

Mathematical Modelling of Agricultural Policy Impact into Rural Areas in the Czech Republic Related to EU Accession

Ivan Foltyn

Introduction:

In the Czech Republic the main attention is devoted to preparing Czech economy to the EU accession. In this context there are examined influences and impacts of harmonization of the Czech agricultural policy with the CAP EU on the Czech agriculture as a whole and even on individual regions of the CR. The methodology and main results were described in two studies of the Research institute of agricultural economics (VUZE) which have been working out for national economy studies on this problem stimulated by the Advice Council of the Czech government. At present the increased attention is focused to examining position of different types of farmers in different conditions in rural areas of the CR.

Material and methods:

For simulation of the agrarian sector development there was used a non-linear optimization model (AGRO-3) which searches market equilibrium on the three markets: agricultural commodities (market 1), processed commodities (market 2) and retailing sector commodities (market 3). The model AGRO-3 simulates impacts of producer price changes to food consumption, consumer prices and consumer expenditures on the base of macroeconomic and agricultural exogenous assumptions.

For the assessment of competitiveness of agricultural commodities there was developed and used a structural model (ZEM-1). The model ZEM-1 uses indicators R (productivity), %TT (terms of trade) for individual commodities and the main indicators of Economic Accounts of Agriculture for the agricultural branch. Assumptions for the model scenarios were following: a) the base year 2000, b) the predicted years 2004 (first year of the accession – no adjustment), 2005 (second year – slight adjustment), 2006 (represents period till 2006 – 2010 – perfect adjustment), c) variants of the agricultural policies - A (without subsidies), B (subsidies 25 %, 30 % and 35 % of the EU level), C (subsidies on the 100 % of the EU level), d) the predicted cost level - 100 % and 80 %.

For the assessment of perspectives of different farm types is used a linear optimization model (FARM-2) which simulates economic possibilities of a farm for the period 4 years. Specification of the model parameters of FARM-2 enables to determine different conditions which occur in rural areas in the Czech Republic.

As data sources there are used information of the Czech Statistical Office, resort statistics of the Czech Ministry of Agriculture and farm examination of VUZE (FADN).

Results:

The main results of the above mentioned studies are: Czech producer prices will quickly adjust to EU prices, food processors' prices will be held on the minimum economic sustainability level of the processing industry, food consumer prices will change below the average wage growth of population and will be acceptable by the population (under the assumption that profit margins in retail sector will not overcome 30 % level). From these reasons "no price shock" is expected after the CR accession to EU. Nevertheless, model results show that food price development in CR as a consequence of the Czech agricultural policy before the accession and the CAP after the accession will be uneven equable, i.e. period 2002 - 2004 on the low level, in 2004 "price jump" and period 2005 – 2010 gradual adjustment to the average EU prices.

The competitiveness of agricultural commodities according to model simulations will be better for crop commodities than for animal products.

Impact analysis of the accession on Czech farms by the help of the model FARM-2 is at present in the phase of model simulations and experiments. Economic behavior of the chosen Czech farm will be compared with comparable types of EU farms (e.g. Austrian farms) on base of available data sources.

Discussion and conclusions:

Combination of the macro- and microeconomic approach for examining impacts of the CR accession to EU on the Czech agriculture by the help of the above described models seems to be suitable methodology which enables to Czech authorities (Ministry of Agriculture, Ministry of Foreign Affairs etc.) operationally to assess EU proposals to candidate countries and parallel to prepare the own counter-proposals for negotiations.

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Author:

Dr. Ivan Foltyn
Research Institute of Agricultural Economics (VUZE)
Manesova 75
120 58 Praha
Czech Republic
tel.: +420-2-22000414
fax: +420-2-22725450
e-mail: foltyn@vuze.cz