European Integration: The Case of Agricultural Farms in Slovak Republic[1]

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This study tries to quantitatively estimate the implication of integration on farms in Slovak republic. The model used for assessment assumes perfect competition and also assumes that farmers are risk neutral. The modelling technique applied in this paper is that of linear programming and theoretical background is based on microeconomic mathematical programming sector model derived by McCarl and Spreen.

The results show that the integration led to increasing level of farms' profitability However if there were no agricultural protection then only the farms situated in regions with better climatic conditions would survive in competitive environment with no subsidies. Another main result of the study is that current Slovak agricultural policy gives strong support to farms situated in regions with worse production conditions in contrast to what it would be under Common agricultural policy of EU.

1. Introduction

One of the most discussed issues related to EU accession of former communist countries, is the agricultural sector. This is because the integration of the large agricultural sector of Central and Eastern European countries (CEEC) may cause significant changes in the EU budgetary exposure and can therefore have important implications for the entire integration process (Hertel, Brockmeier and Swaminathan, 1997). Also there are concerns around the prospective market implications. Especially changes in production can cause overproduction in CEEC and consequently floods of markets in Western Europe.

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The argument, that enlargement of the EU would bring an increase of agricultural supply, was deduced from the observation of sizeably lower agricultural product prices in CEE countries at farmgate level in the early 90s comparing to EU level (see for price comparison European Commission, 1997, and in the case of Hungary Halmai and Elekes, 2000). Also direct subsidies to agriculture in Central and Eastern European countries have been much lower than in the European Union.

This resulted in much lower total supports to agriculture, as measured by producer subsidy equivalents (PSEs) in CEEC (see Hartell and Swinnen, 2000). Therefore, upon accession adjustment of prices and direct support, up to the current European Union levels, would lead to substantial raise of agricultural supply in the CEEC, while at the same time this would lead to decrease in food demand, because of lower personal income (see Tangermann and Josling, 1994).

There are a number of studies where quantitative estimations have been made to analyse the implications of EU enlargement on production, change in EU budgetary expenditures, welfare and other issues in the area of agriculture. In papers written by Tangermann and Josling (1994) (who used ESIM model developed by USDA/ERS and Tim Josling and Stefan Tangermann), Weber (2000) partial equilibrium models have been used to tackle these problems. In other studies, agricultural focused general equilibrium models were used (as Hertel et al., 1997, using GTAP model and Banse, 2000). Also a combination of partial and general equilibrium models has been used by Banse et al. (2000) and Munch (2000). Studies of Pokrivcak and de Gorter (2000) and Swinnen (1996) have developed political economy model to assess the impact on agricultural protection due to enlargement of EU.

Our study also tries to bring some insight into this issue and it quantitatively estimates the implication of integration. But it differs in respect that it looks at micro-level of the agricultural sector. Specifically it tries to asses impact of the EU enlargement on farms' financial situation and their production structure, as well as comparison of regional differences between farms, which are situated in different growing regions in Slovak Republic. The model assumes perfect competition and also assumes that farmers are risk neutral. This means that farmers are price takers and maximise their gross margin (GM) (revenue minus variable costs) given market prices and subsidies provided under agricultural policy, which is considered.

The paper is organised as follows. The methodology is explained in section 2. Section 3 provides the results of the model. Section 4 takes a general view or it is a summary of empirical findings. Also appendix is included where farm-modelling results can be found.

2. Methodology

The modelling technique applied in this paper is that of linear programming and theoretical background is based on microeconomic mathematical programming[2] sector model with embodied theoretical aggregation processes derived by McCarl and Spreen (1980). However we did not follow aggregation procedure, we just have modelled micro-level, and assumed that theoretical issue at macro--level hold.

2.1. The Micro-level

The model assumes a sector made up of a large number of participants where each of them seeks to optimise some objectives. Producers and consumers operate in competitive markets for both factors and outputs. The producers produce homogenous outputs and compete for the same factors of production. Each producer has a finite set of production processes with each representing a particular way of combining a maximum of n-owned factors (y_{jk}) with a maximum of m-purchased factors (x_{ik}) to bring one unit of output into production.

Thus, the producer's problem may be formulated as the following linear programming problem:

$$\left(i = 1, 2 \dots, m; \ k = 1, 2 \dots, r\right)$$

subject to:

(1) $\qquad -x_{ik} + a_{ik} q_k = 0 \qquad \left(i = 1, 2 \dots, m; \ k = 1, 2 \dots, r\right)$

(2) $\qquad -y_{jk} + b_{jk} k_k = 0 \qquad \left(i = 1, 2 \dots, n; \ k = 1, 2 \dots, r\right)$

(3) $\qquad \displaystyle\sum_{k=1}^{r} y_{jk} = y_j \qquad \left(i = 1, 2 \dots, n; \ k = 1, 2 \dots, r\right)$

(4) $\qquad q_k, x_{ik}, y_{jk} \geq 0 \qquad \left(i = 1, 2 \dots, m; \ k = 1, 2 \dots, r\right)$

where

q_k – output level of the kth production process ($k = 1, 2 \dots, r$);

p_k – price of kth output ($k = 1, 2 \dots, r$);

x_{ik} – the use of the ith purchased factor in the kth production process ($i = 1, 2 \dots, m$; $k = 1, 2 \dots, r$),

y_{jk} – the use of the jth owned factor in the kth production process ($j = 1, 2 \dots, n$; $k = 1, 2 \dots, r$);

y_j – the quantity of the jth owned factor available to the producer ($j = 1, 2 \dots, n$);

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[2] See Norton and Schiefer (1980) for a discussion on methodological issues related to policy analysis using mathematical programming.

a_{ik} — the quantity of the ith purchased factor required by one unit of the kth production process ($i = 1, 2 ..., m; k = 1, 2 ..., r$);

b_{jk} — the quantity of the ith owned factor required by one unit of the kth production process ($j = 1, 2 ..., n; k = 1, 2 ..., r$);

c_i — the market price per unit of the ith purchased factor ($i = 1, 2 ..., m$).

Given the values of all-necessary parameters and prices, the problem can be solved easily via linear programming. It will be more instructive, however, to formulate the Lagrangian (L) for this problem.

$$L = \Pi + \sum_{i=1}^{m}\sum_{k=1}^{r} \lambda_{ik}\left(x_{ik} - a_{ik}q_k\right) + \sum_{j=1}^{m}\sum_{k=1}^{r} \varpi_{ik}\left(y_{ik} - b_{jk}q_k\right) + \sum_{j=1}^{n} \mu_j\left(y_j - \sum_{k=1}^{r} y_{jk}\right)$$

Kuhn-Tucker conditions provide the necessary and sufficient conditions for a constrained maximum at q_k^0, x_{ik}^k, y_{jk}^0, λ_{ik}^0, ϖ_{jk}^0, μ_j^0. Mathematically, the conditions for this problem are as follows.

Outputs:

(5a)
$$\frac{\partial L}{\partial q_k} = p_k - \sum_{i=1}^{m} \lambda_{ik}^o a_{ik} - \sum_{j=1}^{n} \omega_{jk}^o b_{jk} \leq 0$$

(5b)
$$\frac{\partial L}{\partial q_k} q_k^o = 0 \qquad (k = 1, 2 ..., r)$$

(5c)
$$q_k^o \geq 0 \qquad (k = 1, 2 ..., r)$$

Purchased factor:

(6a)
$$\frac{\partial L}{\partial x_{ik}} = -c_i + \lambda_{ik}^o \leq 0 \qquad (i = 1, 2 ..., m; k = 1, 2 ..., r)$$

(6b)
$$\frac{\partial L}{\partial x_{ik}} x_{ik}^o = 0 \qquad (i = 1, 2 ..., m; k = 1, 2 ..., r)$$

(6c)
$$x_{ik}^o \geq 0 \qquad (i = 1, 2 ..., m; k = 1, 2 ..., r)$$

Owned factor:

(7a)
$$\frac{\partial L}{\partial y_{jk}} = \omega_{jk}^o - \mu_j^o \leq 0 \qquad (j = 1, 2 ..., n; k = 1, 2 ..., r)$$

(7b)
$$\frac{\partial L}{\partial y_{jk}} y_{jk}^o = 0 \qquad (j = 1, 2 ..., n; k = 1, 2 ..., r)$$

(7c)
$$y_{jk}^o \geq 0 \qquad (j = 1, 2 ..., n; k = 1, 2 ..., r)$$

If $q_k^0 \geq 0$ then equation (5a) will hold with strict equality thus:

$$(9) \qquad p_k = \sum_{i=1}^{m} \lambda_{ik}^o a_{ik} + \sum_{j=1}^{n} \omega_{jk}^o b_{jk}$$

Then (9) says that total return (price) from one unit produced under the kth production process must be equal to the total imputed costs from one unit produced under the kth production process.

This fairly technical explanation can be interpreted as the well-known marginal condition for profit maximisation: continue to supply a product up to the point where price equals marginal cost.

Rewriting (6a) gives

$$(10) \qquad c_i = \lambda_{ik}^o$$

Thus (10) is analogous to the familiar marginal condition: continue to apply a variable factor up to the point where its price equals the value of its marginal product.

Rewriting (7a) gives

$$(11) \qquad \omega_{jk}^o = \mu_j^o$$

(11) implicitly states that the marginal value of the jth owned factor used in kth process must be less than or equal to the marginal value imputed to the jth owned factor.

2.2. The Macro-level (or Aggregation)

We remind that we did not follow aggregation procedure of McCarl and Spreen (1980) model. We show it here just to give a full picture of the model construction.

The above marginal conditions give the rules by which producers make production decision. Within the competitive framework, individual producers cannot affect factor or product prices. In other hand on aggregate level, the assumptions of exogenously determined prices for all factors and outputs are no longer tenable.

When producers of a sector are significant consumers of a factor or suppliers of a product, interrelationship of price and quantity needs to be considered. Consider that inverse demand relation for the output of the sector exists and is given by

$$(12) \qquad P_k = f_k(Q, \Theta) \qquad (k = 1, 2 \ldots, r)$$

where Θ is a vector of exogenous factor and Q is a vector with elements equalling each commodity's total sector output production.

Also consider that the inverse supply relation for purchased factors to the sector exists and is given by

(13) $$r_i = g_i(X, \Gamma) \qquad (i = 1, 2 \ldots, m)$$

where Γ is a vector of exogenous factors and X is a vector of total sector use of purchased factors.

The production level of each activity should be determined by the first order conditions with which an individual producer will select his production level. Additionally, demand and supply relations should be included. This leads to an aggregate model wherein participants individually behave as small competitive units, yet collectively, price and quantity are endogenous.

Let Q_{lk} be the level of the output from kth production process produced by lth producer $(l = 1, 2 \ldots, L; k = 1, 2 \ldots, r)$. Similarly can by defined x_{ilk}, y_{jkk}, λ_{ikk}, a_{ilk}, b_{jlk}, c. Using this definition, it follows that the sectoral use of the ith purchased factor and the sectoral supply of the kth output are.

(14) $$x_i = \sum_{k=1}^{r} \sum_{l=1}^{L} x_{ilk} \qquad (i = 1, 2 \ldots, m)$$

(15) $$Q_k = \sum_{l=1}^{L} q_{lk} \qquad (k = 1, 2 \ldots, r)$$

The aggregate conditions can be constructed from the above microconditions. If we consider optimal level of output Q^0, we can develop an aggregate equation-relating price analogous to (5a).

(16) $$f_k(Q^0, \Theta) - \sigma_k^0 \leq 0 \qquad (k = 1, 2 \ldots, r)$$

where σ_k^0 is dual variable from (15).

Similarly, an analogous condition to (10) where λ_i^0 is the dual variable associated with (14), is

(17) $$g_i(X^0, \Gamma) \geq \lambda_i^0 \qquad (i = 1, 2 \ldots, m)$$

Furthermore individual producers are price takers equating aggregate price with the price they receive (pay) when they produce an output (consume a factor). The price at which a producer is willing to sell output is greater than or equal to the aggregate price and the producers imputed value of a factor is less than or equal to its aggregate price. Thus conditions relating aggregate and micro-prices need to be imposed:

(18) $$\sigma_k^0 \leq p_{kl} \qquad (k = 1, 2 \ldots, r; l = 1, 2 \ldots, L)$$

(19) $$\lambda_i^0 \geq \lambda_{ilk}^0 \qquad (i = 1, 2 \ldots, m; k = 1, 2 \ldots, r; l = 1, 2 \ldots, L)$$

Consider following linear demand and supply curves:

(20) $\qquad P_k = G_k - H_k Q \qquad (k = 1, 2 \ldots, r)$

(21) $\qquad r_i = E_i + F_i X \qquad (i = 1, 2 \ldots, m)$

Similar as Samuelson (1952), who converted spatial price equilibrium model into linear programming by specifying as objective maximisation of social pay-off function was followed by McCarl and Spreen (1980). The following optimisation model possesses the first-order conditions which are developed above, based upon the aggregation process.

(22) $\qquad Q'G - 1/2\, Q'HQ - XE' - 1/2\, X'FX$

Subject to (1)–(4) for all producers and to (14) and (15)

for $(k = 1, 2 \ldots, r)$, $(i = 1, 2 \ldots, m)$, $(l = 1, 2 \ldots, L)$, $(j = 1, 2 \ldots, n)$

It can be verified that by assuming that good k is produced ($Q_k > 0$), than the dual variable from (14) equals the product price from the demand curve, and by further assuming that micro-units produces ($q_{kl} > 0$) then the equation of price and marginal cost follows as discussed above. Similar arguments could be made for factors. Thus, the formulation implies the microeconomic conditions for production by competitive firms are met.

The objective function no longer represents producer profit. The substitution of price-dependent, product-demand, and factor supply schedules transforms the objective function into a measure of consumer's plus producer's surplus. Consumer's plus and producer's surplus or net social benefit is defined as the area between the demand and supply curves to the left of their intersection (Samuelson, 1952).

In the derivation of the model, it is assumed that the sector is composed of many competitive micro-units, none of which can individually influence output or factor prices. Each producer supplies according to the rule: equate product price to marginal cost of producing one more unit of that product. Similarly, each producer uses purchased factors according to the rule: equate factor price to marginal value product. So, intuitively, going backward from macro (aggregate) to micro-level, when markets are at equilibrium and agricultural policy is given, than farms at micro-level maximise gross margin taking prices of inputs and prices of outputs and also subsidies as given.

The competitive behaviour simulating properties of the model provides a potential powerful tool for agricultural policy analysis. The model allows, for policy assessment purposes, to implement in the model policy instruments and then observe simulated micro-level or sectoral response to the policy instrument.

The farm's model presented in this paper considers four agricultural policy scenarios (or four different vectors of policy instruments): (1) *CEEC – scenario:*

considers the continuation of existing agricultural policy in Slovakia; (2) *AGEN-DA 2000 – scenario*: assumes the accession of Slovak Republic into EU and therefore considers reformed European Common Agricultural Policy (CAP) (European Commission's policy reform ideas presented in the Santer Package of 16th July 1997); (3) *AGENDA no EU payments – scenario*: differs with previous one because in this case farmers are ineligible for direct payments under the CAP, and (4) *LIBERAL – scenario*: considers the complete liberalisation of Slovak agricultural policy. All four policy scenarios have been formulated for two distinct years, 2002[3] and 2007 and the base year 1996 for comparison purpose. As derived in the model the farmers are price takers and therefore prices are exogenously defined in the model. Specifically we have considered two alternative assumptions. First assumes that world market prices remain unchanged (optimistic variant) at their 1996 levels and second assumption considers that they declined by 2 % in real term per annum (pessimistic variant). Concerning the prices of variable inputs, they were considered that will reach the world level for *AGENDA 2000* and *LIBERAL* scenarios and that they will follow the trend observed in the past for *CEEC* scenario.

The model is generally formulated for implementation purposes and it applies for all the selected farms. For concrete farms, technical and technological matrix and restriction matrices have been updated respecting each farm's specific conditions. The model describes all relevant branches of plant and animal production, and their interrelation is demonstrated through fodder crop balance.

The theoretical model of McCarl and Spreen (1980), developed above, explicitly considers all individual farms (or producers) placed in the analysed region (Slovak Republic in our case). In empirical work, however, the specification to include every individual producer is impossible. To simplify this task empirical studies have attempted to identify homogenous groups or producers (Thomson and Buckwell, 1979). Each group is then treated as an individual producer or there is chosen a representative farm for each homogenous group (or region) (Roebeling et al., 2000). Similar strategy has been followed in our model. Five farms were chosen on the basis of an expert opinion, each placed in different agricultural growing region. A brief characteristic is given in Table 1. As large and co-operative forms of agricultural production are predominant in Slovak Republic,[4] all five considered farms are of this type. This is consistent

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[3] The accession of Slovak Republic into EU in 2002 is not realistic but is given here only for comparison purpose or to have an idea how it would be if Slovakia is integrated in EU at this point of time.

[4] The proportion of Co-operative farms measured as share of their agricultural land of total agricultural land was 53.80 % in 1998 and the proportion of large farms (which cultivated over 1 000 ha agricultural land) was 79 % in 1998 (Zelená správa, 1999).

with the study of Hutník et al. (1999, p. 829) that large farm will remain predominant in Slovak agriculture.

Table 1

Selected Farm Types and Their Short Description

Farm Type (by region)	Farm Size and Description
I. Corn growing region	mixed co-op, 2346 ha, 300 milk cows, cattle, 500 sows,
II. Sugar beet growing region	mixed co-op, 5039 ha (3262 grassland), 660 milk cows, cattle, 311 sows, 500 ewes
III. Potatoes growing region	mixed co-op, 4336 ha, 757 cows, cattle, 360 sows, 421 ewes
IV. Potato-oats growing region	mixed co-op, 4274 ha, 950 cows, cattle, 480 sows, 500 ewes
V. Mountain region	mixed co-op, 2234 ha, 420 cows, cattle, 100 sows, 391 ewes

Source: Farm data.

3. Empirical Results

In this part we show the impacts of assumed scenarios, figuring out changes in the level of farms economic indicators (like: gross margin, costs, income, subsidies, etc., that can be found in appendix tables) and in the farming structure (planting and animal production) as well, for all the selected farms.

3.1. The Impact of Different Scenarios on Economic Indicators of Selected Farms

We will start the impact analysis with the *representative farm from corn growing region*. In the basic period of 1996, this farms gross margin is 413 EUR per ha. With subsidies at a relatively low level of 57 EUR per ha and high level of overheads at 217 EUR per ha, the farm income[5] could be not higher than 20 EUR per ha. A remarkable change in the situation of this farm is caused by the implementation of Agenda 2000 scenario where the instruments of EU Common Agriculture Policy has been implicitly included. So, under the optimistic variant (no changes in the world prices), farms gross margin increases considerably by 104 % in 2002, resp. 120 % in 2007. We see that the level of subsidies for both years (compared to 1996 base year) is considerably higher with 300 EUR per ha, resp. 313 EUR per ha.

This factor combined with higher EU prices leads to farm income increases at a remarkable 417 EUR per ha in 2002 and 524 EUR per ha in 2007. This is in fact the best performance achieved by this type of farm under any of the scenarios. As it can be seen under the same scenario but with given pessimistic

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[5] Farm income (FI) was defined as total revenues minus total costs (including fixed costs).

price forecasts where prices fall by 2 %, the farm income still increases but at a slightly lower rate than in the optimistic variant. Anyway the conclusion is that the implementation of CAP in this type of farm can be increasingly helpful and remarkably improves its performance especially if (EU) paymentsare included.

However, the performance of this type of farm under the CEEC scenario (which means the continuation of the recent Slovak agriculture policy but where the Slovak membership into EU is not assumed) is still good. So, compared to the base year 1996, gross margin increases by 27 % in 2002 and by 51 % in 2007. As the prices of slovak agriculture commodities approach world prices, this has a positive impact also in the level of farm income and concretely the farm income for 2002 is 80 EUR per ha and for 2007 is 197 EUR per ha. Because the level of subsidies under this scenario remains the same throughout analyzed periods as in the base year 1996, farm income is lower than under Agenda 2000 scenario. However farms performance under CEEC scenario is still better than as we will see below in the liberal scenario.

Liberal scenario includes two important factors that have an important impact on farms economic indicators:

• it counts for trade liberalization so that domestic prices approach world prices which are recently at a considerably higher level,

• but also it assumes no subsidies to be addressed for any purpose in the analyzed farms.

So the outcome for this type of farm is as the following: Under optimistic variant, the farm is still able to earn positive income which increases from 1996 by 1.9 times in 2002 and by 4.5 times in 2007. However, under pessimistic variant with a 2 % decrease in world prices, it is impossible (given the farm gross margin) to offset the impact of rising costs and of the exclusion of subsidies and as a result the farm income is negative.

For the *representative farm from sugar beet growing region*, in the basic period of 1996 farms gross margin (GM) is at 286 EUR per ha. A higher level of subsidies (92 EUR per ha) than that of corn growing region associated with a huge extensively used area of meadows and pastures (3 283 ha) is the main reason to be counted. Also the level of overheads is lower in this type of farm (109 EUR per ha). As a result, farm income is higher than in the corn-growing region at 66 EUR per ha. The implementation of Agenda 2000 scenario contributed to a better performance in this type of farm too. So, under the optimistic variant, farms gross margin increases 76 % in 2002, resp. 60 % in 2007 while under pessimistic variant its just slightly lower but still a strong increase. The farm is profitable in both variants and its income varies between 263 EUR per ha (in 2007 under pessimistic variant) and 349 EUR per ha (in 2002 under the

optimistic variant). This is thanks to a higher level of subsidies for both years (compared to 1996 base year) with 213 EUR per ha, resp. 236 EUR per ha combined with higher EU prices. Even in this type of farm the conclusion is straightford: the implementation of Common Agricultural Policy in this type of farm can be increasingly helpful and improves its performance especially if (EU) payments are included.

Farm performance under the CEEC scenario is still good. So, compared to the base year 1996, gross margin increases by 13 % in 2002 and by 48 % in 2007. Keeping fixed costs unchanged the farm income is considerably higher than in the base year 1996 varying from 372 EUR per ha to 535 EUR per ha. Because the level of subsidies under this scenario remains the same I all periods as in the base year 1996, it is obvious that farm income is lower than under Agenda 2000 scenario. However farms performance under CEEC scenario is still better than as we will see below in the liberal scenario.

Under the liberal scenario with optimistic variant it can be noticed a slight decrease of farms gross margin in 2002 at 92 % level of 1996, while no changes are observed for 2007. Under pessimistic variant farms gross margin dramatically falls in both periods at 67 %, resp. 35 % of 1996 level. The conclusion is straightford and clear: with trade liberalization and a 2 % decrease in world prices this type of farm will likely face big losses.

In the basic period of 1996, the *representative farm from potato growing region* has reached a gross margin of 211 EUR per ha and farm income is at 63 EUR per ha which is less than in the sugar beet growing region. The level of subsidies in this farm is slightly higher than in the pervious case with 96 EUR per ha. Also the level of overheads is lower in this type of farm (53 EUR per ha). The implementation of Agenda 2000 scenario contributed to a better performance in this type of farm too.

So, under the optimistic variant, farms gross margin increases by 56 % in 2002, resp. 41 % in 2007 while under pessimistic variant its just slightly lower. The farm is profitable in both variants but it should be emphasized that the instruments of CAP are more important to farm profitability in this type of farm than in the two previous cases. So for example the level of subsidies increases to 157 EUR per ha in 2002 and 211 EUR per ha in 2007. Under CEEC scenario the farm is still profitable thanks to the system of subsidies assumed in this scenario. However as the level of subsidies is lower from that of Agenda 2000 (payments included) gross margin and farm income are lower too. The stronger effect of supportive instruments for profitability in this type of farm is proven in the case of liberal scenario. As subsidies are absent in this scenario, farm income is

negative as gross margin sharply decreases because fixed costs are not covered any more and even higher world prices can not offset them.

The *representative farm from potato-oats growing region* has in the basic period of 1996, a very low farm income 3 EUR per ha while its gross margin is at a relatively high level 315 EUR per ha. High overheads are to be counted for this fact. With the implementation of Agenda 2000 scenario farm performance improves considerably. So, under the optimistic variant, farms gross margin increases by 35 % in 2002, resp. 13 % in 2007. This leads to an increase in farm income in both periods at 145 EUR per ha, resp. 94 EUR per ha. However under pessimistic variant with prices falling, gross margin increases just slightly in 2002 (18 %) but declines in 2007 by 8 % thus contributing to a negative farm income in 2007.

Under Central and Eastern European countries scenario this type of farm is still profitable thanks to the subsidy system of Slovak agriculture policy which tends to support regions with difficult climatic and farming conditions. Thus it seems logical that the removal of subsidies as assumed in liberal scenario leads to a sharp decrease in the value of gross margin and as a result this type of farm under these circumstances faces big losses which make impossible its further activity in the farm business.

For the *representative farm from mountain region* in the basic period of 1996, the farm income is a 47 EUR per ha while its gross margin is 246 EUR per ha. This is a little bit different situation compared to the example of potato-oats growing region, as farm income is higher and gross margin lower. Lower over-heads are to be counted for this fact. With the implementation of Agenda 2000 scenario farm performance improves. So, under optimistic variant, farms gross margin increases by 49 % in both periods. This leads to an increase in farm income in both periods at 152 EUR per ha, resp. 158 EUR per ha. However under pessimistic variant with prices falling, gross margin increases just slightly and so do farm income

Under CEEC scenario this type of farm is still profitable the subsidy system of Slovak agriculture policy which tends to support regions with difficult climatic and farming conditions remains the same as in 1996 while prices reach the higher world level. Gross margin increases as a result by 21 % in 2002 and by 55 % in 2007 (slightly better than Agenda 2000!). Thus farm income increases and for 2007 is higher than in scenario Agenda 2000.

Liberal scenario proves that how important are subsidies for such a farm situated in worse climatic and farming conditions. As subsidies are removed in this scenario and prices of some commodities like milk tend to fall, gross margin is not high enough to earn positive farm income in both periods.

3.2. The Impact of Scenarios on the Farms' Production Structure

With regard to the *farm from corn growing region*, its optimized structure in 1996 is characterized by the fact that cereal production, especially wheat and corn production is realized in the full available area. They represent a big share in the farm production structure (this is true for all scenarios) reflecting good climatic conditions and high percentage of tillage (90 %). Dairy cow capacities are completely used but sow capacities are partly used at 353 heads out of 590. All the available arable land is used. Under Agenda 2000 scenario, there is a substitution in the corn production area for wheat production area. This is due to lower prices of corn comparing to wheat both in EU and world markets. The implementation of a milk quota under this scenario leads to a reduction in the number of dairy cows to 250 heads. While the sow capacities decrease slightly in 2002 they are completely excluded from the farming structure in 2007. Under this scenario the arable land is completely used.

The structure of crop production under liberal scenario is not different from that of Agenda 2000. Contrary to the crop structure, animal production is different from that of Agenda 2000. So, the number of dairy cows reaches the maximum capacity at 300 heads because there is no quota limitations. Under the optimistic variant in 2002 the number of sows increases at the maximum capacity level otherwise they are not included in the farming structure, reflecting very high prices of concentrate used for pig breeding.

Under CEEC scenario, there are no big changes in farming production structure except of pig breeding. So, in 2002 pig capacity rapidly increases (sow heads 590, pig heads 2 963) while in 2007 it fell at 55 sow heads and 276 pig heads.

The optimized structure for the *farm from sugar beet growing region* in 1996 is in brief as the following: crop production is oriented mainly on cultivation of wheat and barley while peas and rape are the technical crops included for the purposes of rotation. The percentage of tillage is low (45 %) but the share of meadows and pastures is high and this factor is used for the purposes of sheep breeding or extensive dairy cow breeding. Meanwhile the forage share on arable land declined and arable land is more intensively used for the purposes of the cultivation of cereals and technical crops reflecting the reduction in the number of dairy cow and sheep (as we will see below). Even though this type of farm is situated in such climatic and land conditions that favors sugar beet cultivation, it has a big share in the production structure only in 2002 under CEEC scenario. Housing capacities for dairy cows, sheep and sows are completely used at full capacity. All the available arable land is used. Under Agenda 2000 scenario, there are no big differences from the base year 1996 regarding the crop structure

except a slight increase in the area of rape. The opposite is true for animal pro-duction. The implementation of a quota under this scenario leads to a reduction in the number of dairy cows to 550 heads in 2002 and 458 heads in 2007. Pigs' feeding is ineffective under the pessimistic variant in 2007 while the same is true for sheep breeding in Agenda without payments. Under this scenario the arable land is completely used but the reduction in the number of dairy leads to the reduction in the area of meadows and pastures.

The structure of crop production under liberal scenario is not different from that of 1996. Contrary to the crop structure, animal production is different. So, the number of dairy cows reaches the maximum capacity because there is no quota limitations but number of pigs and sheep changes. Under pessimistic vari-ant in 2007 pig breeding is ineffective otherwise remains unchanged. Contrary to this, sheep breeding is effective only under optimistic variant in 2002 other-wise it is not included in the farming structure.

Under CEEC scenario, there are changes in farming production structure. So, there are increases in production area of potatoes and rape supported by high price expectations and substituting for sugar beet that is cultivated at its area lower limit. The number of dairy and sows is noticed to reach the upper limit of the capacity while sheep breeding is ineffective in both variants.

The optimized structure for the *farm from potato growing region* in 1996 is characteristic with the crop production mostly oriented on cultivation of wheat while rape is the technical crops included for the purposes of rotation. Even though this type of farm is situated in such climatic and land conditions that fa-vors potato cultivation it is cultivated only at the lower limit of their production area. This is caused mainly by low potato prices that cannot offset high variable costs and this obviously leads to negative gross margins. Regarding animal pro-duction, number of dairy heads is just slightly below the capacity 757 out of 780. The same applies for the number of sheep. Under Agenda 2000 scenario, there are no big differences from the base year 1996 regarding the crop structure except a substitution of rape production area for peas. The implementation of milk quota under this scenario leads to a reduction in the number of dairy cows to 650 heads in 2002 and 542 heads in 2007. Pigs feeding and breeding are ef-fective only under the optimistic variant in 2002. Under this scenario the arable land is completely used in 2002 but in 2007, 116 hectares are set aside. The usage of meadows and pastures depends on the number of sheep and dairy.

The structure of crop production under liberal scenario is just little different from that of 1996. The number of dairy cows reaches the maximum capacity (780 heads) because there is no quota limitations but pigs and sheep are not included in any of the variants of liberal scenario.

Under CEEC scenario, there are no big changes in farming production structure. So, there is only a slight increase in rape production area. The number of dairy reached the maximum housing capacity while sheep pigs are not included in the production structure as ineffective. Arable land is used completely.

The optimized structure for the *farm from potato-oats growing region* in 1996 is characteristic with the crop production mostly oriented on cultivation of wheat and forage, while rape is the technical crop included for the purposes of rotation. It should be emphasized that crop structure is adjusted to animal production as farm priority reflecting worse climatic and farming conditions for cultivation. Animal production as a priority is reflected especially by a full usage of dairy cow capacity and increasing sheep capacities.

Under Agenda 2000 scenario, there are no significant differences from the base year 1996 regarding the crop structure. The implementation of milk quota under this scenario leads to a reduction in the number of dairy cows to 660 heads in 2007. Pigs feeding and breeding numbers changes in response to price changes with a capacity reduction or even have been excluded from farming structure as in 2007. Sheep capacities are still at a high level using the maximum capacity in all variants.

The structure of crop production under liberal scenario is just little different from that of 1996. There are changes in animal production where sheep breeding is excluded from the structure under pessimistic variant while pig breeding is included only in the optimistic variant in 2002. Under CEEC scenario, there are similar structural responses to price changes especially pig and ship breeding where the last one is excluded as ineffective.

With regard to the optimized structure for the *farm from mountain region* in 1996 it is as the following: crop production mostly oriented on cultivation of cereals which area has been increased at maximum available area permitted by rotation and where wheat has the major share. This has led to a decrease in the forage production area causing limitation with regard to dairy cow capacities. So, dairy capacities are reduced by 150 heads. Meadows and pastures are used for the purposes of sheep breeding. Under Agenda 2000 scenario, there are interrelated changes between animal production structure and forage structures. The implementation of milk quota under this scenario increases the number of dairy cows up to quota limit. Sheep capacities are considerably increased in this scenario and agriculture land is completely used.

Under liberal scenario changes in animal production leads to changes in forage structure. Cattle capacities were slightly reduced. Sheep breeding is included in the structure only under optimistic variant while pig breeding is included only in the optimistic variant in 2002. Above-mentioned changes lead to

a decrease in the use of meadows and pastures. 49 ha of arable are set aside under pessimistic variant in 2007.

Under Central and Eastern European countries scenario, there are similar structural responses to price changes especially ship breeding that is excluded as ineffective. Cattle capacities are increased especially dairy. Pig capacities are low. There is a substitution of forage area for wheat production area. Agriculture land is completely used.

4. General Assessment

Up to this point, we have seen a detailed analysis of the impacts for different scenarios in different selected farms. It is helpful to have a look also on the differences of the impact resul s that exist between farms from the aspect of policy implementation. It helps to make a comparison of scenario impacts while moving from farm to farm. So, based on the optimization results, following conclusions could be made:

In the basic period of 1996, all the selected farms are profitable but the level of farm income is different (see Table 2). This difference in the level of farm income does not correlate with growing regions characteristics i.e. their climatic and land conditions characteristics or to their appropriateness to agricultural production.

The reason should be found in different subsidy levels that increases in favor of regions with worse production conditions (i. e. potato-oats and mountain region) (see Graph 1). A larger sum of subsidies is disbursed to farms situated in the above mentioned regions. Sometimes the level of subsidies disbursed to farms with worse production conditions is three times higher than in other regions. Area payments portion on total sum of disbursed subsidies increases in relation to regions with worse production conditions.

The implementation of Agenda 2000 scenario under optimistic price forecasts leads in both modelling periods (2002 and 2007), to increasing level of farms' profitability. Of course this level declines with regard to farms with worse production conditions (see Table 2).

While keeping fixed costs unchanged, farms' profitability is affected by increased level of Gross Margin. Such an increase in Gross Margin is caused by higher EU prices and subsidy level that decline in relation to farms situated in regions with worse production conditions. (see Graph 1). Under pessimistic price forecasts the figure is not much different. The only distinctive change that happens in the farm situated in potato growing region is that in 2007 its income becomes negative (see Table 3).

T a b l e 2

Farm Income per ha (in EUR) – Optimistic Variant (0 % price change)

Growing regions	1996 BASE	2002 AGENDA	2002 AGENDA (no EU payments)	2002 LIBERAL	2002 REAL CEEC	2007 AGENDA	2007 AGENDA (no EU payments)	2007 LIBERAL	2007 REAL CEEC
I. Corn	20	417	151	39	80	524	237	90	197
II. Sugar beet	66	349	129	37	143	345	110	66	279
III: Potatoes	63	218	70	−26	83	243	34	−9	197
IV. Potato-oats	3	145	−49	−173	21	94	−145	−204	120
V. Mountain	47	152	37	−70	81	158	21	−77	163

Source: Modelling results.

T a b l e 3

Farm Income per ha (in EUR) – Pessimistic Variant (–2 % price change)

| Growing regions	1996 BASE	2002 AGENDA	2002 AGENDA (no EU payments)	2002 LIBERAL	2002 REAL CEEC	2007 AGENDA	2007 AGENDA (no EU payments)	2007 LIBERAL	2007 REAL CEEC
I. Corn	20	365	48	−93	80	296	−30	−180	197
II. Sugar beet	66	301	114	−39	143	263	19	−122	279
III: Potatoes	63	180	25	−47	83	161	−44	−195	197
IV. Potato-oats	3	85	−110	−232	21	−22	−248	−406	120
V. Mountain	47	110	−12	−125	81	83	−61	−222	163

Source: Modelling results.

Liberal scenario leads to a profitable structure only in the farms situated in regions with better climatic and farming conditions, concretely corn and sugar beet growing regions. Other farms, under trade liberalization would suffer losses. This situation shows again that subsidies are an important factor accounting for farm profitability in regions with worse conditions like potato-oats and mountain one. Even worse, under pessimistic variant no farm is profitable in this scenario.

The CEEC scenario that accounts for the current level of subsidies applied by current Slovak agricultural policy, and in which domestic agricultural commodity prices gradually reach the world price level, leads to a sharp increase in the farm income level of all farms compared to 1996. At the other hand the level of farm income per hectare depends on the character of growing regions. The reason could be found again in the higher level of subsidies disbursed to regions with worse production conditions.

Graph 1

The Comparison of Disbursed Subsidies Between CEEC and Agenda 2000 Scenario
(i. e. between the implementation of Slovak Agriculture Policy and CAP)

Subsidies per ha of agricultural land
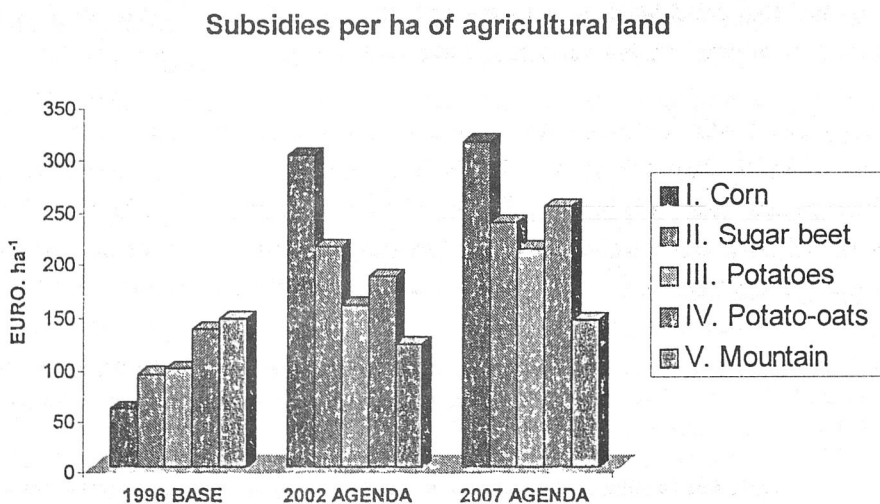
Slovakia presents an interesting case for the implications of EU accession, which is largely determined by current Slovakian agricultural policy, with large subsidies, counting for 4–22 % of total output depending on farming conditions. In the absence of the direct payments from the Common Agricultural Policy Slovak farms in the potato-oats, potato and mountainous regions fair particularly badly whereas farms in the corn and sugar beet regions fair better with the farm

income on the farm in the corn region rising by 88 %. Thus, Slovak farms in the more productive regions would gain, and those in the less productive regions would lose from the adoption of Agenda 2000 with the direct payments of the Common Agricultural Policy.

The results indicate that production structure in Slovak farms does not change significantly with change of policy scenario, especially in crop structure. Animal production is much more sensitive on price change and scenario change.

Current Slovak agriculture policy gives a strong support to farms situated in regions with worse production conditions (Graph 1) and thanks to this fact, these farms' earned profit per hectare of agriculture land is relatively high. Consequently the farms situated in regions with conditions appropriate for intensive farming production, face tougher competitive conditions in the market. The updated agriculture policy instruments implemented in Agenda 2000 scenario leads to changes in the support priorities for the farms, and in the achieved profitability relations. Higher support is given to farms in regions with better conditions.

However, it should be taken in consideration that the model does not include the support given to farmers in the European Union under the different regional development programs, which may improve the financial position of the farms situated in regions with worse production conditions. For instance Council Regulation 1 259/99, under certain circumstances, makes possible to give support for less-favored areas similar to what is given under current Slovak agriculture policy.

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Appendix

Farm 1 – Representative Farm from Corn Growing Region

Table 4

Modelling Results for Representative Farm from Corn Growing Region – Optimistic Price Scenario (0 % price change)

Scenario	1996 BASE	2002 AGENDA	2002 AGENDA (no EU payments)	2002 LIBERAL	2002 REAL CEEC	2007 AGENDA	2007 AGENDA (no EU payments)	2007 LIBERAL	2007 REAL CEEC
GMha	413	844	557	484	524	924	626	516	623
FI/ha	20	417	151	39	80	524	237	90	197
Subsidies/ha	57	300	1	0	57	313	1	0	57
Overheads/ha	217	217	217	217	217	221	222	217	217
GM/1996GM	1.00	2.04	1.35	1.17	1.27	2.19	1.48	1.25	1.51
Subsidy/GM	14	36	0	0	11	34	0	0	9

Table 5

Modelling Results for Representative Farm from Corn Growing Region – Pessimistic Price Scenario (–2 % price change)

Scenario	1996 BASE	2002 AGENDA	2002 AGENDA (no EU payments)	2002 LIBERAL	2002 REAL CEEC	2007 AGENDA	2007 AGENDA (no EU payments)	2007 LIBERAL	2007 REAL CEEC
GMha	413	766	466	323	524	691	381	218	623
FI/ha	20	365	48	–93	80	296	–30	–180	197
Subsidies/ha	57	307	1	0	57	309	1	0	57
Overheads/ha	217	217	217	217	217	217	217	217	217
GM/1996GM	1.00	1.85	1.13	0.78	1.27	1.67	0.92	0.53	1.51
Subsidy/GM	14	40	0	0	11	45	0	0	9

Farm 2 – Representative Farm from Sugar Beet Growing Region

Table 6

Modelling Results for Representative Farm from Sugar Beet Growing Region – Optimistic Price Scenario (0 % price change)

Scenario	1996 BASE	2002 AGENDA	2002 AGENDA (no EU payments)	2002 LIBERAL	2002 REAL CEEC	2007 AGENDA	2007 AGENDA (no EU payments)	2007 LIBERAL	2007 REAL CEEC
GMha	286	638	385	277	372	642	402	355	535
FI/ha	66	349	129	37	143	345	110	66	279
Subsidies/ha	92	213	1	0	106	236	1	0	116
Overheads/ha	109	138	124	114	125	152	149	135	137
GM/1996GM	1.00	1.76	1.18	0.92	1.13	1.60	1.02	1.00	1.48
Subsidy/GM	32	33	0	0	28	37	0	0	22

Table 7

Modelling Results for Representative Farm from Sugar Beet Growing Region – Pessimistic Price Scenario (–2 % price change)

Scenario	1996 BASE	2002 AGENDA	2002 AGENDA (no EU payments)	2002 LIBERAL	2002 REAL CEEC	2007 AGENDA	2007 AGENDA (no EU payments)	2007 LIBERAL	2007 REAL CEEC
GMha	286	546	368	227	524	564	305	112	535
FI/ha	66	301	114	–39	143	263	19	–122	279
Subsidies/ha	92	198	1	0	106	249	1	0	116
Overheads/ha	109	127	133	128	125	160	155	122	137
GM/1996GM	1.00	1.63	1.05	0.67	1.13	1.34	0.75	0.35	1.48
Subsidy/GM	32	36	0	0	28	44	0	0	22

Farm 3 – Representative Farm from Potato Growing Region

Table 8

Modelling Results for Representative Farm from Potato Growing Region – Optimistic Price Scenario (0 % price change)

Scenario	1996 BASE	2002 AGENDA	2002 AGENDA (no EU payments)	2002 LIBERAL	2002 REAL CEEC	2007 AGENDA	2007 AGENDA (no EU payments)	2007 LIBERAL	2007 REAL CEEC
GMha	211	401	260	135	227	469	254	197	388
FI/ha	63	218	70	−26	83	243	34	−9	197
Subsidies/ha	96	157	2	0	97	211	2	0	122
Overheads/ha	53	64	67	56	53	83	80	72	67
GM/1996GM	1.00	1.56	0.97	0.61	1.07	1.41	0.79	0.68	1.45
Subsidy/GM	46	39	1	0	43	45	1	0	31

Table 9

Modelling Results for Representative Farm from Potato Growing Region – Pessimistic Price Scenario (−2 % price change)

Scenario	1996 BASE	2002 AGENDA	2002 AGENDA (no EU payments)	2002 LIBERAL	2002 REAL CEEC	2007 AGENDA	2007 AGENDA (no EU payments)	2007 LIBERAL	2007 REAL CEEC
GMha	211	352	187	126	227	383	170	40	388
FI/ha	63	180	25	−47	83	161	−44	−195	197
Subsidies/ha	96	157	2	0	97	214	2	0	122
Overheads/ha	53	64	60	59	53	83	82	95	67
GM/1996GM	1.00	1.38	0.77	0.53	1.07	1.15	0.52	0.11	1.45
Subsidy/GM	46	45	1	0	43	56	1	0	31

Farm 4 – Representative Farm from Potato-oats Growing Region

Table 10

Modelling Results for Representative Farm from Potato-Oats Growing Region – Optimistic Price Scenario (0 % price change)

Scenario	1996 BASE	2002 AGENDA	2002 AGENDA (no EU payments)	2002 LIBERAL	2002 REAL CEEC	2007 AGENDA	2007 AGENDA (no EU payments)	2007 LIBERAL	2007 REAL CEEC
GM/ha	315	544	405	225	360	615	342	221	479
FI/ha	3	145	−49	−173	21	94	−145	−204	120
Subsidies/ha	134	184	3	0	146	252	3	0	155
Overheads/ha	182	232.	264	226	199	314	294	248	211
GM/1996GM	1.00	1.35	0.89	0.89	1.04	1.13	0.67	0.51	1.31
Subsidy/GM	42	34	1	1	41	41	1	0	32

Table 11

Modelling Results for Representative Farm from Potato-Oats Growing Region – Pessimistic Price Scenario (−2 % price change)

Scenario	1996 BASE	2002 AGENDA	2002 AGENDA (no EU payments)	2002 LIBERAL	2002 REAL CEEC	2007 AGENDA	2007 AGENDA (no EU payments)	2007 LIBERAL	2007 REAL CEEC
GM/ha	315	455	337	119	360	496	249	37	479
FI/ha	3	85	−110	−232	21	−22	−248 19	−406	120
Subsidies/ha	134	179	3	0	146	249	31	0	155
Overheads/ha	182	224	268	208	199	312	303155	261	211
GM/1996GM	1.00	1.18	0.73	0.33	1.04	0.92	0.4875	0.08	1.31
Subsidy/GM	42	39	1	0	41	50	10	0	32

Farm 5 – Representative Farm from Mountain Region

Table 12

Modelling Results for Representative Farm from Mountain Growing Region – Optimistic Price Scenario (0 % price change)

Scenario	1996 BASE	2002 AGENDA	2002 AGENDA (no EU payments)	2002 LIBERAL	2002 REAL CEEC	2007 AGENDA	2007 AGENDA (no EU payments)	2007 LIBERAL	2007 REAL CEEC
GMha	246	367	253	137	297	382	251	140	383
FI/ha	47	152	37	−70	81	158	21	−77	163
Subsidies/ha	144	121	2	0	144	143	2	0	144
Overheads/ha	97	97	97	97	97	101	104	97	97
GM/1996GM	1.00	1.49	1.03	0.55	1.21	1.49	0.96	0.57	1.55
Subsidy/GM	59	33	1	0	48	37	1	0	38

Table 13

Modelling Results for Representative Farm from Mountain Growing Region – Pessimistic Price Scenario (−2% price change)

Scenario	1996 BASE	2002 AGENDA	2002 AGENDA (no EU payments)	2002 LIBERAL	2002 REAL CEEC	2007 AGENDA	2007 AGENDA (no EU payments)	2007 LIBERAL	2007 REAL CEEC
GMha	246	325	209	83	297	299	179	30	383
FI/ha	47	110	−12	−125	81	83	−61	−122	163
Subsidies/ha	144	114	3	0	144	135	3	0	144
Overheads/ha	97	97	97	105	97	97	112	123	97
GM/1996GM	1.00	1.32	0.85	0.31	1.21	1.21	0.63	0.10	1.55
Subsidy/GM	59	35	1	0	48	45	1	0	38

Note: GM/ha, FI/ha, Subsidies/ha and Overheads/ha are represented in EUR.

Abbreviations: GM – Gross Margin, FI – Farm Income, 1996GM – Gross Margin obtained in 1996.

Source: Modelling results.

EURÓPSKA INTEGRÁCIA Z POHĽADU POĽNOHOSPODÁRSKYCH PODNIKOV V SLOVENSKEJ REPUBLIKE

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Cieľom príspevku je odhadnúť vplyv vybraných scenárov agrárnej politiky na finančnú situáciu a výrobnú štruktúru poľnohospodárskych podnikov Slovenska v prípade jeho integrácie do Európskej únie (EÚ). Na účely analýzy sme vybrali päť reprezentatívnych poľnohospodárskych družstiev, každé z inej výrobnej oblasti Slovenskej republiky.

Na modelovanie správania vybraných poľnohospodárskych podnikov (družstiev) sa použila metóda lineárneho programovania. Jej teoretickým základom je mikroekonomický model odvodený McCarlom a Spreenom (1980). V aplikovanom modeli sa predpokladá dokonalá konkurencia, čo znamená že žiadny z účastníkov trhu (v našom prípade poľnohospodárske družstvo) nemôže ovplyvniť cenu na trhu, ani celkové množstvo produktov obchodované na trhu. To znamená, že poľnohospodári berú ceny ako exogénne premenné a maximalizujú hrubý zisk pri daných trhových cenách a dotáciách poskytnutých v rámci danej poľnohospodárskej politiky. V modeli sa zároveň predpokladá neutrálnosť voči riziku.

V modeli boli implementované nasledujúce štyri scenáre agrárnej politiky (alebo štyri rozdielne vektory nástrojov poľnohospodárskej politiky): 1. *Scenár CEEC* – uvažuje o pokračovaní súčasnej poľnohospodárskej politiky v Slovenskej republike; 2. *Scenár Agenda 2000* – predpokladá vstup SR do EÚ, a preto ráta s reformovanou spoločnou poľnohospodárskou politikou EÚ; 3. *Scenár Agenda bez EÚ príplatkov* – tento scenár sa od predchádzajúceho scenára odlišuje tým, že poľnohospodári nemajú nárok na priame príplatky poskytované v rámci spoločnej poľnohospodárskej politiky EÚ; 4. *Scenár Liberal* – predpokladá úplnú liberalizáciu slovenskej poľnohospodárskej politiky. Všetky štyri scenáre sme implementovali do modelov daných fariem na roky 2002 a 2007. Na porovnanie sme za bázický považovali rok 1996. V modeli je odvodené, že poľnohospodári ako jednotlivci nemôžu ovplyvniť trhovú cenu, to znamená, že ceny sú exogénnymi premennými. V aplikovanom modeli sa uvažovalo s dvoma predpokladmi: po prvé, že svetové ceny sa nezmenia v modelovanom horizonte a ostanú na úrovni roka 1996 (optimistický variant), a po druhé, že ceny klesnú ročne o 2 % (pesimistický variant). Čo sa týka variabilných nákladov, v modeli sa predpokladalo, že v scenároch *Agenda* a *Liberal* sa ceny budú približovať svetovým cenám a v scenári CEEC budú pokračovať v trende pozorovanom v minulosti.

V bázickom roku (1996) boli všetky vybrané poľnohospodárske podniky ziskové, ale s rozdielnou mierou ziskovosti. V tomto prípade je dôležité, že rozdiel v ziskovosti medzi jednotlivými poľnohospodárskymi podnikmi nekoreluje s charakteristikami výrobnej

oblasti (klimatické podmienky, kvalita pôdy alebo vhodnosť pre poľnohospodársku výrobu), v ktorej sa podnik nachádza. Tento fakt je zapríčinený rôznou úrovňou poskytnutých dotácií, ktoré sú vyššie v horších výrobných oblastiach než v lepších výrobných oblastiach.

V prípade integrácie Slovenska do EÚ a za predpokladu nezmenených svetových cien (Scenár Agenda 2000) sa ziskovosť poľnohospodárskych podnikov v porovnaní s rokom 1996 výrazne zvýši v obidvoch modelovaných obdobiach. Zvýšenie ich ziskovosti ovplyvnil nárast hrubého zisku (príjmy – variabilné náklady). Tento nárast hrubého zisku bol zapríčinený vyššími cenami poľnohospodárskych produktov v EÚ, ako aj vyššími dotáciami.

Treba si všimnúť, že ziskovosť poľnohospodárskych podnikov v prípade integrácie klesá vo vzťahu k výrobnej oblasti. Tie podniky, ktoré sa nachádzajú v horších výrobných oblastiach, dosahujú nižšiu ziskovosť než tie v lepších výrobných oblastiach, na rozdiel od scenára, podľa ktorého sa Slovensko nepripojí k EÚ a kde táto závislosť medzi ziskovosťou a výrobnou oblasťou neexistuje.

V pesimistickom variante vývoja cien podľa scenára Agenda 2000 dôjde k stratám iba v roku 2007, a to len v prípade poľnohospodárskych podnikov nachádzajúcich sa v zemiakarskej výrobnej oblasti, v ktorých sa predpokladajú vysoké výrobné náklady. Všetky ostatné podniky sú za rovnakých podmienok ziskové.

Liberálny scenár pri optimistickom variante vývoja cien predpokladá ziskovosť len v podnikoch situovaných v lepších výrobno-klimatických podmienkach, osobitne v obilninárskej a repárskej výrobnej oblasti. Ostatné podniky sú stratové. V pesimistickom variante vývoja cien sú vyhliadky vybraných poľnohospodárskych podnikov ešte horšie. Žiadny podnik za takých podmienok nemôže byť ziskový. Za tým treba hľadať dve hlavné príčiny: nízka konkurencieschopnosť a vysoké výrobné náklady. Konkurencieschopné sú len podniky z obilninárskej a repárskej oblasti.

Scenár CEEC, ktorý ráta s kontinuitou súčasnej agrárnej politiky SR (s rovnakou úrovňou dotácií) a s priblížením cien domácich poľnohospodárskych produktov k svetovej úrovni, vedie k zvýšeniu ziskovosti v porovnaní s rokom 1996 vo všetkých podnikoch. Úroveň ziskovosti na hektár poľnohospodárskej pôdy však úzko súvisí s charakterom jednotlivých výrobných oblastí. Významným faktorom, ktorý ovplyvňuje úroveň ziskovosti, je aj spôsob rozdeľovania dotácií, keďže súčasná agrárna politika SR podporuje viac oblasti s horšími výrobno-klimatickými podmienkami.

Slovensko predstavuje zaujímavý prípad dôsledkov prípadnej integrácie s EÚ, a to kvôli relatívne vysokej úrovni dotácií danej súčasnou poľnohospodárskou politikou SR (od 4–22 % celkovej výroby podľa jednotlivých oblastí). V prípade, že sa nezavedie systém priamych platieb zo strany spoločnej poľnohospodárskej politiky EÚ, vyhliadky slovenských podnikov zo zemiakarsko-ovsenej, zemiakarskej a z horskej oblasti sú zlé. Na druhej strane, pre podniky z obilninárskej a repárskej oblasti zostáva aj za takých podmienok stále

priestor na zvýšenie ziskovosti (až 88 % z prvej menovanej oblasti). Z uvedeného jedno-značne vyplýva, že slovenské farmy v lepších výrobných oblastiach by zavedením Scená-ra Agenda 2000 aj s platbami získali, zatiaľ čo ostatné podniky by stratili.

Výsledky optimalizovania ukazujú, že výrobná štruktúra slovenských poľnohospodár-skych podnikov sa v súvislosti so zmenami jednotlivých scenárov výrazne nemení, a oso-bitne to platí pre rastlinnú výrobu. Živočíšna výroba, naopak, reaguje na zmeny cien a scenárov citlivejšie.

Súčasná poľnohospodárska politika SR viac podporuje podniky v oblastiach s horšími výrobnými podmienkami, čo napomáha ich prežitie v silnejúcej trhovej konkurencii. Poľnohospodárske podniky nachádzajúce sa v lepších výrobných podmienkach sa musia vyrovnať s podstatne tvrdšími trhovými podmienkami. Implementovanie nástrojov aktu-alizovanej spoločnej poľnohospodárskej politiky EÚ vedie aj k zmenám v prioritách podpory poľnohospodárskych podnikov, kde sa uprednostňuje podpora a dotovanie pod-nikov s lepšími vyhliadkami na zvýšenie ziskovosti a iných kritérií obmedzených trho-vými pravidlami a komoditnými poriadkami. V modeli však neboli zahrnuté iné nástroje regionálnej politiky EÚ, ktoré v skutočnosti môžu zlepšiť finančnú situáciu podnikov nachádzajúcich sa v oblastiach s horšími výrobnými podmienkami. Napríklad nariadenie Rady č. 1259/1999 umožňuje za určitých okolností obdobnú podporu pre znevýhodnené oblasti, ako poskytuje aj súčasná poľnohospodárska politika SR.