Assessment of Food and Nutrition Security in Countries of Central and Eastern Europe: Estimation of Food Demand

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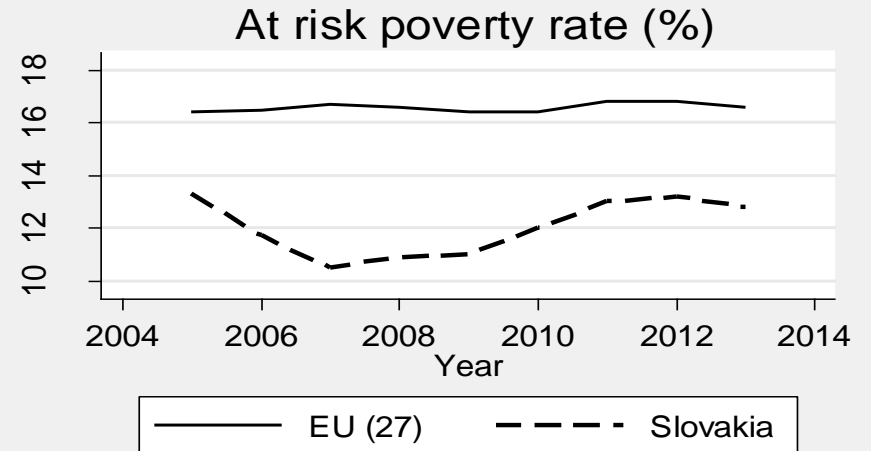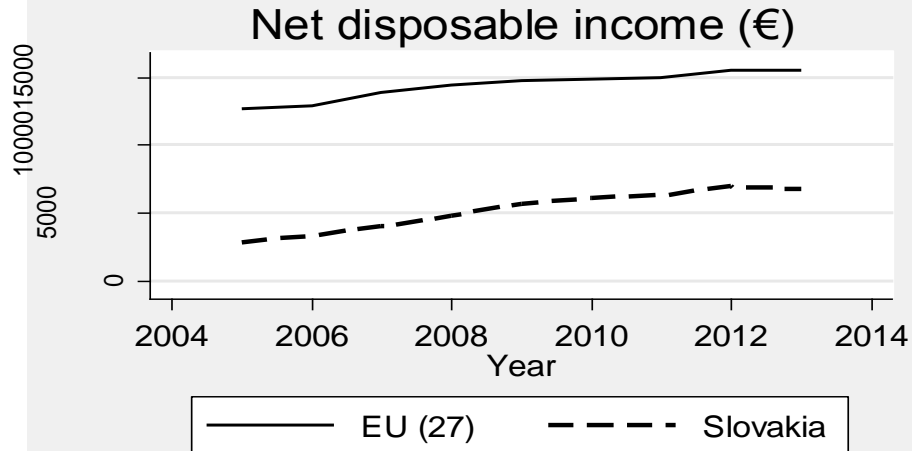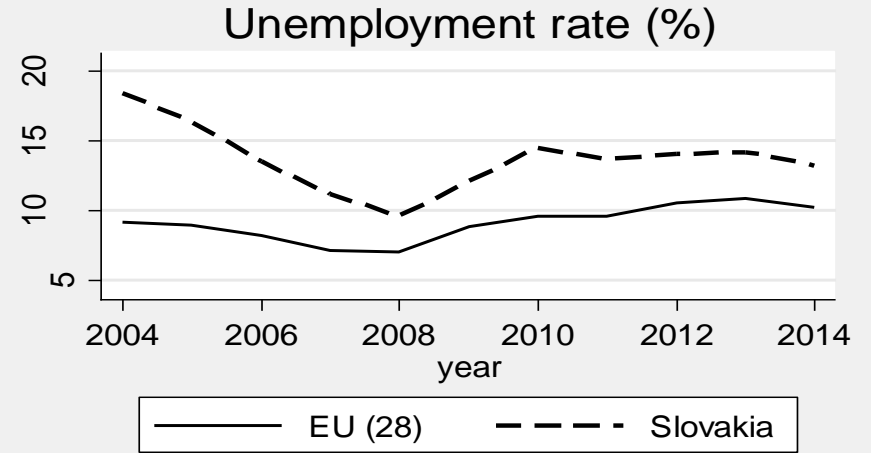[a] Slovak University of Agriculture, Nitra, Slovakia
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Background and introduction

GDP growth (%)

Unemployment rate (%)

Net disposable income (€)

At risk poverty rate (%)

EU (28) — — Slovakia

EU (27) — — Slovakia

Source: Eurostat

Background and introduction

Bread and cereals / Meat / Milk, cheese and eggs / Fruit / Vegetables / Sugar, jam, honey, chocolate ... — EU (27) and Slovakia
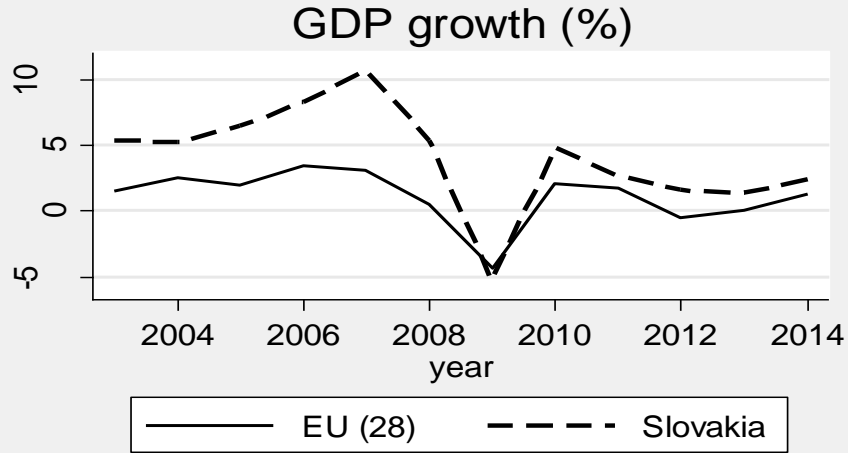
Source: Eurostat
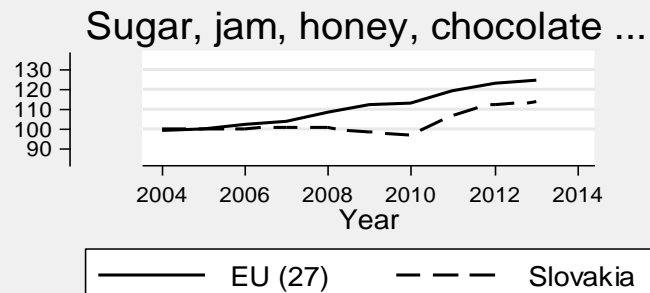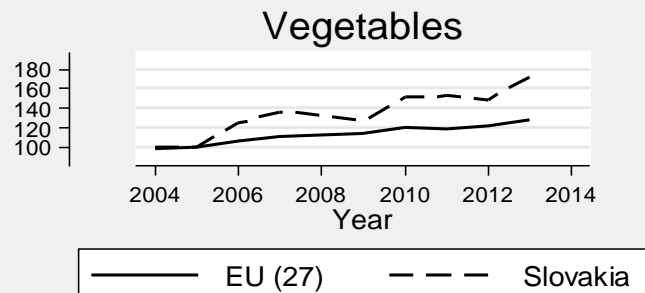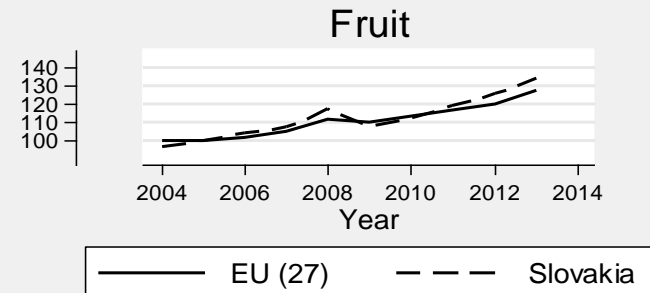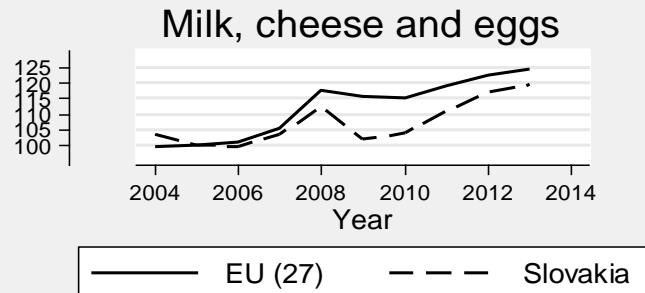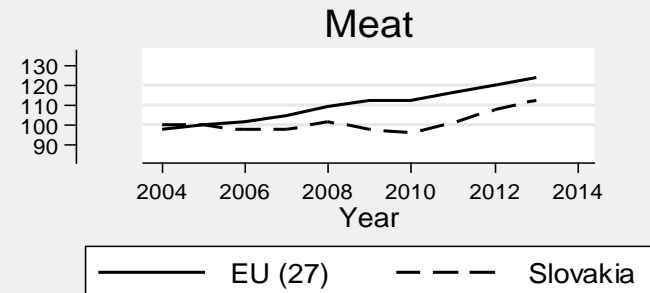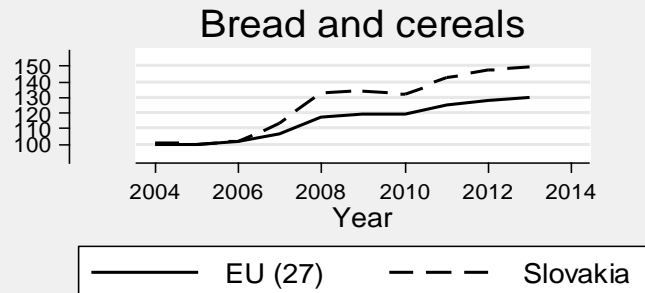
Background and introduction

Income levels, unemployment and poverty rates considerably differ among developed and less developed regions of Slovakia

Unemployment rate by regions

Region	2004	2007	2010
Bratislava	3.39	1.98	4.63
Trnava	8.83	4.3	8.17
Trencin	8.09	4.5	9.51
Nitra	14.8	7.1	11.76
Zilina	11.12	5.55	10.86
Banska Bystrica	19.5	14.1	18.86
Presov	17.5	12.05	17.75
Kosice	18.89	13.02	16.78
Total	13.07	7.99	12.46

Poverty rate by regions

Region	2005	2007	2010
Bratislava	7.8	5.9	5.1
Trnava	10.9	8	6.7
Trencin	13	7	10.1
Nitra	16	12.2	13.2
Zilina	12	8.5	9.6
Banska Bystrica	10	12.6	16.9
Presov	21.3	15.6	18.7
Kosice	13	11.9	12.7
Total	13.3	10.5	12

Source: Slovak Statistical Office

Background and Introduction

- Growing demand for FAFH especially in developed countries

- Expenditure share on FAFH 40 - 45% of total food spending

- FAFH consumption less developed in CEE, but expanding and becoming relevant

Objective of the paper

Analyze food-away-from-home and its determinants (important aspect of FNS since obesity is closely related to FAFH demand)

Literature Review

- Much evidence internationally that rising income increases the demand for FAFH (e.g.Prochaska and Schrimper, 1973; Kinsey, 1983; Jensen and Yen, 1996; Nayga, 1996),

- **Household composition and population structure** has effect on FAFH
  - Families with preschool children and older woman dine away from home less than other families (Redman,1980)
  - Households with members between age 4 and 14 consume more FAFH than those with people 26–50 years. (Lee and Brown, 1986)
  - Per capita FAFH expenditure on younger members is less than that on adults, but that expenditures on youth are increasing over time. (Byrne et al. 1996)

Literature Review

- Household composition and population structure has effect on FAFH
  - Household composition has varying effects on consumption of particular foods such as cheese (Yen and Jones, 1997) and pork (Su and Yen, 1996).
  - Household size significantly increases the probability and expenditure of breakfast consumption away from home but negatively affects lunch consumption in Spain (Mutlu and Gracia, 2006)

Literature Review

- Many studies have analyzed link between FAFH and obesity as well because of the oversized portions of meals offered at fast-food outlets (see, e.g. Thompson et al., 2003; or Naska et al., 2011)

- Since the obesity rates are quite high in the CEE Countries ranging from 20% in Slovakia to almost 28% in Hungary (OECD, 2014), FAFH analysis is timely

Data

- Slovak HBS data consists of seven annual rounds, 2004 – 2010

- Annual sample has about 4700 households

- Info collected on a one-month recall basis

- Data contains household incomes, expenditures on food and non-food goods and services, expenditures on FAFH during past month.

- Data contains also info on quantities consumed by household, its location and size as well as individual household member characteristics such as age, education, occupation, marital status and others.

Data

- Households are asked whether they participate in the FAFH market and how much they spend on it (monthly recall basis)

- As explanatory covariates, HH income, wife's working status, HH head's characteristics and other control variables are used

- Estimations are carried out on the pooled dataset covering period from 2004 to 2010

Theoretical Framework

- FAFH estimation based on the household production theory developed by Becker (1965), Lancaster (1971), and Michael and Becker (1973).

- Households assumed to be both producers and utility maximizing consumers.

- Households maximises utility, which is a function of the quantities of commodities produced in the household subject to the household production function, time constraints and full-income constraints.

- The derived demand for FAFH is a function of income, opportunity costs of woman's time and a set of demographic and socio-economic characteristics.

Theoretical framework

- Relative to neoclassical demand functions,household production models include the opportunity cost of time, full-income budget constraint, and technical efficiency or technical change in household production as determinants of the demand for food and other inputs.

- Time spent shopping, preparing and eating food has a cost even though there is not a direct cash outlay and that individuals who have a higher opportunity cost of time find ways to substitute toward less human time intensive means of household production.

Estimation

- Since the main variable of interest FAFH expenditure contains lots of zeroes, standard OLS would produce biased estimates

- We employ several censored dependent variable models such as Tobit and its nested verion-Double-hurdle model which was developed by Cragg (1971)

Estimation

- Participation stage of Double-hurdle model can be written as:

$$d_i^* = X'_{1i}\beta_1 + u_i \qquad u_i \approx N(0,1)$$

$$d_i = \begin{cases} 1 & if \quad d_i^* > 0 \\ 0 & if \quad d_i^* \le 0 \end{cases}$$
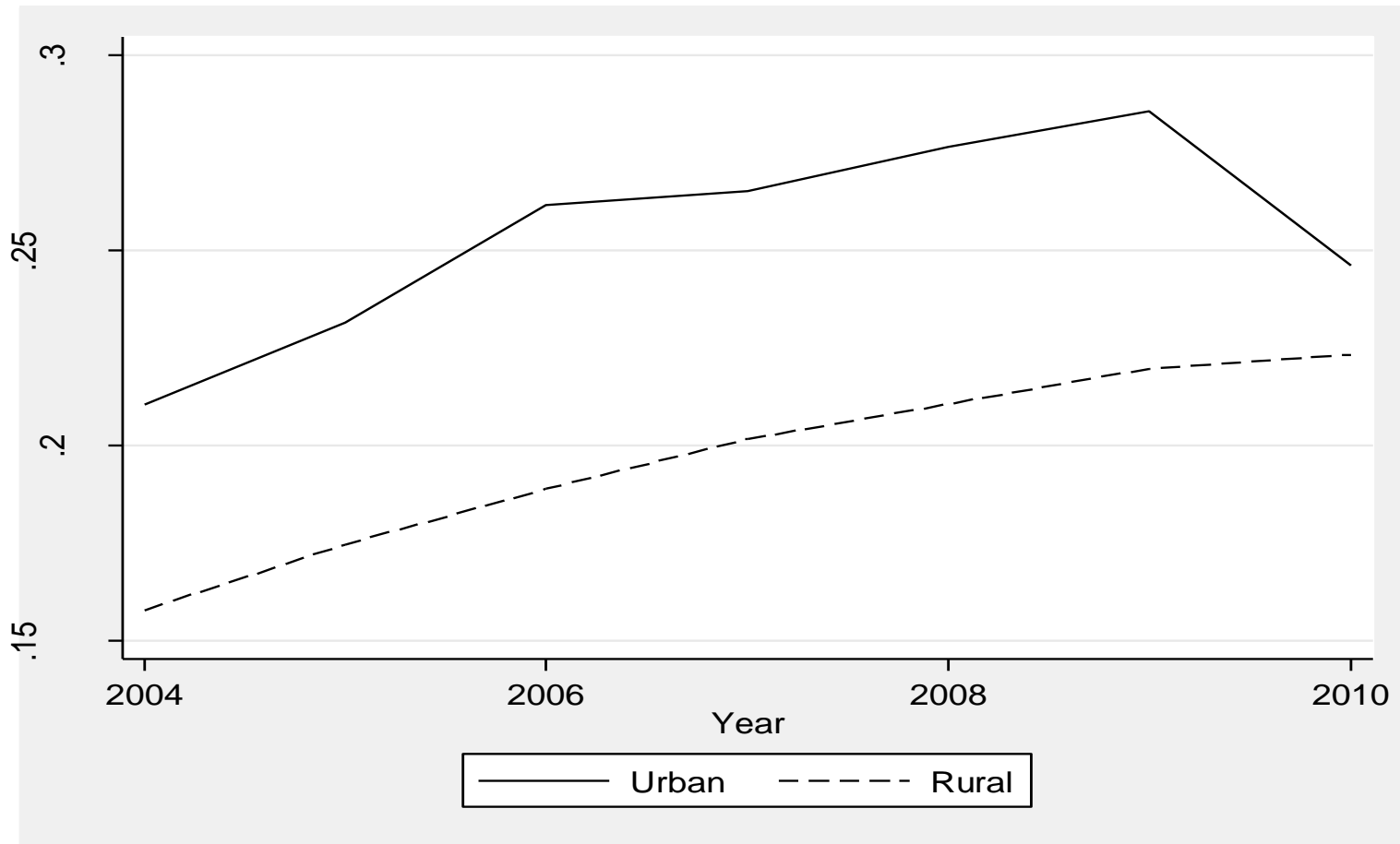
- Consumption stage is given as:

$$y_i^* = X'_{2i}\beta_2 + v_i \qquad v_i \approx N(0,\sigma^2)$$

$$y_i = \begin{cases} y_i^* & \boldsymbol{if} \ d_i = 1 \quad and \quad y_i^* > 0 \\ 0 & \boldsymbol{else} \end{cases}$$

FAFH: data (cont'd)

Evolution of the FAFH expenditure out of the total food expenditure

Source: Slovak HBS; authors' calculations

	2004		2010	
	Absolute	Relative	Absolute	Relative
Food and non-alcoholic beverages	5 065	0.20	6 862	0.18
Alcoholic beverages and tobacco	1 355	0.05	1 801	0.05
Clothing and footwear	1 065	0.04	1 639	0.04
Housing, water, electricity, gas and other fuels	6 984	0.27	10 000	0.26
Furnishing, household equipment and routine maintenance of the house	1 275	0.05	2 387	0.06
Health	604	0.02	1 200	0.03
Transport	2 231	0.09	3 054	0.08
Communication	946	0.04	1 471	0.04
Recreation and culture	2 150	0.08	3 664	0.10
Education	363	0.01	581	0.02
Hotels, cafés and restaurants	**1 613**	**0.06**	**1 998**	**0.05**
Miscellaneous goods and services	2 158	0.08	3 697	0.10
Total	25 809	1.00	38 353	1.00

Table 1 Summary statistics, (2004 and 2010)

Variable	2004			2010		
	Mean	Min	Max	Mean	Min	Max
FAFH_expenditure [a]	26.308 (21.311) [b]	0.157	120.160	37.904 (28.554)	0.200	120.426
FAFH_participation	0.558 (0.497)	0.000	1.000	0.604 (0.489)	0.000	1.000
Income	442.997 (244.818)	118.371	1763.567	685.683 (353.866)	118.902	1762.142
Employed_HH	0.594 (0.491)	0.000	1.000	0.554 (0.497)	0.000	1.000
Age_HH	50.906 (15.051)	18.000	95.000	52.140 (14.439)	18.000	95.000
Gender_HH	0.680 (0.467)	0.000	1.000	0.681 (0.466)	0.000	1.000
Education_HH	1.991 (0.524)	0.000	3.000	2.030 (0.488)	0.000	3.000
Employed_wife	0.310 (0.462)	0.000	1.000	0.351 (0.477)	0.000	1.000
Familysize	2.899 (1.427)	1.000	10.000	2.843 (1.418)	1.000	10.000
N_children	0.532 (0.861)	0.000	6.000	0.458 (0.793)	0.000	6.000
Single	0.174 (0.379)	0.000	1.000	0.203 (0.403)	0.000	1.000
Urban	0.612 (0.487)	0.000	1.000	0.552 (0.497)	0.000	1.000

Trend in Harmonized Indices of Consumer Prices: restaurants and cafes
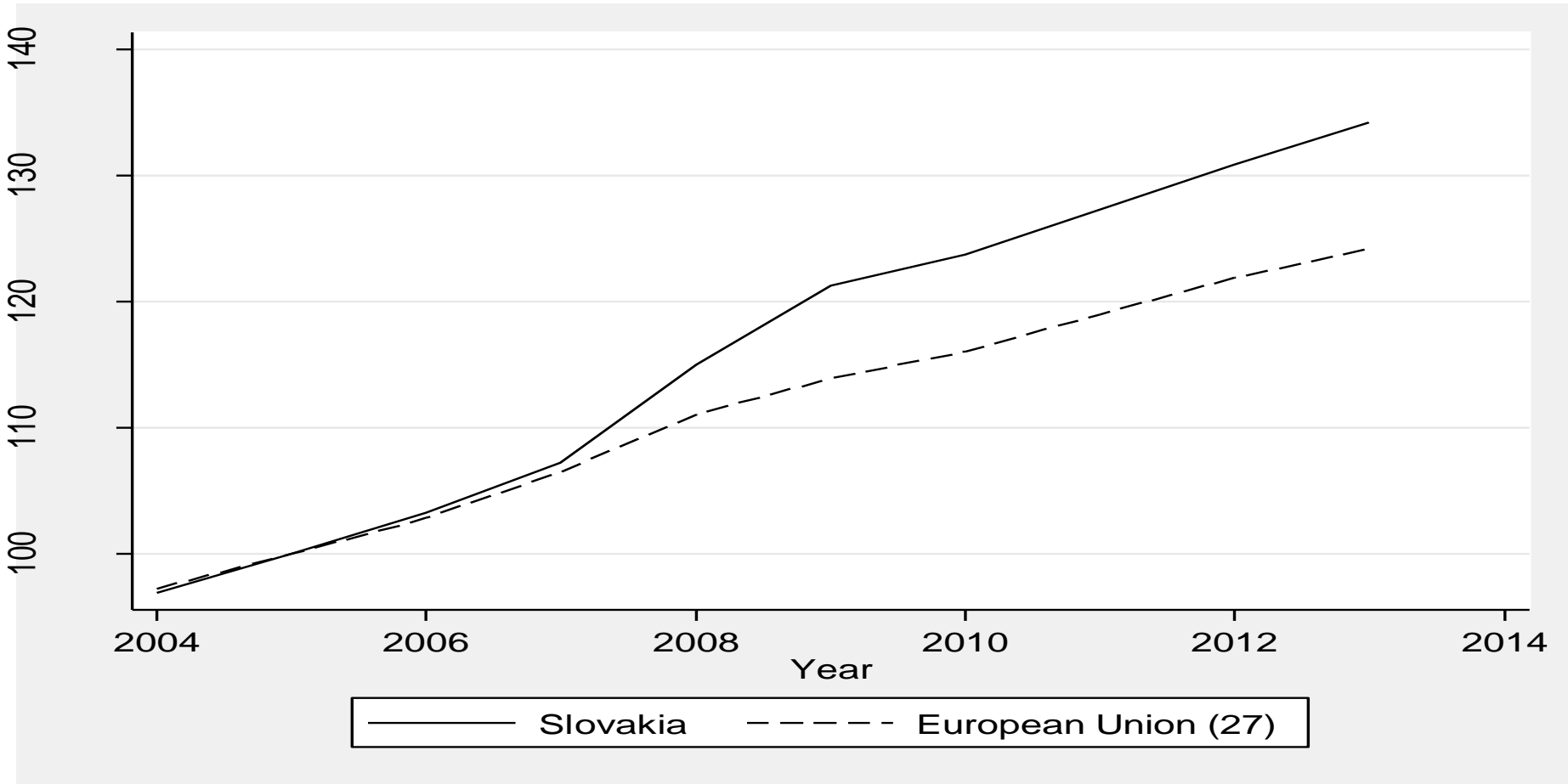
FAFH: results (cont'd)

Double-hurdle and Tobit maximum likelihood estimates, pooled sample (2004-2010)

Variable	Double-hurdle participation stage	Double-hurdle consumption stage	Tobit
Income (ln)	0.921*** (0.026)[a]	0.740*** (0.019)	1.827*** (0.037)
Employed_HH	0.395*** (0.023)	0.396*** (0.020)	1.005*** (0.039)
Age_HH	-0.015*** (0.001)	-0.003*** (0.001)	-0.027*** (0.001)
Gender_HH	-0.147*** (0.021)	-0.073*** (0.017)	-0.277*** (0.034)
Education_HH	0.242*** (0.018)	0.028** (0.013)	0.363*** (0.026)
Employed_wife	0.207*** (0.022)	0.208*** (0.015)	0.407*** (0.031)
Family_size	-0.051*** (0.011)	0.018** (0.007)	-0.022 (0.015)
N_children	0.136*** (0.015)	-0.004 (0.009)	0.113*** (0.019)
Single	0.202*** (0.029)	0.192*** (0.025)	0.376*** (0.047)
Urban	0.088*** (0.017)	0.020 (0.013)	0.144*** (0.025)
Constant	-5.228*** (0.150)	-2.037*** (0.112)	-10.099*** (0.221)
N	33300	33300	33300
Pseudo R^2			0.1398
Log pseudolikelihood	-41475.6		-51573.9

Source: Slovak HBS; authors' calculations

FAFH: results

Estimated marginal effects of Double-hurdle model

	Probability	Conditional	Unconditional
Continuous effects			
Income (ln)	0.258	0.722	1.175
Age_HH	-0.004	-0.002	-0.014
Discrete effects			
Employed_HH	0.110	0.386	0.551
Education_HH	0.068	0.027	0.207
Gender_HH	-0.041	-0.071	-0.160
Employed wife	0.058	0.203	0.290
Family size	-0.014	0.018	-0.029
N_kids	0.038	-0.004	0.104
Single	0.057	0.187	0.276
Urban	0.025	0.020	0.082

Source: Slovak HBS; authors' calculations

FAFH: results (cont'd)

Elasticity estimates with respect to household income by different household types
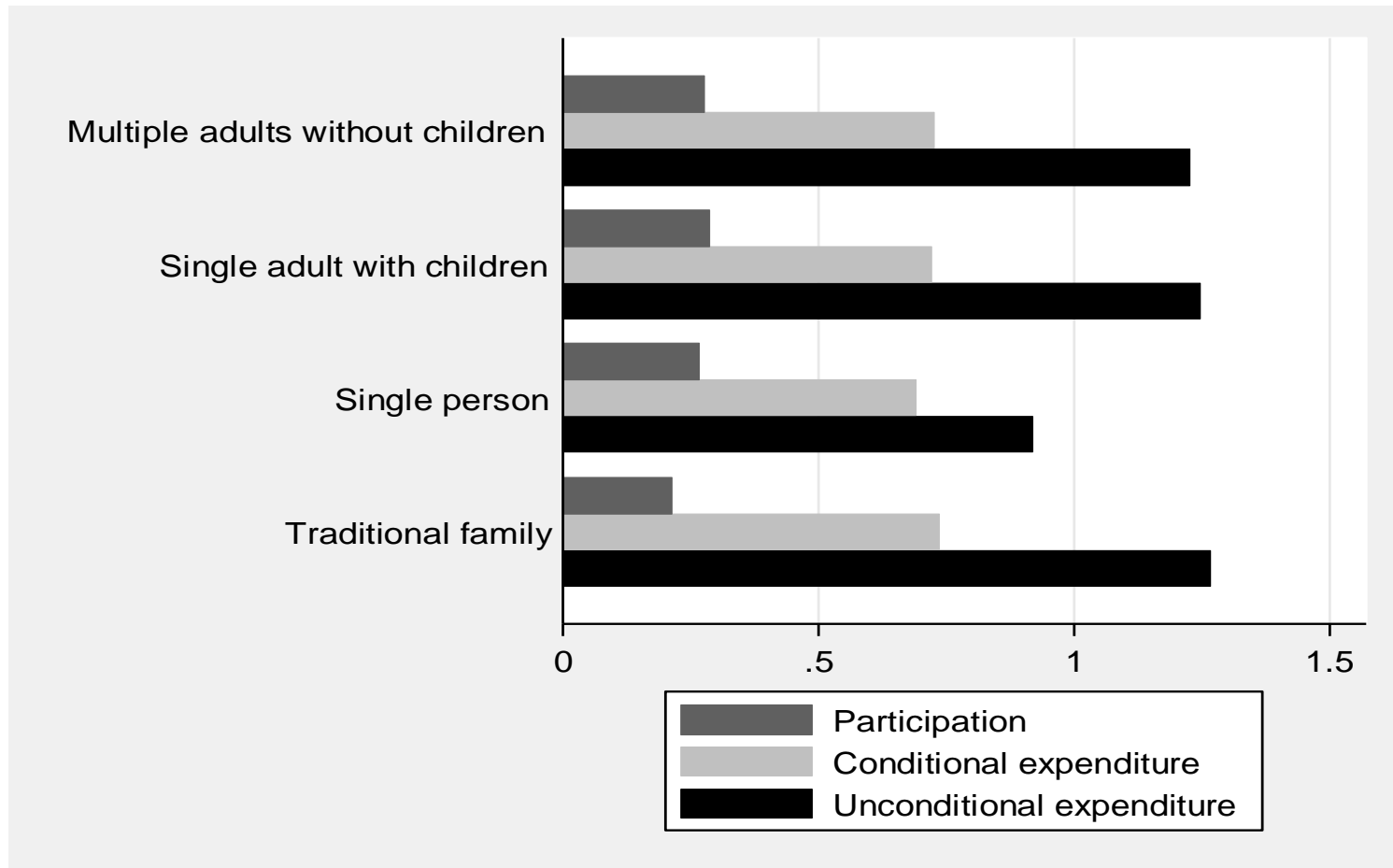
Source: Slovak HBS; authors' calculations

Conclusion and policy implications (cont'd)

- Share of out of home eating households has been increasing, but still has not reached levels of western countries

- Providers of restaurants can expect further growth of this industry

- Policymakers dealing with quality of diet and obesity should be aware of possible increase in volume of overweight or obese people when the obesity rates are already quite high in the CEE according to the OECD