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Analysis of consumption and expenditure for Lithuanian households: using budget survey data

Creg V. Shaffer
Iowa State University

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Analysis of consumption and expenditure

for Lithuanian households:

Using budget survey data

by

Creg V Shaffer

A Thesis Submitted to the

Graduated Faculty in Partial Fulfillment of the

Requirements for the Degree of

MASTER OF SCIENCE

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Iowa State University
Ames, Iowa

1992

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1 INTRODUCTION

The objective of this study is to analyze household expenditure patterns in Lithuania, and how these patterns may shift in view of recent economic reforms.

Lithuania is one of the three Baltic States. It is bordered by Poland on the south, Byelorussia on the east, Latvia to the north, and the Baltic Sea on the west. In 1939, Hitler and Stalin signed an anti-aggression pact in which they agreed that Poland would belong to Germany and Lithuania, Latvia, and Estonia would go to the Soviet Union. As a result, in 1940 Lithuania became a republic of the Soviet Union. At this time, its economic system became highly centralized, being planned and directed by republic and all-union officials and ministries from Moscow (Nove p. 53). In 1991 Lithuania gained its independence, and is currently in the process of reforming its political and economic systems. Inefficiency in the management of information, allocation of resources, and distribution of goods and services of the Soviet-type command economy has given rise to recent economic and political reforms throughout Eastern Europe and the former Soviet Union. These reforms will have tremendous economic and social impacts on the region and the world.

Because many studies have, and are attempting to analyze the effect of these reforms, the demand for data and information is great. This study provides some relevant data derived from published tables on Lithuanian consumer expenditures. The data are analyzed through the use of Engel functions in order

to obtain reasonable consumption parameter estimates. Engel function specification has been studied by many scholars in the past, and results from a few of their studies are presented for comparison of income parameters.

This study presents the position of Lithuanian households with respect to income, expenditure, size, and composition as they existed in 1986 and 1989. It also provides estimates for changes in household expenditure given price reforms initiated in 1990 by using the estimated effects of the income change. The method of this study centers around the use of standard econometric techniques to estimate Engel functions. The estimated parameters of the Engel functions are then used to obtain expected shifts in household expenditures given changes in real income.

Chapter 2 provides a discussion of the design and purpose of the survey used to obtain the data along with a profile of household income, expenditure, size, and composition. Chapter 3 begins by reviewing previous studies that compare the usefulness and theoretical plausibility of several forms of Engel functions. Following this review, a description is given of the procedure used to estimate semi-logarithmic and double-logarithmic Engel functions using the data described in chapter 2. The estimated parameters of the Engel functions are then used to calculate income elasticities for the initial allocation of income to five expenditure groups. Engel functions and expenditure elasticities are then

calculated for eleven food commodity groups. Chapter 4 presents the results of the study by giving the estimated average per capita expenditure shares for 1991, and comparing them to existing (1989) expenditure shares.

2 PROFILE OF INCOME AND EXPENDITURE

This chapter focuses on the patterns of income and expenditure displayed by households in Lithuania. These patterns are discussed in terms of relative comparisons of the observations on the variables over increasing levels of household income, and household designation as being either urban or rural. Graphs and tables are used to depict the patterns. In section 2.1 a description of the income-expenditure data is presented. Section 2.2 defines the income groups used, and gives the 1989 percent distribution of households over the income groups. Section 2.3 gives a description of household employment and income across income groups and urban/rural specification. Section 2.4 gives a profile of expenditures by showing and comparing household expenditure shares on five categories of commodities across income groups and household urban/rural specification. And finally, because household expenditure patterns are closely tied to the size and composition of the household, section 2.5 discusses the patterns of household size and composition.

2.1 Description of the Data Set

The data used for this study come from two years of published data resulting from national household budget surveys conducted in Lithuania. The survey has been conducted periodically to establish baseline information on household budgets. One of the objectives of this study is to make the data set

from this survey available to researchers in English to facilitate further analysis. The survey data for 1986 were made available in series of tables and published in Russian. The survey data for 1989 were made available in nearly an identical series of tables with the exception that they were published in Lithuanian. Many of the survey tables have been translated into English, and some of these will be used for the following analysis. The published data are referred to in this analysis as "survey tables" when general reference is made; or "survey tables 1986" and "survey tables 1989" when more specific reference is required, with a page number included when referring to a specific table.

The survey was conducted by the Central Statistical Department for Lithuania. The survey was centrally administered and families were randomly selected in order to give equal representation of the occupational and social strata of Lithuania's economy. Surveyors were instructed to conduct bimonthly interviews with families as well as gather information on salaries, payments-in-kind, and pensions etc. from the household members' place(s) of employment.

The goal of the household budgetary survey was to provide data for analyzing the patterns of consumption and the level of well-being of people in different occupational, economic, and social groups (i.e., size, composition, and physical location of household; as well as the source and level of income). Its intent was to provide information with which to analyze the relationship of consumption (level and structure) to the level and source of income, structure of family, and other socioeconomic and occupational factors. The survey tables

summarize individual household observations on 313 variables covering family size and composition, family employment, income sources, expenditures, consumption, nutrient intake (i.e., the percent of total calories and protein derived from animal products), retail prices, household inventory of food commodities, and holdings of land and livestock.

The survey tables, and those adapted from them, present the data by dividing the sample of households into seven groups according to household per capita monthly income. Observations on the variables used in this study are the average values reported within each one of the seven income groups. The sample of households was further delineated by their designation as being urban or rural, and the tables report data for urban and rural households separately. This structure provides 28 observations for most of the variables: four household specifications (urban 1986, rural 1986, urban 1989, and rural 1989) reporting average values for 7 income groups.

In this study we are particularly concerned with income and expenditure data. However, the income and expenditure levels for 1986 are not directly comparable with data for 1989 because they are given in different units. The 1986 observations on income and expenditure are reported in average per family per year, and for 1989 in average per capita per month. In order to make comparisons between the two, all values for income and expenditure were converted into units of per capita per year by dividing the observations on family income and expenditure for 1986 by average family size, and by multiplying the

monthly per capita observations for 1989 expenditure by 12. The expenditure data and total income in units of per capita per year are the common units for analysis.

The survey tables which provide data for 1989 report values for the seven income groups for urban and rural households; they also include an average value for all families. These observations for "all families" are not available for the 1986 data. The 1989 values for "all families" appear in the tables presented here under the heading "All".

2.2 Income Groups and Distribution of the Population

Average values within separate income groups provide the basis for observations in this study. Table 2.1 defines the income groups, to which households were assigned according to income per capita per month. The ranges of the income groups differed slightly between the 1986 and 1989 classifications. For either year the income groups are referred to by category (I through VII), ranging from lowest to highest group (Table 2.1).

The distribution of households over the income groups was not reported for 1986. It was reported for 1989 (Table 2.2) and the data indicate that there was a relatively small portion of the population found in the lowest income groups. Specifically, the lowest income group contained only 4.3 and 2.9 percent of urban and rural households, respectively. In contrast, the highest income group

contained 31.5 and 40.7 percent of urban and rural households, respectively. Throughout this study comparisons will be made across these income groups, hence, it should be remembered that these groupings do not divide the population into groups containing an equal share of the total households sampled.

A weakness of the published survey tables is that they do not provide the total number of households in each income group, nor the total number of households in the sample, nor any indication of the total number of urban or rural households in Lithuania. The data on the total number of urban and rural families (Table 2.2) in Lithuania for 1989 were obtained through personal communication with Lithuanian researchers (Kazlauskiene).

2.3 Family Employment and Income

2.3.1 Family employment

Table 2.3 provides data that describe the employment status of family members in Lithuanian households for 1989. The budget survey and Table 2.3 categorize family members according to their employment status as follows: working, working pensioners, non-working pensioners, students, other. The category "working pensioners" is a subset of the category "working." The other categories are mutually exclusive. Initial inspection of these data indicate that the level of income is positively associated with the category "working pensioners," and negatively associated with the category "other." In 1989, the average per capita income for both urban and rural households rose steadily with the average

number of working pensioners per family. On the other hand, the number of persons in the "other" category declines noticeably as per capita income rises. This makes intuitive sense because the family members classified as "other" are, most likely, children and non-working adults.

The survey data also indicate that a substantially higher percentage of persons collected a pension in rural households than in urban households. This can be seen in the final column of Table 2.3 as the sum of the amount for working pensioners and the amount for non-working pensioners. The average number of persons collecting a pension in urban households is .25 (.14 + .11); the average number of persons per rural household collecting a pension is .73 (.25 + .48). As a result, only 9 percent of total family members in urban households received a pension ($.25 \div 2.72$), while 25 percent of total family members in rural households received a pension ($.73 \div 2.88$).

2.3.2 Family income

Tables 2.4 and 2.5 show a breakdown of average family income with respect to its sources for 1986 and 1989, respectively. The sources of income for which data are reported are: (1) salaries of urban workers, (2) salaries of rural workers, (3) pensions/stipends/grants, (4) income from individual plots, and (5) other sources. The tables (2.4 and 2.5) give data on income per family, and show that the level of total family income was higher for rural families. For 1989, average total income for "all" rural households is 7544.5 rubles per year (Table

2.5). The average total income for "all" urban households was 6482.3 rubles per year (Table 2.5). Adjusting for household size bring the values for urban and rural income closer together. Dividing total family income values in Table 2.5 by average family size from Table 2.3 yields a per capita income level for "all" rural families of 2619.6 rubles per year ($7544.5 \div 2.88$), and a per capita income level for urban families at 2383.2 rubles per year ($6482.3 \div 2.72$).

Figure 2.1, created from the data in the first column of Table 2.5, shows differences in the sources of income between urban and rural families for 1989. One difference was in the amount of income generated from individual plots. Income from individual plots was, as expected, much greater for rural households. It accounted for nearly 39 percent of total income on average (2920 as a percent of 7544.5). This compares with approximately 6 percent for urban households (372.8 as a percent of 6482.3). Urban families, however, received 76.2 percent of total income in the form of salaries [(4921.7 + 21.6) as a percent of 6482.3], while salaries made up only 49 percent of total income for rural households [(239.0 + 3457.8) as a percentage of 7544.5]. Urban households also received a relatively larger percentage of their income from "other sources" (9.9%) than did rural households (2.0%).

2.4 Expenditure Profile

The data set made available in the survey tables gives a detailed description of household spending patterns in Lithuania. This section exposes the

patterns of expenditure across income groups and points out peculiarities in them. This section describes the breakdown of total expenditure into expenditure groups, and compares the levels and shares of these groups for urban households with those of rural households. A description is also given of the composition of each expenditure group.

2.4.1 Expenditure level

Tables 2.6 and 2.7 replicate the data available from the two surveys. These data were converted to the standard basis of "average per capita per year" and reported in Tables 2.8 and 2.9. Table 2.8 was derived by changing the units of expenditure for 1986 in Table 2.6 from rubles per family per year to rubles per capita per year; Table 2.9 was derived by changing the units of expenditure for 1989 in Table 2.7 from rubles per capita per month to rubles per capita per year.

Tables 2.8 and 2.9 present the initial breakdown of total expenditure the following mutually exclusive groups: food, non-food, alcoholic beverages, services, taxes-duties-payments, income unaccounted for, other expenditure, and savings (the 1989 survey data combined income unaccounted for with other expenditure). The "non-food" expenditure group is not an expenditure classification pertaining to all items other than food. "Non-food" expenditures are reported as one of the eight mutually exclusive expenditure groups listed above. Consumer durables (household furniture, appliances, vehicles, etc.) and clothing comprise the non-

food group. This will become clearer later in this section when each one of the above expenditure groups will be discussed with respect to their relative importance in total expenditure and the commodities that comprise them.

The level of total expenditure for 1989 is higher than the level of total expenditure for 1986 (Tables 2.8 and 2.9). This is true for both urban and rural households and across all income groups. The increase in expenditure must come from an increase in prices, an increase in the quantity purchased, or an increase in both. The survey data provided information on prices for some food commodities (page 34 and 35 of the 1986 survey and page 38 and 39 of the 1989 survey), and the data do indicate that these prices were higher in 1989. This would account for some of the increase in expenditure for food commodities. Prices were not made available for any other expenditure items; therefore, it is not clear what causes the increase in expenditure level from 1986 to 1989. This analysis, however, does not focus on comparisons or changes in expenditure over time, but over the various levels of income and urban/rural specification.

2.4.2 Expenditure shares

The relative importance or share of each expenditure group in total expenditures is presented in Tables 2.10 through 2.13. In general, the share of total expenditure for food was greater than all other expenditure shares in the lowest three to four income groups. Non-food expenditure share was typically higher than the other expenditure groups for income groups V, VI, and VII.

Across all income groups, non-food expenditure was consistently about 30 percent of total expenditure. Notice (Tables 2.10 through 2.13) the large share of expenditure allocated to savings, especially for rural households (Tables 2.11 and 2.13).

The data indicate that urban households, in general, spent a greater share of total income on services and taxes-duties-payments than did rural households. However, "other" expenditure shares seem to be greater for rural households. Looking at expenditure patterns across the seven income groups, there was a steady decline in food expenditure shares as average income increased (Tables 2.10 through 2.13). Expenditure shares on the categories "other" and "savings" increased with income level. Non-food, services, alcoholic beverages, and taxes do not show any noticeable trend across income groups.

Figures 2.2 and 2.3 show the shares of five expenditure groups for urban and rural households, respectively, for 1989. In these figures, food expenditure and savings are unchanged from the data in Tables 2.12 and 2.13; however, non-food and services are different, and there is an additional category for housing. Non-food includes the share for alcoholic beverages. The values for housing were obtained by adding the expenditures for dwelling and public utilities to expenditures for dwelling maintenance and construction, reported under services in Table 2.16. Services includes the shares for both taxes-duties-payments and other, less the expenditure for "housing" as a share of total expenditure.

Figures 2.2 and 2.3 depict patterns of expenditure share for 1989 across

income groups similar to those mentioned above: (1) the food expenditure share declined as income level increased; (2) non-food share remained fairly constant; (3) share of housing and utility payments remained consistently below 5 percent of total expenditures across all income groups; (4) the group labeled services and taxes, which also contains "other" expenditure increased steadily but only slightly; and (5) the saving share by rural households was very high.

The following four subsections describe, in more detail, the expenditure patterns and composition of the expenditure groups discussed above for 1989. The composition of expenditure groups and consumption patterns for 1986 were very similar.

2.4.3 Food

Food expenditure as a percentage of total expenditure in 1989 urban households ranged from 46.6 in income group I to 23.4 in group VII, with an average of 29.4 percent (Table 2.12). For rural households the range was from 41 to 20 with an average of 24.8 percent (Table 2.13). Table 2.14 shows the composition of total per capita food expenditure by decomposing total per capita food expenditure into eleven food commodity groups. The table also shows the share that each of the eleven food groups has in total food expenditure for each income group. There was little noticeable shift in shares from one food group to another across income groups.

Figure 2.4 is a representation of the data given in the final column of table

2.14, and shows that there was little difference in shares on food commodities between urban and rural households. Meat and meat products represent by far the largest food expenditure share within total food (Figure 2.4). Meat products claimed nearly one third of total food expenditure across all income groups (Table 2.14). Other important items in total food expenditure were milk and related products (approximately 15 percent), fruit and berries (10 percent), and sugar-confectionery-honey (10 percent).

2.4.4 Non-food

The non-food expenditure group, as explained above, is a category of expenditure comprised of items such as clothing, household appliances, vehicles, and articles for education and leisure. It is completely separate from all other expenditure groups. As seen previously in Table 2.9, the level of this expenditure group in total expenditure was greater than all other groups for the urban households in the highest three income groups, and was similarly significant in the expenditures of rural households. As a share of total expenditures non-food remained fairly constant at around one third across income groups for urban households (Table 2.12), and approximately one fourth of total expenditure for rural households (Table 2.13).

Table 2.15 provides the composition of the non-food expenditure group for both urban and rural households in 1989. This table was replicated from the 1989 survey tables (p. 42 and 43). The data indicate that expenditure for apparel

(clothes, knitted wear, and shoes) had by far the highest budget share within total non-food. Other important items within non-food for 1989 from table 2.15 were household furnishings (curtains and furniture), recreation, and vehicles (cars, motorcycles, and bicycles).

2.4.5 Alcoholic beverages

The expenditure share for alcohol remained fairly consistent across all income groups. For rural households, the share of alcohol ranged from 5.5 to 7.3 percent of total expenditures (Table 2.13). This was slightly higher than the urban share which ranged from 3.4 to 4.9 percent (Table 2.12).

2.4.6 Services

Per capita expenditure on services for 1989 also remained fairly consistent across income groups; however, there were location differences (Table 2.16). Expenditure levels for services were lower for rural households. The share of total budget of urban households for services was 9.4 percent on average (Table 2.12); rural households allocated only 4.8 percent of total budget to services (Table 2.13).

Total expenditure on services in 1989 and the items that comprise it are listed in Table 2.16 for urban and rural households and all income groups. The most significant items within the total service expenditure group were dwelling and public utility payments, and transportation. Most of the other items within

the services group are related to education, recreation, repair, and maintenance.

2.4.7 Savings

Both the level and share of savings as a part of household expenditure are noteworthy. Savings were reported by households with no indication as to what types of savings were made. The savings shares are shown in Tables 2.10 and 2.11 for 1986, 2.12 and 2.13 for 1989, and in Figures 2.2 and 2.3.

In 1986 the share of savings was at its highest in income group VII at 13.2 percent of total expenditure for urban households and 24.2 percent for rural households. Urban households in income group VII in 1989 allocated 11.2 percent of total expenditure to savings. The overall average savings share for urban households in 1989 was 8.4 percent (Table 2.12). For 1989 rural households, however, the reported savings shares were very high. The lowest income group "saved" 21.2 percent, the highest income group's share was 32.0 percent, and the overall average was 27.5 percent.

2.5 Household Size and Composition

There are several observations to note related to household size and composition in the classification of data for 1986 and 1989. As described earlier, the seven income groups are defined on the basis of per capita household income. One obvious and expected relationship is that families with higher incomes per capita were smaller and had fewer children. The numbers in Table 2.17 show

that average family size decreased as average per capita income increased.

Based on the numbers in Table 2.17 it is possible to calculate the percent of total family members that are pension-age, adult, or children. Pension-age was defined as women over age 55 and men over age 60; adults were those age 16-54; and children were those under 16 years of age. Figure 2.5 depicts how family composition changed with respect to the level of per capita income. The data in Table 2.17 and Figure 2.5 indicate first, that the percentage of pension-age family members increased for both urban and rural families as income rose, but more obviously in rural families; second, the number of children as a percentage of total family members declined significantly with income for both urban and rural families; and third, the percentage of adults in the family increased for urban families but remained fairly constant across income groups for rural families.

Table 2.18 shows the average number of children, adults, and pension-age persons for all urban and all rural families. It is apparent (Figure 2.5 and 2.6) that there was a substantially higher proportion of pension-age persons in rural households.

Table 2.1 Income groups, Lithuania 1986 and 1989 (rubles per capita per month)

Income group	Income Ranges	
	1986	1989
I	less than 75	less than 100
II	75 - 100	100 - 125
III	100 - 125	125 - 150
IV	125 - 150	150 - 175
V	150 - 175	175 - 200
VI	175 - 200	200 - 250
VII	greater than 200	greater than 250

Table 2.2 Distribution of households, Lithuania 1989

Income groups	URBAN		RURAL	
	number	percent ^b	number	percent ^b
TOTAL	670805 ^a	100.0	329197 ^a	100.0
I		4.3		2.9
II		7.0		5.7
III		10.9		11.3
IV		11.9		9.3
V		11.5		11.1
VI		22.9		19.0
VII		31.5		40.7

^a personal communication with Natalia Kazlauskiene

^b all percentages are taken from the 1989 survey tables (urban p. 14; rural p. 16)

Table 2.3 Employment status of family members, Lithuania 1989 (average number per family)

Employment status	Income groups							All
	I	II	III	IV	V	VI	VII	
URBAN								
total in family	3.92	3.57	3.31	3.31	3.10	2.56	1.86	2.72
working	1.59	1.72	1.67	1.80	1.82	1.74	1.54	1.68
working pensioners ^a	(.02)	(.05)	(.04)	(.05)	(.09)	(.15)	(.27)	(.14)
non-working pensioners	.07	.14	.15	.12	.08	.17	.06	.11
students	.03	.01	.04	.06	.02	.03	.01	.03
other	2.23	1.70	1.45	1.33	1.18	.62	.25	.90
RURAL								
total in family	4.35	4.60	3.97	3.65	3.28	2.55	2.08	2.88
working	1.57	1.77	1.73	1.78	1.70	1.60	1.64	1.67
working pensioners ^a	(.09)	(.18)	(.31)	(.37)	(.42)	(.53)	(.64)	(.48)
non-working pensioners	.18	.46	.32	.54	.19	.24	.16	.25
students	.	.01	.01	.01	.05	.03	.01	.01
other	2.60	2.36	1.91	1.32	1.34	.68	.27	.95

Note: This table is adapted from the 1989 survey (urban p. 9; rural p. 10).

^a "working pensioners" is included in "working"

Table 2.4 Average family income by source, Lithuania 1986 (rubles, average per family per year)

Income Source	Income groups						
	I	II	III	IV	V	VI	VII
URBAN							
total income	2592.9	4103.8	5185.8	5597.2	5515.7	5898.6	5869.5
salaries of urban workers	1357.5	3023.5	3984.6	4382.5	4400.0	4251.9	4191.9
salaries of rural workers							
on collective farms	.	.	3.3	0.4	4.4	8.3	2.3
pensions/stipends/grants	382.4	423.6	316.8	474.4	504.5	809.9	758.3
from individual plots	89.0	230.8	367.1	330.4	345.5	589.1	578.1
other sources	764.0	425.9	514.0	409.5	261.3	239.4	338.9
RURAL							
total income	4134.6	5070.3	5391.0	6497.7	6294.7	5831.3	6939.6
salaries of urban workers	84.0	96.5	233.1	479.1	240.4	188.9	141.2
salaries of rural workers							
on collective farms	1930.5	2335.7	2428.9	3036.6	3097.2	2697.7	2991.4
pensions/stipends/grants	293.4	634.5	527.6	688.6	508.7	641.0	855.8
from individual plots	1673.9	1801.9	2048.6	2147.4	2167.8	2192.3	2762.8
other sources	152.8	201.7	152.8	146.0	280.6	111.4	188.5

Note: Table replicated from 1986 budget survey (urban p. 16; rural p. 17).

Table 2.5 Average income by source, Lithuania 1989 (rubles, average per family per year)

Income Source	Income groups							
	All	I	II	III	IV	V	VI	VII
URBAN								
total income	6482.3	3981.1	4895.0	5389.5	6379.1	6989.3	6827.9	7283.5
salaries of urban workers	4921.7	2852.7	3793.7	4152.5	4980.7	5458.8	5209.2	5316.6
salaries of rural workers								
on collective farms	21.6	10.2	15.0	1.5	44.5	46.9	6.5	30.3
pensions/stipends/grants	525.0	329.2	323.1	423.1	475.3	479.5	581.7	617.7
from individual plots	372.8	166.4	185.8	235.1	346.5	458.5	442.6	387.6
other sources	641.2	622.6	577.4	577.3	532.1	545.6	587.9	931.3
RURAL								
total income	7544.5	4665.7	6343.4	6580.7	7161.6	7417.3	6874.9	8630.6
salaries of urban workers	239.0	15.9	116.3	325.8	598.4	165.3	246.3	189.4
salaries of rural workers								
on collective farms	3457.8	2550.9	3201.3	3234.6	2926.5	3674.0	2907.2	3833.4
pensions/stipends/grants	775.6	378.3	563.6	554.1	820.8	708.3	795.3	913.0
from individual plots	2920.0	1527.5	2255.4	2326.9	2593.9	2549.4	2716.4	3363.8
other sources	152.1	193.1	206.8	139.3	222.0	320.3	209.7	331.0

Note: Table replicated from the 1989 budget survey (urban p. 18; rural p. 19).

Table 2.6 Household expenditures, Lithuania 1986 (rubles, average per family per year)

Expenditure groups	Income groups						
	URBAN	I	II	III	IV	V	VI
total expenditure/income	2592.9	4103.8	5185.8	5597.2	5515.7	5898.6	5869.5
food	1327.8	1896.8	1992.9	1967.6	1807.9	1714.7	1577.4
non-food	735.2	1517.8	1558.6	2038.8	1674.1	1851.6	1765.5
alcoholic beverages	135.8	232.6	200.2	206.4	293.9	221.9	224.2
services	353.7	471.3	482.7	517.0	469.1	593.6	471.4
taxes/duties/payments	109.9	329.8	468.2	533.7	522.3	521.2	543.1
income unaccounted for	5.4	32.7	20.2	15.4	28.3	19.3	27.2
other	70.0	160.0	172.0	215.3	233.7	315.9	486.7
savings	-144.9	-537.2	291.0	103.0	556.4	660.4	774.0
RURAL							
total expenditure/income	4134.6	5070.3	5391.0	6497.7	6294.7	5831.3	6939.6
food	1925.8	2048.5	1875.5	2045.6	1797.6	1525.2	1561.3
non-food	1636.5	1358.3	1722.5	1782.0	2051.3	1854.9	1620.2
alcoholic beverages	207.4	221.2	281.1	337.5	356.2	254.7	339.1
services	161.6	184.2	264.4	318.9	421.4	313.8	340.1
taxes/duties/payments	34.2	47.3	70.8	129.8	76.2	61.6	65.0
income unaccounted for	184.4	35.3	34.3	25.0	30.9	83.6	41.2
other	266.6	391.4	512.0	398.2	694.2	900.8	1291.4
savings	-281.9	784.2	630.4	1460.7	866.9	836.7	1681.3

Note: Table replicated from 1986 survey (urban p. 20; rural p. 21).

Table 2.7 Household expenditures, Lithuania 1989 (rubles, average per capita per month).

Expenditure group	Income groups							
	I	II	III	IV	V	VI	VII	All
URBAN								
total expenditure/income	84.5	114.3	135.9	160.8	188.1	222.1	325.8	198.5
food	39.4	45.4	49.6	52.8	56.6	63.0	76.2	58.4
non-food	26.6	41.3	42.3	52.7	60.4	76.0	121.1	68.6
alcoholic beverages	4.1	4.4	4.6	6.6	7.6	9.2	11.0	7.6
services	8.6	10.9	15.1	16.2	18.4	18.9	27.9	18.6
taxes/duties/payments	6.6	10.6	12.5	15.9	18.5	21.7	32.6	19.4
other	2.4	3.8	5.1	5.6	8.1	13.6	20.5	9.1
savings	-3.2	-2.1	6.7	11.0	18.5	19.7	36.5	16.8
RURAL								
total	89.3	115.0	138.1	163.6	188.6	224.6	346.4	218.2
food	37.3	40.1	44.2	48.1	48.0	57.6	69.5	54.1
non-food	18.9	37.3	37.0	48.5	46.2	60.1	73.7	53.9
alcoholic beverages	5.2	8.4	7.6	10.5	10.9	14.6	18.7	12.7
services	3.8	6.0	5.9	8.3	10.1	12.0	14.9	10.4
taxes/duties/payments	0.6	1.5	1.7	2.5	1.9	2.3	3.4	2.3
other	4.7	10.4	12.0	16.5	17.5	26.6	55.3	24.9
savings	18.8	11.3	29.7	29.2	54.0	51.4	110.9	59.9

Note: Table replicated from the 1989 survey (urban p. 28; rural p. 29)

Table 2.8 Household expenditures, Lithuania 1986 (rubles, average per capita per year)

Expenditure group	Income groups						
	I	II	III	IV	V	VI	VII
URBAN							
total expenditure/income	747.2	1106.1	1364.7	1641.4	1942.1	2251.4	3105.6
food	382.7	511.3	524.4	577.0	636.6	654.5	834.6
non-food	211.9	409.1	410.2	597.9	589.5	706.7	934.1
alcoholic beverages	39.1	62.7	52.7	60.5	103.5	84.7	118.6
services	101.9	127.0	127.0	151.6	165.2	226.6	249.4
taxes/duties/payments	31.7	88.9	123.2	156.5	183.9	198.9	287.4
income unaccounted for	1.6	8.8	5.3	4.5	10.0	7.4	14.4
other	20.2	43.1	45.3	63.1	82.3	120.6	257.5
savings	-41.8	-144.8	76.6	30.2	195.9	252.1	409.5
RURAL							
total	760.0	1067.4	1337.7	1657.6	1936.8	2242.8	3304.6
food	354.0	431.3	465.4	521.8	553.1	586.6	743.5
non-food	300.8	286.0	427.4	454.6	631.2	713.4	771.5
alcoholic beverages	38.1	46.6	69.8	86.1	109.6	98.0	161.5
services	29.7	38.8	65.6	81.4	129.7	120.7	162.0
taxes/duties/payments	6.3	10.0	17.6	33.1	23.4	23.7	31.0
income unaccounted for	33.9	7.4	8.5	6.4	9.5	32.2	19.6
other	49.0	82.4	127.0	101.6	213.6	346.5	615.0
savings	-51.8	165.1	156.4	372.6	266.7	321.8	800.6

Note: Table adapted from table 2.6 or 1986 survey as described in text.

Table 2.9 Household expenditures, Lithuania 1989 (rubles, average per capita per year)

Expenditure groups		Income groups						
URBAN	I	II	III	IV	V	VI	VII	All
total expenditure	1014.0	1371.6	1630.8	1929.6	2257.2	2665.2	3909.6	2382.0
food	472.8	544.8	595.2	633.6	679.2	756.0	914.4	700.8
non-food	319.2	495.6	507.6	632.4	724.8	912.0	1453.2	823.2
alcoholic beverages	49.2	52.8	55.2	79.2	91.2	110.4	132.0	91.2
services	103.2	130.8	181.2	194.4	220.8	226.8	334.8	223.2
taxes/duties/payments	79.2	127.2	150.0	190.8	222.0	260.4	391.2	232.8
other	28.8	45.6	61.2	67.2	97.2	163.2	246.0	109.2
savings	-38.4	-25.2	80.4	132.0	222.0	236.4	438.0	201.6
RURAL								
total	1071.6	1380.0	1657.2	1963.2	2263.2	2695.2	4156.8	2618.4
food	447.6	481.2	530.4	577.2	576.0	691.2	834.0	649.2
non-food	226.8	447.6	444.0	582.0	554.4	721.2	884.4	646.8
alcoholic beverages	62.4	100.8	91.2	126.0	130.8	175.2	224.4	152.4
services	45.6	72.0	70.8	99.6	121.2	144.0	178.8	124.8
taxes/duties/payments	7.2	18.0	20.4	30.0	22.8	27.6	40.8	27.6
other	56.4	124.8	144.0	198.0	210.0	319.2	663.6	298.8
savings	225.6	135.6	356.4	350.4	648.0	616.8	1330.8	718.8

Note: Table adapted from 1989 survey (urban p. 28; rural p. 29) as described in text.

Table 2.10 Budget share for household expenditure, urban 1986 (percent)

Expenditure group	Income Groups						
	I	II	III	IV	V	VI	VII
total	100	100	100	100	100	100	100
food	51.2	46.2	38.4	35.2	32.8	29.1	26.9
non-food	28.4	37.0	30.1	36.4	30.4	31.4	30.1
alcoholic bev.	5.2	5.7	3.9	3.7	5.3	3.8	3.8
services	13.6	11.5	9.3	9.2	8.5	10.1	8.0
taxes-duties	4.2	8.0	9.0	9.5	9.5	8.8	9.3
other	2.9	4.7	3.7	4.1	4.7	5.7	8.8
savings	-5.6	-13.1	5.6	1.8	10.1	11.2	13.2

Note: Table adapted from Table 2.8 above.

Table 2.11 Budget share for household expenditures, rural 1986 (percent)

Expenditure group	Income Groups						
	I	II	III	IV	V	VI	VII
total	100	100	100	100	100	100	100
food	46.6	40.4	34.8	31.5	28.6	26.2	22.5
non-food	39.6	26.8	32.0	27.4	32.6	31.8	23.3
alcoholic bev.	5.0	4.4	5.2	5.2	5.7	4.4	4.9
services	3.9	3.6	4.9	4.9	6.7	5.4	4.9
taxes-duties	0.8	0.9	1.3	2.0	1.2	1.1	0.9
other	10.9	8.4	10.1	6.5	11.5	16.8	19.2
savings	-6.8	15.5	11.7	22.5	13.8	14.3	24.2

Note: Table adapted from Table 2.8 above.

Table 2.12 Budget share for per capita expenditure, urban 1989 (percent)

Expenditure group	Income Groups							All
	I	II	III	IV	V	VI	VII	
total	100	100	100	100	100	100	100	100
food	46.6	39.7	36.5	32.8	30.1	28.4	23.4	29.4
non-food	31.5	36.1	31.1	32.8	32.1	34.2	37.2	34.6
alcoholic bev.	4.9	3.8	3.4	4.1	4.0	4.1	3.4	3.8
services	10.2	9.5	11.1	10.1	9.8	8.5	8.6	9.4
taxes-duties	7.8	9.3	9.2	9.9	9.8	9.8	10.1	9.8
other	2.8	3.3	3.8	3.5	4.3	6.1	6.3	4.6
savings	-3.8	-1.8	4.9	6.8	9.8	8.9	11.2	8.4

Note: Table adapted from table 2.9 above.

Table 2.13 Budget Share for household expenditure, rural 1989 (percent)

Expenditure group	Income Groups							All
	I	II	III	IV	V	VI	VII	
total	100	100	100	100	100	100	100	100
food	41.8	34.9	32.0	29.4	25.5	25.6	20.1	24.8
non-food	21.2	32.4	26.8	29.6	24.5	26.8	21.3	24.7
alcoholic bev.	5.8	7.3	5.5	6.4	5.8	6.5	5.4	5.8
services	4.3	5.2	4.3	5.1	5.4	5.3	4.3	4.8
taxes-duties	0.7	1.3	1.2	1.5	1.0	1.0	1.0	1.1
other	5.3	9.0	8.7	10.1	9.3	11.8	16.0	11.4
savings	21.1	9.8	21.5	17.8	28.6	22.9	32.0	27.5

Note: Table adapted from table 2.9 above.

Table 2.14 Distribution of food expenditures, Lithuania 1989 (rubles, average per capita per year)

Food commodity	Income groups							
	URBAN	I	II	III	IV	V	VI	All
total food expenditure		472.5	544.7	594.9	633.5	678.6	835.0	700.4
		in percent of total food expenditure						
bread products		6.9	6.2	6.0	5.3	5.3	5.0	5.4
potatoes		2.9	2.9	2.8	2.5	2.6	2.5	2.6
vegetables		7.0	6.8	7.0	7.4	7.4	7.5	7.4
fruit/berries		9.2	9.2	10.4	9.6	10.4	10.3	10.1
meat/meat products		32.7	33.8	33.2	35.2	33.7	33.9	33.8
milk/milk products		16.4	16.1	15.9	14.5	14.2	14.1	14.6
eggs		3.6	3.4	3.4	3.4	3.3	3.0	3.2
fish/fish products		2.7	2.7	2.9	2.9	2.9	2.7	2.8
sugar/confectionery/honey		10.7	9.9	10.1	9.9	10.6	10.4	10.3
vegetable oil/margarine/other fats		1.1	1.2	1.1	1.2	1.1	1.1	1.1
other food		6.6	7.8	7.2	8.1	8.5	9.5	8.7
RURAL								
total food expenditure		447.9	482.0	530.1	577.2	576.2	782.0	649.0
		in percent of total food expenditure						
bread products		7.2	7.3	7.3	6.3	6.3	6.2	6.5
potatoes		4.2	4.1	4.3	3.7	4.3	3.7	3.9
vegetables		6.6	6.1	6.2	6.6	6.5	6.5	6.4
fruit/berries		10.1	8.8	10.2	9.1	9.3	11.1	10.4
meat/meat products		33.7	34.4	33.1	34.8	35.5	34.9	34.7
milk/milk products		16.0	16.7	16.7	16.0	15.9	15.2	15.7
eggs		4.0	3.5	4.4	4.1	4.7	4.3	4.3
fish/fish products		3.0	3.1	2.5	3.2	2.3	2.5	2.6
sugar/confectionery/honey		9.2	10.5	9.5	9.6	9.2	9.3	9.4
vegetable oil/margarine/other fats		0.8	0.8	0.9	0.8	0.7	0.7	0.4
other foods		5.2	4.7	4.9	5.8	5.3	5.6	5.4

Table 2.15 Non-food expenditure, Lithuania 1989 (rubles, average per family per year)

Non-food expenditures	Income groups								
	URBAN	I	II	III	IV	V	VI	VII	All
total non-food expenditure	1209.7	1730.7	1642.6	2050.3	2193.3	2286.0	2660.9	2194.7	
cloth	34.4	35.1	47.6	49.5	73.0	79.9	82.0	67.6	
clothes	224.2	367.1	379.9	448.5	485.9	488.4	466.6	444.3	
knitted wear	184.0	197.5	199.9	220.1	246.8	233.5	223.9	224.7	
shoes	149.2	176.2	194.3	204.6	218.8	214.3	222.7	209.4	
curtains	57.4	65.9	78.0	99.8	93.4	130.1	129.2	108.3	
furniture/household	126.5	162.1	154.2	300.5	178.5	295.7	263.1	237.9	
cultural needs/recreation	126.8	144.9	180.0	218.1	233.3	259.7	236.6	223.0	
cars/motorcycles/bicycles	29.8	306.2	60.2	139.2	156.1	163.0	618.5	277.6	
tobacco products	36.1	38.8	37.4	39.0	49.2	43.7	35.5	40.7	
building materials	23.0	6.6	42.4	27.2	92.8	43.2	69.1	52.3	
fuel	4.2	3.7	8.3	6.1	5.5	5.4	3.8	6.0	
medicine/sanitary/hygiene	87.5	92.7	111.9	126.8	129.4	125.1	130.3	122.6	
RURAL									
total non-food expenditure	956.2	2013.7	1726.5	2086.0	1791.1	1802.3	1796.26	1826.7	
cloth	12.4	63.4	70.7	55.6	60.5	73.2	0.7	62.8	
clothes	260.6	449.6	403.4	400.3	386.5	358.9	409.0	392.8	
knitted wear	153.0	215.5	220.4	186.4	198.5	161.8	143.9	171.2	
shoes	181.7	230.5	220.3	165.7	166.5	175.6	156.3	174.1	
curtains	26.7	49.4	66.7	53.8	62.9	55.9	61.5	59.0	
furniture/household	83.0	156.0	194.7	268.1	296.5	244.5	186.5	219.0	
cultural needs/recreation	47.2	151.5	123.8	101.5	151.1	128.8	121.6	123.6	
cars/motorcycles/bicycles	2.0	351.5	113.5	472.7	154.2	265.6	277.2	272.2	
tobacco products	48.9	35.2	45.8	38.4	45.8	33.4	31.9	36.5	
building materials	8.6	25.4	47.3	28.2	14.7	70.5	89.4	61.3	
fuel	29.2	62.2	33.7	64.2	69.5	53.2	51.6	53.5	
medicine/sanitary/hygiene	56.6	104.3	98.6	103.5	76.0	78.8	78.2	83.9	

Note: Table replicated from 1989 survey (urban p. 42; rural p. 43).

Table 2.16 Services expenditure, Lithuania, 1989 (rubles, average per family per year)

Services	Income groups						
	I	II	III	IV	V	VI	All
URBAN							
total services	440.7	499.2	637.8	680.7	727.8	651.2	647.9
baths/laundry	31.0	34.9	34.3	36.5	41.9	34.7	35.5
dwelling maintenance/construction	13.9	7.6	13.5	21.7	57.4	28.2	28.2
cloths/shoes	29.2	20.7	30.4	27.8	33.7	35.9	32.9
repair of HH items/furniture	5.4	13.4	6.2	10.8	11.3	9.1	9.5
children institutions	56.7	96.0	120.2	117.6	101.1	36.7	68.7
accommodation in holiday houses, sanitarium, etc.	3.0	17.5	23.0	23.7	33.4	34.2	29.3
cinema, theaters, other cultural	26.1	46.5	47.1	53.0	56.7	54.5	52.0
transportation	75.9	81.8	95.2	147.8	117.0	142.4	129.4
postal	28.4	23.1	41.8	39.3	35.5	37.2	36.7
dwelling/public utility payments	156.4	141.5	174.7	162.4	171.8	154.2	158.6
other services	14.7	16.2	51.4	40.1	68.0	84.1	67.1
RURAL							
total services	210.7	366.4	298.4	390.4	420.2	394.0	382.3
baths/laundry	10.0	13.4	7.9	13.2	11.8	10.9	11.1
dwelling maintenance/construction	0.9	0.6	8.6	8.3	47.3	32.8	27.3
cloths/shoes	7.5	21.0	11.2	17.9	15.3	16.2	15.9
repair of HH items/furniture	7.3	16.7	5.7	7.0	7.4	7.5	7.6
children institutions	.	26.2	11.9	21.6	95.8	22.7	32.7
accommodation in holiday houses, sanitarium, etc.	.	8.2	22.7	.	.	1.4	3.8
cinema, theaters, other cultural	15.7	19.8	18.0	12.3	18.4	10.9	13.2
transportation	62.1	77.4	70.3	71.6	63.2	53.5	59.2
postal	1.8	14.8	12.5	15.1	15.5	24.0	19.6
dwelling/public utility payments	86.4	102.4	84.6	87.3	85.7	76.3	81.8
other services	19.0	65.9	45.0	136.1	59.8	137.8	110.1

Note: Table replicated from 1989 survey (urban p. 50; rural p. 51).

Table 2.17 Family size and composition across income groups, Lithuania 1989
(average per 100 families)

Category	Income groups							
	All	I	II	III	VI	V	VI	VII
URBAN								
total	272	392	357	331	331	310	256	186
children < 7	29	65	60	39	45	36	22	6
children 7-8	10	26	20	18	16	8	6	2
children 9-15	36	102	80	66	54	44	22	11
men 16-54	78	85	84	85	94	92	82	58
women 16-54	99	111	111	107	110	114	101	83
men 60+	5	0	0	3	1	5	8	7
women 55+	15	3	12	14	11	11	15	20
RURAL								
total	288	435	460	397	365	328	255	208
children < 7	27	143	81	24	56	37	18	4
children 7-8	7	14	11	18	16	11	5	2
children 9-15	43	54	126	120	56	60	21	13
men 16-54	80	116	106	105	83	89	75	65
women 16-54	71	99	113	91	85	86	64	50
men 60+	19	0	9	7	26	16	25	22
women 55+	41	9	14	32	43	29	47	52

Table 2.18 Composition of Lithuanian households, urban and rural, 1989
(average number in family)

TYPE	URBAN	RURAL
Type		
children	.75	.77
adults	1.77	1.51
pension-age	.20	.60
total	2.72	2.80

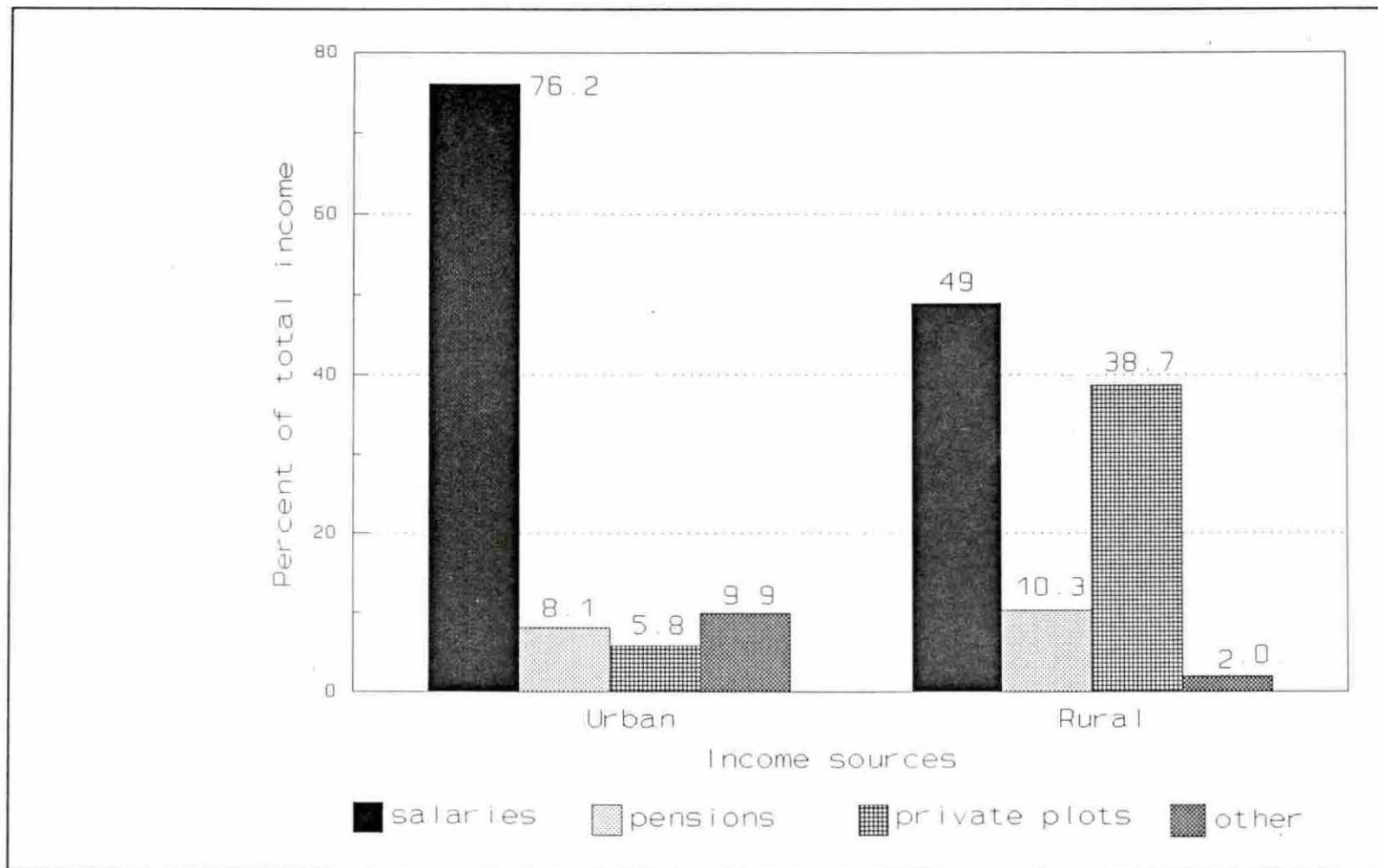


Figure 2.1 Source distribution of income, 1989 (average per family per year)

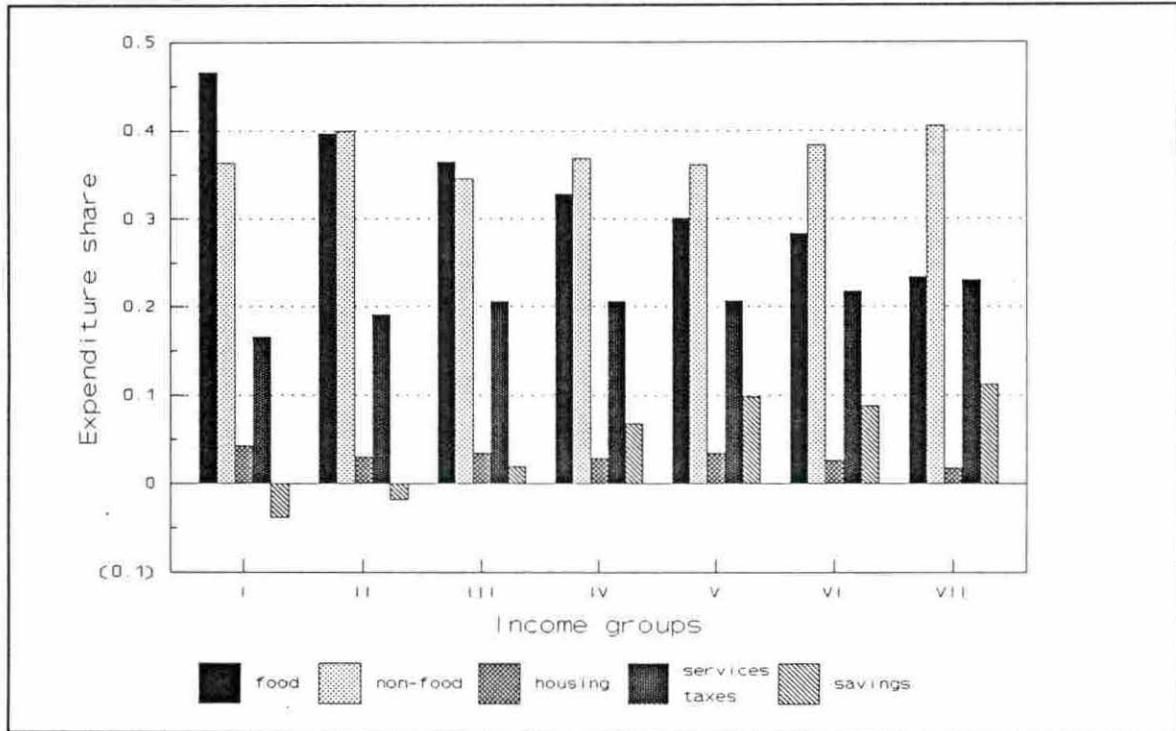


Figure 2.2 Expenditure shares for urban households, 1989

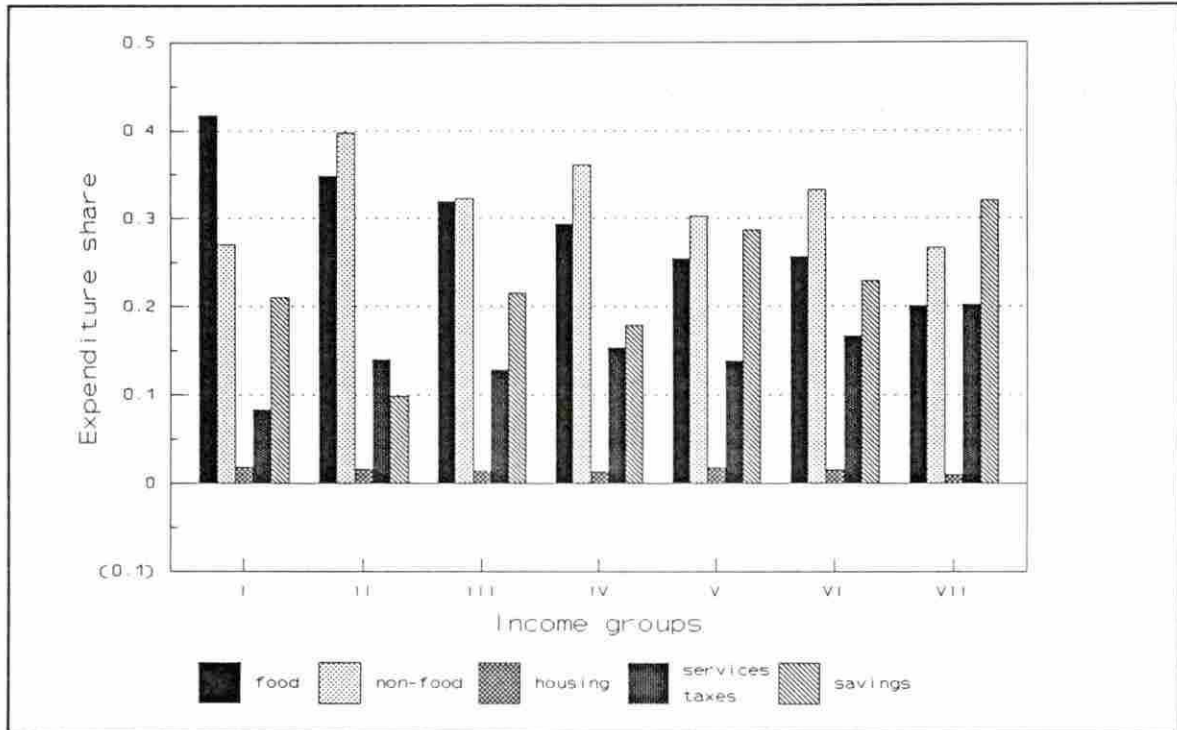


Figure 2.3 Expenditure shares for rural households, 1989

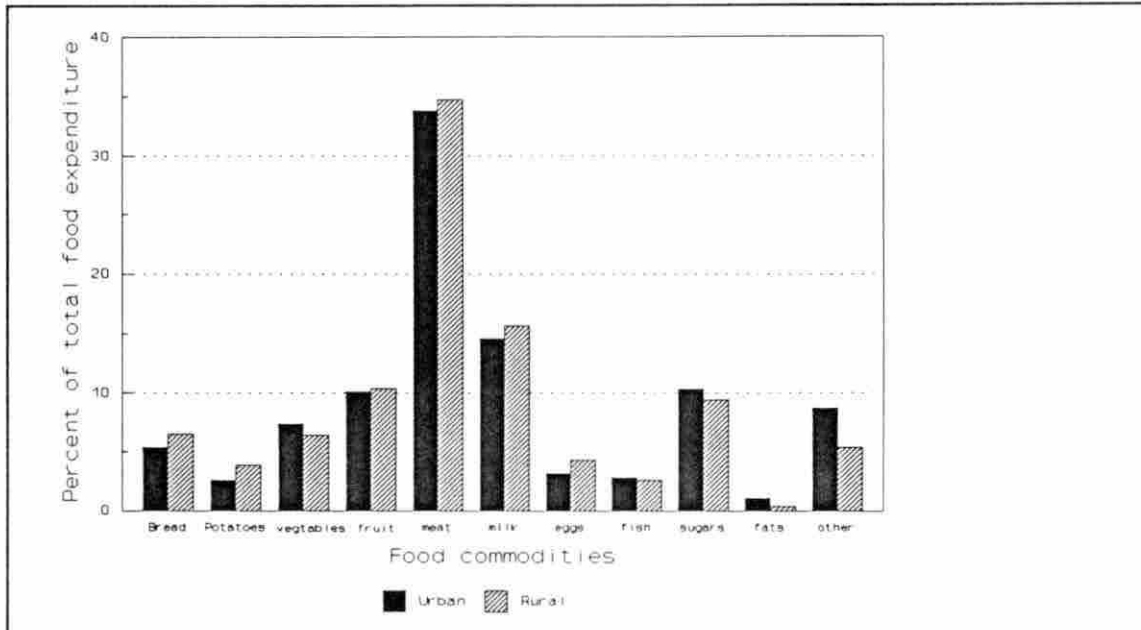


Figure 2.4 Distribution of household food expenditures, 1989

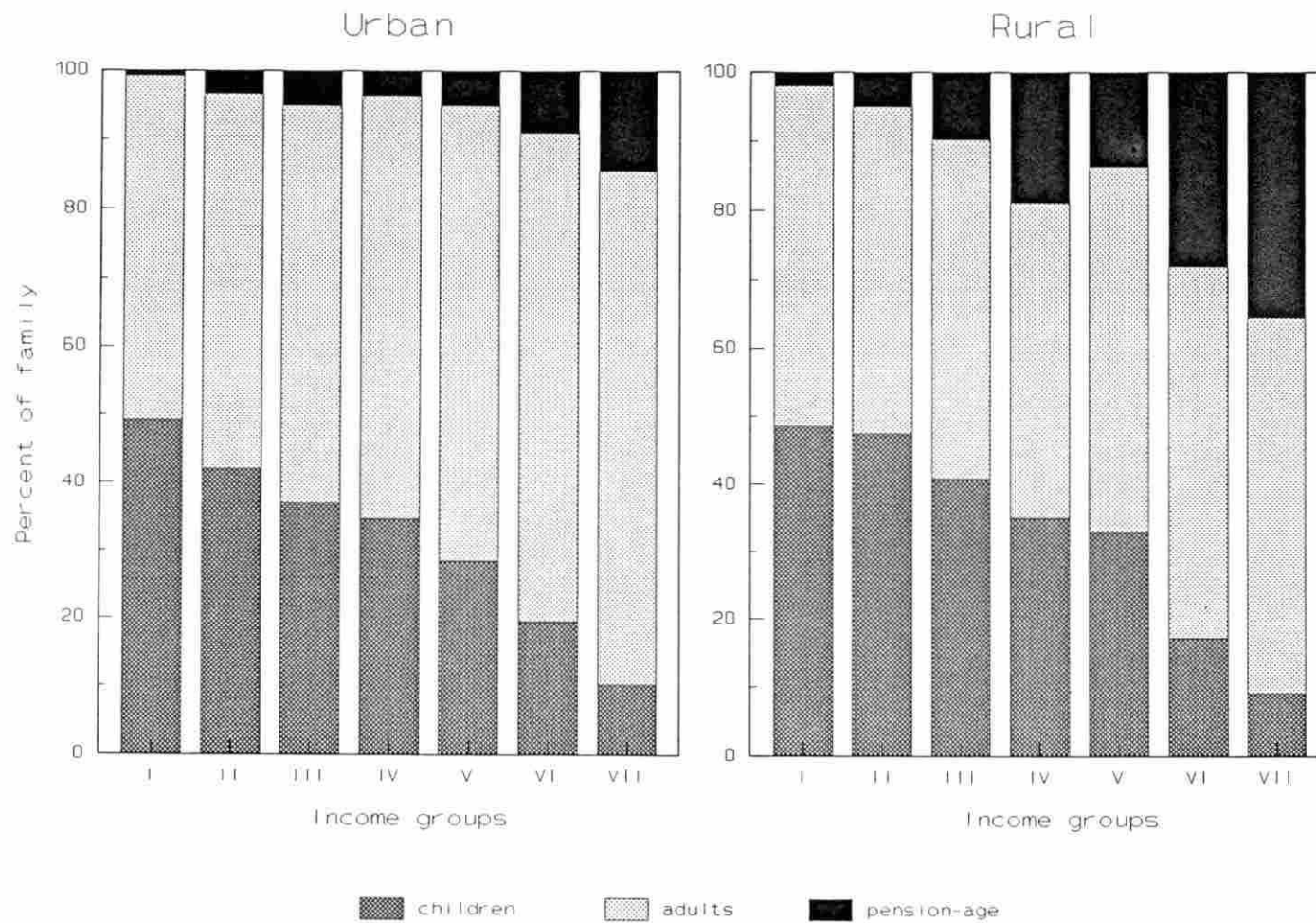


Figure 2.5 Distribution of household composition with respect to income group, 1989

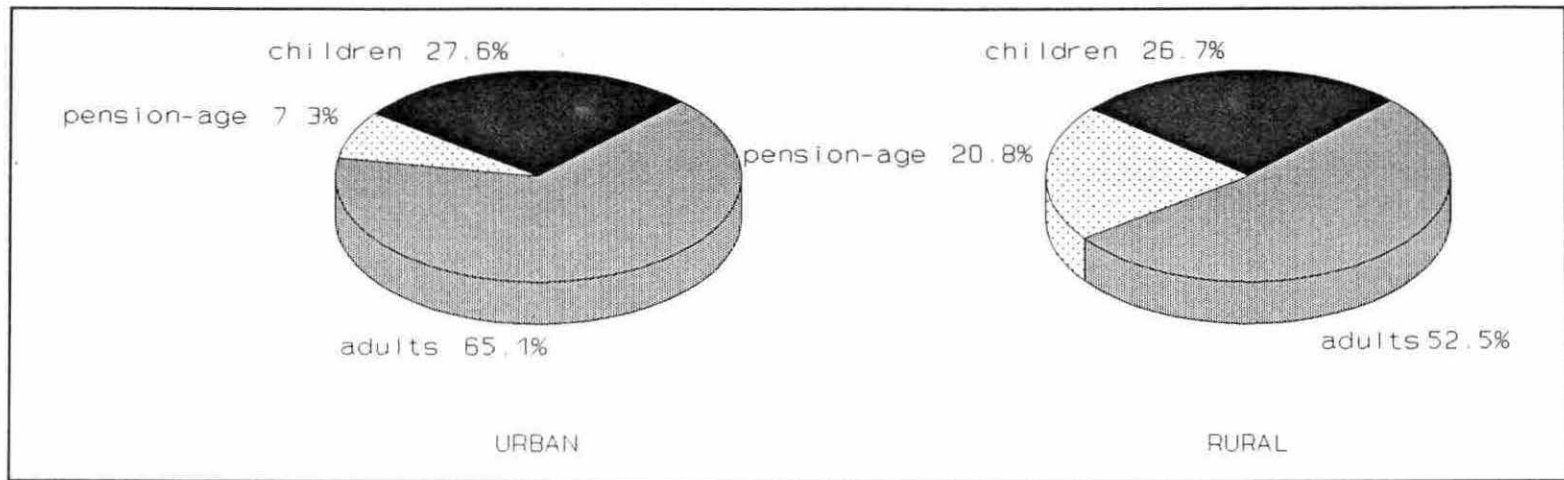


Figure 2.6 Urban-rural comparisons of household composition, 1989

3 ANALYSIS OF EXPENDITURES

In this chapter total expenditures and the expenditures on food for Lithuanian households are analyzed using established consumer theory and econometric techniques. The first section (3.1) reviews the fundamentals of consumer demand theory, emphasizing the use of Engel functions to analyze the relationship between total income and expenditure on various commodities. Section 3.2 provides a review of the literature addressing Engel function modeling. Studies comparing different Engel function specifications are summarized. Their findings justify the use of a semi-log and double-log specification of the Engel functions for income-expenditure analysis. Section 3.3 describes the process, the models, and the data used in the estimation of the Engel functions for Lithuania. This section also presents the results of the estimation process with an interpretation of those results. Section 3.4 uses the parameters estimated in section 3.3 to calculate the income elasticities for urban and rural households in Lithuania.

3.1 Review of Consumer Demand Theory

Economics is the science dealing with the production, distribution, and consumption of commodities. Microeconomics is the study of the economic behavior of the individual units (i.e., the firm, individual, or households) within an economic system. A large portion of microeconomic literature and empirical

studies is dedicated to developing and testing the theory of consumer behavior. Consumer behavior here refers to behavior related to the demand for and consumption of final goods and services by a household or individual.

The main questions addressed by consumer demand analysis are: what quantity of a commodity will a consumer or group of consumers demand, and what elements change the consumer's demand? In basic consumer theory it is assumed that the quantity demanded for a commodity is dependent on the consumer's preferences, purchasing power, and the relative prices of commodities.

Purchasing power is a product of and directly affected by the consumer's income and prices of commodities. In the simplest treatments of consumer theory, the extent of purchasing power is represented by the following linear budget constraint

$$\sum p_i x_i = Y ; \quad (3.1)$$

x_i = quantity of commodity i
 p_i = price of commodity i
 Y = total income.

This constraint simply implies that the consumer's expenditures equal his income.

3.1.1 Utility maximization problem

The preferences of an individual or household in microeconomic studies are represented by a utility function. Utility is a measure of the level or degree of satisfaction that the consumer achieves by consuming the bundle of goods $(\underline{x})^1$.

The conventional assumption and basic principle of consumer theory is that the consuming unit, be it a household or an individual, is rational and will choose among available alternatives in such a way that utility is maximized. This is represented by the following maximization problem,

$$\begin{aligned} & \text{Maximize } U = u(x) \text{ with respect to } x, \\ & \text{subject to } \sum p_i x_i = Y ; \end{aligned} \quad (3.2)$$

where $u(x)$ is the utility function². Let the solution to this problem be the vector of commodities $\underline{x}^* = \underline{x}^*(p, y)$. This is referred to as the Marshallian demand for the commodity bundle \underline{x} and gives the utility maximizing quantity demanded for each commodity in \underline{x} given prices and income.

Because the utility function is a theoretical tool and is not directly observable, and because the bundle \underline{x}^* , prices, and income are observable in the economy, empirical studies of demand commonly estimate \underline{x}^* as a function of prices and income. The remainder of this study concentrates on the relationship between \underline{x}^* and the consumer's income.

3.1.2 Engel functions and income elasticities

A commonly used and effective tool for studying the demand for a commodity and the income of the consumer while holding prices constant is the Engel Curve. By definition, the Engel curve shows "the quantities of a good or service that a consumer will take at all possible income levels, all else constant" (Eckert and Leftwich p. 632). The assumption that prices remain constant is not

unreasonable for this study because the data used, as discussed in the previous chapter and in section 3.3 below, are cross section data, and the use of cross section data implies the absence of price effects (Goungetas p. 32). Also during this period, prices in Lithuania were set by the government.

The significance of the Engel curve lies in its shape and slope. Engel curves for different commodities will most likely have different shapes. An Engel curve for a commodity can be upward sloping, and if so, the commodity is called "normal". If the Engel curve for a commodity is negative in slope the commodity is called "inferior".

Income elasticities of demand are calculated using the slope of the Engel curve. Income elasticities are a measure of the percentage change in the quantity demanded of a commodity with respect to a percentage change in income, all else constant. Equation 3.2 illustrates what the elasticity is in mathematical terms.

$$\xi_i = \frac{\partial x_i}{\partial Y} \left(\frac{Y}{x_i} \right) = \frac{\partial \ln(x_i)}{\partial \ln(Y)} \quad (3.3)$$

Notice that the elasticity is a ratio of percentage changes and, therefore, is free of the units associated with income and quantities; this is what makes elasticity measures so useful for cross commodity comparisons.

Demand analysis using cross section data and Engel curve estimation can yield information through the interpretation of the income elasticity. In general, income elasticities can be positive, negative, or zero. Commodities with positive income elasticities are referred to as normal goods, while those with negative

income elasticities are referred to as inferior. A further distinction is made within the class of normal goods as follows: goods with income elasticities that exceed 1 are referred to as luxuries, and those with income elasticity between 0 and 1 are called necessities.

3.1.3 Engel aggregation condition

Income elasticities across commodities are related. By keeping in mind that x_i^* is the utility maximizing quantity demanded for commodity x_i and hence is a function of income and prices, if we differentiate the budget constraint

$$\sum_{i=1}^n P_i X_i = Y \quad (3.4)$$

with respect to Y , assuming no change in prices ($dp_i = 0$), and multiply the left hand side by 1 (x_i/x_i and Y/Y) we obtain

$$\sum_{i=1}^n \left(\frac{x_i}{x_i} \right) \left(\frac{Y}{Y} \right) P_i \frac{\partial x_i}{\partial Y} = 1 \quad (3.5)$$

or, upon rearranging,

$$\sum_{i=1}^n \frac{P_i X_i}{Y} \left[\frac{\partial \ln(x_i)}{\partial \ln(Y)} \right] = 1. \quad (3.6)$$

Equation (3.6) is called the Engel aggregation condition (Henderson and Quandt p. 24). The Engel aggregation condition implies that changes in prices and income result in reallocation of quantities that do not violate the budget constraint (Goungetas p. 14).

3.2 Engel Functions: Literature Review

The previous section introduced the concept of an Engel curve or Engel function and the income elasticity. This section considers the algebraic form or model specification of the Engel function to be estimated. Model specification is critical because different models will yield very different income elasticities from the same data set (Prais and Houthakker p. 94). Model specification is also important because some models consistently give more accurate representations of income-expenditure data than do others. The following is a list of the commonly used and compared specifications for the Engel function. In all of the following models, E is expenditure on a specific commodity or a group of commodities, and Y is total income.

$$\textit{Linear} \quad E = \alpha + \beta(Y)$$

$$\textit{Quadratic} \quad E = \alpha + \beta_1(Y) + \beta_2(Y)^2$$

$$\textit{Semi-log} \quad E = \alpha + \beta_1 \ln(Y)$$

Previous research comparing different models indicates that each functional form

$$\textit{Double-log} \quad \ln(\mathbf{E}) = \alpha + \beta_1 \ln(\mathbf{Y})$$

$$\textit{Log-inverse} \quad \ln(\mathbf{E}) = \alpha + \beta_1 \left(\frac{1}{\mathbf{Y}} \right)$$

$$\textit{Inverse} \quad \mathbf{E} = \alpha + \beta_1 \left(\frac{1}{\mathbf{Y}} \right)$$

possesses some desirable characteristics, hence no single form has found general acceptance (Salathe p. 10-15).

In studies done by Larry Salathe (1979) and S.J. Prais and H.S. Houthakker (1971) the above models were compared on the basis of how well they fit the data and how realistic were the generated income elasticities. Prais and Houthakker used British household data from 1938, Salathe used the 1965 USDA Household Food Consumption Survey data. Using the estimated parameters generated by the different models above, Salathe calculated and compared the income elasticities and found them to be substantially different. The inverse and log-inverse forms generally gave the lowest elasticities while the double-log form gave the highest elasticities, except where the income elasticities were negative. In this case the double-log form gave the lowest. Salathe also compared the mean square errors and correlation coefficients of the separate models in order to examine goodness-of-fit. In general he found that the double and semi-log functional forms gave the lowest mean square error while the inverse functional form had the highest. The one exception was that the double-log model fit the data poorly for flour and cereals, which had negative income

elasticities under all specifications (Salathe p. 13).

These results led Salathe to conclude that the double-log form may be a poor choice for estimating commodities with negative income elasticities, but for commodities with positive income elasticities it performed well (Salathe p. 12). In addition his study found that when per capita expenditures were expressed as a function of per capita income the double and semi-log functional form provided the best results (Salathe p. 11), but when per capita expenditures were expressed as a function of household size and income the quadratic form provided the best fit.

Prais and Houthakker's comparisons of the different models listed above showed the following:

- (1) There was significant variation in the income elasticities generated, with the greatest variation occurring for commodities with the highest elasticities (p. 94).
- (2) The double and semi-log forms yielded higher income elasticities than did the other models (p. 94).
- (3) The correlation coefficients, calculated using natural numbers for all models, showed the linear and inverse models to be clearly inferior.
- (4) Using a test on the degree of linearity, the semi-log specification gave the best representation of the data so long as that commodities income elasticity did not exceed unity (p. 96).

Notice that Salathe's conclusions agree with Prais and Houthakker's.

As a result of their study Prais and Houthakker chose to use the semi and double-log Engel curve specifications for further analysis of household consumption behavior (Prais and Houthakker p. 98).

There is, however, the disadvantage of theoretical inconsistency associated with assuming the semi- and double-log functional forms. Neither of them are compatible with utility maximization and hence they do not satisfy the Engel aggregation condition in Equation (3.6) above (Goungetas p. 36).

3.3 Estimation of Engel Functions: Using Lithuanian Income/Expenditure Data

Because the semi-log and double-log specifications tend to fit cross sectional per capita income-expenditure data relatively well, and because they generate more realistic income elasticities, this section provides results and generates elasticities based on the semi-log and double-log specification of the Engel function with per capita expenditures expressed a function of per capita income. It must be remembered, however, that theoretical plausibility is compromised in the process.

Estimation of Engel functions using the Lithuanian data described above were done assuming a two stage budgeting process. Engel functions were estimated and income elasticities calculated for both stages. In the first budgeting stage it is assumed that the household allocates its total income between these five commodity groups: food, non-food, housing, services, and

savings (Table 3.1). How the household allocates its budget on the commodities within the five groups above is referred to as the second stage.

3.3.1 Models

The model specification for a semi-logarithmic Engel curve as discussed in the previous section is

$$E_{ij} = \alpha + \beta \ln (Y_j).$$

In this model E_{ij} is the average per capita expenditure for commodity group i by the households in income group j . Y_j is the average total per capita income for the households in income group j . The same definitions for E_{ij} and Y_j apply for the double logarithmic Engel curve with the following form:

$$\ln (E_{ij}) = \alpha + \beta \ln (Y_j).$$

The data set provides the ability to partition the sample into urban and rural households. As explained earlier, the interesting parameters in the Engel function are those estimating slope, because they are used in the calculation of the income elasticity. Therefore, it will be useful to allow and test for different slopes between urban and rural households. In order to do this a binary variable was introduced into the models above (see Judge et al. p. 420). The semi-logarithmic Engel curve incorporating the binary variable is:

$$E_{ij} = \alpha + \beta \ln (Y_j) + \delta \ln (Y_j) D.$$

where D is a binary variable equal to 1 for urban observations, and equal to 0 for

observation on rural households. E_{ij} and Y_j are defined as above. The double-log Engel curve incorporating the binary variable to allow for differing slopes is:

$$\ln (E_{ij}) = \alpha + \beta \ln (Y_j) + \delta \ln (Y) D$$

where all variables are defined as above, and α , β , and δ are parameters to be estimated.

The data used for this process is given in Table 3.1. The unit of observation for total income are the average per capita total expenditure reported within each income group. Given the expenditure groups defined in section 2.4 total per capita income is equal to total per capita expenditure. The unit of observation on expenditure, on commodity i , are the average per capita level of expenditure for commodity i reported within each income group. Only the data for 1989 was used to estimate the models, providing a total of only 14 observations ($n = 14$); seven urban observations and seven rural (Table 3.1).

An Engel function was estimated for each of the five expenditure groups composing stage one using ordinary least squares (OLS) methods. The results of these regressions are in Tables 3.2 and 3.3. Even though the data set provided only 14 observations the results of the estimation process using both models were good. The R-squared values range from .824 to .961 for the semi-log model, and from .826 to .984 for the double-log model. The parameter estimates were statistically significant ($\alpha = .05$) for both models. It is clear from the results that our introduction of the binary variable (D) to allow for different slopes was

justified; because the estimated coefficients for δ were statistically significant for all expenditure groups at a 95 percent confidence level. Hence, with some degree of confidence we can say that the slopes of the Engel curve for urban households are different than those of rural households, with the difference being the value of δ (Judge et al. p. 426). The final column in Tables 3.2 and 3.3 adds the estimated value for β and for δ , and therefore, is the estimated slope of the Engel curves for urban households, while β is the slope of the Engel curves for rural households.

As mentioned above we are considering a two stage budgeting process. The second stage analysis of expenditure in this study considers only the household's expenditure on food commodities. In the survey data set, total food expenditures were allocated to eleven food groups (as shown in Table 2.14). For these eleven food groups Engel functions were estimated using semi-log and double-log specifications as defined above with the following designation for the variables: Y_j is now average total per capita food expenditure for the households in the j th income group; E_{ij} is the average level of expenditure per capita on food group i for households in income group j ; and D is a binary variable with the same definition.

The results of this process are shown in Table 3.4 for the semi-log model and in Table 3.5 for the double-log model. The estimated parameter for δ was not statistically significant for all Engel functions. For both semi-log and double-log model specifications we failed to reject the hypothesis that the estimate for δ was equal to 0 for the following food commodities:³ fruit/berries, meat and meat

products, milk and milk products, and fish and fish products. Hence, we cannot conclude that the Engel curves for urban households had different slopes than those for rural households for these food groups. In these cases the final column contains a dash (-) and the estimated slope for both urban and rural households is simply β .

A considerable weakness of this model is the lack of observations for the regressions. This makes for a low number of degrees of freedom, high standard errors, and hence our confidence in the estimated coefficients is not as high as it would be for larger samples. In addition, the observations are means (averages) not individual household observations. This implies two things: first, the variance will be smaller than what would occur if the individual observations were used; and second, non-constant variance is hidden. We expect that the variance of expenditure will be higher in the higher income groups. But because the individual observations are not available this non-constant variance cannot be observed or adjustments made to the model to compensate for it. If we had the variances, in addition to the mean values, we would be able to adjust for this non-constant variance by performing a variable transformation on each observed mean to take it into account.

3.4 Calculation of Income/Expenditure Elasticities

The next step is to calculate the income and expenditure elasticities for the commodities and expenditure groups given the estimated parameters of the Engel curves. Income and expenditure elasticities were calculated for both urban and rural households at their mean values of expenditure. The formula for the calculation of the income elasticity when the semi-log Engel function is used is

$$\xi_i = \frac{\beta_i}{\bar{e}_i}; \quad (3.7)$$

where ξ_i is the income elasticity, β_i is the estimated slope of the Engel curve, and \bar{e}_i is the average⁴ expenditure for commodity i . When income elasticities are calculated for rural households β_i will come from the column of values labeled β in Table 3.2, and \bar{e}_i will be the average expenditure on commodity i for all rural households and found in Table 2.7. When income elasticities are calculated for urban households β_i will be the values in the final column of Table 3.2 ($\beta_i + \delta_i$), and \bar{e}_i is the average expenditure for all urban households on commodity i also found in Table 2.7.

The income elasticity for the double-log function is simply the estimated coefficient β_i for rural households and $\beta_i + \delta_i$ (Table 3.3) for urban households. Table 3.6 gives the income elasticities for the first budgeting stage for both semi- and double-log Engel function.

As discussed in previous sections a change in real income may cause a household to shift income from some groups of commodities to others in order to

maximize satisfaction. The results above indicate that food expenditures, with an income elasticity ranging from .44 to .49, will change about half as much as income changes.

Given a change in income and an expected change in food expenditure we can study the expected change in food commodity shares by calculating a food expenditure elasticity for food commodities. This gives the percentage increase in food items with a percentage change in food expenditure. Food expenditure elasticities under the assumption of a semi-log Engel curve are calculated by using equation (7) again, with β_i being the values in the third and fifth columns of Table 3.4 for rural and urban households respectively. Under the assumption of the double-log Engel curve the food expenditure elasticity is, as before, the value of β_i for rural households and $\beta_i + \delta_i$ for urban households. It is a simple step to convert the food expenditure elasticities into income elasticities. This is accomplished by multiply the expenditure elasticity for the eleven food commodities by the income elasticity estimated for "total food" as follows:

$$\xi_{fi} = (\xi_f) (\epsilon_i) \quad (3.8)$$

ξ_{fi} = income elasticity for food commodity i

ξ_f = income elasticity for total food

ϵ_i = food expenditure elasticity for food commodity i

The estimated food expenditure elasticities calculated using both semi and double-log Engel functions for eleven food groups are listed in Table 3.7. The

total income elasticities for the eleven food commodities are listed in Table 3.8.

There is more analytical work that should be done along the same lines as above. We cannot be totally satisfied with the assumption that per capita expenditures (especially on food) are a function of per capita income alone. The fact cannot be ignored that the expenditure for consumer commodities, especially food, is done on a household basis. Hence, a more comprehensive study would analyze the effect of household size and composition on household expenditure.

In an attempt to capture household size and composition effects, household size elasticities were calculated for this data set following the procedure outlined in the above mentioned study by Salathe and another study done by Bauer, Capps, and Smith (1989). The process involved estimating an Engel function exactly like the ones above with the exception of one additional household size regressor. The household size elasticities were calculated in the same manner as the income elasticities by using the appropriate estimated parameters (Bauer, Capps, and Smith p. 5). However the addition of one more parameter to the models above given the already small data set yielded generally insignificant parameters and unsatisfactory elasticities both for income and household size.

Another method by which to incorporate the size and characteristics of the household on the level of expenditure is to incorporate into the Engel function a commodity specific adult equivalent scale, dependent upon the composition and size of each household. A thorough treatment of this procedure with results of an empirical application is given in Basile Goungetas' The Impact of Household Size

and Composition on Food Consumption, (1986).

It would be my recommendation to obtain a data set containing observations for individual households on variables similar to those examined in this study. This would provide enough degrees of freedom to allow for models that include additional regressors. As a result simple household size elasticities could be estimated as described by Salathe (p. 13). This would provide some indication as to the effects of household size on the level of expenditure. But better yet would be to use the method described by Goungetas (1986) to take into account not only the size of the household, but the composition as well when analyzing expenditure.

ENDNOTES

1. \underline{x} is the vector of commodities x_i .
2. See Varian chapter 3 and Krepps chapter 2 for discussion on the implication of rationality and the existence of a continuous differentiable utility function.
3. at $\alpha = .05$
4. average for all urban households when calculating elasticities for the urban sector, and average for all rural households when calculating elasticities for the rural sector.

Table 3.1 Calculated total income and expenditure data, Lithuania 1989 (rubles, average per capita per year)

Observations	Total income	Food	Non-food	Housing	Services	Savings
URBAN						
I	1014.0	472.8	368.4	43.4	211.2	-38.4
II	1371.6	544.8	548.4	41.8	303.6	-25.2
III	1630.8	595.2	562.8	56.9	392.4	80.4
IV	1929.6	633.6	711.6	55.6	452.4	132.0
V	2257.2	679.2	816.0	73.9	540.0	222.0
VI	2665.2	756.0	1022.4	71.3	650.4	236.4
VII	3909.6	914.4	1585.2	71.3	972.0	438.0
RURAL						
I	1071.6	447.6	289.2	20.1	109.2	225.6
II	1380.0	481.2	548.4	22.4	214.8	135.6
III	1657.2	530.4	535.2	23.5	235.2	356.4
IV	1963.2	588.2	708.0	26.2	327.6	350.4
V	2263.2	576.0	685.2	40.5	354.0	648.0
VI	2695.2	691.2	896.4	42.8	490.8	616.8
VII	4156.8	834.0	1108.8	42.8	883.2	1330.8

Table 3.2 Estimated parameters for first stage, using semi-log specification

Commodity Groups	R ²	β (std err)	δ (std err)	$\beta + \delta$
Food	.961	24.95* (1.48)	1.20* (.239)	26.15* (1.49)
Non-food	.887	59.22* (6.07)	2.40* (.980)	61.62* (6.10)
Housing	.893	1.72* (.32)	.457* (.052)	2.18* (.32)
Services	.917	43.01* (3.73)	1.87* (.603)	44.88* (3.75)
Savings	.824	53.01* (8.02)	-6.09* (1.294)	46.11* (8.06)

* Statistically significant at $\alpha = .05$.

Table 3.3 Estimated parameters for first stage, using double-log specification

Commodity Groups	R ²	β (std err)	δ (std err)	$\beta + \delta$
Food	.984	.467* (.017)	.0228* (.0028)	.4898* (.018)
Non-food	.933	.968* (.074)	.0324* (.0119)	1.0004* (.074)
Housing	.873	.501* (.100)	.1280* (.0162)	.6290* (.101)
Services	.956	1.35* (.086)	.0716* (.0139)	1.4216* (.087)
Savings	.826	2.02* (.304)	-.2320* (.049)	1.7880* (.154)

* Statistically significant at $\alpha = .05$.

Table 3.4 Estimated parameters for second stage (food), using semi-log specification

Food Groups	R ²	β (std err)	δ (std err)	$\beta + \delta$
Breads	.760	21.36* (3.59)	-.708* (.206)	20.65* (3.54)
Potatoes	.929	15.54* (1.88)	-1.180* (.108)	14.36* (1.85)
Vegetables	.963	46.79* (3.17)	.649* (.182)	47.44* (3.13)
Fruit /berries	.922	77.11* (6.92)	-.232 (.397)	76.88 (6.93)
Meats	.986	223.70* (8.13)	-.940 (.460)	222.67 (8.14)
Dairy	.948	74.10* (5.25)	-.610 (.302)	73.49 (5.26)
Eggs	.825	22.99* (3.31)	-.837* (.190)	22.15* (3.26)
Fish	.752	14.26* (2.62)	.100 (.150)	14.36 (2.62)
Sugars	.937	58.92* (5.17)	.703* (.290)	59.62* (5.19)
Fats/oils	.931	4.77* (.747)	.347* (.040)	5.12* (.74)
Other	.907	60.55* (8.23)	2.310* (.473)	62.86* (8.10)

* Statistically significant at $\alpha = .05$.

Table 3.5 Estimated parameters for second stage (food), using double-log specification

Food Groups	R ²	β (std err)	δ (std err)	$\beta + \delta$
Breads	.788	.546* (.086)	-.018* (.0049)	.528* (.085)
Potatoes	.947	.756* (.079)	-.059* (.0045)	.697* (.078)
Vegetables	.981	1.096* (.052)	.016* (.0029)	1.112* (.051)
Fruit /berries	.936	1.23* (.102)	-.002 (.0058)	1.228 (.102)
Meats	.987	1.060* (.037)	-.0039 (.0021)	1.056 (.037)
Dairy	.948	.776* (.055)	-.0055 (.0032)	.771 (.055)
Eggs	.827	.989* (.139)	-.0337* (.0080)	.956* (.138)
Fish	.722	.840* (.166)	.0058 (.0059)	.846 (.166)
Sugars	.953	.952* (.073)	.0122* (.0042)	.964* (.071)
Fats/oils	.947	.797* (.110)	.0610* (.0064)	.858* (.110)
Other	.972	1.400* (.105)	.0578* (.0061)	1.458* (.104)

* Statistically significant at $\alpha = .05$.

Table 3.6 Income elasticities for the first budgeting stage

Expenditure groups	Elasticities by specification			
	Semi-log		Double-log	
	urban	rural	urban	rural
Food	.45	.46	.49	.47
Non-Food	.81	.89	1.00	.97
Housing	.38	.54	.63	.50
Services	.95	1.14	1.42	1.35
Savings	2.74	.88	1.78	2.02

Table 3.7 Food expenditure elasticities for eleven food groups.

Expenditure groups	Elasticities by specification			
	Semi-log		Double-log	
	urban	rural	urban	rural
Breads	.55	.51	.53	.55
Potatoes	.79	.61	.70	.76
Vegetables	.92	1.20	1.11	1.20
Fruit/berries	1.09	1.14	1.23	1.23
Meats	.94	.99	1.06	1.06
Dairy	.73	.73	.78	.78
Eggs	.99	.82	.96	.99
Fish	.73	.85	.84	.84
Sugars	.83	.97	.96	.95
Fats/oils	.66	1.84	.86	.80
Other	1.03	1.73	1.46	1.40

Table 3.8 Total income elasticities for food commodities

Expenditure groups	Specification			
	Semi-log urban	rural	Double-log urban	rural
Breads	0.25	0.24	0.26	0.26
Potatoes	0.35	0.28	0.34	0.35
Vegetables	0.41	0.55	0.54	0.56
Fruit/berries	0.49	0.53	0.60	0.57
Meats	0.42	0.46	0.52	0.50
Dairy	0.33	0.34	0.38	0.36
Eggs	0.44	0.38	0.47	0.46
Fish	0.33	0.39	0.41	0.39
Sugars	0.37	0.45	0.47	0.44
Fats/oils	0.30	0.85	0.42	0.37
Other	0.46	0.80	0.72	0.65

4 APPLICATION TO POLICY ANALYSIS

In this chapter income elasticities from chapter three are used to analyze the impact of estimated income changes due to price reforms in Lithuania on per capita expenditures.

4.1 Price Reforms and their Effect on Income

In 1991 Lithuania implemented price reforms for agricultural commodities. One of the goals of the price reform was to reduce the government subsidies to producers and processors by bringing prices more in line with costs. This required an increase in retail prices of from 173 percent for potatoes to 382 percent for meat (Kazlauskiene p. 28). These price reforms are initially expected have an adverse effect on the level of real income in Lithuania. The most recent estimates suggest a decline in real per capita income of 41.1 percent from 1989 to 1991 (personal communication with Meyers, December 1991). By using these price changes along with a system of supply and demand equations Kazlauskiene, Devadoss, and Meyers (1991) applied an "Adaptive Policy Simulation Model" (ASPM) to study the impact of the price reforms on agricultural commodity markets and consumer aggregates. Among the results of their study were estimates for changes in consumption and expenditure from 1989 to 1995. Specifically, they estimated that food expenditure, as a share of total per capita income, would increase from 27 percent in 1989 to 57.5 percent by 1991

(Kazlauskiene p. 35). Total per capita expenditure on food was estimated to increase from 644.8 rubles per year in 1989 to 2,493.4 rubles per year by 1991 (p. 33), for an increase of over 280 percent.

4.2 Effect of Price Reform on Expenditure

This section uses the income elasticities calculated in the previous chapter with the estimates for changes in real income given above to analyze the effect of recent price reforms on per capita expenditures.

Using the income elasticities calculated in the previous chapter it is possible to estimate a new level of expenditure for a commodity or a group of commodities given a percentage change in income. This is accomplished by first multiplying the income elasticity, for the commodity group under consideration, by the percentage change in income. This will yield an estimated percentage change in expenditure for that commodity group.

The commodity groups considered here were the same five commodity groups for which income elasticities were calculated in chapter 3 (Table 3.6). Table 4.1 shows the expenditure groups with their income elasticities estimated using the double-logarithmic specification of the Engel curve. These income elasticities are used because they fit the data a little better than the elasticities generated using the semi-log Engel curve (see Tables 3.2 and 3.3). Included in Table 4.1 is the expected percentage change in expenditure for each of the expenditure groups. This percentage change in expenditure was calculated by

multiplying each income elasticity by the assumed percentage change in per capita income from 1989 to 1991 (-.411). The third column lists the results of applying the estimated percentage change in expenditure to the baseline level of average per capita expenditure in 1989. The last column lists the estimated 1991 average per capita expenditure level for these commodity groups, in 1989 rubles.

The estimated average levels and shares are compared to the 1989 base levels for each income group in Table 4.2 and 4.3. It can be seen in these tables that both the level and share of average per capita expenditure estimated for 1991 are most similar to those of the lower income groups in 1989.

The 1991 estimates in the last column of the two tables are based on the assumption of a change in real per capita income of -41.1 percent from 1989 to 1991, and the income elasticities calculated in section 3.3 of this paper. Under these assumptions it appears that households will spend a greater percentage of their budgets on the "food" "housing and utility payments" and "non-food" expenditure categories. In addition, households will be allocating less of their income to services and savings.

The data in Tables 4.2 and 4.3 indicate that food expenditures will be reduced by nearly 20% (Table 4.2), but food as a percentage of total expenditure will increase by 35.7 to 37.1 percent (Table 4.3). The study by Kazlauskiene et al. estimated that food expenditure share per capita would increase approximately 113 percent (from 27 to 57.5) from 1989 to 1991.

A possible explanation for the differences between the estimates for

changes in food expenditure lies the differences in methodology. The ASPM is described as a simplified representation of the econometric multi-commodity models and it takes into account the specific features of the Lithuanian agro-industry (Kazlauskienė et al. p. 4). The analysis provided by the ASPM is comprehensive in that it includes exogenous assumptions defining the policies, technology, state of the economy, and behavior parameters (price and income elasticities for food) pertaining to production and consumption in the agricultural sector of the economy. In their study, per capita food consumption was influenced by changes in relative retail food prices and real income, over time, through cross and own price elasticities and income elasticities estimated for the Soviet Union as a whole. Their study did not take into account per capita expenditures for commodities other than food.

In contrast, the analysis based on household budget data does not directly take into account the change in prices for agricultural commodities, and it is assumed that relative prices remain constant for all commodities. This study views the price changes as causing changes in real income, then analyzes the shift in budget shares with respect to the estimated change in real income. The estimates for income elasticities and changes in expenditure are based on cross-section data for total per capita expenditure for food as well as all other expenditures. The estimates for changing food expenditures are therefore indirectly dependant upon expenditure for other than food commodities. Expenditures for commodities other than food are not examined in the study by

Kazlauskiene et al.

Substitution effects, not analyzed in this study based on household budget data, could be quite substantial and could explain the relatively lower estimates for changes in food expenditures compared with the Kazlauskiene et al. estimates. Food commodities were, as reported in 1989, relatively price inelastic (Kazlauskiene et al. p. 25 and 27). Hence, given the projected large increases in food retail prices we would expect per capita food expenditures to increase due to the price increase. The analysis based on household budget survey did not take into account: (1) the substitution effect of rising food prices, or (2) the consumers' demand for food commodities with respect to food price elasticities. For this reason, changes in food expenditure as shown in Tables 4.1 and 4.3 should be considered a lower bound. Finally, the projected income change of 41.1 percent is a very large one, and the results presented above must also be viewed in the context of the assumption of constant behavioral parameters over such a large change in real income.

Conclusions

In the introduction to this paper one of the stated objectives was to provide a preliminary analysis of income and expenditure data for Lithuania based on newly available published data. In addition, the purpose of the survey used to collect this data (as stated in section 2.1) was to provide information on the relationship of consumption and expenditure to income and other

demographic variables such as urban/rural designation, household size and composition, and the strata of the national economy in which the household was primarily employed. Given the lack of observations in the data set used for this study it was impossible to give a complete analysis of household responses to economic or policy signals according to the purpose of the survey. However, this work can be considered as a profile of the structure of Lithuanian households and their expenditures with some indications as to the shifts in expenditure given estimated changes in real income due to economic reforms.

Table 4.1 Elasticities, estimated percentage change in expenditure, and estimated 1991 percapita expenditure (in 1989 rubles)

expenditure groups	income elasticity from table 3.6	calculated percent change in expenditure	estimated 1991 exp. level ^a
URBAN			
Food	.49	-20.1	559.1
Non-food	1.00	-41.1	538.4
Housing	.63	-25.8	51.0
Services	1.42	-58.4	235.0
Saving	1.79	-73.5	53.5
RURAL			
Food	.47	-19.2	524.6
Non-food	.968	-39.8	481.2
Housing	.50	-20.6	30.1
Services	1.35	-55.5	200.9
Saving	2.02	-83.0	122.0

^a in 1989 rubles

Table 4.2 Expenditure levels, Lithuania 1989 (average per capita per year) and estimated levels for 1991 (in 1989 rubles)

Group	Income groups							1989 Average	1991 est. Average	percent change
	URBAN	I	II	III	IV	V	VI			
total*	1014.0	1371.6	1630.8	1929.6	2257.2	2665.2	3909.6	2382.0	1403.0	-41.1
food	472.8	544.8	595.2	633.6	679.2	756.0	914.4	700.8	559.1	-20.1
non-food	368.4	548.4	562.8	711.6	816.0	1022.4	1585.2	914.4	538.4	-41.1
housing	43.4	41.8	56.9	55.6	73.9	71.3	71.3	68.7	51.0	-25.8
services	211.2	303.6	392.4	452.4	540.0	650.4	972.0	565.2	235.0	-58.4
savings	-38.4	-25.2	80.4	132.0	222.0	236.4	438.0	201.6	53.5	-73.5
RURAL										
total*	1071.6	1380.0	1657.2	1963.2	2263.2	2695.2	4156.8	2618.4	1542.2	-41.1
food	447.6	481.2	530.4	577.2	576.0	691.2	834.0	649.2	524.6	-19.2
non-food	289.2	548.4	535.2	708.0	685.2	896.4	1108.8	799.2	481.2	-39.8
housing	20.1	22.4	23.5	26.2	40.5	42.8	42.8	37.9	30.1	-20.6
services	109.2	214.8	235.2	327.6	354.0	490.8	883.2	451.2	200.9	-55.5
savings	225.6	135.6	356.4	350.4	648.0	616.8	1330.8	718.8	122.0	-83.0

Note: Table adapted from table 2.9

* This value is total expenditure and is equal to total income.

Table 4.3 Distribution of expenditures (shares), Lithuania 1989; and estimates for 1991

Group	Share of total expenditures all income groups							1989 Average	1991 est. Average	percent change
	I	II	III	IV	V	VI	VII			
URBAN										
food	.466	.397	.365	.328	.301	.284	.234	.294	.399	35.7
non-food	.363	.400	.345	.369	.361	.383	.405	.384	.384	0.0
housing	.428	.030	.034	.029	.033	.028	.018	.029	.037	27.6
services	.165	.191	.206	.206	.206	.217	.230	.237	.167	-29.5
savings	-.038	-.018	.068	.068	.098	.089	.112	.274	.038	-86.1
RURAL										
food	.437	.348	.320	.294	.254	.256	.200	.248	.340	37.1
non-food	.269	.397	.322	.360	.302	.332	.266	.305	.312	2.3
housing	.018	.016	.014	.013	.017	.0158	.010	.014	.019	35.7
services	.083	.139	.127	.153	.138	.166	.202	.172	.130	-24.4
savings	.210	.098	.215	.178	.286	.228	.320	.275	.079	-71.3

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