Seminar 4

Model application, model dynamisation, dummy variables

Exercises

1. Explain the meaning of parameters and process an economics verification of the following model (estimated in seminar 3):

$$y_{1t} = 8{,}994 - 0{,}101x_{2t} + 0{,}027x_{3t} + 0{,}065x_{4t} + 0{,}027x_{5t} + u_{1t} \quad ,$$

where y_{1t} .....pork meat consumption (kg/person/year)
x_{2t}.....pork meat consumer price (CZK/kg)
x_{3t}.....beef meat consumer price (CZK/kg)
x_{4t}.....chicken meat consumer price (CZK/kg)
x_{5t}.....income (thousand CZK)
$u_{1t} \sim nid(0, \sigma^2)$

Explain the parameters utilization in the structural analysis.

2. Calculate direct price, cross price and income elasticity in the last period. Interpret the results.

Then calculate:

a) amount of pork meat consumption caused by 10 % decrease of beef meat consumer price in comparison to the level of the last period, ceteris paribus.

b) amount of pork meat consumption caused by 5 % increase of income compared to the last period, ceteris paribus.

3. Simulate following scenarios:

a) change of pork meat consumer price (calculate it), ceteris paribus, to ensure amount of pork meat consumption of 12 kg/person/year in the 10^{th} period.

b) change of income (calculate it), ceteris paribus, to ensure pork meat consumption of 12 kg/person/year in the 10^{th} period.

c) Calculate change of pork meat supply (omit foreign trade) to ensure market equilibrium, if the income increases by 6 000 CZK in the 9^{th} period, ceteris paribus.

d) Calculate change of beef meat consumer price in order to pork meat consumption increase in 10^{th} period by 4 % compared to the previous period and pork meat consumer price increase by 2 %.

4. Estimate parameters of dynamic model in which the income is in form of the 1^{st} differences. Verify parameters and interpret the relationships. Compare results of dynamic and static model. Calculate coefficient of income elasticity in the last period and interpret it.

5. Following table contains hypothetic data of pork meat consumption, which was influenced in year 2000 and 2001 by important shock (e.g. caused by pigs' disease). The shock caused significant decrease of consumption in these years. Eliminate this shock using dummy variable. Use dynamic model specified in exercise 4.

Year	C PM (kg/person/year)	CP PM (CZK/kg)	CP BM (CZK/kg)	CP ChM (CZK/kg)	Income differences (thousand CZK)
Variable					
1996	8,87	90,42	102,12	62,77	8,536
1997	8,74	92,11	104,82	70,64	6,854
1998	10,36	86,39	110,16	73,31	6,974
1999	9,78	80,47	107,8	56,51	2,829
2000	5,94	90,04	111,53	61,83	2,651
2001	6,05	101,66	112,56	71,28	6,745
2002	9,55	89,84	112,99	62,4	2,986
2003	10,14	82,74	108,02	60,67	4,949
2004	9,97	85,36	112,84	62,55	4,115
2005	11,18	85,3	117,73	62,73	14,3565

Individual exercise

1. Based on the following model calculate differential coefficient of elasticity of the 3rd order for the 5 % increase of income compared to the last period.

$$\hat{y}_t = 37{,}5 x_{2t}^{-0,5} x_{3t}^{0,2},$$

where $\hat{y}_t$ .....consumption
x_{2t}.....price
x_{3t}.....income

Values in the last period are following: $y_t = 41$
$x_{2t} = 5$
$x_{3t} = 102$