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DEVELOPMENT OF AGRICULTURE AND RURAL AREAS IN CENTRAL AND EASTERN EUROPE

Thematic Proceedings

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Expert analyses and forecasts of economic conditions are a compulsory basis of any appropriate development and policy making. They are necessary for the preparation of different expert economic and development documents as well as the continuous adaptation of economic and development policy measures to the changes in actual developments. The significance of forecasts is even greater if we take into account that they direct the economies into the desired direction by influencing the expectations and thereby the actual events. Of course, these are not forecasts in the classic meaning of the word but rather the most probable results of developments based on certain assumptions.

The current agricultural policies play a special role in the development of single markets in agriculture. These policies are usually based on subsidies to agricultural producers. In the Common Agricultural Policy of the European Union, subsidies were until the last reform in 2003 in large part tied to some agricultural commodities and they thus distorted the free market solutions regarding the supply, demand and product prices. The producers were encouraged to preserve agricultural production and at the same time to produce certain commodities. They should directly contribute to greater economic activity. The situation has only started to change in the last few years, when market principles have also been increasingly applied to agriculture.

We can use the production volume, the value of production, and income as measures of economic activity. Value added, which is the mathematical difference between the value of production in basic prices and the value of intermediate consumption, is used in the National Accounts.
2. METHODOLOGY

2.1. The tool

A national agricultural sector APAS/ABTA model (Agricultural Policy Analysis Simulator / Activity Based Table of Accounts) is constructed for estimating the annual growth rates of value added in the Slovenian agriculture in the current medium-term period. The model is based on two existing tools after which it is named.

The APAS was developed to estimate changes in agricultural producers' income after Slovenia's accession to the EU (Kavčič, 2000). This model is updated with new data and adapted for annual value added forecasting. We used it to estimate production volumes in two steps. The first one is the calculation of area sown or the number of animals by the following equation:

\[
\sum_{i=1}^{n} L_i = \sum_{i=1}^{n} A_i + \sum_{n=1}^{n} \varepsilon_i \sum_{i=1}^{n} (\ln P_i - \ln P_c) + \sum_{i=1}^{n} B_i \sum_{j=1}^{m} \ln L_{i,j} \tag{1}
\]

where \( L_i \) is the harvested area or number of animals, \( A_i \) the constant (value for origin year), \( \varepsilon \) the appropriate elasticity, \( P_i \) prices, \( P_c \) the deflator, \( B_i \) the coefficient of long-term trend and \( L_{i,j} \) the area harvested or animal inventory in the previous year. The second equation is used to calculate production intensity, i.e. yield per hectare or yield per animal:

\[
\sum_{i=1}^{n} Y_i = \sum_{i=1}^{n} C_i + \sum_{n=1}^{n} \varepsilon_i \sum_{i=1}^{n} (\ln P_i - \ln P_c) + \sum_{i=1}^{n} \Gamma_i \sum_{j=1}^{m} \ln Y_{i,j} \tag{2}
\]

where \( Y_i \) is the production intensity, \( C_i \) the constant (value for origin year), \( \varepsilon \) the appropriate elasticity, \( P_i \) prices, \( P_c \) the deflator, \( \Gamma_i \) the coefficient to take account of technological changes and \( Y_{i,j} \) yields in the previous year. By multiplying the results of (1) and (2) we estimate the production volume of an individual commodity.

The ABTA is a database that provides ample data on the ratios in agricultural production (Rednak, 2003). We used it to estimate intermediate consumption for the calculated production levels. The specific model calculation’s results were used as a basis for the distribution of Economic Accounts for Agriculture input aggregates by activities:

\[
Y_{aj} = \frac{YM_{aj} \cdot EAA_j}{\sum_{a=1}^{n} YM_{aj}} \tag{3}
\]
where \( Y_{a,i} \) is the value of input for a given activity, \( Y_M \) are the results of model calculations, \( EAA \) are aggregated data of Economic Accounts for Agriculture and \( a = 1..n \) is the activity.

### 2.2. Commodity coverage

Our forecasts cover ten commodities. These are wheat, maize, barley, sugar beet, milk, beef, pork, poultry, sheep and goats, and eggs. In addition we included the majority of forage plants, which beside the four crops mentioned above comprise silage maize, fodder carrot, green fodder from field and fodder from permanent grassland. Furthermore, both (i) intermediate consumption and (ii) subsidies on product were distributed to the final consumer, i.e. to animal output. Until 2006, subsidies on products were formally granted for production of certain forage plants, but actually they support livestock production. In total, the commodities included comprise around three-quarters of the net agricultural production value in Slovenia.

### 2.3. Main assumptions

There are four main assumptions in the model: macroeconomic trends, trends of producer prices, trends of intermediate consumption prices, and trends of subsidies. Macroeconomic trends include inflation, exchange rates, and average wages. They are taken from IMAD (2006). Producer prices are taken from FAPRI (2005). In the standard and regional schemes, they are generally projected to fall slightly in the first few years of the forecasting period and rise again towards the end of the period. In a free market scenario, these prices would drop much more, approximately by a quarter. The rises of intermediate consumption prices are projected to be consistent with inflation. Subsidies are defined by agricultural policy (European Commission, 2003) and are divided per unit of individual product.

### 2.4. Scenarios

The scenarios are simulated for various dynamics of producer prices and measures of agricultural policy. Our forecasting period coincides with the launching of the 2003 CAP direct payments reform (EC, DG Agriculture, 2003). As an alternative to the standard scheme of direct payments (Ss), which was implemented in Slovenia until 2007, we examined the potential effect of adopting a regional single area payment scheme (Rs) and the implications of a hypothetical full liberalisation of trade in agricultural products (Ls). These scenarios have not been chosen
because they are regarded as highly probable but rather as interesting theoretical alternatives for testing the model's capacity and presenting the dilemmas of agricultural policy.

3. RESULTS

3.1. Production volume

The total area sown with wheat, maize, barley and sugar beet in Slovenia decreased in the last few years. In 2005 it comprised about 93,000 hectares, which was approximately a fifth less than in 1991. The majority was sown with maize and wheat (46% and 32%), and less with barley and sugar beet (17% and 5%). In the period until 2013 we cannot expect an increasing economic interest for these crops, but the negative trends could be stopped or slowed down. In the case of continued standard scheme the area sown would decrease the least, by 0.8%, in the case of introducing a regional scheme by 1% and in the case of a liberalised market by 5% (see Graph 1).

Graph 1 Trends in total area sown

Sources of data: Statistical office of Republic of Slovenia until 2006; further on own calculations

The total number of livestock, i.e. cattle, pigs, poultry, sheep and goats, which are the most important animals for the Slovenian economy, varied considerably in the last decade, but nevertheless it had a positive trend. In 2004 there were about 477,000 livestock units (LSU), which was roughly equal as in 1994. There were one third of cattle, a third of pigs, slightly less than a third of poultry and 4% of sheep and goats. In the period until 2013 one can expect different trends in the
animal inventory strongly dependent on the actual agricultural policy. In the case of a continued standard scheme the total number would increase slightly, by 1%. In conditions of the regional scheme and in the case of a liberalised market it would decrease, by 0.3% and by 7%, respectively (see Graph 2). The structure of the analysed production would change: the number of cattle would drop while the number of sheep and goats would increase. The number of dairy cows would fall in all three cases, by around 15%, as a result of the allocated milk quotas.

Graph 2 Trends in animal inventory
Sources of data: Statistical office of Republic of Slovenia until 2006; further on own calculations

The production intensity (average yield per hectare) in all analysed crops increased in the past and one can expect the increase to continue, mainly because of better technology applied. Model results showed that the intensity would rise most quickly in the standard scheme, slightly less in the regional scheme and the least under the liberalised scheme. The intensity of livestock production (average yield per animal) depends on optimal technology. In the next period we do not expect any significant changes in meat production. The opposite is expected concerning milk yield of dairy cows, which is quite low in Slovenia in comparison with some agriculturally developed countries.
The total production volume of the analysed crops (the sum of area sown multiplied by the corresponding yields) increased in Slovenia over the last decade and was about 10% higher in 2005 compared with 1991. In the period until 2013 the growth is likely to continue, but at varying rates in all three observed schemes: in the standard scheme by 8%, in the regional scheme by 7% and in the liberalised scheme by 2% (see Graph 3). This rise would mainly be underpinned by the continuing growth of production intensity. The total meat production (the sum of animals multiplied by the corresponding intensity) in Slovenia would continue to grow only in circumstances of the standard scheme, by 1%. In the case of the regional and liberalised schemes, it would decrease, by a respective 0.6% and 7% because of the decreasing number of animals (see Graph 4).
3.2. Value of production, intermediate consumption and value added

The total value of production in producer prices in the current mid-term period would increase in circumstances of the standard and regional schemes, by 4% and 3%, respectively. In the liberalised scheme it would drop by as much as 26% due to the lower production volume as well as lower producer prices. Their value in basic prices would increase only in the standard scheme, by 6%, while in the other two cases it would decrease significantly, by 7% and 33%. The differences between the values in producer prices and the values in basic prices are a consequence of the applied methodology, according to which subsidies on production (regional area payments), in contrast to subsidies on products, are not part of value in basic prices.

The total value added of the analysed production (the difference between the value of production in basic prices and the value of intermediate consumption) would face a nominal drop under all three scenarios (see Graph 5). It would be, as seen above, mostly the result of three factors: (i) trends in production volume, (ii) growing gaps between the rises in agricultural producer prices and prices of intermediate consumption and (iii) calculation methodology, since subsidies on production are not part of value added. By 2013, it would fall by around a quarter in the circumstances of the standard scheme and by around half in the regional single payment scheme. If trade in agricultural products were fully liberalised, the value added would turn negative already in 2010 when production costs would exceed the value of production. This would be a result of the significantly lower product prices and the abolition of all agricultural subsidies.

Graph 5 Trends in total value added of analysed production

Sources of data: Statistical office of Republic of Slovenia until 2006; further on own calculations
4. DISCUSSION AND CONCLUSIONS

The main findings of our research are the following:

(i) The total area sown with analysed crops would slightly decrease in the case of implementing the regional scheme compared with the standard scheme, although the opposite might be expected. We can infer that in the case of introducing the regional scheme the area sown with crops not included in the model would increase; (ii) The substantial drop in the total livestock inventory in the case of a liberalised market is projected, which is not surprising, since the livestock and meat prices on the world market are much lower than in the local and European markets; (iii) The total value of analysed production depends in large part on the trends of producers prices. It is possible that these will move in a different way than assumed in this outlook, in which case the results would be different; (iv) The value of intermediate consumption depends on the trends in intermediate consumption prices, which are one of the most uncertain assumptions in the model; (v) All results of the model assume normal weather conditions and normal conditions for production, with no animal diseases and no significant climate change. In the case of different assumptions, the outcome would change significantly; (vi) Due to the expected decrease in agriculture's value added and particularly the anticipated relatively fast development of other activities, the proportion of agricultural activity to total economy's value added can be expected to drop further in the medium-term period in Slovenia. This proportion is projected to shrink from the current 2.3% to around 1% of total value added until 2013. If the sector were fully liberalised, agricultural production would probably become unviable in a relatively short time frame. In order to keep the agricultural sector viable in the future, it will therefore be necessary to reconsider its many social roles that are not strictly limited to food production.

REFERENCES


