Testing Structural Change in Demand for Foods

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Has there been any structural change in demand for foods?

The question of whether there has been a structural change in demand for foods in the United States has received much attention, especially after a sharp decline in beef consumption and a steady increase in poultry products consumption in the late 1970s. The issue of structural change in demand for foods is important to food producers for their production plans and marketing strategies, such as the meat industry's decision as to whether to scale down the size of cattle herds or spend more money for a meat promotion program. The structural change issue is also important to food policy decision-makers to know whether there is a shift in demand for foods toward a healthy diet because unhealthy food consumption causes obesity and overweight and imposes heavy physical and economic tolls on the Nation.

In studying structural change in demand for foods, many economists such as Chavas (1983), Eales and Unnevehr(1988), Moschini and Meilke (1989), and Huang and Hahn (1995) focused on the meats. In the consumer budgeting process, however, changes in any food other than meats may be equally important in determining food demands. A complete food demand system including all foods should be implemented so that the interdependent demand relationships among all foods can be explicitly recognized. Also, as indicated by Hicks (1956, p. 83), the Marshallian demand has two functions: (a) It shows the amounts that consumers will take at given prices, and (b) It shows the prices at which consumers will buy given quantities. Accordingly, both ordinary (quantity-dependent) and inverse (price-dependent) demand systems should be applied for testing the structural change in demand for foods.

The major focus of this study is on developing a methodology for testing the structural change within the context of a complete food demand system. Two empirical U.S. ordinary and inverse food systems for six food groups and one nonfood sector are estimated first. These empirical estimates of food demand systems are then used for testing the structural change in demand for foods in the United States.

Testing structural change based on complete food demand systems

A differential-form of demand model is applied for specifying ordinary and inverse demand systems. Let p_i and q_i denote the ith price and associated quantity demanded in the allocation of a representative consumer expenditure m across a set of n commodities, following Huang (1993), an ordinary demand system is specified as

$$dq_i/q_i = \Sigma_j\, e_{ij}\, (dp_j/p_j) + \eta_i\, (dm/m) \qquad i=1,2,..,n \tag{1}$$

where $e_{ij} = (\partial q_i/\partial p_j)(p_j/q_i)$ is the price elasticity of the ith commodity with respect to a price change of the jth commodity, and $\eta_i = (\partial q_i/\partial m)(m/q_i)$ is the expenditure (income) elasticity of the ith commodity. In view of classical demand theory, the model elasticities are constrained by symmetry, homogeneity, and Engel aggregation as follows: $e_{ji}/w_i + \eta_j = e_{ij}/w_j + \eta_i$, $\Sigma_j\, e_{ij} + \eta_i = 0$, and $\Sigma_i\, w_i\eta_i = 1$, where $w_i = p_iq_i/m$ is the expenditure weight of the ith commodity.

On the other hand, following Huang (1991), a compensated inverse demand system is specified by applying the distance (or transformation) function approach as

$$dr_i/r_i = \Sigma_j\, f_{ij}^*\, (dq_j^*/q_j^*) + g_i\, (ds/s) \qquad i=1,2,..,n \tag{2}$$

where $r_i = p_i/m$ is the normalized price of the ith commodity, s is a scale variable defined as the geometric expenditure-weighted average of individual quantities q_j's: $\log s = \Sigma_j\, w_j \log q_j$. Then a reference quantity can be obtained as $q_j^* = q_j/s$. The parameters $f_{ij}^* = (\partial r_i/\partial q_j^*)(q_j^*/r_i)$ is the compensated price flexibility of the ith commodity with respect to a quantity change of the jth commodity, and $g_i = (\partial r_i/\partial s)(s/r_i)$ is the scale flexibility showing the effect of the ith commodity price on the proportional change in all quantities demanded. This demand model can be estimated by incorporating homogeneity, symmetry, and scale aggregation as follows: ($\Sigma_j f_{ij}^* = 0$, $f_{ji}^*/w_i = f_{ij}^*/w_j$, and $\Sigma_i w_i g_i = -1$).

A testing procedure for the demand structural change is developed below with special reference to the potential shifts of an entire set of demand parameters in the demand system over different periods. Suppose that the random disturbances of a demand system are distributed according to a multivariate normal $N(0,\mathbf{\Omega})$. A constrained demand system for the whole sample period with a set of T sample observations is estimated first, and a vector of estimated residuals by stacking each equation, say $\boldsymbol{\varepsilon}$, is computed. The sum of squares of estimated residuals is computed as, say $A = \boldsymbol{\varepsilon}'(\mathbf{\Omega}^{-1} \otimes \boldsymbol{I}_T)\boldsymbol{\varepsilon}$, which is a chi-square distribution with degrees of freedom $nT\text{-}n(n+1)/2+1$.

Then, to reflect potential demand structural change, the whole sample period with T observations is divided into two periods: T_1 observations for the first period and T_2 observations for the second period. The constrained demand system estimation is performed for each period separately, and the estimated residual vectors $\boldsymbol{\varepsilon}_1$ and $\boldsymbol{\varepsilon}_2$, are obtained respectively. The sum of squares of estimated residuals for these two demand subsystems is computed as $B = \boldsymbol{\varepsilon}_1'(\mathbf{\Omega}_1^{-1} \otimes \boldsymbol{I}_{T1})\boldsymbol{\varepsilon}_1 + \boldsymbol{\varepsilon}_2'(\mathbf{\Omega}_2^{-1} \otimes \boldsymbol{I}_{T2})\boldsymbol{\varepsilon}_2$, which is a chi-square distribution with degrees of freedom $nT\text{-}n(n+1)+2$.

Similar to Theil's (*1971*, p. 312-317) testing procedure for linear constraints on coefficient

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of different equations, this study uses the residual measures *A* and *B* and formulates the following *F*-statistic with *k* degrees of freedom in the numerator and (nT-2k) in the denominator:

$$F = [(A\text{-}B)/k] \;/\; [B/(nT\text{-}2k)] \sim F(k, nT\text{-}2k) \qquad (3)$$

where $k = n(n+1)/2-1$. This *F*-statistic can be used to test a null hypothesis about the equality of two sets of demand parameters. If the *F*-statistic is larger than a critical value at a certain significant level, the null hypothesis about no structural change should be rejected. Otherwise, the null hypothesis should be accepted if the *F*-statistic is less than the critical value.

Empirical estimation and testing results

Data sources

To test the structural change in U.S. food demands, I split the sample observations into two periods, 1954-78 and 1979-2003. The divided periods reflect a volatile change in food consumption, especially after a sharp decline in beef consumption and a steady increase in poultry meat consumption per person in the late 1970s. In addition, having 25 yearly observations for each period, it provides enough degrees of freedom in estimation of a complete food demand system. All foods are aggregated into six groups in addition to one nonfood sector. Each food group consists of closely related foods as follows: (1) Meats (beef, pork and other meats), (2) Poultry products (chicken and turkey), (3) Dairy products (fluid milk, evaporated and dry milk, butter, cheese, ice cream and other frozen dairy products), (4) Fruits and vegetables (all fresh and processed fruits and vegetables), (5) Bakery and sweeteners (wheat flour, rice, sugar, sweeteners, and nonalcoholic beverages), and (6) Other

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foods (fish, eggs, fats and oils, and nuts).

The basic data required for estimation are food prices, quantities, per capita expenditures, and a set of average expenditure shares represented for the sample period. Food group price indexes are components of the consumer price index (CPI) obtained from the U.S. Department of Labor. Per capita total expenditure is computed by dividing the personal consumption expenditures (obtained from the U.S. Department of Commerce) by the civilian population of 50 States on July 1 of each year. The quantity index for the nonfood sector is calculated from the current value of per capita expenditure on nonfood divided by the CPI of all items less food. To find the food expenditure shares, I calculated the average expenditure weights between food and nonfood sectors for 1982-84 from the personal consumption expenditures (obtained from the Bureau of Economic Analysis). The food expenditures are then allocated to each food group in accordance with shares of total food consumption obtained from the Bureau of Labor Statistics' *Consumer Expenditure Survey*.

The food quantity data are compiled from ERS' *Food Consumption (Per Capita) Data System* by using the expenditure weights of 1982-84 to calculate the Laspeyres quantity indexes for each food group. These quantity indexes are consistent with the recently published CPI indexes for food groups and the nonfood sector, which are measured with a base of 1982-84. The food quantity data are compiled in two steps. First, to match the available expenditure weight data for 39 food categories in the base period 1982-84, I aggregated a set of original per capita food consumption data series, consisting of 142 individual food items by summing their food weights in a particular food category. The aggregation process is a convenient and reasonable measure because of the homogeneous nature of commodities inside a particular food category. I then use the available expenditure shares to aggregate the quantity data of 39 categories into a set of 6 food groups expressed in Laspeyres quantity indexes.

Results of ordinary demand system:

To test the structural change in demand for foods, a set of three ordinary demand systems specified in equation 1 for a whole sample period and each subperiod are estimated and presented in table 1. The results give information regarding the price elasticities of the food groups in the left column with respect to their prices, income, and constant term at the top of the table. The expenditure share of each food group is listed at the bottom of the table. The empirical estimates of these demand systems are theoretically consistent in the sense that the parametric constraints of homogeneity, symmetry, and Engel aggregation are incorporated into the estimation.

In table 1, the results contained in case A represent estimated elasticities for the whole period. All direct–price elasticities shown in the diagonal of the table are negative as expected, and most of them are statistically significant with t-ratios greater than 2. Among them, the price elasticity of meats and poultry are 0.5082 and 0.3684, respectively. The price elasticity of fruits and vegetables as a group is relatively high at 0.7263. The income elasticities of food groups shown in the next to last column are all positive ranging from 0.0498 to 0.4454, and most of them are statistically significant. Substantial variations are found in the estimated price and income elasticities between 1954-78 and 1979-2003; for example, the price elasticities of meats change from 0.6288 to 0.4190 and poultry products from 0.4848 to 0.1936.

To test structural change in demand for foods, at the beginning the estimated demand systems are used to generate the residuals of each equation. These estimated residuals are then used to formulate the *F*-statistic as shown in equation 3. Accordingly, the F-statistic is calculated to be 1.89 with degrees of freedom $k = 34$ and $(nT - 2k) = 282$. The close critical value of F-statistics available at the 5-percent significance level is $F(40, 120; 0.05) = 1.5$. The computed *F*-statistic is obviously larger than the critical values at the 5-percent significance level.

Thus the testing results indicate a significant evidence of structural change in demand for foods between 1954-78 and 1979-2003. A shift in consumer tastes, not food prices and income, is the overwhelming factor determining the magnitude of change in demand for foods over periods. This finding is consistent with the food consumption pattern in past years that consumers are increasingly concerned about their nutritional and health status. Food consumption has shown a trend toward more poultry products and fewer red meat products. Consumption of eggs declined, and consumption of dairy products changed by the substitution of low fat and skim milk for whole milk. Consumption of fats and oils has been characterized by a rapid increase in the use of vegetable oils. Consumption of fruits, vegetables, and grain products has increased steadily in recent years, and the consumption of cane and beet sugar decreased with the increasing use of corn syrups as a substitution.

Results of inverse demand system:

Alternatively, a set of three inverse demand systems specified in equation 2 for a whole sample period and each subperiod are estimated and presented in table 2. These estimates give information about the compensated price flexibilities of the commodity groups listed in the left column with respect to their quantities, scale, and constant term listed at the top of the table.

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The expenditure share of each food group is listed at the bottom of the table. All estimated price flexibilities satisfy the theoretical constraints of symmetry, homogeneity, and scale aggregation.

In table 2, the estimated scale and compensated direct-price flexibilities (listed in the next to last column and diagonal entries of the table) show the potential price effects under a hypothetical constant preference. All estimated compensated direct-price flexibilities are negative as expected, and most of them are statistically significant, with t-ratios greater than 2. All the estimated scale flexibilities are negative as expected, and the magnitudes are larger than 1 in absolute value.

The estimated compensated cross-price flexibilities are shown in the off-diagonal entries of the table. These compensated cross-price flexibilities reflect substitution if the sign is negative and complementarity if the sign is positive because a marginal increase of the quantity of one good may have a substitution effect on the other goods, and the price of other goods should be lower to induce consumers to purchase the same quantity of the other goods. For example, the compensated cross-price flexibility between the price of meats and poultry products is -0.2023. This estimate implies a substitution relationship between the two food groups: a marginal 10-percent increase in the quantity of poultry is associated with a 2-percent decrease in the price of meats to induce consumers to purchase the same quantity of poultry. On the other hand, the compensated cross-price flexibility of meats with respect to the quantity of dairy products is 0.1153, indicating that a marginal increase of 10 percent in the quantity of cheese will cause the price of meats to increase by 1.2 percent because of their complementary relationship.

The estimated inverse demand systems are then used to formulate the *F*-statistic for testing the structural change in demand for food. The F-statistic is calculated to be 0.32 with degrees of freedom k = 34 and ($nT - 2k$) = 282. By comparing this *F*-statistic with the close critical value of F-statistics available at the 5-percent significance level, which is F(40, 120; 0.05) = 1.5, the computed *F*-statistic is clearly less than the critical value. Thus the null hypothesis about the equality between two sets of demand parameters cannot be rejected, implying no demand structural change between 1954-78 and 1979-2003. The testing results imply that, for given quantities of food marketed, there is no evidence of a significant shift in consumer willingness to pay for the food prices over periods.

Conclusion

In this study, a testing procedure for the structural change in a complete food demand system is developed. The procedure is useful for detecting the potential shifts of an entire set of demand parameters including direct- and cross-commodity effects over periods. Some empirical estimates of U.S. ordinary and inverse food demand systems are used for testing the structural change in demand for foods. The testing results indicate a significant structural change found in an ordinary demand system but not in an inverse demand system.

Although both the demand systems are theoretically consistent within the framework of classical demand theory, there may not be the same testing results of structural change based on their statistical model estimates. It is well known that for a general demand system with discernible cross-commodity effects, the estimated price flexibilities are certainly not the inverse of the estimated price elasticities. Consequently, a structural change found in the quantity-dependent demand relationships may not exist in the price-dependent demand relationships.

According to the testing results for evaluating the effects of price change on food consumption, it is conceivable that consumers shifted their food-demand relationships between 1954-78 and 1979-2003. The change in consumer taste may be an overwhelming factor determining the magnitude of change in food consumption between the periods. On the other hand, for studying market demand about food prices at which a given supply can be sold, no structural change is found in an estimated inverse demand system. It appears that consumers maintain the same willingness to pay for food prices at given quantities available in the market between the periods.

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Table 1--Estimated elasticities of U.S. ordinary demand system, 1954-2003

	Price								
Quantity	Meats	Poultry products	Dairy products	Fruits & vegetables	Bakery & sweet	Other foods	Nonfoods	Income	Constant
Case A: Estimated elasticities for the whole period, 1954-2003									
Meats	-0.5082	0.0553	-0.0066	0.0330	0.0647	0.0344	-0.0872	0.4146	-1.1082
	0.0467	0.0194	0.0173	0.0641	0.0465	0.0286	0.1224	0.1215	0.3645
Poultry products	0.2094	-0.3684	0.0336	0.1804	-0.3134	0.0585	0.1501	0.0498	2.2935
	0.0671	0.0617	0.0486	0.1180	0.0928	0.0782	0.1955	0.1825	0.5583
Dairy products	-0.0065	0.0119	-0.0940	0.0601	-0.0172	-0.1493	-0.1194	0.3142	-0.6695
	0.0262	0.0214	0.0481	0.0471	0.0418	0.0469	0.0768	0.0689	0.2165
Fruit & vegetable	0.0226	0.0322	0.0246	-0.7263	-0.0078	0.0373	0.1765	0.4408	-0.3550
	0.0459	0.0238	0.0217	0.1249	0.0645	0.0362	0.1850	0.1792	0.5828
Bakery & sweet	0.0612	-0.0762	-0.0072	0.0020	-0.1955	-0.0318	0.0183	0.2292	0.1707
	0.0402	0.0227	0.0232	0.0786	0.0753	0.0385	0.1421	0.1317	0.4069
Other foods	0.0784	0.0340	-0.2259	0.1205	-0.0974	-0.1650	-0.1900	0.4454	-0.4000
	0.0647	0.0514	0.0702	0.1175	0.1028	0.1394	0.1863	0.1714	0.5257
Nonfoods	-0.0316	-0.0097	-0.0238	-0.0259	-0.0402	-0.0152	-1.0030	1.1494	0.0043
	0.0034	0.0016	0.0015	0.0077	0.0045	0.0023	0.0160	0.0147	0.0549
Case B1: Estimated elasticities for the first period, 1954-78									
Meats	-0.6288	0.1212	0.0087	0.0954	0.0249	0.0398	0.0477	0.2911	-0.0810
	0.0473	0.0212	0.0180	0.0712	0.0437	0.0227	0.1687	0.1717	0.5653
Poultry products	0.4391	-0.4848	0.0254	0.1970	-0.1849	-0.0480	0.0356	0.0206	1.5490
	0.0713	0.0697	0.0554	0.1289	0.0893	0.0620	0.2763	0.2617	0.8833
Dairy products	0.0136	0.0083	-0.2145	0.0988	0.0373	-0.1347	-0.0962	0.2875	-1.2020
	0.0264	0.0246	0.0632	0.0485	0.0375	0.0468	0.1004	0.0921	0.3154
Fruit & vegetable	0.0843	0.0414	0.0559	-0.6818	0.0374	0.0439	0.5616	-0.1428	0.1645
	0.0515	0.0258	0.0222	0.1534	0.0707	0.0277	0.2602	0.2543	0.8448
Bakery & sweet	0.0247	-0.0456	0.0226	0.0264	-0.0790	-0.0674	-0.0713	0.1897	-0.7996
	0.0393	0.0227	0.0215	0.0892	0.0716	0.0250	0.1864	0.1783	0.5716
Other foods	0.0962	-0.0330	-0.1983	0.1253	-0.1851	0.1259	-0.1076	0.1766	-0.0787
	0.0513	0.0419	0.0704	0.0921	0.0662	0.0910	0.1977	0.1891	0.6289
Nonfoods	-0.0320	-0.0121	-0.0250	-0.0344	-0.0492	-0.0188	-1.0301	1.2015	-0.1259
	0.0036	0.0016	0.0016	0.0085	0.0043	0.0018	0.0207	0.0191	0.0863
Case B2: Estimated elasticities for the second period, 1979-2003									
Meats	-0.4190	0.0575	0.0238	0.0309	0.3624	-0.0307	-0.2297	0.2047	-1.1988
	0.0960	0.0247	0.0317	0.1066	0.1085	0.0674	0.1684	0.1760	0.4884
Poultry products	0.1996	-0.1936	-0.0486	0.1630	0.2175	0.0066	-0.6474	0.3028	2.4819
	0.0858	0.1150	0.0938	0.1367	0.2963	0.1853	0.2732	0.1675	0.5401
Dairy products	0.0252	-0.0236	-0.0926	-0.0071	-0.1122	-0.1666	-0.1417	0.5187	-0.5110
	0.0483	0.0410	0.0706	0.0734	0.1593	0.0918	0.1393	0.0875	0.2661
Fruit & vegetable	-0.0117	0.0244	-0.0175	-0.6127	-0.0272	-0.0290	-0.4298	1.1034	-0.6157
	0.0757	0.0279	0.0340	0.1645	0.1201	0.0777	0.1778	0.1900	0.7137
Bakery & sweet	0.2947	0.0500	-0.0591	0.0023	-0.2917	-0.3311	-0.1164	0.4514	0.9952
	0.0909	0.0711	0.0873	0.1421	0.3437	0.1609	0.3012	0.1797	0.5523
Other foods	-0.0928	-0.0008	-0.2550	-0.0774	-0.9276	0.1333	0.4316	0.7888	-0.6890
	0.1532	0.1215	0.1372	0.2486	0.4390	0.3621	0.4122	0.2952	0.8882
Nonfoods	-0.0438	-0.0168	-0.0180	-0.0270	-0.0349	0.0038	-0.9512	1.0878	0.1004
	0.0053	0.0032	0.0037	0.0081	0.0145	0.0073	0.0155	0.0114	0.0396
Expend shares	0.0375	0.0106	0.0242	0.0526	0.0448	0.0162	0.8140		

Note: Each pair of estimates, the upper part is the estimated elasticity and the lower part is standard error.

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Table 2--Estimated compensated flexibilities of U.S. inverse demand system, 1954-2003

Price	Quantity							Income	Constant
	Meats	Poultry products	Dairy products	Fruits & vegetables	Bakery & sweet	Other foods	Nonfoods		
Case A: Estimated flexibilities for the whole period, 1954-2003									
Meats	-1.1562	-0.2023	0.1153	-0.0842	0.0441	-0.0862	1.3695	-2.0861	-0.8298
	0.1259	0.0457	0.0566	0.0805	0.1083	0.0399	0.2477	0.3243	0.6297
Poultry products	-0.7158	-1.0070	0.1502	0.1132	-0.0001	-0.0298	1.4891	-1.4214	-1.5373
	0.1616	0.1496	0.1704	0.1383	0.2283	0.1085	0.3994	0.5083	0.9978
Dairy products	0.1787	0.0658	-0.3767	-0.1172	0.1430	-0.2446	0.3511	-1.1119	-1.1543
	0.0877	0.0746	0.2863	0.0752	0.1465	0.0955	0.2690	0.2971	0.5427
Fruit & vegetable	-0.0601	0.0228	-0.0540	-0.4918	-0.1023	-0.0016	0.6868	-1.5438	0.0441
	0.0575	0.0279	0.0346	0.0748	0.0716	0.0271	0.1572	0.2258	0.5295
Bakery & sweet	0.0370	0.0000	0.0774	-0.1202	-0.4514	-0.0925	0.5498	-2.0024	1.4802
	0.0908	0.0541	0.0793	0.0841	0.1691	0.0495	0.2501	0.3210	0.6334
Other foods	-0.1993	-0.0194	-0.3648	-0.0051	-0.2549	-0.0650	0.9085	-1.5499	-1.1186
	0.0923	0.0708	0.1424	0.0878	0.1365	0.1011	0.2711	0.3355	0.6544
Nonfoods	0.0632	0.0194	0.0105	0.0444	0.0302	0.0181	-0.1858	-0.8399	0.1078
	0.0114	0.0052	0.0080	0.0102	0.0138	0.0054	0.0340	0.0430	0.0731
Case B1: Estimated flexibilities for the first period, 1954-78									
Meats	-1.0619	-0.1239	0.2547	0.0516	0.0290	0.0955	0.7551	-1.4765	-0.1046
	0.1164	0.0520	0.0539	0.1033	0.1437	0.0594	0.3160	0.4544	0.9692
Poultry products	-0.4385	-1.2114	0.1810	0.4527	-0.1877	-0.1059	1.3098	-0.8803	-2.4816
	0.1839	0.1510	0.1614	0.2025	0.3389	0.1636	0.5941	0.8406	1.6426
Dairy products	0.3946	0.0792	-0.7916	0.0671	0.3052	-0.3820	0.3276	-1.1126	-1.2632
	0.0834	0.0706	0.2751	0.0938	0.1765	0.1204	0.3498	0.4155	0.7919
Fruit & vegetable	0.0368	0.0913	0.0309	-0.4279	-0.0924	0.1017	0.2597	-1.2566	-0.2651
	0.0737	0.0408	0.0432	0.1327	0.1287	0.0547	0.2885	0.4546	0.9951
Bakery & sweet	0.0243	-0.0445	0.1652	-0.1086	-0.3630	-0.2228	0.5494	-2.6619	3.0872
	0.1205	0.0803	0.0955	0.1513	0.3466	0.1044	0.4598	0.6034	1.1577
Other foods	0.2208	-0.0692	-0.5700	0.3294	-0.6139	0.0500	0.6528	-1.4889	-0.8524
	0.1373	0.1069	0.1796	0.1770	0.2878	0.1943	0.5555	0.7403	1.3506
Nonfoods	0.0348	0.0171	0.0098	0.0168	0.0302	0.0130	-0.1217	-0.8585	-0.0653
	0.0146	0.0077	0.0104	0.0187	0.0253	0.0111	0.0601	0.0829	0.1324
Case B2: Estimated flexibilities for the second period, 1979-2003									
Meats	-0.8169	-0.0321	-0.0322	0.1367	0.1640	-0.0984	0.6789	-1.2799	-2.1927
	0.2173	0.0662	0.1447	0.1164	0.0829	0.0527	0.3331	0.3688	0.7975
Poultry products	-0.1135	-0.4869	-0.3763	-0.2559	-0.1713	-0.0919	1.4959	-1.3970	-0.9801
	0.2342	0.2081	0.3552	0.1570	0.2015	0.1354	0.5099	0.5276	1.0407
Dairy products	-0.0499	-0.1647	-0.4507	-0.2313	-0.1295	-0.2674	1.2935	-1.7820	-0.3747
	0.2242	0.1555	0.5261	0.1415	0.1874	0.1389	0.5228	0.5021	0.8405
Fruit & vegetable	0.0975	-0.0516	-0.1065	-0.7039	-0.0400	-0.0759	0.8803	-1.4641	0.6933
	0.0830	0.0317	0.0652	0.0894	0.0400	0.0248	0.1517	0.2006	0.5287
Bakery & sweet	0.1375	-0.0406	-0.0701	-0.0471	-0.0798	-0.0815	0.1815	-1.0620	0.3299
	0.0695	0.0477	0.1015	0.0470	0.0707	0.0357	0.1488	0.1569	0.3069
Other foods	-0.2274	-0.0600	-0.3990	-0.2458	-0.2245	-0.0823	1.2389	-1.5071	-1.1264
	0.1218	0.0884	0.2071	0.0805	0.0984	0.1006	0.2660	0.2664	0.5170
Nonfoods	0.0313	0.0195	0.0385	0.0569	0.0100	0.0247	-0.1810	-0.9151	0.2430
	0.0154	0.0066	0.0156	0.0098	0.0082	0.0053	0.0339	0.0345	0.0680
Expend shares	0.0375	0.0106	0.0242	0.0526	0.0448	0.0162	0.8140		

Note: Each pair of estimates, the upper part is the estimated elasticity and the lower part is standard error.