	0.680069	0.572093	0.504209	-0.122722	0.157512	-0.004836	-0.382306	-0.294001
Women Clothing	5%	-0.658299	-0.304074	-0.468018	-0.672826	-1.222627	-0.867513	-0.445052	-0.054304	0.207155	1.148041	0.258352	-0.191192
	95%	-0.329949	0.014436	-0.124623	-0.443107	-0.812441	-0.564437	-0.079494	0.324261	0.556523	1.492824	0.578888	0.109644
Women Personal Care	5%	1.101931	-0.663238	-0.599368	-0.549082	-0.692341	-0.827451	1.024231	-0.651056	-0.596697	-0.110869	-0.574936	-0.836741
	95%	1.552019	-0.374072	-0.347326	-0.348546	-0.407064	-0.59115	1.47568	-0.348909	-0.322702	0.118448	-0.316142	-0.63513
Jewelry and Watch	5%	-0.922268	-0.325443	-0.878783	-0.303396	-0.3308	-0.615125	-0.639523	-0.567711	-0.378384	-0.104918	-0.806729	-0.134084
	95%	-0.244279	0.53548	-0.361505	0.288378	0.69942	0.252771	0.353659	0.251275	0.440718	0.604288	0.084765	0.604848

note: shaded areas include insignificant gender effects

Table 9: Outlay equivalent ratio, urban

		Males: Age Group						Females: Age roup					
		0-4	5-9	10-14	15-25	26-54	55+	0-4	5-9	10-14	15-25	26-54	55+
Adult goods													
Alcohol and Tobacco		0.368428	0.244575	-0.113418	1.300441	2.04604	0.666436	0.174873	0.290144	-0.112452	0.310346	0.141759	-0.342841
Restaurants and Hotels		0.131788	0.00801	-0.357757	0.360994	0.541767	-0.521831	0.010522	-0.078995	-0.340214	-0.088709	-0.541012	-0.918263
Cultural Activities		-0.562055	0.129144	0.232657	-0.21202	-0.456651	-0.684336	-0.391297	-0.006895	0.060735	-0.403982	-0.715134	-0.798639
Women Footwear		-0.396937	-0.476504	-0.338836	-0.853096	-1.039448	-0.799288	-0.474466	-0.264735	0.570133	1.437678	0.971547	0.188198
Men Footwear		-0.30998	-0.405046	1.082053	1.551261	0.745992	0.37244	-0.28279	-0.231169	-0.261168	-0.423139	-0.425333	-0.355332
Men Clothing		-0.256377	-0.055057	0.118721	1.904617	0.752115	0.284557	-0.1084	-0.247823	-0.299495	-0.306904	-0.377943	-0.248534
Women Clothing		-0.204793	-0.291257	-0.425632	-0.669424	-0.762882	-0.616971	-0.162736	-0.175069	0.205697	1.274095	0.820384	0.209737
Women Personal Care		1.840304	-0.662405	-0.866628	-0.649529	-0.698274	-0.807284	1.75013	-0.679951	-0.578817	0.096185	-0.222758	-0.676195
Jewelry and Watches		0.042858	-0.291053	-0.088618	-0.118281	-0.184769	-0.234022	0.380767	-0.281936	-0.045864	-0.294166	-0.180609	-0.094174
Confidence Intervals													
Alcohol and Tobacco	5%	0.189151	0.0773	-0.257309	1.160373	1.884818	0.559021	-0.001397	0.111127	-0.248282	0.186758	0.009707	-0.509278
	95%	0.544103	0.391654	0.033309	1.446215	2.258972	0.806861	0.339114	0.458096	0.032174	0.427841	0.267031	-0.190772
Restaurants and Hotels	5%	0.028765	-0.118673	-0.449305	0.274331	0.450618	-0.601073	-0.110947	-0.225465	-0.451028	-0.169708	-0.642969	-0.990633
	95%	0.260122	0.106308	-0.261315	0.457998	0.646565	-0.441403	0.13037	0.047277	-0.245385	-0.005904	-0.444524	-0.821134
Cultural Activities	5%	-0.664399	0.027035	0.13971	-0.289663	-0.585687	-0.780031	-0.528992	-0.11145	-0.033293	-0.478543	-0.817417	-0.899287
	95%	-0.445105	0.220151	0.351568	-0.123458	-0.353219	-0.592457	-0.247148	0.098129	0.199763	-0.337219	-0.627117	-0.700058
Women Footwear	5%	-0.576825	-0.624807	-0.517015	-0.965126	1.300591	-0.992806	-0.67331	-0.400403	0.357398	1.277719	0.748452	-0.018602
	95%	-0.204711	-0.310144	-0.163579	-0.671281	-0.791121	-0.601212	-0.312995	-0.09107	0.796772	1.62885	1.225148	0.407161
Men Footwear	5%	-0.509135	-0.615428	0.85388	1.344044	0.522883	0.18597	-0.481488	-0.42746	-0.44934	-0.599682	-0.62488	-0.573828
	95%	-0.090184	-0.211335	1.343982	1.797534	0.939838	0.556755	-0.098975	-0.047168	-0.090155	-0.284582	-0.251396	-0.179298
Men Clothing	5%	-0.406696	-0.170714	0.000471	1.074353	0.617353	0.148815	-0.259583	-0.369064	-0.415674	-0.387783	-0.513768	-0.388355
	95%	-0.108589	0.084711	0.290908	1.303892	0.840675	0.374054	0.052226	-0.128873	-0.186583	-0.226008	-0.259164	-0.159232
Women Clothing	5%	-0.326338	-0.390511	-0.538149	-0.741337	-0.886248	-0.719562	-0.285065	-0.279508	0.064544	1.145389	0.68322	0.063725
	95%	-0.035651	-0.182596	-0.307867	-0.568492	-0.615808	-0.496496	-0.027762	-0.073405	0.326777	1.335447	0.919261	0.293144
Women Personal Care	5%	1.692466	-0.74846	-0.932196	-0.725994	-0.793309	-0.889954	1.621625	-0.763616	-0.652446	0.020427	-0.328906	-0.772346
	95%	1.960698	-0.581805	-0.77245	-0.57665	-0.591859	-0.715744	1.902777	-0.594833	-0.485126	0.165603	-0.129316	-0.559545
Jewelry and Watches	5%	-0.249986	-0.61085	-0.346951	-0.345866	-0.402187	-0.468574	0.022571	-0.603899	-0.336948	-0.461285	-0.454282	-0.314302
	95%	0.405814	-0.07291	0.13583	0.069824	0.020014	-0.058239	0.731818	0.019089	0.270549	-0.096322	0.029623	0.064536

note: shaded areas include insignificant gender effects

Table 10: Testing the validity of the adult goods

	Alcohol and Tobacco F/Prob>F	Restaurants and Hotels F/Prob>F	Cultural Activities F/Prob>F	Women Footwear F/Prob>F	Men Footwear F/Prob>F	Men Clothing F/Prob>F	Women Clothing F/Prob>F	Women Personal Care F/Prob>F	Jewelry and Watch F/Prob>F
Rural									
All Children	1.14	1.48	0.33	7.12**	4.07**	3.64**	4.86**	42.37**	1.35
	0.3391	0.1943	0.8952	0	0.0011	0.0027	0.0002	0	0.2384
Urban									
All Children	1.87	3.17**	15.2**	7.64**	16.39**	4.71**	6.46**	145.16**	0.74
	0.0962	0.0072	0	0	0	0.0003	0	0	0.5925

note: ** p<0.05

Table 11: Summary results of the Rothbarth method

Rural			**Discrimination Againt Girls**					**Discrimination Against Boys**			
			0-4	5-9	10-14	15-25		0-4	5-9	10-14	15-25
Alcohol and Tobacco											X
Restaurants and Hotels				X							X
Cultural Activities											X
Jewelry and Watches					X						
Urban											
Alcohol and Tobacco											X

Table 12: Engel curves showing effects of composition on selected child goods with differencing method, rural

	dBooks	dToys Games and Hobbies	dChild Footwear	dChild Clothing	dFruit and Vegetable	dMilk	dMeat	dEducation	dHealth
	coef/t	coef/t	coef/t	coef/t	coef/t	coef/t	coef/t	coef/t	coef/t
dln *n*	0.000	-0.000	0.001**	0.003***	-0.007***	-0.000	0.018***	0.004***	0.007***
	(0.645)	(-0.831)	(2.053)	(4.904)	(-4.842)	(-0.175)	(8.638)	(5.376)	(5.018)
dratmale 0-4	-0.000	0.003***	0.010***	0.023***	-0.007	0.017**	0.013	-0.001	0.011
	(-0.302)	(7.315)	(5.753)	(8.530)	(-1.072)	(6.920)	(1.419)	(-0.334)	(1.636)
dratmale 5-9	0.003***	0.003***	0.016***	0.036***	-0.015**	-0.006***	0.021**	0.004	0.005
	(3.667)	(6.611)	(9.626)	(12.707)	(-2.369)	(-2.657)	(2.309)	(0.986)	(0.797)
dratmale 10-14	0.004***	0.001***	0.015***	0.031***	-0.000	-0.005***	0.013	0.017***	-0.008
	(4.450)	(3.083)	(9.200)	(11.653)	(-0.069)	(-2.634)	(1.407)	(4.295)	(-1.368)
dratmale 15-25	0.002***	0.000	0.000	-0.001	-0.007	-0.005***	-0.006	0.024***	-0.012**
	(2.824)	(0.737)	(0.323)	(-0.604)	(-1.407)	(-2.709)	(-0.785)	(6.954)	(-2.190)
dratmale 55+	-0.000	0.000	0.002**	0.001	0.032***	0.003**	0.025***	-0.007***	0.006
	(-0.214)	(1.090)	(2.248)	(1.191)	(8.091)	(2.299)	(3.976)	(-2.703)	(1.362)
dratfemale 0-4	0.002**	0.002***	0.010***	0.026***	-0.016**	0.014***	0.006	-0.006	0.013*
	(2.126)	(4.388)	(6.997)	(9.516)	(-2.250)	(6.069)	(0.675)	(-1.464)	(1.886)
dratfemale 5-9	0.004***	0.002***	0.015***	0.033***	-0.009	-0.004*	-0.002	0.006*	-0.002
	(4.291)	(4.055)	(9.633)	(11.444)	(-1.419)	(-1.911)	(-0.246)	(1.735)	(-0.375)
dratfemale 10-14	0.006***	0.001*	0.014***	0.029***	-0.001	-0.004*	-0.007	0.016***	-0.011*
	(5.272)	(1.716)	(9.296)	(10.675)	(-0.223)	(-1.851)	(-0.863)	(4.066)	(-1.799)
dratfemale 15-25	0.002***	0.000	0.000	0.000	-0.002	-0.000	0.001	0.022***	-0.005
	(2.944)	(1.021)	(0.080)	(0.249)	(-0.393)	(-0.038)	(0.069)	(5.927)	(-0.892)
dratfemale 26-54	0.002**	-0.000	0.001	0.003	0.017***	0.005***	0.015*	0.008**	-0.002
	(2.079)	(-0.108)	(0.889)	(1.397)	(3.221)	(2.994)	(1.747)	(2.202)	(-0.360)
dratfemale 55+	0.001	0.000	0.001	0.004***	0.030***	0.007***	0.025***	0.002	0.018***
	(0.969)	(0.300)	(1.050)	(3.073)	(6.488)	(4.753)	(3.545)	(0.657)	(3.656)
dd04	-0.000	0.000	0.000	0.000	0.002**	0.001***	0.005***	-0.001	-0.000
	(-1.116)	(0.327)	(0.284)	(0.260)	(1.999)	(3.149)	(2.909)	(-1.403)	(-0.256)
dd05	-0.000	-0.000	0.000	0.000	0.003**	-0.001*	-0.002	-0.002***	-0.001
	(-1.339)	(-0.765)	(0.003)	(0.553)	(2.239)	(-1.896)	(-1.210)	(-2.641)	(-0.576)
constant	-0.000***	-0.000***	0.001***	0.000	0.010***	0.002***	0.007***	-0.001***	0.003***
	(-3.213)	(-2.858)	(3.423)	(0.674)	(15.075)	(7.142)	(7.580)	(-3.414)	(4.954)

F-tests

	dBooks	dToys Games and Hobbies	dChild Footwear	dChild Clothing	dFruit and Vegetable	dMilk	dMeat	dEducation	dHealth
	F/Prob>F	F/Prob>F	F/Prob>F	F/Prob>F	F/Prob>F	F/Prob>F	F/Prob>F	F/Prob>F	F/Prob>F
0-4	5.73**	2.03	0.03	0.56	1.26	0.57	0.52	1.4	0.11
	0.0167	0.1544	0.8542	0.4537	0.2625	0.4515	0.4724	0.2376	0.7443
5-9	0.34	7.72**	0.17	0.88	0.63	0.22	6.65**	0.53	1.56
	0.5585	0.0055	0.6796	0.3472	0.4271	0.6388	0.0099	0.4649	0.2123
10-14	1.82	2.83	0.31	0.22	0.02	0.2	4.68**	0	0.23
	0.1779	0.0926	0.5798	0.6372	0.885	0.6519	0.0305	0.958	0.6324
15-25	0.01	0.32	0.07	0.72	0.91	7.63**	0.81	0.37	1.78
	0.9154	0.5741	0.7911	0.3953	0.3393	0.0058	0.3672	0.5456	0.182
All Children	8.24**	11.27**	3.72**	3.39**	1.8	34.17**	2.73**	12.64**	5.16**
	0	0	0.0023	0.0047	0.1098	0	0.0179	0	0

note: *** p<0.01, ** p<0.05, * p<0.1

Table 13: Engel curves showing effects of composition on selected child goods with differencing method, urban

	dBooks	dToys Games and Hobbies	dChild Footwear	dChild Clothing	dFruit and Vegetable	dMilk	dMeat	dEducation	dHealth
	coef/t	coef/t	coef/t	coef/t	coef/t	coef/t	coef/t	coef/t	coef/t
dln *n*	0.000	-0.000	0.001***	0.001***	-0.005***	-0.002***	0.016***	0.012***	0.007***
	(1.178)	(-0.631)	(3.722)	(2.956)	(-6.770)	(-7.940)	(13.529)	(15.109)	(6.576)
dratmale 0-4	-0.001	0.005***	0.009***	0.028***	-0.016***	0.019***	0.001	-0.007**	0.022***
	(-1.396)	(11.957)	(10.597)	(17.025)	(-5.162)	(17.444)	(0.215)	(-2.195)	(5.216)
dratmale 5-9	0.004***	0.004***	0.016***	0.037***	-0.011***	0.000	0.004	0.009***	0.014***
	(5.307)	(8.925)	(18.531)	(21.750)	(-3.752)	(0.077)	(0.898)	(2.699)	(3.457)
dratmale 10-14	0.005***	0.001**	0.015***	0.029***	-0.010***	-0.002**	-0.005	0.037***	-0.002
	(6.925)	(2.469)	(16.258)	(18.132)	(-3.487)	(-1.964)	(-1.085)	(10.453)	(-0.522)
dratmale 15-25	0.003***	-0.000	-0.000	0.001	-0.011***	-0.003***	-0.004	0.031***	-0.006*
	(5.417)	(-1.002)	(-0.718)	(0.664)	(-5.030)	(-4.048)	(-1.198)	(10.956)	(-1.947)
dratmale 55+	-0.001	-0.000**	-0.000	0.001	0.034***	0.002***	0.031***	-0.004*	0.009***
	(-1.261)	(-2.325)	(-0.435)	(0.759)	(18.089)	(4.654)	(9.663)	(-1.836)	(3.219)
dratfemale 0-4	0.000	0.004***	0.009***	0.025***	-0.019***	0.020***	-0.001	-0.005	0.019***
	(0.031)	(8.250)	(10.699)	(15.783)	(-6.064)	(18.488)	(-0.187)	(-1.637)	(4.338)
dratfemale 5-9	0.005***	0.002***	0.014***	0.038***	-0.010***	-0.000	0.002	0.010***	0.010**
	(6.429)	(4.584)	(14.565)	(22.607)	(-3.066)	(-0.114)	(0.343)	(2.927)	(2.455)
dratfemale 10-14	0.007***	0.001**	0.012***	0.029***	-0.005	-0.003***	-0.013***	0.032***	-0.002
	(8.184)	(2.219)	(13.476)	(17.656)	(-1.561)	(-3.170)	(-2.654)	(8.824)	(-0.431)
dratfemale 15-25	0.002***	0.000	-0.000	0.000	-0.003	-0.001**	-0.008**	0.025***	0.005
	(4.420)	(1.184)	(-0.618)	(0.329)	(-1.488)	(-2.396)	(-2.274)	(8.382)	(1.515)
dratfemale 26-54	0.000	0.000	0.000	0.001	0.014***	0.002***	0.006	0.009***	-0.001
	(0.156)	(1.150)	(0.398)	(1.312)	(6.215)	(3.200)	(1.637)	(2.946)	(-0.415)
dratfemale 55+	-0.000	-0.000	0.001***	0.002***	0.025***	0.005***	0.024***	0.001	0.016***
	(-1.247)	(-0.638)	(2.846)	(2.665)	(12.893)	(8.482)	(7.451)	(0.620)	(5.485)
dd04	-0.000**	0.000*	0.000	0.001**	0.001*	0.000	0.002	-0.001	0.001
	(-2.060)	(1.763)	(0.184)	(2.131)	(1.941)	(0.237)	(1.465)	(-1.560)	(1.191)
dd05	-0.001***	-0.000	-0.000	0.000	0.005***	0.000	-0.003***	-0.004***	-0.002***
	(-3.973)	(-0.712)	(-1.238)	(0.174)	(9.318)	(1.261)	(-2.980)	(-5.244)	(-2.576)
constant	0.000	0.000	-0.000**	-0.000	-0.004***	-0.001***	-0.003***	0.000	-0.002***
	(1.077)	(0.846)	(-2.500)	(-0.957)	(-13.546)	(-7.844)	(-5.268)	(0.887)	(-3.708)

F-tests

	dBooks	dToys Games and Hobbies	dChild Footwear	dChild Clothing	dFruit and Vegetable	dMilk	dMeat	dEducation	dHealth
	F/Prob>F	F/Prob>F	F/Prob>F	F/Prob>F	F/Prob>F	F/Prob>F	Meat	Education	Health
							F/Prob>F	F/Prob>F	F/Prob>F
0-4	1.12	7.99**	0.04	1.87	0.64	0.66			
	0.2897	0.0047	0.8391	0.1714	0.4233	0.4167			
5-9	0.87	21.44**	4.72**	0.65	0.32	0.03	0.13	0.29	0.68
	0.3497	0	0.0298	0.4192	0.5693	0.8688	0.7159	0.5872	0.4095
10-14	1.56	0.37	6.8**	0.03	2.69	1.36	0.26	0.05	0.96
	0.2115	0.5418	0.0091	0.8609	0.1013	0.2432	0.6131	0.8198	0.3265
15-25	1.55	7.07**	0	0.09	12.86**	3.44	2.1	1.3	0
	0.2125	0.0079	0.9614	0.7648	0.0003	0.0637	0.1469	0.2535	0.9457
All Children	35.13**	32.43**	14.98**	11.88**	4.46**	154.34**	1.1	3.18	15.71**
	0	0	0	0	0.0005	0	0.2954	0.0744	0.0001
							2.74**	58.67**	12.51**
							0.0175	0	0

note: *** p<0.01, ** p<0.05, * p<0.1

Table 14: Test for gender effects in adult goods, differencing method, rural

	dAlcohol and Tobacco	dRestaurants and Hotels	dCultural Activities	dWomen Footwear	dMen Footwear	dMen Clothing	dWomen Clothing	dWomen Personal Care	dJewelry and Watches
	coef/t	coef/t	coef/t	coef/t	coef/t	coef/t	coef/t	coef/t	coef/t
dln *n*	0.002	-0.000	0.003**	0.001*	0.003***	0.009***	0.007***	0.001**	0.005***
	(1.057)	(-0.081)	(2.990)	(1.812)	(6.492)	(9.384)	(8.614)	(2.200)	(5.415)
dratmale 0-4	-0.096***	-0.028***	0.010**	0.003*	-0.004	-0.021***	0.012***	0.037***	-0.002
	(-10.831)	(-4.372)	(2.415)	(1.807)	(-1.575)	(-4.738)	(3.195)	(14.213)	(-0.456)
dratmale 5-9	-0.076***	-0.026***	0.013**	0.006***	-0.008***	-0.015***	0.014***	-0.000	0.002
	(-9.418)	(-4.307)	(3.204)	(3.846)	(-3.127)	(-3.518)	(4.166)	(-0.158)	(0.574)
dratmale 10-14	-0.093***	-0.035***	0.023**	0.006***	-0.001	-0.006	0.013***	-0.002	-0.003
	(-11.692)	(-6.242)	(6.129)	(3.825)	(-0.525)	(-1.492)	(4.147)	(-0.870)	(-0.861)
dratmale 15-25	-0.033***	-0.011**	0.010**	0.002*	0.003*	0.011***	0.007**	0.000	0.004
	(-5.016)	(-2.180)	(2.905)	(1.814)	(1.690)	(3.067)	(2.523)	(0.146)	(1.148)
dratmale 55+	-0.059***	-0.032***	-0.003	0.003**	-0.002	-0.004	0.006***	-0.002*	-0.000
	(-10.820)	(-8.535)	(-1.283)	(2.235)	(-1.478)	(-1.279)	(2.963)	(-1.807)	(-0.023)
dratfemale 0-4	-0.085***	-0.032***	0.005	0.006***	-0.007***	-0.013***	0.017***	0.033***	0.005
	(-9.955)	(-5.030)	(1.198)	(3.512)	(-2.672)	(-2.883)	(4.752)	(12.966)	(1.176)
dratfemale 5-9	-0.090***	-0.028***	0.018***	0.005***	-0.010***	-0.021***	0.021***	0.000	0.000
	(-10.763)	(-4.502)	(4.204)	(3.040)	(-4.011)	(-5.104)	(5.768)	(0.119)	(0.092)
dratfemale 10-14	-0.102***	-0.035***	0.020**	0.011***	-0.004	-0.019***	0.028***	0.002	0.001
	(-13.021)	(-5.912)	(4.756)	(6.688)	(-1.542)	(-4.412)	(8.237)	(0.791)	(0.299)
dratfemale 15-25	-0.101***	-0.033***	0.003	0.014***	-0.008***	-0.019***	0.047***	0.010***	0.003
	(-15.447)	(-6.484)	(0.776)	(9.130)	(-4.051)	(-5.641)	(14.931)	(5.680)	(0.870)
dratfemale 26-54	-0.101***	-0.057***	0.001	0.010***	-0.009***	-0.027***	0.030***	0.002	0.001
	(-14.095)	(-10.196)	(0.315)	(5.929)	(-4.079)	(-7.124)	(9.306)	(0.974)	(0.145)
dratfemale 55+	-0.114***	-0.061***	-0.002	0.007***	-0.007***	-0.021***	0.020***	-0.004**	0.002
	(-19.893)	(-14.006)	(-0.664)	(5.185)	(-3.714)	(-7.159)	(7.591)	(-2.189)	(0.398)
dd04	0.002	-0.002**	0.001	-0.000	-0.001*	-0.001	0.000	0.000	-0.001
	(1.368)	(-2.106)	(0.878)	(-0.200)	(-1.935)	(-1.535)	(0.706)	(0.356)	(-1.407)
dd05	0.005***	0.002	0.000	-0.000	-0.001	-0.002**	0.001*	0.000	0.000
	(3.256)	(1.595)	(0.404)	(-0.176)	(-1.542)	(-1.995)	(1.919)	(0.077)	(0.060)
constant	0.002***	-0.006***	-0.000	0.000*	0.002***	0.003***	0.001	-0.001***	0.001***
	(2.862)	(-10.285)	(-0.132)	(1.817)	(8.311)	(7.813)	(1.476)	(-5.054)	(3.709)

F-tests

	dAlcohol and Tobacco	dRestaurants and Hotels	dCultural Activities	dWomen Footwear	dMen Footwear	dMen Clothing	dWomen Clothing	dWomen Personal Care	dJewerly and Watches
	F/Prob>F	F/Prob>F	F/Prob>F	F/Prob>F	F/Prob>F	F/Prob>F	F/Prob>F	F/Prob>F	F/Prob>F
0-4	1.41	0.39	1.35	2.16	1.24	3.12	1.81	1.77	4.47**
	0.2344	0.5336	0.2461	0.1417	0.2649	0.0772	0.1781	0.1836	0.0346
5-9	2.49	0.06	1.59	0.48	0.71	2.01	3.7**	0.07	0.44
	0.1144	0.8075	0.2068	0.487	0.3984	0.1562	0.0543	0.7959	0.5094
10-14	1.3	0.01	0.71	8.6**	0.77	7.58**	17.93**	2.65	2.33
	0.2549	0.9323	0.4	0.0034	0.379	0.0059	0	0.1036	0.1272
15-25	117.81**	22.21**	5.34**	77.62**	34.86**	70.15**	214.21**	35.99**	0.1
	0	0	0.0209	0	0	0	0	0	0.7478
All Children	2.19**	0.8	5.83**	4.37**	2.6**	3.52**	5.95**	88.11**	2.19**
	0.0522	0.5516	0	0.0006	0.0233	0.0035	0	0	0.0526

note: *** p<0.01, ** p<0.05, * p<0.1

Table 15: Test for gender effects in adult goods, differencing method, urban

	dAlcohol and Tobacco coef/t	dRestaurants and Hotels coef/t	dCultural Activities coef/t	dWomen Footwear coef/t	dMen Footwear coef/t	dMen Clothing coef/t	dWomen Clothing coef/t	dWomen Personal Care coef/t	dJewelry and Watches coef/t
dln *n*	0.000	0.001	0.004***	0.001***	0.002***	0.008***	0.007***	0.001***	0.004***
	(0.144)	(1.089)	(5.634)	(4.820)	(6.358)	(11.969)	(12.147)	(4.134)	(7.029)
dratmale 0-4	-0.062***	-0.022***	-0.001	0.004***	-0.010***	-0.023***	0.009***	0.047***	-0.004
	(-13.160)	(-4.989)	(-0.543)	(3.048)	(-6.674)	(-8.379)	(3.514)	(27.661)	(-1.449)
dratmale 5-9	-0.068***	-0.030***	0.015***	0.005***	-0.008***	-0.015***	0.012***	0.003*	-0.004*
	(-15.041)	(-7.158)	(5.205)	(4.238)	(-5.985)	(-5.670)	(5.347)	(1.934)	(-1.924)
dratmale 10-14	-0.074***	-0.046***	0.020***	0.006***	0.002	-0.015***	0.006***	-0.002	-0.002
	(-17.347)	(-11.336)	(7.171)	(5.414)	(1.478)	(-5.612)	(2.649)	(-1.353)	(-1.015)
dratmale 15-25	-0.027***	-0.016***	0.009***	0.001	0.006***	0.010***	0.001	0.002*	-0.001
	(-8.040)	(-4.624)	(3.917)	(0.985)	(4.866)	(4.727)	(0.526)	(1.897)	(-0.702)
dratmale 55+	-0.047***	-0.047***	-0.006***	0.003***	-0.002**	-0.008***	0.004**	-0.001	-0.002
	(-17.057)	(-18.769)	(-3.508)	(3.594)	(-2.363)	(-4.737)	(2.558)	(-0.892)	(-1.149)
dratfemale 0-4	-0.065***	-0.032***	0.002	0.005***	-0.009***	-0.019***	0.011***	0.048***	0.003
	(-13.946)	(-7.271)	(0.742)	(4.131)	(-6.228)	(-6.813)	(4.511)	(28.874)	(1.288)
dratfemale 5-9	-0.063***	-0.031***	0.013***	0.006***	-0.009***	-0.020***	0.015***	0.003**	-0.004*
	(-13.509)	(-7.416)	(4.790)	(4.969)	(-6.313)	(-7.615)	(6.246)	(2.182)	(-1.663)
dratfemale 10-14	-0.075***	-0.041***	0.016***	0.012***	-0.008***	-0.022***	0.024***	0.003**	-0.000
	(-17.061)	(-10.031)	(5.601)	(10.254)	(-5.844)	(-8.481)	(10.031)	(2.213)	(-0.183)
dratfemale 15-25	-0.061***	-0.036***	-0.001	0.017***	-0.009***	-0.022***	0.050***	0.016***	-0.002
	(-18.647)	(-11.182)	(-0.585)	(16.271)	(-7.988)	(-10.626)	(23.546)	(14.281)	(-0.936)
dratfemale 26-54	-0.068***	-0.058***	-0.009***	0.013***	-0.010***	-0.025***	0.035***	0.010***	-0.005**
	(-19.972)	(-16.832)	(-4.043)	(12.618)	(-8.699)	(-11.364)	(15.315)	(8.453)	(-2.115)
dratfemale 55+	-0.083***	-0.073***	-0.011***	0.008***	-0.009***	-0.021***	0.021***	0.001	-0.002
	(-30.045)	(-27.089)	(-5.939)	(10.272)	(-9.329)	(-11.778)	(11.927)	(1.194)	(-1.096)
dd04	0.005***	0.001*	0.001	-0.000	-0.001***	-0.001*	0.000	-0.000	-0.000
	(5.556)	(1.706)	(1.209)	(-0.050)	(-2.784)	(-1.794)	(0.266)	(-0.618)	(-0.441)
dd05	0.005***	0.001	0.000	-0.001***	-0.001***	-0.003***	-0.001***	-0.001***	0.000
	(6.291)	(0.925)	(0.329)	(-2.827)	(-3.456)	(-5.557)	(-2.877)	(-2.638)	(0.054)
constant	-0.001*	0.002***	-0.000	-0.000	-0.001***	-0.002***	-0.000	0.000***	-0.001**
	(-1.738)	(5.172)	(-0.088)	(-0.944)	(-5.978)	(-5.719)	(-0.973)	(3.054)	(-2.093)

F-tests

	dAlcohol and Tobacco F/Prob>F	dRestaurants and Hotels F/Prob>F	dCultural Activities F/Prob>F	dWomen Footwear F/Prob>F	dMen Footwear F/Prob>F	dMen Clothing F/Prob>F	dWomen Clothing F/Prob>F	dWomen Personal Care F/Prob>F	dJewerly and Watches F/Prob>F
0-4	0.35	4.15**	1.53	1.33	0.3	2.49	0.95	0.31	7.73**
	0.5516	0.0417	0.2165	0.248	0.5852	0.1143	0.329	0.5807	0.0054
5-9	0.98	0.08	0.33	0.56	0.48	3.94**	1.3	0.04	0.04
	0.3213	0.7813	0.5676	0.4561	0.4903	0.047	0.2534	0.8487	0.84
10-14	0.04	1.33	1.63	25.81**	40.46**	6.79**	51.18**	11.4**	0.8
	0.8333	0.248	0.202	0	0	0.0092	0	0.0007	0.3703
15-25	113.83**	42.41**	21.22**	302.02**	154.12**	245.47**	714.52**	192.48**	0.1
	0	0	0	0	0	0	0	0	0.7459
All Children	2.85**	7.75**	18.52**	11.3**	15.68**	46.66**	12.01**	335.91**	2.92**
	0.0141	0	0	0	0	0	0	0	0.0123

note: *** p<0.01, ** p<0.05, * p<0.1

Table 16: Semiparametric outlay equivalent ratios, Turkey

	Males: Age Group						Females: Age roup					
	0-4	5-9	10-14	15-25	26-54	55+	0-4	5-9	10-14	15-25	26-54	55+
Adult goods												
Alcohol and Tobacco	-1.00346	-1.00402	-1.00171	-1.02278	-1.03334	-1.01146	-1.0037	-1.00335	-1.00064	-1.00329	-1.00236	-1.01146
Restaurants and Hotels	-0.99574	-0.99882	-1.00259	-0.99115	-0.9842	-1.00307	-0.99919	-0.99892	-1.00123	-1.00045	-1.00509	-1.00856
Cultural Activities	-0.98872	-0.97478	-0.9693	-0.97983	-0.98963	-0.99474	-0.98694	-0.97476	-0.97296	-0.99031	-0.99556	-0.99703
Women Footwear	-1.00536	-0.99954	-0.99712	-1.01217	-1.01627	-1.00708	-0.9995	-0.9988	-0.97087	-0.94767	-0.96634	-0.9892
Men Footwear	-0.99995	-0.99993	-0.96299	-0.94625	-0.96652	-0.97504	-1.00019	-1.00253	-0.99753	-0.9999	-1.00246	-0.99853
Men Clothing	-0.99864	-0.98957	-0.98578	-0.9624	-0.97208	-0.97908	-0.99206	-0.99638	-0.99676	-0.99664	-1.00025	-0.99558
Women Clothing	-0.99718	-0.99476	-0.99882	-1.00233	-1.00466	-1.0011	-0.99357	-0.98981	-0.98134	-0.95982	-0.97306	-0.98548
Women Personal Care	-0.86668	-0.99084	-0.99656	-0.99154	-0.99444	-0.99687	-0.86697	-0.98963	-0.98852	-0.95249	-0.97361	-0.99474
Jewelry and Watches	-0.99467	-0.99401	-0.99533	-0.98872	-0.98835	-0.99082	-0.9826	-0.99442	-0.98874	-0.99016	-0.99548	-0.99057