Changes in Food, Alcohol and Cigarettes Consumption during Transition: Evidence from Russia

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Abstract:
This paper examines the changes in nutritional behavior of Russian adults over the ten-year transition period, between 1994 and 2004. We present evidence on the impact of individual as well as regional characteristics on changes in fat, protein, alcohol and cigarette consumption, and on diversity of diet. The results from a dynamic empirical model suggest that among microeconomic determinants, initial levels of consumption, gender, holding a university degree, and having access to a garden plot have a significant impact on the changes in consumption behavior in Russia. Regarding the macroeconomic variables, economic growth has a significant impact on changes in fat and protein consumption and on alcohol use, while unemployment changes significantly impact protein intake, alcohol consumption and the diversity of diet.

Key words: consumption, smoking, alcohol, economic transition, Russia

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Introduction

Political, economic and social reforms in Russia since the collapse of the state-command economy in 1991 have brought significant changes in citizens' lives. The economic downturn signified the real GDP falling to 55 percent of its 1989 level by 1998, the lowest point over the last two decades, and a subsequent recovery to 88 per cent by 2005 (World Bank, 2007). Early transition has also been characterized by emerging open unemployment and exploding inflation during the first years of transition. High inflation, sharp declines in production, and quite common wage arrears eroded the income generating basis for many households. Estimates of poverty at the beginning of the new century range between 15 and 22 percent (Yemtsov, 2003, Liefert, 2004). As a result, social indicators point to a fall in living standards for some, deteriorating health conditions and increased mortality. One indicator of declining health conditions is the drop in life expectancy during transition. By 2005, Russian male life expectancy was 59 years, a decline of about 5 years compared to 1989; and for Russian females the life expectancy was 72 years, a decline of 2 years (WHO 2007).

Several studies have examined the reasons for the mortality crisis in the former Soviet republics, in particular Russia, where the life expectancy decline was more severe than in the Central European transition countries (Brainerd and Cutler, 2005; Cockerham, 2000; Shkolnikov et al., 2004, Nemtsov, 2002). The main factors leading to the mortality crisis and poor health in Russia are the unhealthy lifestyles that include heavy alcohol (vodka) and cigarette consumption, a high-fat diet and the lack of recreational exercise. Additionally, Walberg et al. (1998) highlight the role of accidents and crime for decreasing life expectancy. However, Skolnikov et al. (1997) provide evidence that premature mortality had been increasing already before the start of transition. Therefore, economic turmoil might not be the only reason.

To gain a better understanding of the underlying developments of a decreasing life expectancy, we focus on potential causes for poor health directly. More specifically, the goal of the paper is to examine individual socio-economic and regional macro-economic determinants of changes in food, alcohol and cigarettes consumption that have health-related consequences. Therefore, in the empirical analysis, we examine the change in the shares of fat and protein intake in the diet, an index of food consumption diversity, alcohol consumption, and cigarette smoking using data from the Russian Longitudinal Monitoring Survey (RLMS) between the waves in 1994 and 2004. Our analysis aims to quantify the impact of individual determinants as well as the relative impacts of micro and macro determinants on nutritional behavioral changes. The primary contribution of the paper is the examination of the changes in food, alcohol and cigarette consumption over the ten-year period, between 1994 and 2004. We explicitly consider the combined impact of individual and regional characteristics in explaining the changes in lifestyles.

The paper continues as follows. First, a review of the literature on nutritional behavior and its changes during times of economic turmoil is presented. Second, hypotheses are developed, based on various theories of consumption and previous empirical results, to guide our empirical analysis. Third, the data and econometric techniques are described, followed by a discussion of the estimation results. Finally, conclusions are offered.

Economic turmoil and nutritional behavior

There is ample evidence in the literature that individuals who chose to consume large amounts of alcohol, tobacco, and diet rich in fat will have a repercussion on their health, which highlights the importance of lifestyle choices for individual's health status (Chou et al., 2004; Huffman et al., 2008; Lakdawalla et al., 2005; Rashad et al., 2006). Quantitative estimates of the contribution of life-

style related factors to premature death in the US amount to more than one-third of the total effect (McGinnis and Foege, 1993; Mokdad et al., 2004). Khaw et al. (2008) examine the combined impact of lifestyle, using a simple health behavior score based on smoking, physical activity, alcohol consumption and fruit and vegetable intake, on mortality in females and males aged 45-79 years old living in the UK. They find that the combined impact of various lifestyles is associated with a variation in mortality equivalent to 14 years in chronological age.

However, all of the studies mentioned focus on developed economies.[1] Analyses specifically focusing on periods of economic turmoil fail to establish a consistent picture. Using South Korean data over the late 1990s, Khang et al. (2005) report a surprising decline in mortality during recessions. The only important negative effect is an increase in suicides, especially for males. In contrary, Ruhm (1995) using US data shows that increasing alcohol consumption can be driven by economic downturns. Increased stress from the economic turmoil can dramatically affect the lifestyle and diet of the population, as well. Analyzing the severe economic crises in Mexico over the 1980s and 1990s, Cutler et al. (2002) identify a link between availability of public health services and female labor force participation, on the one hand, and mortality among children and the elderly, on the other.[2]

There is a small but growing literature on health outcomes and nutrition in Central and Eastern Europe as well as in the Former Soviet Union; Stillman (2006) presents an excellent review. Heavy alcohol consumption and smoking, a high-fat diet, and lack of leisure-time exercise are the most important causes of heart disease and premature mortality in Russia (Cockerham, 2000). Brainerd and Cutler (2005) show that during the 1990s increased alcohol consumption and psychological

[1] Most of studies mentioned follow static approaches; exceptions, using dynamic approaches, are the papers by Contoyannis and Jones (2004) and Balia and Jones (2008).
[2] However, Russia and Mexico might differ with respect to the change in female labour participation during economic downturn. Thus, the results of Cutler et al. (2002) may not be completely transferable to the Russian situation.

stress were significant causes of increasing mortality rates in Russia. Ogloblin and Brock (2003) investigate the risk factors and economics of the decision to smoke in Russia. Baltagi and Geishecker (2006) test a theoretical model of addiction using Russian panel data, and find some evidence of addictive behavior for alcohol consumption for Russian males.

During the pre-transition period all transition countries, except Romania, exhibited significantly higher consumption levels, defined as cereal equivalent, than market economies at comparable income levels (Rask and Rask, 2004). The reasons were the subsidization of food and, therefore, generally low food prices, on the one hand, and a high prominence of meats in the diet, on the other. Rask and Rask (2004) identify three turning points in the pattern of food consumption for a panel of several transition countries. More specifically, the initial drop in food consumption is followed by stabilization at a lower level and, finally, by an increase in line with increasing income levels. With respect to Russia, they point out that the stabilization of food consumption at a new (lower) level was not yet reached by 2004. The relevance of economic factors for patterns of individual food consumption has also been proven by Brosig (2000), Szabo (1999) and Šlaisova (2001) for Central and Eastern European Countries.

Interestingly, the large majority of empirical studies that have analyzed determinants of nutrition, food choice, smoking and obesity control for regional variations only by including very broadly defined regional dummy variables. Obviously, there are regional differences in consumption behavior and it is reasonable to assume that regional consumption patterns develop differently. For instance, Simpura and Levin (1997) point to regional differences in alcohol consumption within the Russian Federation and attribute them to cultural and ethnic factors. Therefore, in the next section we develop explicit hypotheses for the effects of several micro and regional (macro) factors on individual (and household) nutritional behavior.

Development of hypotheses

Several theories aim at explaining an individual's decision to consume a certain food or to choose a certain lifestyle. To start with standard microeconomic theory, individual food demand is a function of income, a good's own price, cross-prices and preferences. Recent examples are Contoyannis and Jones (2004), who present a theoretical model of lifestyle and health production, and Arnade and Gopinath (2006), who develop a demand function for fat as an outcome of dynamic utility maximization. Arguments of the fat demand function are a consumer's subjective time discount rate, prices (of fat-containing foods), total cumulative fat level and expenditures. Demand for fat is increasing in expenditures but decreasing in the prices and total cumulative fat level. Change in household income and the initial share of fat in total calorie intake are used as proxies for expenditure and cumulated fat intake. However fat (lipids) and proteins originate from different foods, in different amounts. Thus, prices need to be weighted accordingly. Therefore, the cumulative change in consumer prices is used here to account for the expected decreasing demand in prices.

Drinking and smoking can be habit forming. Certainly there is much evidence demonstrating persistence in drinking and smoking over the life course. In the habit formation model cumulative past consumption creates a "stock" of habit that influences current consumption. An individual who has consumed a large quantity of alcohol or cigarettes in the past will derive less utility from any current consumption level that would be derived, had previous consumption be lower. The habit formation model recognizes the dependence of current consumption on past consumption. To test and to control for the habit forming element in a consumer's behavior of Russian adults, lagged consumption is included as an argument. A positive coefficient on the lagged drinking and smoking variables suggest that drinking and smoking is habit forming. Habit persistence that is a higher

current consumption level due to previously high consumption and the influence of past consumption on current preferences are found to have an impact as well (Edgerton et al., 1996).[3]

Besides models grounded in neoclassical theory, consumption decisions might be influenced by various additional factors, like social norms and individual beliefs with respect to consequences of actions (Petrovici et al., 2004*).* Several empirical studies have shown that energy intake follows a life-cycle while generally increasing up to age around 60 and declining subsequently (e.g., Miquel and Laisney, 2001). Thus, age and other individual characteristics such as gender and education are potentially important factors in the choice of nutrition patterns.

Institutional factors might also influence the availability of certain foods. Russian regions face a variety of production and marketing conditions and are differently affected by institutional developments. For example, Russia is known for the poor quality of its rural roads, poor fresh milk handling facilities, and underdeveloped food retail system. Also, in the times of bad harvests, grain-surplus regions restrict exports to other regions. Grain-deficit regions, mainly in the North, have to switch to imports from other countries (Liefert, 2004). More generally, it seems plausible that the quality of infrastructure that is associated with food production and distribution deteriorates as the distance from Moscow increases.

Furthermore, as shown by Sedik and Wiesmann (2003), larger households without access to garden plots suffer a higher level of food insecurity. Both household size and access to garden plots are thus important factors in determining consumption behavior under uncertain economic conditions. However, the magnitude of their effects on consumption changes remains an empirical question.

[3] This finding conflicts with the prediction from the model by Arnade and Gopinath (2006) with respect to fat intake. Therefore, the effect of initial fat consumption behavior on changes in fat intake remains an open question.

Deteriorating macroeconomic conditions such as declining Gross Regional Product (GRP) per capita and rising regional unemployment are expected to stimulate higher alcohol and cigarettes consumption (Ruhm, 1995; Brander and Cutler, 2005).

The following empirical analysis aims at providing the hypotheses and giving evidence if either habit persistence or cumulative intake of certain food has an impact on future consumption behavior.

Data and econometric specification

Data from the Russian Longitudinal Monitoring Survey (RLMS) for 1994 and 2004 and the Russian Statistical Yearbook (RSY) are employed to investigate the micro and regional economic determinants of changes in lifestyle in Russia. The RLMS is a nationally representative household survey that annually samples the population of dwelling units.[4] The RLMS is coordinated by the Carolina Population Center at the University of North Carolina (http://www.cpc.unc.edu/projects/rlms). Data collected include a wide range of information concerning household characteristics such as demographic composition, income and expenditures, and individual characteristics such as employment, anthropometric measures, health status, nutrition, alcohol consumption and medical problems. Data on consumption are based on recall over the last 30 days or/and household dairies. We use round 5 (1994) and round 13 (2004) of the RLMS. The RSY provides data on the regional economic variables of the 32 oblasts covered in our analysis.

To test the hypotheses developed in the previous section, the relationship between changes in food, alcohol and cigarettes consumption and micro and regional economic indicators can be formulated by the following dynamic econometric model:

[4] This is not a true panel survey where sample households and individuals are followed and interviewed in each round. After 1999 the original design was modified and some households and individuals who moved were surveyed at their new locations. The analyses of the RLMS data for attrition, carried out by the Institute for Social Research at the University of Michigan, show that the exits can be characterized as random and that the sample distributions remain unchanged (Heeringa, 1997).

$$\Delta Y_{it} = \alpha Y_{it-1} + \beta \Delta X_{it} + \gamma \Delta M_{it} + \delta Z_{it-1} + \varepsilon_i,$$

where "Δ" refers to difference in time operator for individual *i* such that $\Delta Y_{it} = Y_{i2004} - Y_{i1994}$, or $\Delta Y_{it} = \ln(Y_{i2004}/Y_{i1994})$. Y is alcohol consumption, number of cigarettes smoked per day, diet based on shares of fats and proteins in the diet, and food diversity based on the Berry-Index. The dependent variables are defined as follows:

1) Alcohol consumption is measured by a continuous variable; pure alcohol (ethanol) consumption per day in grams, derived from self-reported consumption during the last 30 days.[5]

2) Smoking is defined in terms of number of cigarettes smoked per day.

3) Diet is measured by three variables:

- share of fat in diet,
- share of proteins in diet,
- food diversity, measured by a Berry index: $BI = 1 - \sum s_j^2$,

where s_j is the share of food group *j* in total consumption (Thiele and Weiss, 2003)[6]. Higher values indicate a more diverse diet. All dependent variables except food diversity are measured at the individual level. The food diversity index is calculated at household level because our data contain expenditure information only for the household.

We have included the beginning period value of the dependent variable (Y_{it-1}) to account and test for possible dynamics in lifestyle choices or state dependence, including the habit formation hypothesis (Deaton and Muellbauer, 1980; Ivaschenko, 2005). For example, if there is general convergence of individual or household demand to a new equilibrium lifestyle, the initial period

[5] We follow Schultz (2008) to calculate the ethanol content. The following weights are applied: 0.05 for beer; 0.11 for table wine/champagne; 0.19 for fortified wine; 0.40 for vodka; 0.45 for home-made liquor/samogon; 0.25 for other alcohol. Although Nemtsov (2004) criticizes the reliability of the alcohol measure in the RMLS, we believe that changes should be less prone to measurement error than absolute levels.

[6] Additionally, food diversity could be measured using an Entropy-Index, which assigns higher weights for items with small shares. However, results are very much the same, and are available upon request.

value of the lifestyle is expect to have a negative coefficient in our empirical of change. We believe that these variables affect the way individuals will adjust lifestyle choices to a new equilibrium consumption path. The initial level of the dependent variables accounts allows testing the habit formation hypothesis versus the accumulation hypothesis by Arnade and Gopinath (2006).

X_i is a vector of micro or socioeconomic variables such as household income and household size measured in 1994 and 2004. Based on the conventional demand theory the changes in food, alcohol and cigarettes consumption will be proportional to changes in household income and household size. M_i is a vector of regional economic indicators for the region where the individual resides: changes in real GRP per capita, inflation rate and unemployment rate for the oblast. Distance between the regional center and the capital Moscow enters in levels. During transition periods, changes in a household's income may be very noisy. For example, changes in regional real GDP per capita might be a better proxy for determining individual behavior than the changes in reported household income. The change in the price level is a proxy for the inflation rate, and a high inflation rate could cause households to reduce money balances and hold real goods in inventory as a substitute for holding money. This would affect demand. Moscow is the population and political center of Russia. Being farther away might affect the individual consumption patterns. Z_{it-1} is a vector of initial level (fixed effects) micro variables such as education, age, gender, marital status, and access to land—that might affect the ease or difficulty of adjusting consumption behavior over the transition. For example, individuals who have more education may adjust faster to new economic conditions than those who have less education (Huffman 1977; Schultz 1975). Those who are older may adjust more slowly because they have less time to benefit from moving to a new equilibrium in lifestyle. ε_i is a random disturbance term reflecting the impact of unmeasured factors on lifestyle choices.

Non-truncated dependent variables like share of fats and proteins are explained using Ordinary Least Square (OLS), and interval regression is applied to explain the truncated variables alcohol and cigarette consumption.[7]

Table 1 presents the definitions, means and standard deviations for all variables used in the econometric analysis. Our sample includes 3,126 adults, 18 years and older. About 39 percent of the individuals in the sample are males and 72 percent are married. Also about 40 percent of the individuals in the sample have access to a garden plot in 1994. Changes of the dependent variables between 1994 and 2004 are of special interest. While the magnitudes of change in fat and protein consumption are quite small they hide substantial heterogeneity in the sample. There is on average a small increase in consumption of protein, by 0.4 percent and a small decrease in consumption of fat, by 1 percent. Consumption of alcohol has declined substantially, by about 40 percent, while the use of cigarettes has increased by almost 31 percent.

Results

Table 2 presents the results of the econometric analysis. The null hypothesis that all of the estimated coefficients of the explanatory variables are jointly zero, except for the intercept, is rejected in all regressions. Past consumption behavior significantly affects the adjustment of consumption over the transition for all five equations. The estimated coefficients point to a convergence in behavior (absence of habit formation) for fat and protein consumption, for food diversity as well as for alcohol consumption. This is consistent with the study by Baltagi and Geishecker (2006), which did not find support for rational addiction (RA) model of Russian women's alcohol consumption but did find some support for RA in Russian male alcohol consumption. However, we find divergence pattern and thus, evidence of habit persistence or possibly addiction with respect to smoking; a

[7] 2142 out of 3162 individuals in the sample never smoked, and 894 out of 3162 individuals never consumed alcohol.

higher initial rate of cigarette consumption leads to a higher rate increase in cigarette consumption over the transition. Our model predicts a higher consumption of cigarettes of about 0.23 percentage points due to 1 percent higher initial cigarettes consumption rate. A one percent increase in the initial share of fat or protein in the diet leads to a -0.9 percent reduction in the percent of fat or protein in the diet over the transition. Our result supports the hypothesis by Arnade and Gopinath (2006) in the case of fat intake. Also, a 1 percent increase in the initial alcohol consumption rate leads to a 0.5 percent decrease in alcohol consumption during the transition.

Individuals who are older at the start of the transition in 1994 show a smaller increase in the rate of cigarette consumption over the transition. Individuals holding university degree at the beginning of the transition increased their consumption of fat by 2.6 percent and protein by 0.86 percent over the transition, but they decreased cigarette smoking by 44%. An increase in an individual's household income and household size over the decade-long transition period results in a more diverse diet, which is consistent with other studies on food diversity. A one percentage increase in an individual's household income over the transition causes an increase in the share of fat and protein in the diet, a larger percentage increase in alcohol consumption and decrease in cigarette consumption over the transition, but these effects are not statistically significant. However, a larger percentage increase in household income causes a larger and statistically significant increase in food diversity over the transition. Being a male leads to a significantly positive increase in share of protein in the diet over the transition, a larger positive percentage increase in cigarette and alcohol consumption, but a decline in food diversity. The availability of garden plots in 1994 leads to a lower increase in fat, cigarette and alcohol consumption, but at the same time, to a lower diversification of diet. A possible explanation is that individuals who have access to a garden will probably already initially eat more vegetables and fruits if they grow the produce. Also if they have

an access to a garden, they are more likely to rely on food from their garden than from the grocery stores and purchase fewer and possibly less diverse food products from grocery stores. Thus, the effect of this variable might work mostly via levels of consumption rather than via changes, which is to say that households with garden plots can better smooth consumption. Working in the garden may also be a means for working off frustration caused by the transition that would otherwise lead to greater consumption of alcohol and cigarettes.

Regarding the macroeconomic determinants of nutritional behavioral changes, the results show that the change in real GRP per capita is relatively influential. In particular, the change in regional income is quantitatively and statistically a more important determinant of changes in fat, protein and alcohol consumption than household income. The share of fat and proteins increases significantly in faster growing regions. If the real GDP per capita increases over the transition by 0.1, the fat content in diet increases over the transition by 0.24 percent and the protein content by 0.16 percent, but it reduces alcohol consumption by 1.38 percent. A change in real oblast income also reflects how other on average are being affected by the transition, which might have positive externalities on any individual or household. Our results suggest that average real growth in GRP per capita is a better proxy for the change in income that affects individual and household consumption than the change in the individual's own household income (per capita).

Inflation, approximated by the cumulate change in consumer prices between 1994 and 2004, does not have a statistically significant effect on the change in an individual's consumption over this transition period. The change in regional/oblast unemployment affects positively and significantly protein intake but negatively alcohol consumption and food diversity. A 1 percent increase in the unemployment rate would reduce a individual's alcohol consumption by 36 percent and food diversity by 15 percent. However, a change in the unemployment rate does not affect the change in

cigarette consumption. The distance to the capital, Moscow, has a positive and significant effect on changes in food diversity, but a negative effect on changes in fat and protein consumption. Living farther away from Moscow reduces the fat and protein content of diet, other things equal. One interpretation is that locally produced supplies of fat and protein are shipped to Moscow where the largest concentration of country's population and most wealthy households live.

Conclusions

The paper is focused on the change in alcohol consumption, smoking and some quality characteristics of Russian adults over the transition period, 1994-2004. All changes are expected to influence directly or indirectly the health of the population. The results from the dynamic econometric model suggest that among the micro determinants, initial levels of consumption, holding a university degree, gender and having access to a garden plot all have a significant impact on changes in nutritional behavior in Russia. Regarding the regional determinants, changes in real GRP per capita has a significant impact only on changes in fat and protein consumption, alcohol consumption and food diversity, while changes in unemployment significantly impact only protein and alcohol consumption as well as food diversity. The habit formation hypothesis was supported only for the cigarettes consumption. Still this paper only provides "the ingredients" for a deeper analysis on e.g. health characteristics of individuals and groups. This further links could be developed by combining consumption data with for example obesity and life expectancy models.

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Table 1. Variable definitions, means and standard deviations

Variable	Definition	Mean	SD
Dependent variables			
Fat	change in the share (in percent) of fats in the diet	-1.0237	13.895
Protein	change in the share of proteins (in percent) in the diet	0.4222	4.8783
Food diversity	proportional change in the Transformed Berry index	0.2513	0.8024
Cigarettes	proportional change in the number of cigarettes smoked per day	0.3053	1.3972
Alcohol	proportional change in the total amount of alcohol per day	-0.4128	2.8805
Explanatory variables			
Fat	share (in percent) of fats in diet in 1994	33.51	10.76
Protein	share (in percent) of proteins in diet in 1994	12.70	3.47
Food diversity	Transformed Berry index (as in Thiele and Weiss) in 1994 TBI=ln[BI/(1-BI)]	0.8245	0.7141
Cigarettes	number of cigarettes smoked per day in 1994	11.61	8.502
Lcigarettes	log of number of cigarettes smoked per day in 1994	2.1190	1.1113
Alcohol	total grams of ethanol equivalent consumed per day in the last 30 days in 1994	96.62	150.36
Lalchohol	log of total amount of alcohol consumed per day (in grams) in 1994	3.4751	1.9138
Age	individual age in years in 1994	43.5000	14.817
High school	dummy=1 if the individual has a high education level (base category is primary education) in 1994	0.4664	0.4989
University	dummy=1 if the individuals has university education in 1994	0.1571	0.3640
Gender	dummy=1 if the individual is a male	0.3915	0.4881
Married	dummy=1 if the individual is married in 1994	0.7232	0.4474
Garden	dummy=1 if the individual has access to household land/plot in 1994	0.7890	0.4080
HHsize	proportional change in the equivalent number of household members	-0.1194	0.4341
HHincome	proportional change in household income	-0.1465	0.7984
Real GDP per capita change	proportional change in real GDP per capita, 1994 and 2004	0.1172	0.2101
Pricechange	proportional change in regional prices, 1994 and 2004	3.6656	0.1624
Unemplchange	change (in percent) in regional unemployment rate, 1994 and 2004	1.1386	2.8390
Distance	log of the regional distance to Moscow	6.3785	1.9245

Notes: Number of individuals in the sample is 3162 and the number of households is 1639.
Proportional change in cigarette consumption is reported for only 1020 individuals that smoke (in 1994, 2004 or in both years). Proportional change in alcohol consumption is reported for only 2268 individuals that drink (in 1994, 2004, or in both years).
Proportional change in the Berry index and log of the Berry index in 1994 are given on the basis of 1638 households.

Table 2. Estimates of Food, Alcohol and Cigarettes Consumption Changes in Russia 1994-2004

	Fat	Protein	Change in Cigarettes	Alcohol	Food Diversity
Household characteristics					
Level of dependent	-0.965***	-0.922***	0.229***	-0.487***	-0.864***
variable in 1994	(0.023)	(0.021)	(0.035)	(0.027)	(0.020)
Age	-0.023	-0.049	-0.053***	0.016	0.001
	(0.092)	(0.032)	(0.018)	(0.023)	(0.007)
Age_squared*10^{-2}	-0.058	0.056	0.017	-0.069**	-0.003
	(0.099)	(0.0355)	(0.019)	(0.025)	(0.007)
High_Education	0.545	0.321*	-0.0004	-0.099	-0.031
	(0.371)	(0.178)	(0.088)	(0.128)	(0.025)
University	2.591***	0.859***	-0.438***	0.221	0.041
	(0.483)	(0.248)	(0.143)	(0.143)	(0.036)
Gender	0.073	0.305***	1.256***	1.105***	-0.059**
	(0.280)	(0.098)	(0.129)	(0.112)	(0.029)
Married	0.707	0.038	0.093	0.039	0.006
	(0.495)	(0.168)	(0.102)	(0.137)	(0.028)
HHsize	-0.099	0.003	-0.104	-0.296**	0.051**
	(0.450)	(0.174)	(0.104)	(0.130)	(0.029)
HHincome	0.214	0.129	-0.008	0.117	0.065***
	(0.277)	(0.109)	(0.047)	(0.085)	(0.016)
Garden	-1.409***	-0.017	-0.371***	-0.344**	-0.108***
	(0.467)	(0.175)	(0.094)	(0.124)	(0.027)
Regional characteristics					
Real GDP per	2.408**	1.611**	-0.189	-1.376***	-0.039
capita change	(1.182)	(0.559)	(0.203)	(0.330)	(0.065)
Price change	-0.237	0.437	0.017	0.265	-0.024
	(1.271)	(0.475)	(0.255)	(0.251)	(0.088)
Unemplchange	-0.732	0.873***	-0.120	-0.356**	-0.150***
	(0.583)	(0.273)	(0.124)	(0.173)	(0.038)
Distance	-0.340***	-0.083*	-0.022	0.023	0.014*
	(0.113)	(0.049)	(0.022)	(0.031)	(0.007)
Constant	36.271***	11.372***	0.151	-0.046	1.149***
	(5.216)	(2.065)	(1.005)	(1.026)	(0.412)
N	3162	3162	3162	3162	1638
F/Waldchi2	191.08***	201.15***	1825.66***	552.31***	184.86***

Notes: * Statistically significant at the 10 percent level or less;
** Statistically significant at the 5 percent level or less;
*** Statistically significant at the 1 percent level or less.
Robust standard errors are in parentheses.
All of the dependent variables except food diversity are measured at individual level, while food diversity is measured at household level.