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Food Expenditures in Latvia: Analysis from the First Year of Reform

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ABSTRACT

The 1991 Lativia household budget survey provided data for establishing basic information about food consumption levels and patterns in Lativa during the first year of major economic reforms. This study uses the 1991 data to examine the importance of income and household composition on food expenditures. Food expenditures represented a major share of household expenditures. Estimated income elasticities for various food commodities suggest the magnitude of changes in real household income that have occurred in Latvia. With relatively low income elasticities (estimated from the 1991 data), declines in household income would not be met by significant reductions in food expenditures, suggesting greater reductions in expenditures on other goods.

FOOD EXPENDITURES IN LATVIA: ANALYSIS FROM THE FIRST YEAR OF REFORM

Latvia, along with other countries of the former Soviet block, is moving from a centralized command economy to one that is market oriented. The economic reforms associated with this transition have had profound effects on Latvian society. As subsidies have been withdrawn, prices have risen rapidly and Latvian living standards have declined.

In 1991 Latvia abandoned Soviet pricing policies and began comprehensive price reforms. These changes preceded those of most other former Soviet republics. The ratio of subsidies to GDP decreased from 13.7 percent in 1990 to 1.3 percent in 1991, mainly because subsidies on food commodities were withdrawn. Price reforms sharply increased prices for goods and services. Retail prices increased by 262 percent from December 1990 to December 1991. This was in contrast to an average annual inflation rate of 10.5 percent in 1990 (World Bank 1993).

Establishing base consumption levels and basic information on food consumption levels and patterns assist with decisions on social assistance and food policy. This study uses 1991 data from a Latvian household survey to examine the importance of income and household composition on food expenditures.

The Latvian Household Budget Survey

The data used to evaluate the structure of consumption come from household budget surveys conducted by the Latvian government and published by the Latvian State Committee of Statistics. The Latvian household budget survey is typical of budget surveys administered throughout the former Soviet Union to determine living costs for wage earners. The surveys were centrally administered, conducted on an annual basis, and families were randomly selected to represent wage earning households. The 1991 Latvia survey was used for the analysis presented in this paper. Enumerators conducted bimonthly interviews with the surveyed families to gather detailed information on expenditures, salaries, payments in kind, pensions, and other sources of income.

The 1991 survey provides extensive information on household composition (size, age, and gender distribution), occupational status of household members, sources of income, and expenditure patterns, with data aggregated on a quarterly basis.

There are several problems with the data: the systematic rotation of sampled households in and out of the sample was not part of the survey design. Hence, some households had been interviewed for many years. The valuation methods are not always consistent with practices used in other national surveys. And consumer subsidies and rationing were important components of the consumers' opportunity set, for which there was no explicit accounting. Also, cash receipts from sales of private production activities were reported; but information on the costs of purchased inputs to produce these goods was not reported. Therefore, net income from these activities cannot be determined. In spite of these shortcomings, the data do provide useful information on the food choices of Latvian households and can be used to evaluate changes in living costs and the likely impacts of income changes. The types of data available in Latvia were similar to survey data available throughout the former Soviet Union.

Income and Demographic Characteristics of the Sample

The 1991 sample included 1,189 households. Table 1 summarizes information on the survey households. The average gross income was slightly less than the average gross expenditure. Mean family size was just under 3 persons. And, as would be expected from a survey of wage earner households, there were relatively few retired household members.

Table 2 summarizes income sources. All households received income from wages and salaries. This characteristic was part of the sample design. However, the percentage of households receiving payments through social safety net is rather high. Of the 1,189 households included in the sample, 746 (62.5 percent) received payment from this source although the contribution to households' gross income was not high. Similarly, 820 (69.0 percent) households earned part of their income from private economic activities (for example, selling output produced in backyard gardens, handicrafts). Interest income (for instance, interest earned from holding bonds or other financial instruments) is the least important source of income. Pensions constitute less than 10 percent of income for survey households, while the subsidies' share is less than 1 percent. For this analysis total expenditure is used as the measure of household income (resources) available for consumption in the estimation stage since, for many households, reported expenditures exceeded reported income.

Total (gross) household expenditure was calculated as follows. For food, the survey provided data on quantities of personal consumption of various food items. It also contained data on quantities purchased and expenditures for food items obtained through different marketing channels (farmers' market, and state and collective farms). The expenditures and quantities by market source allowed

calculating a weighted average of price for each food item, where the weights were the shares of each supply channel in the total purchase. The weighted average price of each commodity was calculated for each household and then averaged over the entire sample. Reported quantities consumed by the household were multiplied by the (weighted) average price (averaged over entire sample) to calculate the total expenditures on food including home-produced foods valued at a weighted market price.

The survey also contained data on total expenditure on various nonfood consumption items like housing, transportation, and clothing. These expenses were added to the total food expenditure to obtain total household expenditure. Note, however, total expenditures on durables, including building construction costs, were included even though the appropriate quantity to include might have been an imputed value of services from the buildings constructed and used during the year. Actual expenses for rents and utilities were used; these were heavily subsidized sectors. Lack of data on market prices prevented use of imputed values rather than the actual expenses in calculating total household expenditure.

Table 3 summarizes the pattern of household expenditure on various broad categories of expenses. Total household expenditure was classified into 11 broad categories. Food expenditure includes household consumption of food at home only, and it covers both purchased food as well as consumption of self-produced food and quantities of food commodities received as part of remuneration for work (at state and collective farms). Expenditure on housing includes rent as well as private construction costs for new building materials. Utilities include gas, electricity, heating, rent, and water. Transportation expenses include only expenses on private transportation, and do not include business related transportation expenditure. Services include items like telephone services, postage, repair and maintenance of household items, laundry and cleaning services and supplies, and personal care expenses. All expenditure data refer to annual household expenditure.

It is evident from Table 3 that food and clothing were the two most important categories of expenditure: on average, food accounted for about 45 percent and clothing accounted for about 16 percent of total expenditure. Housing and utilities were a small fraction of the total expenditure, and were subject to substantial subsidies and price controls. Because food and clothing are so expensive, people have little income left to spend on other goods and services.

The distribution of expenditures, by types, provides information on spending patterns and potential impacts of changes in prices and income. Table 4 shows that, for all family sizes, food expenditure accounted for slightly less than one-half of total expenditure. Expenditures on clothing constituted the second most important category of expenditure and were quite a bit lower that those on

food. Table 5 shows the relationship between total household expenditure and shares of different expenditure categories. Food at home was the most important category of expenditure for households in all expenditure groups, but the share of food at home steadily declined with total expenditure. In 1991, housing and utility expenditures accounted for a small fraction of the total for all expenditure groups. The shares of furniture and accessories and transportation appear to increase with household expenditure. Shares of other expenditure categories do not show any systematic variation with gross expenditure.

Table 6 shows the relationship between per capita expenditure and shares of different categories of expenditure. Households were grouped by per capita expenditure categories. Food at home was again the most important category although the share declined with rising per capita expenditure. Shares of clothing, furniture and accessories, and transportation appear to increase with increases in per capita expenditure.

Food Expenditure

Expenditures on various food items were aggregated into eight broad categories: grains and cereals, fruits and vegetables, meat and meat products, milk and other dairy products, fish and fish products, eggs, vegetable fats, and confectionery items. Total food expenditure was calculated by simply adding expenditures on these broad categories.

Table 7 shows the shares of different food categories in total food expenditure as total household expenditure varies. Share of grains falls while that of meat increases with higher household expenditure. Share of dairy products remains stable for various (total household) expenditure groups except for households with expenditure greater than 30,000 rubles per year the share falls. Other food categories do not show much movement with variation in expenditure. Comparing shares for different per capita expenditure groups reveals similar patterns, except for grains, where the changes are relatively smaller.

Economic Theory and Demand Analysis

The relative importance of household income and demographic factors as determinants of demand for various food groups can be obtained from estimated Engel functions. Economic theory of consumer behavior forms the basis for the derivation and empirical specification of demand and Engel functions.

The decision problem facing an individual (person or household as a unit) is the maximization of utility through the optimal choice of a consumption bundle, given prices and income. It is assumed that the preference ordering of an individual agent can be expressed by a utility function. Demand for consumption goods, **x**, is obtained as a function of prices, **P**, and income, **Y**, for the i = 1, 2, ..., n goods:

$$x_i^* = x_i(p_1, p_2, \ldots, p_n, Y) \qquad \forall_i, i = 1, 2, \ldots, n. \tag{1}$$

Household Characteristics

The demand function as expressed by (1) represents an individual consumer's demand function. However, real world data on consumption patterns are usually household data. So, in order for (1) to be a valid demand function that may be estimated using household data, it must be true that the utility function representing individual preferences also represents the overall household preference pattern—that the household preference ordering has the same properties as individual preferences.

The assumption of the existence of a well-behaved household utility function allows us to interpret (1) as a household demand function. However, households differ in size, age-gender composition, regional and occupational distribution, and religious and ethnic origin. These household characteristics are expected to have important effects on household spending patterns. Economists have for a long time attempted to incorporate household characteristics into demand analysis because such incorporation, if relevant, should yield qualitatively better parameter estimates. In general, we can model the effects of household characteristics on demand by incorporating these factors in the demand function. That is, the demand function may be specified as

$$x_i^* = x_i\ (P, Y, \theta) \tag{2}$$

where x_i^* is the quantity demanded of the i^{th} good, Y is the household income, and θ is a vector of household characteristics where θ_k (k = 1,2, ..., r) is the number of persons with the k^{th} household characteristics.

The assumption behind the demand function as specified by (2) is that household preferences are to be interpreted as conditional preferences (Pollak and Wales 1979). This implies that θ_k is not within

the household choice set. The demand function (2) can be derived from the utility maximization problem:

$$\text{choose} \quad X \text{ to} \quad \text{maximize} \quad U = U(X|\theta)$$

$$\text{subject} \quad \text{to} \quad \sum_{i=1}^{n} p_i x_i \leq Y$$

where the utility function is defined over the vector **X**, given θ. In addition to the standard restrictions of homogeneity, symmetry, and aggregation, the demand function satisfies the following restriction:

$$\sum_{i=1}^{n} p_i \frac{\partial x_i^*}{\partial \theta_k} = \sum_{i=1}^{n} \frac{\partial (p_i x_i^*)}{\partial \theta_k} = 0, \qquad k = 1, 2, \ldots, r.$$

Estimation with Cross-Section Data

This paper reports estimation of demand equations from cross-section data, so it centers around the estimation of the Engel function. In such data sets, there are generally no price effects (since all households are assumed to face the same price) so all restrictions involving the price effect are absent. We now investigate more formally the relationship between income and expenditure patterns. The only restriction that remains is the Engel aggregation restriction. Since prices are assumed constant in cross-section data, the demand function becomes

$$x_i^* = x_i(Y, \theta | P) \qquad i = 1, 2, \ldots, n. \tag{3}$$

This relationship, expressing the demand for a good as a function of income and household characteristics, is commonly referred to as the *Engel function.*

Engel's proposition was that the expenditure on a good deflated by a general equivalence scale is a function of total expenditure deflated by the equivalence scale:

$$\frac{p_i x_i}{m} = p_i f_i \left(\frac{Y}{m}\right) \qquad i = 1, 2, \ldots, n, \tag{4}$$

where m is the equivalence scale that depends on household composition. Note that the choice of scale is an important assumption about *equivalence* in needs, and *equivalence* in welfare. Prais and Houthakker (1955) introduced separate scales for each commodity and an overall scale for income; they estimated the Engel equation

$$\frac{p_i x_i}{m_i} = p_i f_i \left(\frac{Y}{m_0}\right) \qquad i = 1, 2, \ldots, n, \tag{5}$$

where m_i is the commodity-specific scale (for i^{th} good) and $m_0 = m(m_1, m_2, \ldots, m_n, Y)$ is the income scale. Barten (1964) presented a utility-based justification for the Engel function specification of the form given by (5). His idea was that utility depended on *per equivalent adult* consumption of commodities. The concept *per equivalent adult* implies that different types of people are measured as proportions of an adult. Under certain assumptions, Barten's model suggests an Engel function of the form

$$\frac{x_i}{m_i} = \phi_i \left(\frac{Y}{m_0}\right), \qquad i = 1, 2, \ldots, n, \tag{6}$$

which is identical to the Prais and Houthakker (1955) specification.

The two models represented by equations (5) and (6) have been used in many empirical estimations of Engel functions. A relatively recent discussion of the issues, and empirical application, can be found in Deaton, Ruiz-Castillo, and Thomas (1989). However, as Muellbauer (1975) proves, the Engel equation (5) is not identified if estimation is done with cross-section data. Without a priori information or an ad hoc assumption about one of the scales, the equivalence scales cannot be identified from cross-section data. This identification problem can be circumvented by making an explicit assumption about one of the equivalence scales or the income scale; for example, by fixing one of the scales.

Functional Form

The following are the commonly used functional forms for the Engel function relating consumption expenditure, income, and household characteristics

Linear $$\frac{p_i x_i}{m_i} = a_i + b_i \left(\frac{Y}{m_0}\right)$$

Semi-logarithmic $$\frac{p_i x_i}{m_i} = a_i + b_i \, Ln\left(\frac{Y}{m_0}\right)$$

Double-logarithmic $$Ln\left(\frac{p_i x_i}{m_i}\right) = a_i + b_i \, Ln\left(\frac{Y}{m_0}\right)$$

Log-reciprocal $$Ln\left(\frac{p_i x_i}{m_i}\right) = a_i + Ln\left(\frac{m_0}{Y}\right)$$

where Ln denotes natural logarithm.

These different functional forms suggest different effects of income on expenditure. The last three specifications generally provide more realistic parameter estimates, but they lack theoretical basis because they violate the Engel aggregation condition. Only the linear function satisfies the Engel aggregation condition. Prais and Houthakker's general conclusion is that the semi-logarithmic form yields the *best* results, especially for food commodities.

Model Specification, Estimation, and Results

In order to design an efficient social and economic policy it is necessary to know the pattern of demand for various categories of commodities. The large share of food in total expenditure suggests that special attention be paid to the structure of demand for various food commodities. This paper focuses on the factors determining food demand. Since we are restricted to cross-section data, we estimate a set of Engel functions rather than a system of standard demand equations.

Engel functions are estimated for eight different food groups: grains, fruits and vegetables, meat and meat products, dairy products, eggs, fish, vegetable fats, and confectionery items. The age groups that are included are:

1. Children up to two years;
2. Children between three and six;
3. Children between seven and 11;
4. Children between 12 and 17;

5. Adults between 18 and retirement age (55 for women and 60 for men); and
6. Retired people.

Model Specification

The following Engel functions incorporating household composition are estimated

Linear:
$$C_i = m_i \left[a_i + b_i \left(\frac{Y}{m_0} \right) \right] \tag{7}$$

Semi-logarithmic:
$$C_i = m_i \left[a_i + b_i \, Ln \left(\frac{Y}{m_0} \right) \right] \tag{8}$$

Double-logarithmic:
$$C_i = m_i \, A_i \left(\frac{Y}{m_0} \right)^{b_i} \tag{9}$$

where $C_i = p_i x_i$ is the annual household expenditure on the i^{th} good, m_i is the household composition parameter specific to commodity group i (a commodity-specific scale), m_0 is the household composition parameter specific to income (income scale), and Y is the income, measured by the total household expenditure. The specification for the commodity-specific scale, m_i, is

$$m_i = \sum_{g=1}^{6} \delta_{gi} \, n_g \tag{10}$$

where g = 1, 2, 3, 4, 5, 6, and i = 1,2, ..., 8. Here δ_{gi} is the weight of an individual of the g^{th} age group, measured on a scale appropriate for the i^{th} food group, and n_g is the number of people in the g^{th} age group. The weight of the adult is set equal to unity. That gives m_i the natural interpretation as the number of equivalent adults in the household, appropriate for the i^{th} food group.

Estimation of Engel equations (7) through (9) using cross-section data involves an identification problem. This problem is circumvented here by making the assumption that the income scale, m_0, is equal to the size of the household, N. Now substituting (10) in equations (7) through (9) and manipulating, we get:

Linear:
$$C_i = \sum_{g=1}^{6} \gamma_{gi} \left[n_g \left\{ \nu_i + \left(\frac{Y}{N} \right) \right\} \right] \tag{11}$$

where $\gamma_{gi} = b_i \delta_{gi}$, and $\upsilon_i = (a_i/b_i)$.

Semi-logarithmic:
$$C_i = \sum_{g=1}^{6} \gamma_{gi} \left[n_g \left\{ \nu_i + Ln \left(\frac{Y}{N} \right) \right\} \right] \tag{12}$$

where $\gamma_{gi} = b_i\delta_{gi}$, and $\upsilon_i = (a_i/b_i)$.

Double-logarithmic:
$$C_i = \sum_{g=1}^{6} \gamma_{gi} \left[n_g \left(\frac{Y}{N} \right)^{b_i} \right] \tag{13}$$

where $\gamma_{g1} = A_i\delta_{gi}$, and A_i is defined in equation (9).

Estimation and Results

It is evident that the equations are nonlinear in the parameters. A nonlinear method (PROC NLIN) available in SAS (Statistical Analysis System) was used to estimate (11) through (13), using the Gauss-Marquardt algorithm.

Results from the estimation of equations (11) through (13) are reported in Table 8. Since the estimated coefficients are similar, only the coefficients from the semi-logarithmic functional form are reported. (Estimated coefficients for the other functional forms are available on request from the authors.) The regression equations do not include intercept terms. Without an intercept term in the regression equation, the coefficient of determination (R^2) is not bounded between zero and unity and, therefore, loses its usefulness as an indicator of goodness of fit (Schmidt 1976). So the statistics such as sum of squares error and sum of squared regression are not reported.

The nonlinear estimation process using the Gauss-Marquardt algorithm yielded nice convergence for all estimated equations. The asymptotic t-ratios are statistically significant for all coefficients. All the γ- coefficients are positive, thus implying positive weights to all age groups. The positive signs of the weight coefficients are consistent with what one would normally expect: all else equal, additions to the household in any age group lead to higher expenditure for all food categories.

Income Elasticity and Adult Equivalence Scales

The income elasticities are obtained from estimated equations (12) through (14).

Linear:
$$\eta_y = \frac{1}{\left[1 + \upsilon_i \left(\frac{Y}{N} \right) \right]}$$

Semi-logarithmic:
$$\eta_y = \frac{1}{\left[\upsilon_i + Ln \left(\frac{Y}{N} \right) \right]}$$

Double-logarithmic: $\eta_y = b_i$

For linear and semi-logarithmic functions, income elasticities are calculated with N equal to the average family size and Y equal to mean expenditure for the entire population. Adult equivalence scales are obtained by dividing γ_{gi} for each age group by the estimated coefficient corresponding to the adult age group (γ_{5i}).

The estimated income elasticities and the adult equivalence scales are reported in Tables 9 and 10. It is evident from Table 9 that the income elasticities for various commodity groups are not significantly different for different functional forms. All food groups have income elasticity less than unity. Grains and dairy products have the smallest elasticity while that for vegetable is the highest, followed by meat and meat products. The general conclusion from these elasticity estimates is that all of these food categories are *necessary goods*.

The estimated *adult equivalence scales* are reported in Table 10. It is evident from Table 10 that the *adult equivalence scales* are similar for the different functional forms used to estimate the Engel function. The general pattern of these scales is quite reasonable, except for the retired group. The retired had higher *adult equivalence scales* than for adults, which is rather puzzling. One possible explanation may be found in the way the consumption data were reported in the survey. Consumption data, as reported in the sample survey, pertain to consumption at home. Consumption of food by working adults away from home (for instance, in the factory cafeteria) has not been included. It is likely that retired people do not eat lunch at the workplace while adults (working age population) eat a major meal outside of the home at least during the working days of the week. This may explain the higher estimated *adult equivalence scales* for the retired age group compared with those of the adults.

Concluding Remarks

In 1991, food expenditures represented a major share of household expenditures. Household income and demographic characteristics had significant effects on household food expenditure patterns, and the presence of family members of different age groups had different effects on expenditures. Third, the effects of various age groups are different for different commodity groups. Finally, estimated income elasticities for various commodity groups show that all the food categories are *necessary goods*.

These findings have implications for the design of food policies and for evaluating the impact of changes in household income. In designing food assistance schemes, per capita calculations mask the differences that appear in food consumption patterns of households with different demographic composition. For most food groups, including dairy, the presence of children in the household indicates increased expenditures, but not by the same amount as for an adult. Almost all values indicate that members under the age of 18 increase expenditure by more than 0.6 or 0.7, but less than unity.

Estimated income elasticities for food commodities suggest the magnitude of changes in real household income that have occurred in Latvia. With relatively low income elasticities (estimated using 1991 data), declines in household income would not be met by significant reductions in food consumption. Although not estimated here, the changes in consumption patterns would be likely with shifts away from other commodities to food. The greatest decreases in household expenditure for food would be likely to occur for fruits and vegetables (purchased in the market), meat, eggs, and vegetable oils.

It should be noted that these empirical results are based on data for a year when there were rapid changes in the Latvian economy: prices increased rapidly, real household income (purchasing power) declined sharply, and the economy as a whole suffered widespread shortages of goods and services. Significant adjustment of the economy has now taken place, and recent data may generate estimates that might be quite different from those reported in this paper.

Table 1. Selected household summary statistics

Variables	Mean	Maximum	Minimum
	rubles per year		
Gross Income	13248.99	45406.72	1232.19
Per Capita Income	5410.18	23248.85	1232.19
Gross Expenditure	13642.01	52501.47	2376.86
Per Capita Expenditure	5624.98	21769.40	1711.74
	number per household		
Family Members	2.80	9.0	1.0
Children ($\leq$ 2 yr.)	0.095	3.0	0.0
Children (3 - 6 yr.)	0.23	3.0	0.0
Children (7 - 11 yr.)	0.35	5.0	0.0
Children (12 - 17 yr.)	0.356	4.0	0.0
Adults (Working Age)	1.51	4.0	0.0
Retired	0.26	2.0	0.0

Table 2. Sources of income, Latvia 1991

Sources	Households Receiving Income	Households Receiving Income	Average Share of Gross Income
	number	percent	percent
Wages and Salaries	1189	100.0	70.55
Social Safety Net	746	62.5	3.07
Subsidies	347	29.2	0.98
Pensions	319	26.8	8.36
Interest Income	13	1.1	0.05
Private Economic Activities	820	69.0	10.42
Other Sources	1189	100.0	6.57

Table 3. Household expenditure patterns, Latvia 1991

Expenditure Categories	Annual Expenditure	Share of Total Expenditure
	rubles	percent
Food at Home	5872.10	44.83
Housing	264.73	1.43
Utilities	165.94	1.29
Furniture and Accessories	887.67	5.64
Clothing	2183.49	15.70
Transportation	535.33	3.23
Entertainment and Education	487.22	3.80
Alcohol	564.05	4.09
Food Away from Home	501.17	4.20
Services	874.72	6.61
Miscellaneous	1319.08	9.18

Table 4. Family size and expenditure shares

	Family Size		
Expenditure Categories	1- 2	2 - 4	5 or More
		percent	
Food at Home	45.08	44.19	46.67
Housing	1.02	1.74	2.03
Utility	1.24	1.31	1.43
Furniture	4.93	6.41	5.75
Clothing	15.52	16.05	14.62
Transportation	2.88	3.43	3.95
Entertainment and Education	4.18	3.57	3.05
Alcohol	3.78	4.40	4.29
Food Away from Home	5.16	3.46	2.84
Services	6.97	6.33	6.14
Miscellaneous	9.24	9.11	9.23

Note: Expenditure shares are calculated as percentage of total household expenditure.

Table 5. Total expenditure distribution and expenditure shares

Expenditure Categories	Expenditure Groups in Rubles per Year					
	< 7500	7500 - 15000	15000 - 22500	22500 - 30000	> 30000	Total
Food at Home	51.85	46.23	42.10	35.88	26.74	44.93
Housing	0.75	0.75	2.00	4.98	7.86	1.43
Utility	1.50	1.37	1.17	0.86	0.64	1.29
Furniture	2.92	4.39	8.45	7.24	11.12	5.64
Clothing	12.22	16.04	16.44	17.28	13.75	15.70
Transportation	2.42	2.59	3.36	8.09	13.76	3.23
Entertainment and Education	4.43	3.98	3.54	2.44	1.76	3.80
Alcohol	3.23	4.31	4.16	3.84	3.59	4.09
Food Away from Home	6.27	4.56	3.08	2.25	1.44	4.20
Services	7.03	6.86	6.22	5.50	4.81	6.61
Miscellaneous	7.34	9.02	9.58	11.64	14.53	9.18

Note: Expenditure shares are calculated as percentage of total household expenditure.

Table 6. Per capita expenditure distribution and expenditure shares

Expenditure Categories	Per Capita Expenditure in Rubles per Year						
	< 2000	2000 - 4000	4000 - 6000	6000 - 80000	8000 - 10000	> 10000	Total
Food at Home	58.65	50.13	45.64	42.58	37.74	33.85	44.93
Housing	0.27	0.81	1.40	1.97	2.29	1.73	1.43
Utility	4.09	1.63	1.23	1.10	1.08	0.91	1.29
Furniture	3.40	4.03	5.79	6.06	7.11	8.96	5.64
Clothing	10.83	14.20	16.02	15.23	18.34	18.73	15.70
Transportation	2.11	2.72	2.99	3.47	3.55	5.73	3.23
Entertainment and Education	5.87	3.66	3.86	3.88	4.10	3.45	3.80
Alcohol	8.21	4.37	4.04	4.10	3.87	3.42	4.09
Food Away from Home	0.55	3.77	4.12	4.70	5.11	3.90	4.20
Services	3.35	6.52	6.38	6.92	6.84	7.08	6.61
Miscellaneous	2.67	8.26	8.63	10.19	10.07	12.34	9.18

Note: Expenditure shares are calculated as percentage of total household expenditure

Table 7. Total expenditure distribution and food expenditure

Food Groups	Per Capita Income Groups					
	< 7,500	7,500 to 15,000	15,000 to 22,500	22,500 to 30,000	> 30000	Total
Grains	15.41	15.06	14.95	14.76	12.88	15.62
Fruits and Veg.	19.70	18.95	19.43	20.53	18.75	19.03
Meat and Meat Products	27.12	29.20	29.96	29.54	34.71	29.12
Dairy Products	17.10	16.00	15.38	15.14	13.88	15.94
Fish Products	2.85	2.69	2.54	2.26	2.93	2.57
Eggs	4.05	4.03	3.97	4.51	3.94	4.04
Vegetable Oils	0.84	0.83	0.81	0.82	0.85	0.83
Confectionery Items	12.93	13.24	12.96	12.44	12.06	12.85

Note: Food budget shares represent percentage of total food expenditure spent on each category of food.

Table 8. Estimated coefficients and t-ratios for the semi-logarithmic Engel function

Estimated Coefficients	Grains	Fruits & Vegetables	Meat & Meat Products	Dairy Products	Eggs	Fish Products	Vegetable Oils	Confectionery Items
υ	-5.06	-7.12	-6.70	-5.67	-6.60	-5.47	-6.92	-6.61
t-ratio	(-11.78)	(-102.92)	(-77.07)	(-23.50)	(-40.25)	(-11.15)	(-53.65)	(-64.73)
γ_1	88.80	338.66	264.07	89.53	40.56	4.68	3.22	131.24
t-ratio	(4.77)	(6.01)	(6.32)	(5.44)	(4.28)	(1.31)	(1.47)	(6.91)
γ_2	67.97	265.08	203.18	69.20	27.42	5.24	5.75	101.44
t-ratio	(5.16)	(7.25)	(7.36)	(6.07)	(4.50)	(2.06)	(3.73)	(7.98)
γ_3	77.60	295.75	266.08	97.37	35.85	13.30	7.43	137.77
t-ratio	(6.01)	(9.58)	(10.73)	(8.18)	(6.41)	(4.24)	(5.58)	(11.26)
γ_4	75.21	298.87	280.76	84.01	42.09	13.70	10.56	112.73
t-ratio	(5.86)	(9.62)	(10.93)	(7.59)	(6.88)	(4.20)	(6.81)	(10.05)
γ_5	98.90	319.65	396.19	129.49	48.22	21.27	11.55	151.19
t-ratio	(8.36)	(19.90)	(21.77)	(12.31)	(12.18)	(6.47)	(12.81)	(19.43)
γ_6	142.82	391.03	451.37	173.46	63.52	25.96	13.57	171.87
t-ratio	(7.99)	(15.63)	(18.32)	(11.54)	(10.72)	(6.08)	(10.35)	(16.21)

Table 9. Estimated income elasticities

Food Groups	Linear	Semi-Log	Double-Log
Grains	0.259	0.291	0.292
Fruits and Vegetables	0.719	0.731	0.711
Meat	0.528	0.559	0.559
Dairy	0.305	0.355	0.347
Eggs	0.530	0.527	0.560
Fish	0.327	0.331	0.356
Vegetable Oils	0.587	0.636	0.610
Confectionery	0.494	0.531	0.523

Notes: Family size effects are not incorporated.
Elasticities are evaluated at mean family size and mean household expenditure.

Table 10. Estimated adult equivalence scales

Food Groups	Age Groups					
	> 2	3-6	7-11	12-17	Adult	Retired
Grains						
Linear	0.842	0.677	0.764	0.743	1.000	1.433
Semi-log	0.898	0.687	0.785	0.760	1.000	1.444
Double-log	0.886	0.688	0.781	0.758	1.000	1.441
Meat and Meat Products						
Linear	0.635	0.522	0.662	0.712	1.000	1.134
Semi-log	0.667	0.513	0.672	0.709	1.000	1.139
Double-log	0.656	0.521	0.669	0.713	1.000	1.135
Eggs						
Linear	0.836	0.602	0.754	0.906	1.000	1.315
Semi-log	0.841	0.569	0.743	0.873	1.000	1.317
Double-log	0.861	0.601	0.761	0.906	1.000	1.316
Vegetable Oils						
Linear	0.235	0.496	0.631	0.912	1.000	1.176
Semi-log	0.279	0.498	0.644	0.915	1.000	1.175
Double-log	0.245	0.490	0.630	0.904	1.000	1.173
Fruits and Vegetables						
Linear	1.035	0.873	0.939	0.980	1.000	1.221
Semi-log	1.059	0.829	0.925	0.935	1.000	1.223
Double-log	1.009	0.835	0.916	0.941	1.000	1.216
Dairy Products						
Linear	0.630	0.518	0.728	0.625	1.000	1.332
Semi-log	0.691	0.534	0.752	0.649	1.000	1.340
Double-log	0.673	0.531	0.745	0.642	1.000	1.336
Fish and Fish Products						
Linear	0.205	0.255	0.628	0.654	1.000	1.215
Semi-log	0.220	0.247	0.625	0.644	1.000	1.220
Double-log	0.230	0.260	0.635	0.657	1.000	1.218
Confectionery Items						
Linear	0.800	0.673	0.890	0.736	1.000	1.126
Semi-log	0.868	0.671	0.911	0.746	1.000	1.137
Double-log	0.832	0.672	0.900	0.739	1.000	1.130

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