The CAP
and competitiveness
of the Polish and European
food sectors

INSTITUTE OF AGRICULTURAL
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COMPETITIVENESS OF THE POLISH FOOD
ECONOMY UNDER THE CONDITIONS OF
GLOBALIZATION AND EUROPEAN INTEGRATION

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Contents

Foreword

The development of agriculture and the structural changes less and less depend on endogenous conditions in the sector, and increasingly depend on sectoral policies and, above all macroeconomic policy. A key role in determining the competitiveness of the food sector is played by the development trends in the macro-scale. The situation in agriculture is an integral part of the economic situation and at the same time it is a derivative thereof. In a globalizing world, more and more interdependent, and in recent years clearly integrating economically on a regional basis, European agriculture, including the Polish, is increasingly subject to external influences. The EU enlargement to include the countries of Central and Eastern Europe, the growing internal budgetary constraints and the effects of the global economic crisis, as well as conditions resulting from multilateral negotiations under the WTO, have had a significant impact on the shape and scope of public support directed to agriculture and rural areas.

The parallel development of attitudes of state intervention and the principles of liberalism and openness of the world economy brought results far unsatisfactory, relative to expectations. The civilization breakthrough that is occurring in recent years brings the replacement of industrial civilization by a new, still undefined, knowledge-based economy. The first decade of the twenty-first century revealed the accumulation of effects of social, economic, cultural, political and ethical nature. Irreversible changes have also touched the role played by factors of production in the wealth generation process: land, raw materials, energy, water, fixed assets, technology, financial capital, and above all human and social capital. More and more difficult it is to achieve social cohesion in its various manifestations, without which it is difficult not only achieve economic efficiency, but even social peace and sustainable development.

To meet these challenges, the Institute of Agricultural and Food Economics – National Research Institute organized on 26-28th November 2014 in Józefów, close to Warsaw an international conference entitled "The CAP and the competitiveness of the Polish and European food sector". Its aim was to present and summarize the research carried out under the Multiannual Programme 2011-2014. The key topic of discussions and the presentations was present and future state of Europe. There was talk of an aging society, problems with work for young people, deepening diversification of income, European tax havens, the need to reform the euro zone, increasing the EU's financial needs, the challenge for Europe related to the trade agreement with the United States. It was also pointed out to limitations, such as the earth's resources and the ways of over-

coming them were shown, e.g. by building an innovative economy. Food production may be one of the strengths of the EU. With a drop in domestic demand (because the number of inhabitants will decrease) we have to focus on the global market. But to realize this concept changes are needed in improving the competitiveness of the food economy. The current CAP does not motivate enough to increase productivity. Its improvement could contribute to reorientation of agricultural support, mainly aiming to change the agrarian structure, creating larger, economically strong farms with market-oriented production. "Valid" rules concerning, among others the dogma of national food self-sufficiency have to change. Another problem of the EU is a big diversity in levels of economic and development opportunities, and thus the effects of the CAP.

This book consists of 17 articles relating to the most important, according to its authors, challenges of modern agriculture, food and rural development and their analysis. Chapters I – VIII refer to issues related to the analysis of factors and determinants of competitiveness in selected EU member states mainly in respect of the instruments of the CAP including rural development policy. Starting from purely theoretical considerations in chapter I, prof. Włodzimierz Rembisz and dr Agata Sielska (IAFE-NRI) analyse the impact of political rent for agricultural producers, representing, among others, assumptions and evidence of analytical and empirical illustration of the relationship of remuneration to productivity of labour. In chapter II prof. Jacek Kulawik, prof. Edward Majewski, dr Joanna Pawłowska-Tyszko, dr Adam Wąs and dr Barbara Wieliczko (IAFE-NRI) analyse the budgetary determinants of competitiveness of agriculture, relating to, among others, the sources of funds in agriculture, the issue of "greening" direct payments, taxes and insurance. In chapter III, dr Werner Kleinhanss of Thünen-Institute of Farm Economics, Braunschweig introduces the reader to the issue of competitiveness of German agriculture based on FADN data referring to, among others, the level and distribution of income and opportunity cost analysis of farms according to their organizational form, region and type of production. In chapter IV prof. Wojciech Józwiak, MSc. Adam Kagan, dr Grażyna Niewęgłowska, MSc. Jolanta Sobierajewska and MSc. Marek Zielinski (IAFE-NRI) based on the analysis of FADN data from 2005-2012 show the issues related to factors leading to an increase in the competitiveness of Polish farms and indicate the decisive reasons for changes in the number of farms with a competitive ability and those that can achieve this ability in a short time.

Chapter V written by dr Tomas Medonos and dr Martin Hruska, the Institute of Agricultural Economics and Information in Prague together with dr Tomas Ratinger of Technology Centre refers to evaluation of the effects of implemented investment support in the Czech Republic under the rural development programme 2007-2013. To evaluate the actual effects of implemented programmes of support the authors used models based on the methods of factor analysis and regression probit models based on data from 1,400 farms. Chapter VI prepared by dr Minka Chopeva and professor Dimitre Nikolov from the Institute of Agricultural Economics in Sofia presents an analysis of the CAP's impact on the efficiency of small farms in Bulgaria. In these studies the authors used the principle of input-output modelling using the Cobb-Douglas function for semi-subsistence farms by groups specializing in field crops, permanent crops and livestock herbivorous. In Chapter VII, dr Aldona Skarżyńska (IAFE--NRI) presents the results of studies on projected profitability of cultivation of cereals and oilseed rape in 2020 in variant approach. To build the projection models the author used empirical material for four basic cereals, i.e. winter wheat, winter rye, barley and winter rape in 2011-2013, collected and processed according to the principles of the system Agrokoszty. Professor Yurii Lupenko and dr Leonid Tulush from the Institute of Agricultural Economics in Kiev presents in Chapter VIII special tax arrangements concerning the agricultural sector in Ukraine in terms of their effectiveness, ability to support increase in the production potential and prospects of further development of agriculture in Ukraine.

Chapters IX to XIII of this publication are mostly devoted to the analysis of issues related to marketing, foreign trade in agri-food products and the question of the internal market in relation to the issue of the competitiveness of the food economy. Chapter IX written by dr Branko Mihailovic, prof. Drago Cvijanović and MSc. Predrag Vuković from the Institute of Agricultural Economics in Belgrade presented issues related to the role of international marketing in the process of raising the competitiveness of agricultural products and foodstuffs in Serbia. The article presents, among others, issues concerning the competitiveness of the exports of the agricultural sector, international marketing, and marketing on the example of products of protected origin in Serbia. Dr Jolanta Drożdz and dr Artiom Volkov of the Lithuanian Institute of Agricultural Economics presented in chapter X the results of research on the diversification of the food exports in Lithuania. The authors referred to the issues related to the transformation of the conditions of Lithuania's foreign trade, international trade flows, the trends of ex-

ports and trends in market diversification. Issues related to foreign trade were also referred to by dr Łukasz Ambroziak and dr Iwona Szczepaniak (IAFE-NRI) in chapter XI on the competitiveness of the agri-food exports and decomposition of the changes in agri-food exports in the period of the Polish membership in the European Union. The authors, based on selected indicators, assessed the competitive position in the export of the Polish agri-food products in the years 2003-2013 and using methods of constant market share (CMS) prepared a decomposition of changes in the Polish agri-food exports in the years 2003-2013. Chapter XII written by prof. Krystyna Świetlik (IAFE-NRI) is devoted to the issues of domestic demand for food. The article constitutes a polemic, mainly in relation to the export success. This refers to the macroeconomic determinants of demand for food in 2009-2013, consumption of food and its balance sheets according to national accounts and household consumption.

Subsequent chapters of the book (XIII - XV) are devoted to the issues of broadly defined sustainability. Prof. Orest Furdychko of the National Academy of Agrarian Sciences of Ukraine and dr Natalia Gnativ of Agroecology and Environmental Management of NAAS in Kiev presented in chapter XIII the issues of rural development in the context of Ukraine's integration with the European Union referring, among others, to the underlying problems and factors affecting the conditions of rural development in Ukraine, the administrative system and management policy options for the government of Ukraine concerning the promotion of sustainable rural development and European experiences with sustainable rural development and the possibility of their implementation in Ukraine. Issues of sustainable development of agriculture in the light of the paradigm of competitiveness are also presented in chapter XIV by prof. Józef St. Zegar (IAFE-NRI). The author refers primarily to the paradigm of competitiveness, existing models and forms of agriculture, issues of competition for resources including those related to the concept of the so--called ecological footprint of the population and market issues and policies. The concept of sustainability is also presented in chapter XV written by dr Theodora Stoev and dr Dimka Haytov of the University of Agriculture in Plovdiv. It presents the impact of the Common Agricultural Policy on the sustainability and competitiveness of the Bulgarian vegetable production. In this context major types of vegetable production in the period 2001-2012 are presented, including the size of the area covered by the cultivation of vegetables and dynamics of its changes and average yields.

The last two chapters relate to issues of social capital. Dr Monica Tudor from the Institute of Agricultural Economics – Romanian Academy of Sciences in chapter XVI discusses the issues of human capital trying to verify whether human capital of Romanian rural areas can act as a catalyst or as a limiting factor of competitive potential of the Romanian rural areas. The author refers to issues related to internal and external migration, education and the labour market and rural entrepreneurship as a catalyst for smart growth. Michał Dudek (IAFE--NRI) refers in turn to the problems of human capital in the process of structural changes in the Polish agriculture. The author points to the historically shaped and persistent disparities between the rural population and urban dwellers in access to technical infrastructure, social services and various services related to education, training and health. He also argues that the barrier to improve the economic situation of numerous farming families is the lack of financial resources for investments associated not only with the enlargement of the acreage, but also modernization of existing resources, reorientation of production profile or adaptation of new organizational solutions.

The publication ends with a short summarizing chapter XVIII presenting a reflection on the competitiveness of the Polish and European food sectors. Poland thanks to the membership in the EU became a participant in the global market. The accession has changed the international competitiveness of Poland and above all contributed to an unprecedented in the recent history of the country modernization of the countryside, farming and food industry and to an increase in economic efficiency. Assessment of the economic impact of these processes, however, shows that not all regions, both in Poland and other countries analysed, equally exercise the opportunity of catching-up. Some of thirteen "new" EU member and candidate countries are still in a difficult situation and have a long way to make up the historical delay. In this publication we tried to present only selected issues of the research conducted by IAFE-NRI, which were presented during the conference presentations and the discussions. In our opinion, presenting all these different aspects and problems in one book is one of the most important advantages of this publication. Pointing to the most important problems in individual countries, we tried to present it in close connection with the CAP, not forgetting also the global context. We hope that thanks to this approach we were able to answer at least some questions concerning competitiveness. At the same time we are aware that we have failed to answer all the questions related to the title of this publication, as well, despite the vastness of this book, we failed to show fully the analysed issues presented

in this volume. Therefore, we leave ourselves the opportunity to continue discussions on the above subject realizing the next IAFE-NRI's multi-annual programme for the period 2015-2019 IAFE-NRI entitled "The Polish and the EU agricultures 2020+. Challenges, opportunities, threats, proposals".

Editorial Committee

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1. Political rent vs. investments and relationship between remuneration and labour productivity by agricultural producers

1.1. Introduction

In this paper we adopt the hypothesis according to which political rent increases investments undertaken by farmers, improvement in manufacturing techniques and this rent allows for maintaining a reasonable relationship between the growth of wages and labour productivity. Labour productivity is regarded as a basic economic source of remuneration of labour, thus *implicite* income of agricultural producers[1]. This hypothesis we first prove analytically, then empirically.

We simplify the reasoning and empirical analysis and synthesize it to extract only the most important issues for the adopted hypothesis. We understand the term political rent as income effects of the Common Agricultural Policy [Bezat-Jarzębowska, Rembisz, Sielska 2012].

1.2. Assumptions and analytical evidence

We assume that the following assumptions are fulfilled. The first assumption concerns the level of fixed capital agricultural producers use. It is the result of accumulated investment and consumption (moral and physical) of this factor. This process can be described as [Bezat-Jarzębowska, Rembisz, Sielska 2013]:

$$K_t = I_t + (1 - \delta)K_{t-1}$$

$$K_t = (1 - \delta)K_0 + \sum_{i=0}^{t-1} I_{t-1}(1 - \delta)^i$$

$$K_{t-1} = \frac{I_t}{\left(\frac{\Delta R}{R} - \delta\right)}$$

where:
K_t – fixed capital (machines, equipment, buildings, etc.), I_t – accumulated investments, δ – depreciation of capital, R – volume of production.

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[1] Assuming that the income from work is a major source of income for an agricultural producer. It does not differ from the reality of individual farms.

Such a dynamic approach is the core of the analysed process. We also assume that rationally behaving farmers whose aim is to maximize the income (profit), undertake investments, if the marginal rate of the revenue from investment after the deduction of depreciation is equal to its cost at least at the level of interest rate. Thus we have:

$$\frac{\Delta R_{t+1} \cdot C_R}{\Delta K_t} = P_K$$
$$P_K - \delta = r$$

where:

C_R – prices received (agricultural prices), R_t – volume of production, r – interest rate (opportunity cost), P_K – marginal revenue from the investment.

Naturally, the basis of the investment are savings, whether it be *ex-post* or *ex-ante* (credits), made by agricultural producers. We assume that political rent adds to the "normal" savings of producers and "catalyzes" raising the level of investment made by them:

$$S_{t-1} \Rightarrow I_t$$
$$S_{t-1} < I_t$$
$$S_{t-1} + B_t = I_t \uparrow$$

where:

S_t – savings, B_t – income from political rent.

This is undoubtedly a positive basis for increased production and development processes in each business activity, as well as in agriculture, recognized in the literature. As a result of the process described with the above formulas we observe an increase in the level of the factor of fixed capital employed by agricultural producers. This induces an increase in both production volume and in achieved revenues and ultimately in incomes, which are the objective of agricultural producers. This process can be described as:

$$I_t \uparrow \Rightarrow K_t \uparrow \Rightarrow R_t \uparrow$$
$$C_R \cdot R_t \uparrow \Rightarrow D_t \uparrow$$

where:

D_t – revenues.

In *per capita* terms the effect of these changes is an improvement in manufacturing techniques, namely the relationship between capital factor and labour factor, and ultimately an increase in labour productivity and an increase in its remuneration as a rational basis of income:

$$\frac{K_t}{L_t} \uparrow \Rightarrow \left(\frac{R_t}{L_t} = w_L{}^t\right) \uparrow \Rightarrow \frac{D_t}{L_t} \uparrow \Rightarrow C_L{}^{t+1} \uparrow$$

where:

L_t – labour input, w_L – labour productivity, C_L^t – remuneration of labour.

Accordingly, the second assumption concerns the relations present among political rent, manufacturing techniques, productivity and remuneration of the capital factor.

The third assumption adopted in the paper concerns the impact of political rent on the distribution of income of agricultural producers. In line with the above reasoning, we assume that political rent can increase savings (then allocated to investments) or consumption[2]:

$$B_t + C_L^t = C_t + S_t + T_t$$

thus:

$$(C_t + C_B \cdot B_t) + (S_t + S_B \cdot B_t) + T_t$$

with:

$$C_B \lessgtr S_B$$

where:

$C_B = \frac{\partial C}{\partial B_t}$, $S_B = \frac{\partial S}{\partial B_t}$, C_t – consumption, T_t – taxes.

Investment and income effects of political rent can appear. Labour productivity becomes a source shaping incomes of agricultural producers:

$$(S_{t-1} + S_B \cdot B_t) \uparrow \Rightarrow I_t \uparrow \Rightarrow \frac{K_t}{L_t} \uparrow \Rightarrow w_L \uparrow \Rightarrow C_L^{t+1} \uparrow.$$

The last assumption concerns the occurrence of a kind of multiplier effect of investment in the case of political rent's growth. Assuming that the increase in income earned by agricultural producers from political rent has a catalysing effect on the investments made by them, political rent multiplier can be defined as:

$$m_I = \frac{\Delta I}{\Delta B}.$$

When $m_I > 1$ we have a dynamic closed cause-effect cycle being a foundation for increase in the remuneration of labour based on a growth of this factor's productivity as a rational base for income's increase:

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[2] Political rent and direct payments related to it undoubtedly increase creditworthiness of an agricultural producer, thus *ex-ante* savings.

$$\Delta\, C_L^t + \Delta\, B_t \cdot m_I \Rightarrow \Delta S_t \Rightarrow \Delta I_t$$
$$\Delta I_t \Rightarrow \Delta K_t(1-a) \Rightarrow \frac{\Delta K_t}{\Delta L_t} \Rightarrow w_{L(t+1)} \Rightarrow \Delta\, C_L^{\,t+1}.$$

The above described potential impact of the occurrence of political rent is synthetically illustrated in Fig. 1.1. Increasing the slope angle of the lines in relation to their hypothetic position represents a catalysing effect of political rent on investment, production techniques and on income.

Figure 1.1. Ideograms of impact of political rent on investment, technical equipment and labour productivity
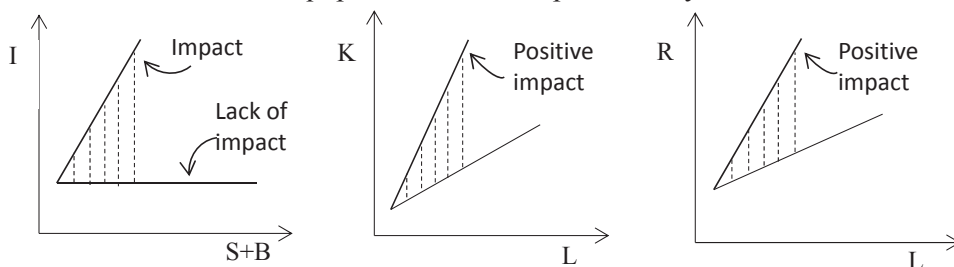
Source: own elaboration.

1.3. Political rent and investment

The empirical illustration is based on data from the CSO's Local Data Bank[3] and the FADN Public Database[4].

It may be noted that the value of investment in agriculture (Section A)[5] continued to increase (Fig. 1.2). The most important from the point of view of the adopted hypothesis and assumptions is that the pace of growth was significantly higher than for the whole economy. This is the first condition positively verifying the hypothesis and the above analytical reasoning. Agricultural producers, it seems, used properly their political rent.

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[3] http://stat.gov.pl/bdl/app/strona.html?p_name=indeks
[4] European Commission – EU FADN, http://ec.europa.eu/agriculture/rica/database/database_en.cfm.
[5] In the inter-sector comparative analysis we use the division of economic activity in line with the Polish Classification of Activities PKD 2007 [Wyjaśnienia PKD 2007]. We will treat section A as agriculture. It includes the following activities: agriculture, forestry, hunting and fishing.

Figure 1.2. Dynamics of investment in agriculture and the whole economy (2009 = 1)
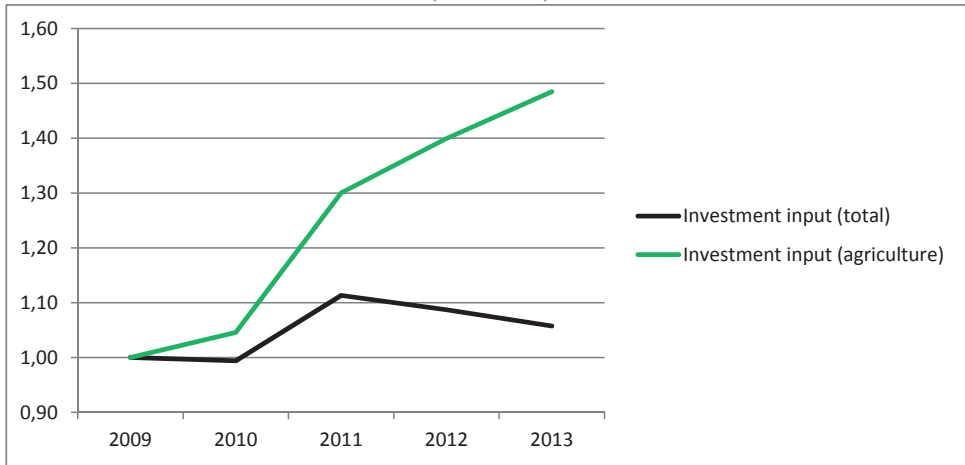
Source: own elaboration based on CSO's Local Data Bank.

To further verify the assumptions, this increase in investment in agriculture, according to the above reasoning, will be compared with the political rent, in this case subsidies for investment (which is obvious) and direct payments (Fig. 1.3). Positive relationships take place here – the effects of political rent are visible in investment. Pearson correlation coefficients calculated for these variables were 0.68 for the relationship between the investment and subsidies earmarked for investments and 0.56 for investments and payments excluding subsidies on investments. Therefore, it can be considered a positive verification of the first part of the adopted hypothesis and assumptions and confirming the validity of the analytical approach set out above. Political rent catalysed the investment process taking place on farms, which can be regarded as a positive effect of the CAP. It is also a simple synthetic approach rooted in microeconomics and its principles and in analytical approach.

Figure 1.3. Dynamics of investment in agriculture and of subsidies
(2009 = 1)
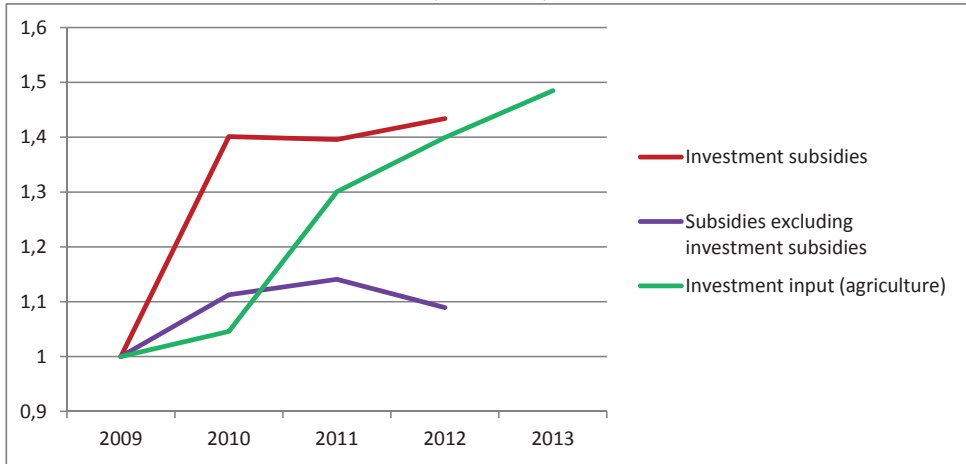
1.4. Relation between remuneration and labour productivity

The second part of the adopted hypothesis relating to rational relationship between performance and remuneration of labour consists in the problem of choice of the manufacturer (in the decision process). As in the approach used in microeconomics, producer using two factors of production (manufacturing), is faced with the task of maximizing the objective function:

$$\Pi = R \cdot C_R - (K \cdot C_K + L \cdot C_L) \rightarrow max$$

where:
Π – income[6], R – volume of production, C_R – received prices, K – capital input (including land), C_K – remuneration of capital (profit and rent), L – labour input, C_L – remuneration of labour.

Optimality conditions require equality of the marginal productivity of the relevant factors of production and their remuneration [Rembisz, Sielska 2011]:

$$\frac{\partial R}{\partial K} = C_K \qquad \frac{\partial R}{\partial L} = C_L.$$

Thus, the relation between remuneration of the factors and their performance (productivity) is crucial for the producer. It decides on funding opportunities and restoring processes in subsequent cycles, and from the point of view of

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[6] Profit in general approach.

verified hypothesis – about the coverage of remuneration by performance (productivity) of a given factor of production (which is treated as a source of financing of this remuneration). Thus it informs about rationality of management, competitiveness and existence of a balance [Rembisz, Sielska 2014].

As a measure for assessing and illustrating these processes, while reassessing the second part of the hypothesis, we used quotient of the level of remuneration of labour to the productivity of this factor, the so-called unit labour costs *ULC*:

$$ULC = \frac{C_L}{w_L} \times 100\%$$

where:

$w_L = \frac{R_t}{L_t}$ – labour productivity, C_L – remuneration for labour input.

This measure carries a number of important synthetic economic information. Basically, it should not exceed 100%. When *ULC > 100%* we face a situation of declining competitiveness and a lack of rationality. Labour productivity (for given prices received) is lower than its remuneration, thus it is not the source of its financing. As a result, the labour costs outweigh the value of production generated with the use of this factor. Thus, the manufacturer must find an additional funding source of remuneration for labour, and one of the potential possibilities in this case is the income generated from political rent (or an increase in the prices received – buying prices, what is omitted here). When *ULC < 100%* remuneration of labour is with a vengeance covered by its performance at given prices received. In the long run this positive effect, e.g. in the form of manufacturing competitiveness is redeemed by low incomes (income parity issues, etc.) and undermining the foundations of development.

Equally important, if not more important and more objective (less important are the issues of remuneration and performance measurement), is an approach to this ratio based on the relationship of change (increase) in the size of remuneration and productivity, i.e.:

$$\Delta ULC = \frac{\Delta C_L}{C_L} : \frac{\Delta w_L}{w_L}.$$

This approach allows us to evaluate the grounds for changes in rationality and in competitiveness of agricultural production. As in the case of the *UCL*, in the optimum situation *ΔULC* values should be close to one, reflecting the balance of growth. When the ratio is greater than one, this means that the re-

muneration grows faster than productivity. This can lead to a deterioration of competitiveness and dependence upon external support. We will illustrate this case empirically.

The values of the *ULC* and *ΔULC* allow us to conclude that there is rationality, referred to the allocation of factors of production, and competitiveness, as well as they provide a basis for the evaluation of justice in the sense of distribution referred to remuneration. Thus, they can be a tool for assessing the effects of agricultural policy and, as it has already been mentioned, they are useful for verifying the second part of the research hypothesis.

1.5. Empirical illustration of the relationship between remuneration and labour productivity

An introduction to the analysis based on the *ΔULC* is an illustration of changes in the remuneration of labour in agriculture and the economy as a whole (Fig. 1.4). The growth of this remuneration (excluding direct payments) was noticeable in both the whole economy and in agriculture. By 2010 remuneration of this factor in agriculture increased to a similar extent to that seen for the whole economy, which contradicts many popular opinions. Moreover, after 2010 remuneration of labour in agriculture grew significantly faster than in the economy as a whole. This of course is a positive assessment of the impact of the CAP and exemplification of the effects of political rent. It is also a good basis for positive verification of the hypothesis. However, for this to happen, this positive development should be compiled in accordance with the above analysis of the dynamics of changes in labour productivity.

An increase in productivity (Fig. 1.5) occurs in agriculture, and in the whole economy. From approx. 2009 labour productivity growth has clearly been accelerating in relation to this indicator for the whole economy and recently it has even become equal to the one for the whole economy. This applies to growth rates rather than levels[7]. This is undoubtedly a positive effect of political rent.

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[7] It should also be noted that the remunerations were similar (analogous graphs for the absolute values presented in [Rembisz, Sielska 2014] confirm this observation), while there were significant differences as to the levels of productivity.

Figure 1.4. Dynamics of average wages in agriculture
and in the whole economy in the years 2005-2012 (2005 = 1)
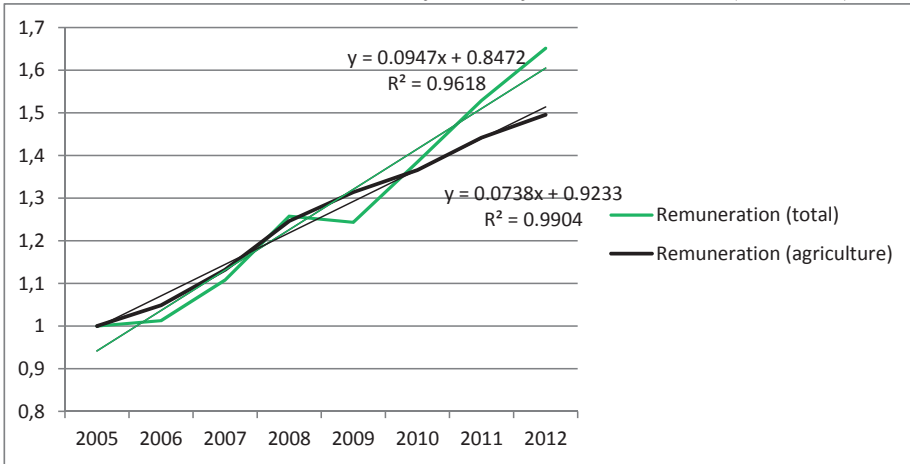
Figure 1.5. Dynamics of average labour productivity in agriculture
and the whole economy in the years 2005-2011 (2005 = 1)
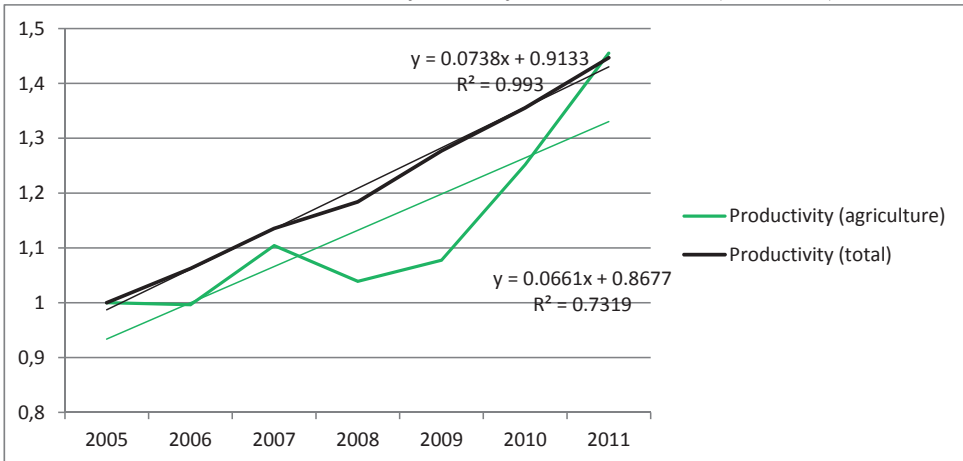
To the positive effects of the CAP also points the analysis of changes in employment in agriculture and the whole economy (Fig. 1.6). We can see a clear decline in employment in agriculture, which must lead to that recorded higher growth of labour productivity. In the case of the whole economy, we can record employment growth in the early years analysed and the relative stability after 2008.

Figure 1.6. Dynamics of average employment in agriculture and the whole economy in the years 2005-2012 (2005 = 1)

$$y = -0.0049x^2 + 0.0596x + 0.9373$$
$$R^2 = 0.934$$

$$y = -0.0116x + 1.0241$$
$$R^2 = 0.8422$$
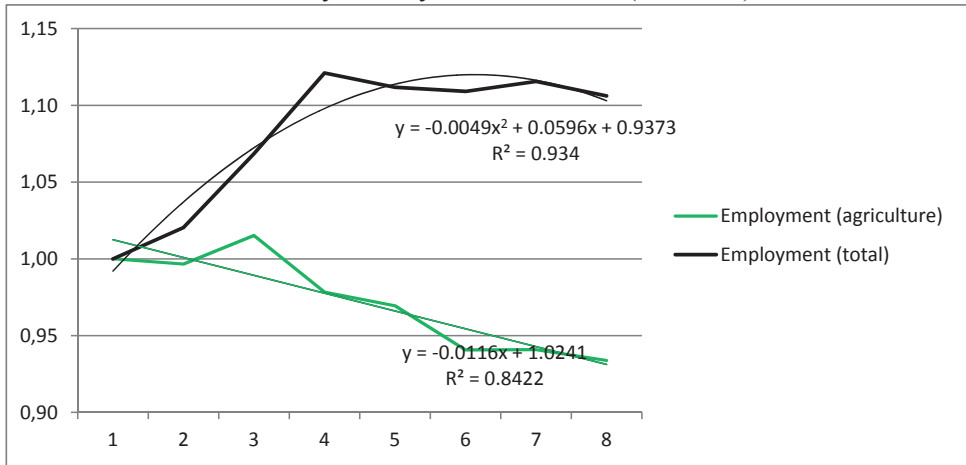
Source: [Rembisz, Sielska 2014, p. 82].

The above remarks are synthesized by visualizations in Figure 1.7. We can see that in the whole economy the relation between wage growth and productivity is greater than in agriculture. This is probably the result of agricultural policy effective in its allocative role.

Figure 1.7. Dynamics of average wages and productivity in agriculture and in total in 2005-2011 (2005 = 1)
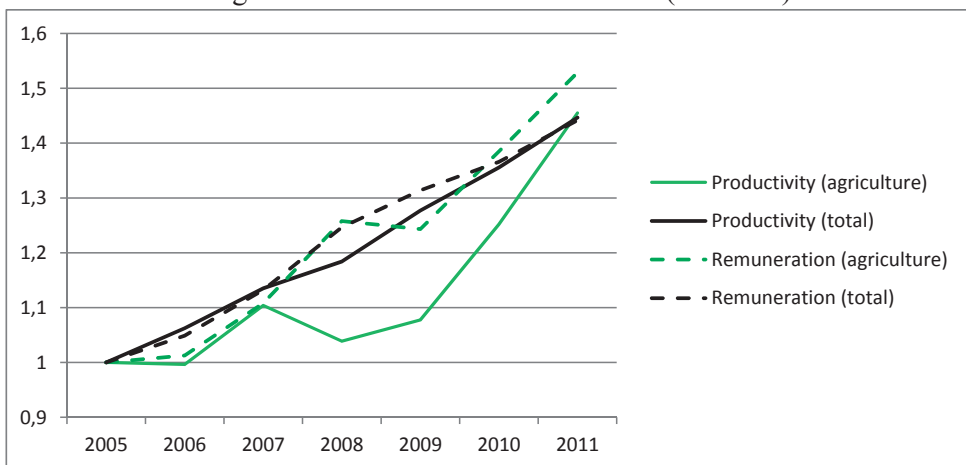
Source: [Rembisz, Sielska 2014, p. 97].

1.6. *ΔULC* index

These assertions have to find expression in the formation of the ΔULC[8]. Its value higher than one ($\Delta ULC > 1$) contrary to appearances, is not a good news. Although it means that the growth rate of remuneration (adjusted for the payments under the CAP) is faster than the growth rate of labour productivity, it can, however, lead to distortions in the longer-term equilibrium growth. This may result in a deterioration in competitiveness of production. It can also lead to reliance on external funds to finance the difference. It may also indicate that, in fact, agriculture uses or takes part of the value added generated in other sectors analysed here. This is undoubtedly a positive evaluation of agricultural policy for the division. In other sectors, this ratio is below one or close to one, which indicates that remuneration growth is lower than productivity growth, or in other words: the labour productivity growth has not been fully consumed in the form of increase in its remuneration. It was different in agriculture (Fig. 1.8).

Figure 1.8. *ΔULC* in 2005-2011 by type of economic activity
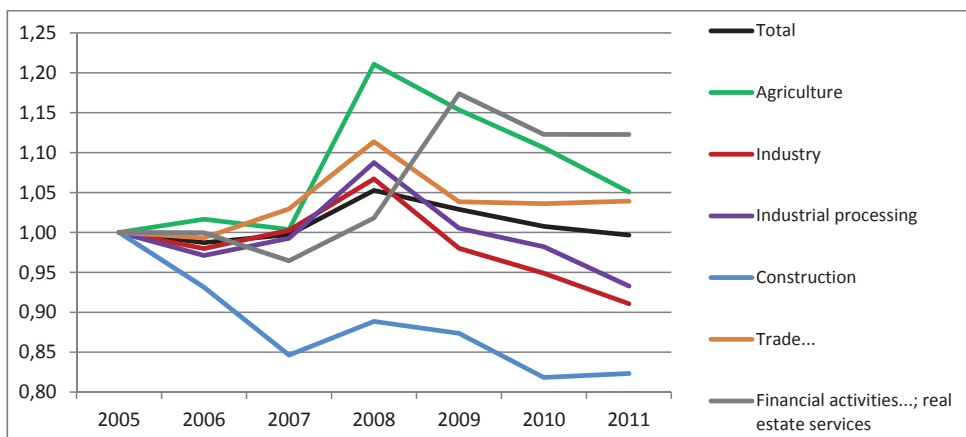
Source: own elaboration based on CSO's Local Data Bank.

The high average rate of growth recorded in the first period (since 2008) indicates that agricultural growth in wages far exceeded productivity growth. This also applied to other types of economic activities, but to a lesser extent. The only exception was construction. On the other hand, in the second part of the period considered, agriculture began to adjust wage increases to productivity growth, which is undoubtedly a positive phenomenon (Fig. 1.9).

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[8] We analyse changes in relations to 2005.

Figure 1.9. Average annual rate of change in *ΔULC* in 2005-2011
by type of economic activity
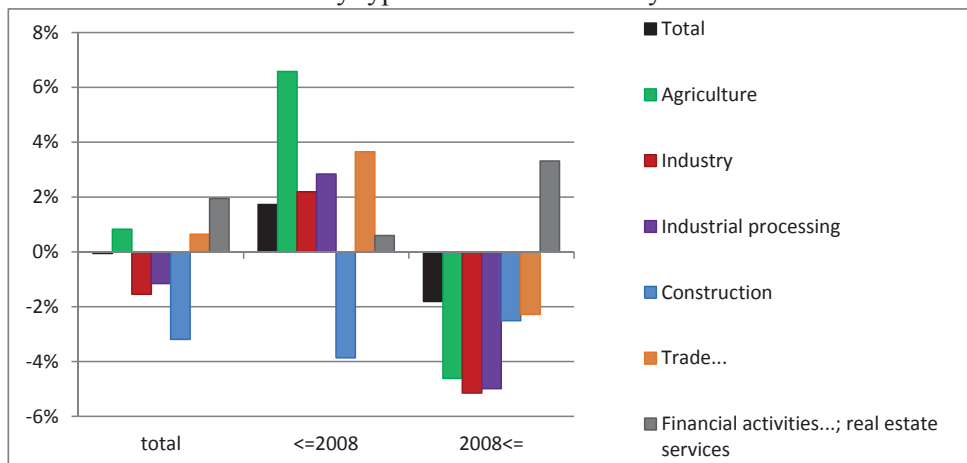
1.7. Summary

The paper presents the author's analytical model allowing to determine and evaluate the effects of agricultural policy in the form of investment growth, changes in manufacturing techniques and the formation of rational relationship between changes in labour productivity and its remuneration. We described the mechanism of influencing these values by political rent.

As an empirical illustration in line with the analytical model and the adopted hypothesis we showed a positive "catalysing" effect of political rent on investment undertaken by agricultural producers and the positive impact on labour productivity and the manufacturing technique (fall in employment). A positive impact on maintaining a proper relationship between changes of wages and labour productivity (*ULC*) can also be observed.

References

1. Bezat-Jarzębowska A., Rembisz W., Sielska A., *Wybór polityki i jej wpływ na decyzje producentów rolnych w ujęciu analitycznym z elementami weryfikacji empirycznej*, IERiGŻ-PIB, PW 49,Warszawa 2012.
2. Bezat-Jarzębowska A., Rembisz W., Sielska A., *Wpływ polityki rolnej na decyzje producentów rolnych odnośnie dochodów i inwestycji*, IERiGŻ-PIB, PW 97,Warszawa 2013.
3. Rembisz W., Sielska A., *Mikroekonomia – zarys w ujęciu analitycznym*, Vizja Press&IT, Warszawa 2011.

4. Rembisz W., Sielska A., *Wybrane wskaźniki ekonomiczne w rolnictwie jako skutek długookresowej polityki rolnej i uwarunkowań popytowych*, IERiGŻ-PIB, PW 133, Warszawa 2014.

5. Wyjaśnienia PKD 2007. Załącznik do Rozporządzenia Rady Ministrów z 24 grudnia 2007 r. w sprawie Polskiej Klasyfikacji Działalności (PKD) (Dz.U. z 2007r. nr 251, poz. 1885), (http://stat.gov.pl/Klasyfikacje/doc /pkd_07/pdf/3_PKD-2007-wyjasnienia.pdf).

6. http://ec.europa.eu/agriculture/rica/database/database_en.cfm

7. http://stat.gov.pl/bdl/app/strona.html?p_name=indeks

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2. Budgetary considerations of competitiveness in agriculture

2.1. Introduction

The research conducted under the theme "Budget grounds for improvement of the competitiveness of the Polish agriculture" allow us to adopt a hypothesis that the fiscal instruments in different directions affect the competitiveness of agriculture, and in addition they are oriented at the same time to achieve other important socio-economic objectives. It is very difficult to estimate their pure summary impact on competitiveness.

This paper presents three important issues of budgetary conditions influencing the competitiveness of the Polish agriculture. First of the issues raised are the sources of funding in the agricultural sector in Poland and the assessment of the potential impact on the competitiveness of agriculture of various types of public support. The second issue presented is the "greening" of direct payments and the assessment of the expected impact of this change in the functioning of direct payments on the competitiveness of agriculture. The last of the analysed problems is the impact of the tax and insurance on the competitiveness of agriculture in Poland.

2.2. Sources of financing in Polish agriculture and the potential impact of public funds obtained on the competitiveness of the agricultural sector

As shown in the structure of sources of funds in the Polish agriculture in the years 2005-2013 (Fig. 2.1), the importance of public funds (national and the EU) is steadily growing. This comes at the expense of the operating sector, or income from sales of products produced by agriculture. The importance of the market sector fluctuates, but it remains minimal. The decrease in the share of agricultural activity in the structure of funding demonstrates a growing dependence of the sector on public support, which could inter alia, restrict and delay efforts to implement innovations designed to increase the efficiency of the sector.

Figure 2.1. Structure of sources of funds in Polish agriculture
in the years 2005-2013 (in percent)
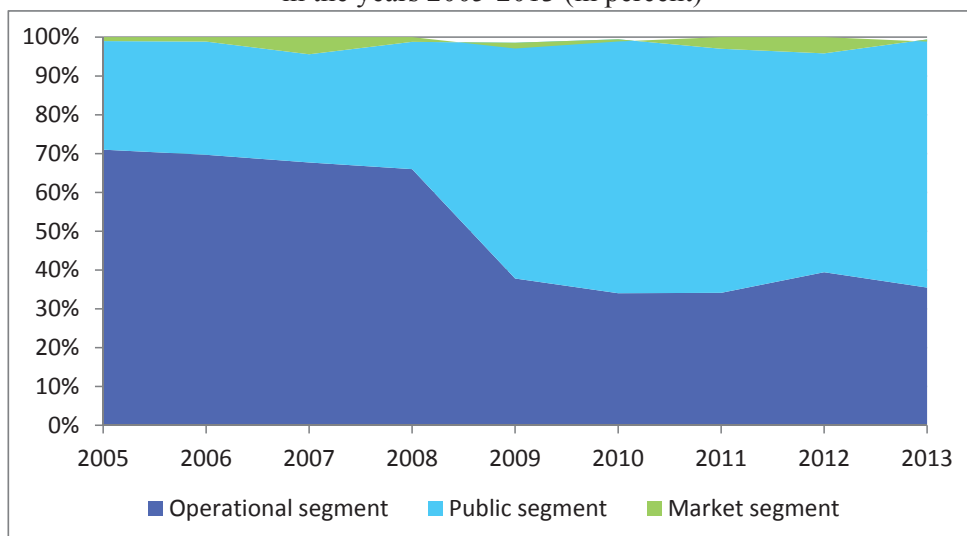
*Source: own elaboration based on data: A. Kowalski (ed.), Analiza produkcyjno-
-ekonomicznej sytuacji rolnictwa i gospodarki żywnościowej w 2012 roku, IERiGŻ-PIB, War-
saw 2013 and former.*

The research studies on the impact of direct payments indicate that their use
is distorting to market mechanisms' influence on farmers' decisions. However, by
stabilizing income and reducing barriers to external capital, they may also indi-
rectly positively influence the competitiveness of this sector [OECD, 2011].

The basis of competitiveness is to have a competitive advantage in a given
area. A literature review enables us to distinguish four types of competitive ad-
vantages, which are:

1. Effectiveness/productivity – it combines the cost leadership strategy product
stand out from the competition;

2. Basing on innovation and entrepreneurship;

3. Referring to corporate social responsibility (CSR);

4. Using the concept of creating a shared, economic and social value – Creating
Shared Value (CSV)[9].

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[9] A more detailed description of all types of advantages is presented in the text: J. Kulawik,
B. Wieliczko *Financial conditions of competitiveness of agriculture* [in:] A. Kowalski, M. Wigier,
M. Dudek, *Proposed solutions CAP 2013+ and the competitiveness of the food economy and ru-
ral development*, PM Report 2011-2014, No. 61, Warsaw 2013, pp. 130-141.

An analysis of the CAP instruments implemented in the period 2014-2020 indicates that direct payments do not generally have a positive impact on any type of competitive advantages (Tab. 2.1). As research indicates, their relationship of production conducted or its absence do not affect the level of investment [Viaggi et al. 2013]. At the same time, these instruments do not enforce the implementation of any measures with a beneficial effect on the competitiveness of farms receiving them. Naturally, indirectly it is possible to achieve such an effect, but it depends on the will and decision of a given farmer on how to use the resources obtained.

Table 2.1. Potential impact of the CAP on competitive advantages in agriculture

CAP	Effectiveness/productivity	Basing on innovation and entrepreneurship	CSR	CSV
PILLAR I	-	-	-	-
PILLAR II	+/-	+/-	+/-	+/-

Source: own elaboration.

In the case of policy instruments for rural development (Pillar II of the CAP) the assessment is more complex. It is difficult to determine the impact of these activities on each of the competitive advantages as the nature and characteristics of each instrument are very diverse. Potentially positive for all types of advantages can be an instrument "Creating producer groups and producer organizations". Other instruments may have varying effects on different types of competitive advantages or their effect may be different depending on the type of co-financed project.

Evaluation of the potential impact of the two pillars of the instruments on the achievement of each of the main budgetary objectives is the same and more unequivocal (Tab. 2.2). The CAP instruments can positively affect the allocative distributional and stabilising budget objectives. However, in the case of environmental objectives and those related to growth their evaluation is ambiguous and largely dependent on the type of instrument (Pillar II) or the use of received funds (Pillar I).

Table 2.2. Potential impact of the CAP on fulfilling budgetary objectives

CAP	Allocative	Distributional	Stabilising	Growth	Environmental
PILLAR I	+	+	+	+/-	+/-
PILLAR II	+	+	+	+/-	+/-

Source: own elaboration.

2.3. Projected impact of the "greening" of direct payments on the competitiveness of the Polish agriculture

The Common Agricultural Policy of the European Union is in the process of systematic evolution. In the early years of its existence it was strongly oriented towards increasing agricultural production to ensure food security. To achieve this objective were used, among other instruments, subsidies to prices of means of production and instruments to support structural changes in agriculture, which led to the intensification of agricultural production. The dynamic development of European agriculture resulted in an increase in production, until a surplus of certain agricultural products occurred. At the same time increasingly negative externalities were appearing. They were related to excessive intensity of production [Kopiński 2011; Krasowicz et al. 2011]. In response to the occurrence of these negative developments in the EU common agricultural policy emerged gradually introduced restrictions, some of which related to the development of relationship between agricultural production and the natural environment. The WTO negotiations to some extent influenced introducing these restrictions [Butault, Bureau 2006; Cantore et al. 2011].

The last reform of the CAP broadens the scope of activities related to environmental and climate objectives. It envisages the introduction of "greening" and the requirement that 30% of the budget allocated to Member States for direct payments will be spent only provided that the "greening" requirements are fulfilled.

The introduction of instruments to promote the production of public goods (e.g. the Nitrates Directive, set-aside, cross-compliance and "greening") imposed on farmers obligation to undertake appropriate adjustments with a sanction of losing some or all of the direct payments. Other solutions (premium for extensive production, agri-environmental programmes) had a form of incentives, supported financially by the budget of the CAP Pillar II, and beneficial to the environment actions voluntary undertaken by farmers.

The changes in the CAP in this area were constantly accompanied by discussion on the potential environmental benefits from the use of particular instruments, as well as their consequences, including the impact on competitiveness of the EU agriculture.

Estimating the impact of environmental regulations of the CAP on the competitiveness of the EU agriculture is difficult because of the multidimensionality of the concept of competitiveness, which, among other things, is expressed by the existence of multiple definitions of this term.

In the literature, there are no studies that comprehensively refer to the relationship between environmental restrictions and competitiveness. Many authors discuss only some aspects of this issue.

Peterson and Valluru in their study aimed at identifying the determinants of foreign trade structure of 40 countries show that very often environmental constraints do not increase the costs of production [Peterson, Valluru 2000]. Interpreting this finding, we can conclude that these limitations do not change the level of competitiveness.

In turn de Roest et al. in the study of farms specializing in meat cattle show that the Nitrates Directive affects in the EU 4.2% of the holdings with intensive production and 3.0% of holding with extensive production [de Roest et al. 2012]. The implementation of the Nitrates Directive has increased the cost of beef production sector by 0.095%. This has no significant impact on the sector's competitiveness in global markets (exports -0.68%, imports + 0.51%).

Colyer states that the costs caused by environmental regulations, although relatively small, could be of key importance for the competitiveness of some products as manufacturers cost advantages in individual countries are often very small [Colyer, 2004]. Agriculture, however, is the beneficiary of "green payments" which are currently exempt from the restrictions imposed by the WTO on national subsidies. They are not without impact on the competitiveness of agriculture. The author further notes that environmental policy can also be used as a non-tariff barrier and thus lead to changes in the level of farms' competitiveness. To sum up, Colyer points out that, depending on the context the environmental regulations may lead both to an increase and to a reduction in the competitiveness of agriculture in different countries.

As part of the task entitled "Direct payments and budget subsidies versus finance and functioning of holdings and agricultural enterprises" conducted within the multi-annual programme we prepared a study that focused mainly on determining the effects of the "greening" of the CAP on the Polish farms. The basic

tool deployed for this purpose was the optimization model of an agricultural farm FARM-OPTY [Majewski 2008] extended with non-linear cost function that uses the method of Positive Mathematical Programming (PMP) [Howitt 1995]. The farm models were developed for selected types of farms using FADN typology. We constructed three scenarios of the CAP, assuming: the continuation of current agricultural policy (Baseline 2020), the adoption of environmental restrictions imposed by the reformed CAP (Green 2020) or their rejection (No_Green 2020), while other factors (including payment rates) were kept unchanged.

Table 2.3. Impact of the analysed scenarios on agricultural income of farms in the Polish FADN population in 2012

Farm income	Scenarios		DIFFERENCE
Baseline_2020 = 100	Green_2020	No_Green_2020	
FADN regions			
POLAND	103.3%	104.0%	0.7%
Pomorze i Mazury (785)	100.4%	102.3%	1.9%
Wielkopolska i Śląsk (790)	102.7%	103.2%	0.5%
Mazowsze i Podlasie (795)	105.6%	105.9%	0.3%
Małopolska i Pogórze (800)	102.7%	102.9%	0.2%
Level of adjustment			
Exempt	104.5%	104.5%	0.0%
Green	106.9%	107.1%	0.3%
Lack of diversification	101.6%	101.7%	0.1%
Lack of EFA	101.4%	102.4%	1.0%
Lack of EFA and diversification	97.6%	101.0%	3.5%

Source: own elaboration.

The results presented in Table 2.3 confirm that the environmental re-strictions, in this case the "greening", can affect both negatively and positively the income earned by the individual farms. In a variant assuming the current price levels, the Polish farmers are net beneficiaries of the new policy. "Greening" of the CAP should not mean losses for the average Polish farm except for those that do not meet the requirement of crop diversification and do not have sufficient sur-face of an area of ecological compensation (Ecological Focus Area – EFA). Thus, the "greening" of the CAP should not affect the competitiveness of the Polish agricultural sector as well as the competitiveness of the agricultural holdings.

2.4. Taxes vs. competitiveness of agriculture

Competitiveness is an important element of the market policy of each state. It is a desirable phenomenon since it has a major impact on the economic development of each country. This is because it is a "driving force" of innovation, creativity or technical and technological progress. In the era of globalization in most countries the phenomenon of tax competition is visible, which manifests itself, among others, by creating an appropriate legal and tax conditions leading to advantageous position in the area of taxes and insurance, both on the domestic and foreign markets. Legislation creating the framework for the activity of economic entities has a significant impact on market power and business development. Appropriate design of the tax and insurance systems is conducive not only to gaining a competitive edge, but it also allows for attaining the social and economic goals in each country. This is made possible by obtaining competitive advantages in the four above-mentioned areas i.e. efficiency, innovation and entrepreneurship, corporate social responsibility (CSR) or in creating a shared, economic and social value (CSV). Implementation of economic objectives, which promotes possession of certain competitive advantage is also the starting point for achieving a high level of prosperity at both individual and global levels.

In the literature, tax competition is variously portrayed. On the one hand it refers to the rivalry between the different actors for mobile factors of production. On the other hand, it has a dimension of institutional competition, which refers to the quality of fiscal institutions present in a given country [Furman, 2012]. Both the first and the second kind of competition are equally effective in achieving economic goals. This is also confirmed by D.J. Mitchel, citing M. Fridman, who believes that competition between the national governments in delivering public goods and taxes imposed by them is as productive as competition between individuals or businesses in providing goods and services to the market at prices determined by them [Mitchell 2004]. Economic theory suggests that tax competition is desirable. Among others, it leads to a situation when some countries stand out economically and gain a competitive advantage or it leads to implementation of optimal solutions, the most desirable from the point of view of the economic strategy of the country. The state has a broad set of tax and quasi-tax instruments to support and stimulate the desired economic development.

Taxes and insurance are the instruments aimed at ensuring certain budget incomes of each country through which it is possible to meet budgetary targets. The impact of these tools on their achievement is ambiguous and multidirectional. The state most fully achieves its objectives with the help of income tax and VAT. The impact of other instruments is difficult to determine. An example might be the agricultural tax on income of Polish farmers, which has little allocative meaning and does not operate as an automatic economic stabilizer. Moreover, it contributes little to the objectives of distribution (only on a cross sectorial level). It is also difficult to determine the impact of this tax on economic growth and environmental protection. Agricultural insurance, through which the state can lead to improved socio-economic situation of farmers and create conditions for social safety net for the poorest groups, contributes much more to achieving budgetary objectives. The analyses carried out showed that both insurance and taxes play the most important role in achieving budget's allocative objectives. Their role in achieving other objectives is multi-dimensional and depends on the nature of a given instrument.

Gaining competitive advantages in the area of innovation, efficiency, CSR and CSV strategies allows gaining a strong competitive position in a given sector on the domestic, but also on the international markets. It should be noted, however, that – as with the possibility of meeting the fiscal targets in the agricultural sector by using fiscal instruments – their impact on gaining competitive advantages is ambiguous and multidirectional (Tab. 2.4). A review of selected tax instruments indicates that these tools will significantly contribute to achieving advantages in the area of CSR and CSV. In practice, the vast majority of the analysed instruments is conducive to the development of sustainable agriculture, leading to a balance between the economic, social and environmental dimensions of economic activity. A significant impact on the competitive advantage in this area may have the so-called new taxes, i.e. an environmental tax and a tax on "junk food". Because they enforce such measures that restrict the consumption of scarce and environmentally precious resources and contribute to undertaking socially desirable initiatives. Due to a low popularity of using these instruments we will have to wait for the effects of their implementation. Among the instruments that have a strong, positive impact on gaining the presented competitive advantages, we should mention the agricultural tax and agricultural insurance contributions (Agricultural Social Insurance Fund). Their design makes the size of the burden posed by them on the agricultural sector small, which allows it to get the efficiency advantage and has a positive effect on the

possibility of achieving CSR and CSV advantages. This makes it possible to achieve an increase in the overall level of competitiveness, not only at the level of the sector, but also at national and international levels.

Table 2.4. Potential impact of taxes and insurance on obtaining competitive advantages in agriculture

Specification	Effectiveness/ productivity	Basing on innovation and entrepre-neurship	CSR	CSV
Agricultural tax	+	-	+	+
Income tax	-	+	+	+
Tax on special types of agricultural activity	+/-	+/-	-	-
VAT	+/-	+/-	+/-	+/-
Taxes on "junk food"	-	+	+	+
Environmental taxes	-	+	+	+
Social security	+	+/-	+	+
Property insurance	+	+/-	+	+
Plant and livestock insur-ance	+	+/-	+	+

Source: own elaboration.

The achievement of the budgetary targets and gaining competitive advantages is a contribution to the continuous improvement of welfare, which is the guarantee of economic development of each country. Overview of insurance and taxes in terms of their impact on welfare shows their clear multidirectional impact (growth, stabilization or loss). The tax system in Polish agriculture contributes to a small extent to the emergence of large losses in prosperity.

In the construction of agricultural tax system it is difficult to trace the formation of the negative effects of taxation. This is due to the small inconvenience of agricultural tax, namely a low share of taxes in income and simple way of its calculation, a small collection costs, and therefore its high collection rate. It should be noted, however, that the agricultural tax plays mainly a fiscal role. It does not perform a redistributive function at the intra-sectorial level, which is mainly attributed to the system of social security.

2.5. Conclusions

The problems discussed in this paper allows us to draw the following conclusions:

1. Partial, single-cycle analysis of the use of particular budgetary expenditures in EU agriculture show that their impact on the traditionally understood competitiveness is diverse. This is mainly due to their multi-channel influence, which is often contradictory. In total, however, their negative impact outweighs the positive one.

2. Definitions of competitiveness are very broad and diverse depending on their location in the theory and the level on which the research is conducted. Implemented environmental regulations can both reduce and improve the competitiveness of nations, sectors and companies. A review of the literature, however, shows that the prevailing view among researchers is that the practical limitations will not have a material impact on the competitiveness in agriculture. Planned environmental constraints of the reformed ("greened") CAP for 2014-2020 seem to have a limited impact on the sector's competitiveness in Poland, although significantly affect the competitiveness of some of farm types (both positively and negatively). It seems, however, that due to the relative nature of competition, changes in the performance of the Polish farms occurring as a result of CAP reform should be considered in the context of the processes and changes occurring in agriculture and its environment in a broader, international perspective.

3. Expenditure and income instruments in agriculture cause various deformations in allocation of resources and economic incentives, which reduces the efficiency, competitiveness and social welfare. On the other hand, they may also positively influence the above mentioned categories via the internalisation of externalities, provision of public goods and improvement of redistribution. The net result of their use is therefore an open question, very dependent upon the national context.

References

1. Butault J.P., Bureau J.Ch., *WTO Constraints and the CAP: Domestic Support in EU 25 Agriculture*, Institut National de la Recherche Agronomiqu, Grignon, France, Trinity College Dublin, no. 171, 2006.
2. Cantore N., Kennan J., Page S., *CAP reform and development introduction, reform options and suggestions for further research*, Overseas Development Institute, 111 Westminster Bridge Road, London 2011.

3. Colyer D., *Environmental Regulations and Competitiveness*, "Agricultural & Resource Economics", West Virginia University, Working Paper no. 1, 2004.

4. Furman Ł., *Konkurencyjność polskiego systemu podatkowego w świetle wybranych stawek podatkowych*, "Journal of Management and Finance", vol. 10, no. 4, part 1, October 2012. www.jmf.wzr.pl.

5. Howitt R.E., *Positive Mathematical Programming*, "American Journal of Agricultural Economics", vol. 77, no. 2, 1995, pp. 329-342.

6. Kopiński J., *Tendencje zmian intensywności produkcji rolniczej w Polsce w aspekcie potencjalnych oddziaływań środowiskowych*, Zeszyty Naukowe SGGW w Warszawie – Problemy Rolnictwa Światowego, vol. 11(26), issue 1/2011, pp. 95-104.

7. Kowalski A. (ed.), *Analiza produkcyjno-ekonomicznej sytuacji rolnictwa i gospodarki żywnościowej w 2012 roku*, IERiGŻ-PIB, Warszawa 2013 and previous.

8. Krasowicz S., Oleszek W., Horabik J., Dębicki R., Jankowiak J., Stuczyński T., Jadczyszyn J., *Racjonalne gospodarowanie środowiskiem glebowym Polski*, "Polish Journal of Agronomy", no. 7, 2011, pp. 43–58.

9. Kulawik J., Wieliczko B., *Finansowe uwarunkowania konkurencyjności rolnictwa* [in:] A. Kowalski, M. Wigier, M. Dudek, *Propozycje rozwiązań WPR 2013+ a konkurencyjność gospodarki żywnościowej i obszarów wiejskich*, PW 2011-2014, no. 61, Warszawa 2013, pp. 130-141.

10. Majewski E., *Trwały rozwój i trwałe rolnictwo – teoria a praktyka gospodarstw rolniczych*, SGGW, Warszawa 2008.

11. Mitchel D.J., *Ending the Tax Harmonization Threat*, „The Insider", no. 299, Washington D.C. 2004, pp. 20.

12. OECD, *Fostering Productivity and Competitiveness in Agriculture*, OECD Publishing, Paris 2011.

13. Peterson E., Valluru S., *Agricultural comparative advantage and government policy interventions*, „Journal of Agricultural Economics", vol. 51, no. 3, 2000, pp. 371-387.

14. de Roest K., Winsten J., Dillen K., *An EU/US perspective on nutrient management policies and growth hormone bans in the beef sector* [in:] Economics of Regulation in Agriculture: Compliance with Public and Private Standards, Chapter: 8, Publisher: CAB International, (ed.): F.M. Brouwer, G. Fox, R.A. Jongeneel, 2012, pp.131-145.

15. Viaggi D., Bartolini F., Puddu M., Raggi M., *Farm/Household-Level Simulation Results of Testing Policy and Other Scenarios,* Project "Comparative Analysis of Factor Markets for Agriculture across the Member States", Working Paper, no. 54., 2013.

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3. Analysis of competitiveness of the main farming types
in Germany

3.1. Introduction

Competitiveness is a rather complex subject dealing with interactions between firms, sectors, national and global economies, etc. Measurement concepts are market shares, productivity changes and economic performance indicators [Latruffe 2010]. Referring to the latter, Depperu and Cerrato [2010] gave a good definition with regard to firm level, which is also in line with the orientation of this paper: "Profitability is generally considered the most important measure of competitive success. Economic performance in the short term can be measured through profitability ratios (…). Costs and productivity are good signals of competitiveness, especially in case the industry is characterized by homogenous products".

The analytical work for this paper refers to a measurement concept proposed by Gardallo et al. [2001], expressing the relation of income (Farm Net Income; FNI) and the opportunity costs of fixed factors owned by a given farm. This method is applied to Germany using national FADN data for the main farming types over the last nine economic years in which the EU CAP and prices changed significantly with consequences to income and the remuneration of owned factors.

In relation to competitiveness between other EU Member States[10], we considered doing similar calculations based on EU FADN data. We have not done this yet due to time constraints in adjusting the model, and last but not least, due to the problem that FNI of German agriculture is still considerably under-estimated in EU-FADN, which would probably result in a weaker competitive position as in reality.

3.2. Method and data base

The working hypothesis behind this analysis is that generating income is necessary to remunerate own factors of production, financing net investments (to compensate for inflation) for farm growth and innovations. Income is generated by entrepreneurs optimizing their business under given (and future) economic and legal framework, where output (prices), inputs and governmental

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[10] A comparable analysis for Poland has been undertaken by Józwiak et al. [2014].

transfers play the main role. If income is greater than factor costs, entrepreneurs are able to compete and stay in business; otherwise they could try to adjust or go out of business and use the factors otherwise. The measurement concept is expressed by the following formula[11]:

$$CI_f = \frac{FNI_f}{OC_w + OC_l + OC_c} \underset{<}{\overset{>}{=}} 1$$

where:

CI_f – Competitiveness Index of farm (f),

FNI_f – Farm Net Income of farm (f)[12],

OC – opportunity costs of farm's owned fixed factors, family labour ($_w$), owned agricultural land ($_l$), and owned capital ($_c$).

An index value CI >= 1 indicates an at least full remuneration of owned factors, while CI < 1 indicates a partial remuneration of owned factors.

In the analysis we made a further differentiation as follows:

CI (-) – value in case of negative FNI (CI1[13]),

0 <= CI <1 partial remuneration (CI2),

1 <= CI <2 full remuneration up to 100% more (CI3),

CI >= 2 remuneration of at least 200% (CI4).

For the analysis we use farm accounting data of the German national FADN[14] over the period from 2004/2005 to 2012/2013[15]. Based on the data of about 11,000 farms per year, representing about 200,000 farms in Germany (Standard Output (SO) >25,000 €), farms are selected excluding the farm types

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[11] Gallardo et al. [2001] called this index Global Competitive Index (GCI). However, this expression is misleading, because the name used i.e. in the Global Competitiveness Report, comparing the competiveness of different countries, and the definition of it is different (http://de.wikipedia.org/wiki/Global_Competitiveness_Index). Therefore, we changed the name to "Competitiveness Index", using the formula defined by Gardallo et al.

[12] The formula can be also applied for other income measures as FNVA (Farm Net Value Added) mainly used in FADN statistics of the EU Commission. In this case the denominator has to be extended by costs of external factors for hired labour, land rented and interest paid.

[13] Abbreviations used in the figures.

[14] Testbetriebsnetz (http://berichte.bmelv-statistik.de/BFB-0114001-2014.pdf)

[15] The German FADN is based on economic years from July to June.

horticulture, permanent crops and wine[16]. Farm types and weighting factors are based on SO typology. All results shown below are weighted by or summed up at sector level using the farm weighting factors.

FNI is directly taken from the farm accounts, while opportunity costs (OC) are derived from costs of external factors and aggregated by regions (Länder[17]) and main farming types:

- OC_Land based on rental prices of land rented;
- OC_Labour based on labour costs of salaried workers;
- OC_Capital based on interest rates (excluding land).

It has to be mentioned that the underlying indicator is not indifferent with regard to organizational forms, i.e. individual vs legal entities, which is due to the different levels of denominators (opportunity costs). Therefore, results are differentiated by individual farms and Legal Entities, on top of farm types and regions, but not as a general rule in presenting the results. Results are also aggregated at the sector level as a basis for distributions by the different CI categories, etc. Although the literature recommends using data from several years [Depperu and Cerrato, 2010] we calculate only annual values. We could also use balanced panel data, but we would lose about 40% of farms in the sample, therefore the representativeness of the approach would be less and also the rather dynamic part of farms would partially be excluded[18].

3.3. Level of FNI and opportunity costs and share of farms in the different CI categories

At first we give a brief overview on some structural indicators, on the income and opportunity costs by the different CI categories and then details on distribution by farm types, regions and organizational forms.

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[16] The sample of the farms considered is about 10,200 farms in the beginning and 9,400 farms at the end of period.

[17] Calculating opportunity costs at the individual farm level is technically possible in cases where both, external and owned factors exist, but would cause high variation and outliers due to rounding errors. Regional values seem to be a good proxy for decision-making between on- and off-farm use of resources.

[18] We also did calculations of scenarios considering different options of direct payments, but these results are not presented here.

Structural and economic indicators

Figure 3.1. Distribution of UAA; direct payments and income (FNI)
by regions (represented by the sample)
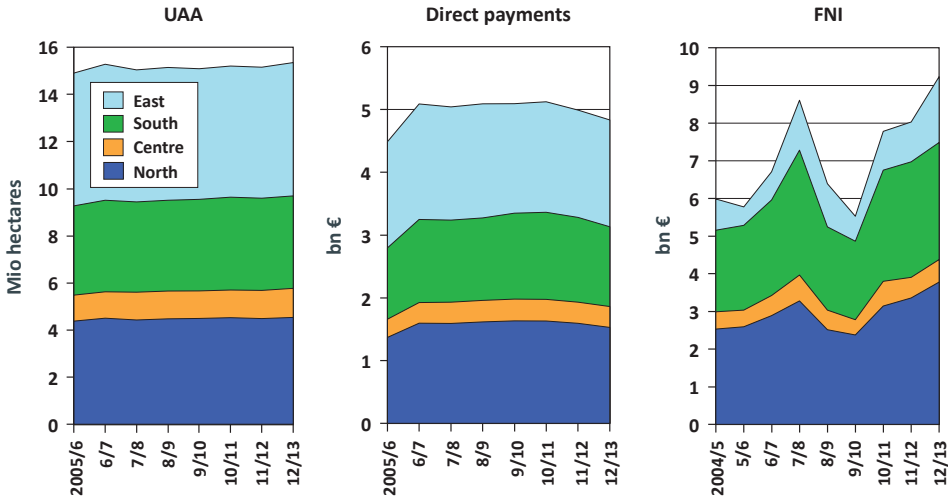
Source: Thünen-Institute (TI-BW), Kleinhanss [2014].

Figure 3.1 shows the land use, direct payments and income aggregated by regions[19]. About one quarter of UAA each is located in the regions South and North, about 10% in the region Centre[20] and about one third in the region East. The sample represents about 15 million hectares which is about 90% of the total UAA. Due to the sampling effect UAA slightly increases over time. Direct payments – contributing significantly to income – are similarly distributed to UAA, which is an effect of the stepwise implementation of decoupling via regional flat rates. Rising direct payments in the first years is an effect of the introduction of milk and sugar beet premiums, the decline in the last years is an effect of modulation and the lower sample size.

Referring to **income** (FNI) there is a high variation between EUR 6 billion in 2004/2005 and EUR 8.5 billion in 2007/2008 thanks to booming prices for arable crops and milk. Then a drop to EUR 5.5 billion in 2008/2009 during the economic crisis, and since 2010/2011 an upward tendency until 2012/2013 with

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[19] The Länder are aggregated to 4 regions: North: Schleswig-Holstein, Niedersachsen, Nordrhein-Westfalen; Centre: Hessen, Rheinland-Pfalz, Saarland; South: Baden-Württemberg, Bayern; East: Brandenburg, Mecklenburg-Vorpommern, Sachsen, Sachsen-Anhalt, Thüringen.

[20] Region Centre has a higher share of land use for horticulture and wine which is excluded here.

highest income of EUR 9 billion were observed. The region North contributes the most to income, and the region South has the second place in the level of contribution. The income share of the region Centre is much lower and slightly lower than in the region East. While in region West income shares are roughly similar to UAA as well as direct payments, the share is much lower in the East but increased in the last year. This low share is a result of the dominance of legal entities with almost full salaried labour and about 90% of land rented[21].

Dividing the FNI into the above mentioned CI categories (Fig. 3.2), it has to be mentioned that about 12% of farms are making losses with slightly higher shares in bad years, and lower shares in good years. The amount of losses is about EUR 0.5 billion per year. This means that these farms are unable to remunerate owned factors, unable to finance investments and therefore unable to survive in the medium term. FNI in the CI category with partial remuneration of owned factors amounts to about EUR 1.5 billion, while 40 to 50% of farms are in this category. This means that 50 to 60% of farms have losses or are unable to fully remunerate owned factors. Some of them are able to survive if they accept lower remunerations than opportunity cost, which is the case in a lot of family farms. Elder farmers may accept this due to high transaction costs, but the successors would take other positions.

Figure 3.2. Development/distribution of FNI and share of farms by CI classes – sector
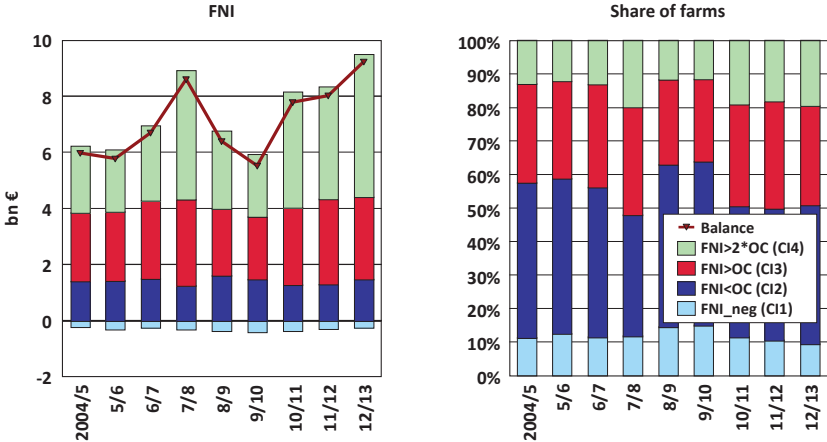
Source: Thünen-Institute (TI-BW), Kleinhanss [2014].

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[21] It has to be mentioned; FNI is not an appropriate indicator for income comparisons between West and East, therefore in the national FADN statistics FNI plus labour costs per labour unit (AWU) is used.

While the groups mentioned have a rather constant level of aggregated income, the remainder is rather fluctuating and largely influenced by price changes. This means that more than two thirds of income in the bad years is for farms falling into the CI category > 1 (full remuneration of opportunity costs), rising to more than three-quarters in good years. About 30% of farms are in the CI category >=1; <2 and about 15 to 20% in the category > 2. This is an indication of a rather unequal income distribution, but also an indicator of competition between farms of different income levels.

Although we do not have room to describe structural characteristics of the CI categories, we have to present in a few words with their farm size. Average farm size of the sample is about 70 hectares of UAA. Farms of CI category (1) are smaller (45 ha UAA), as well as farms in CI2 with 55 hectares. Farms of CI3 have 70 hectares and CI4 with about 110 hectares. In the last categories size varies by 10 hectares due the different composition of the sub-samples depending on FNI.

Aggregated opportunity costs are shown in figure 3.3. They sum up to EUR 5.5 to 6.5 billion and fluctuate less than income. The highest share of opportunity costs is in the CI category "partial remuneration", meaning that opportunity costs are about double that of income. The development is driven by rather continuously rising labour costs, interest in the 2nd quarter and rising land prices in the last quarter.

Figure 3.3. Development of opportunity costs of farm owned factors
by CI classes – sector
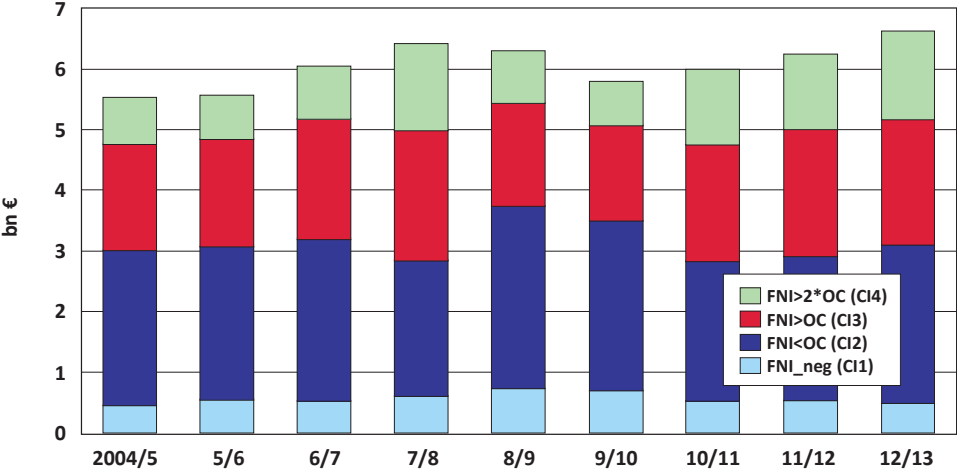
Figure 3.4 shows FNI and opportunity costs for the different CI classes and aggregated at the sector level. For the first CI category, opportunity costs are about EUR 0.6 billion, FNI is negative with about EUR -0.3 billion and the total balance is about EUR 1 billion. However, the variation over the years is rather low. In the category "partial remuneration" FNI income of about EUR 1.5 billion is about two third of opportunity costs, meaning a coverage of 60% of opportunity costs or a negative balance of EUR 1.5 billion. In CI category >=1, <2 income lies between EUR 2.4 and 3 billion, which is higher than opportunity costs of EUR 1.7 and 2.1 billion. For the CI category > 2 the development of FNI shows a high variation between EUR 2.2 and 4.6 billion. The aggregation at sector level gives a rather interesting picture: The opportunity costs show an upward tendency at a level of about EUR 6.7 billion; they are close to FNI in the first years, but higher than income in 2008/2009, the year of economic crisis. In the other years FNI is higher than opportunity costs, with highest spreads in 2007/2008 and 2012/2013. This balance is heavily influenced by the farms of the CI category >0, <= 1 and CI >2.

Figure 3.4. Relation between income and opportunity costs – sector level
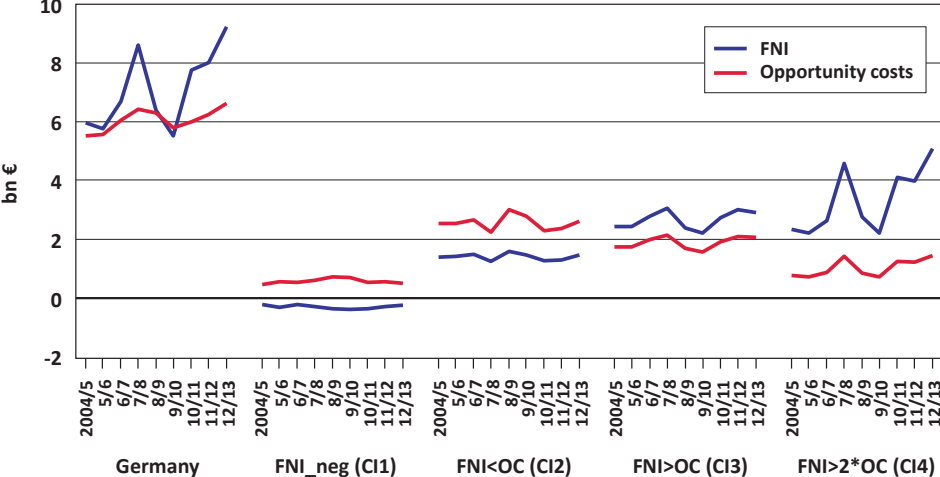
Source: Thünen-Institute (TI-BW), Kleinhanss [2014].

FNI vs opportunity costs by farm types

In the following we focus on the development in the main farming types. Against the previous figures, only the difference of FNI minus opportunity costs in each category is shown. Moreover, totals for all categories are summed up, where a positive value indicates a positive overall balance and therefore a potential to compete, and vice versa.

Results for the **arable** crop farms are shown in figure 3.5. As for the whole sector there are also farms making losses. They sum up to EUR 0.2 billion in bad years and EUR 0.3 billion in good years. High negative values were due to CAP reform and market prices close to intervention prices in the first years. These might also be influenced by pig price cycles, because a considerable share of pigs is produced in arable farms. With the rise of market prices in 2007/2008, amounts become lower, and especially in 2012/2013 they become lowest. The latter is also true for the category of partial remuneration of opportunity costs. In most of years the difference between FNI and opportunity costs is about EUR -0.2 billion. Only in the last year did the amount decrease to EUR 0.1 billion. The balance is EUR 0.2 billion in farms able to fully remunerate opportunity costs from 100 to 200%, this share is rather constant. The part of farms able to remunerate opportunity costs of least twice is the most important but shows a high variation. It is about EUR 0.4 billion in the "bad" years, rising to EUR 0.9 billion under conditions of booming arable crop prices (2007/2008 to 2008/2009, 2010/2011 to 2011/2012) and it reached its maximum of about EUR 1.7 billion in 2012/2013, the best year for the arable crops sector. This indicates that a considerable share of farms is profitable and their performance (and competitiveness) becomes better due to high market prices and larger farm size. The overall balance is positive for the whole period, with the lowest level in 2005/2006 and the maximum in 2012/2013 with EUR 1.7 billion.

The results for **dairy farms** are shown in figure 3.6.:

- There is also a share of 5 to 10% farms making losses, where the balance of FNI minus opportunity costs amounts to EUR -0.1 billion in good years and to EUR -0.3 billion in the years of economic crises (2008/2009 and 2009/2010), where the dairy (and the pig) sector are affected most.
- The share of balance in the CI category with partial remuneration of opportunity costs is important. In good years (2007/2008 and 2011/2012) the balance is about EUR -0.3 billion, in bad years it almost doubled (2008/2009).

- The balance of farms able to fully (+100 %) remunerate opportunity costs is about EUR 0.3 to 0.4 billion per year; it also varies by the economic conditions.
- The balance in farms able to remunerate opportunity costs at least twice depends on the market situation. In the first years the balance is rather low due to rather decreasing milk prices under the milk market reform, it even worsened in the economic crisis in 2008/2009 and 2009/2010. The balance became highest during the first milk price boom in 2007/2008 with a value of about EUR 1.4 billion. Milk prices have also recovered since 2011/2012, however feed and energy costs also increased resulting in lower incomes.

The overall balance of dairy farms is slightly positive in the first year and negative in the years of economic crises. It amounted to EUR 1.5 billion in 2007/2008 thanks to high milk prices. It follows, that the economic performance and hence competitiveness is rather good, but with a higher variation compared to arable farms.

Figure 3.5. Development, distribution and balance
(FNI minus opportunity costs) – arable farms (aggregated)

Source: Thünen-Institute (TI-BW), Kleinhanss [2014].

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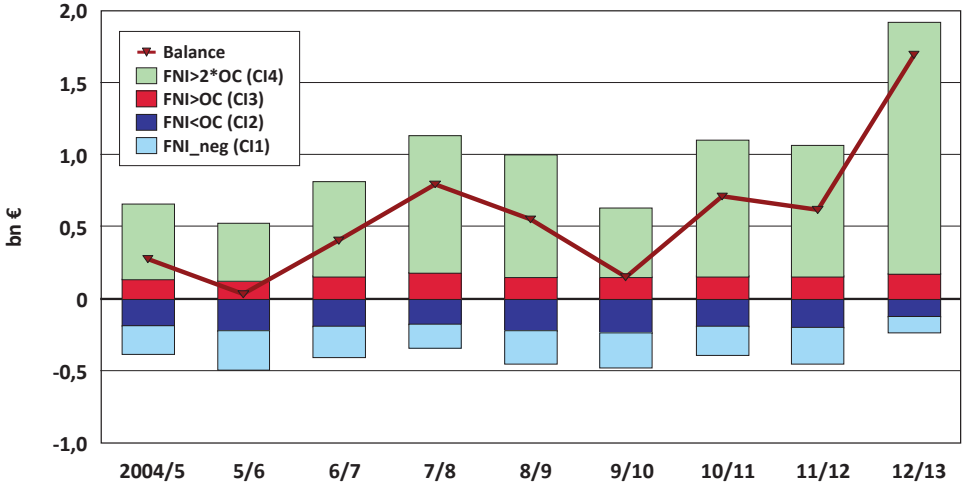
Figure 3.6. Development, distribution and balance
(FNI minus opportunity costs) – dairy farms (aggregated)
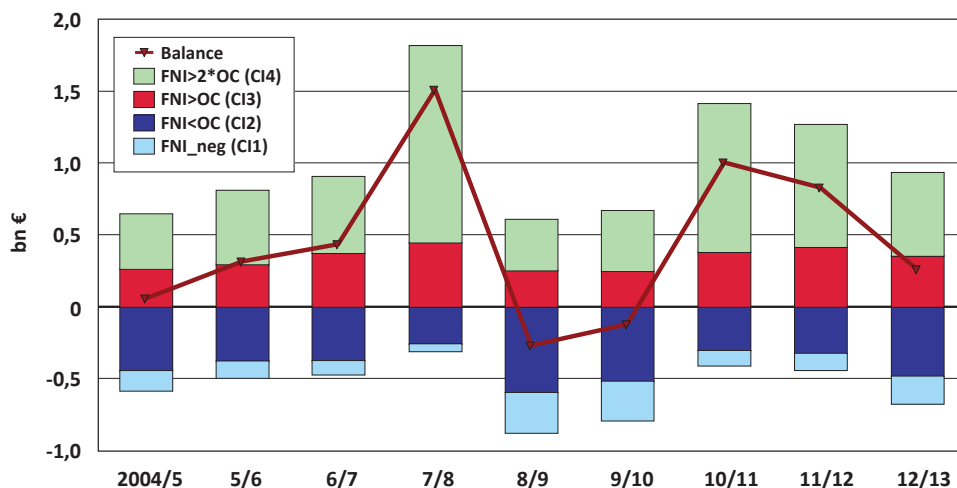
Source: Thünen-Institute (TI-BW), Kleinhanss [2014].

Results for **pig & poultry**[22] farms are shown in figure 3.7. Here, in farms making losses the negative balance varies from EUR -0.1 to -0.2 billion. In farms with partial remuneration of opportunity costs, the balance was extremely high in 2007/2008, which is mainly determined by extremely low pig and piglet prices and rising feed costs under the price boom of arable crops. An opposite development is given for farms with full remuneration of opportunity costs up to double (about EUR 0.08 to 0.12 billion) and more than double (about EUR 0.1 to 0.4 billion). The relation of positive to negative balances is about 3:1 in the best year (2012/2013), and only 1:3 (2007/2008) in the worst year. The overall balance is positive in two of nine years, in three years slightly positive and quite good at the beginning and end of the period. It follows, that performance and competitiveness has been heavily influenced by the pig price situation and feed costs since the first price boom of crops in 2007/2008.

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[22] Poultry is under-represented in the German FADN; they are included in the farm type, but the results are mainly related to the pig sector.

Figure 3.7. Development, distribution and balance
(FNI minus opportunity costs) – pig & poultry farms (aggregated)
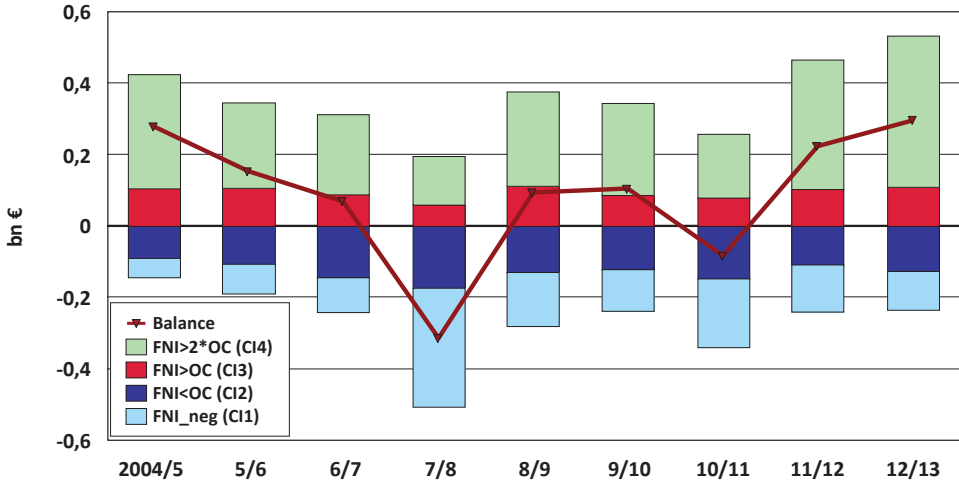
Source: Thünen-Institute (TI-BW), Kleinhanss [2014].

The overall balances for **all farm types** considered (including other cattle and mixed farms) is shown in Figure 3.8. Beside the farm types mentioned above, the balance of FNI minus opportunity costs is rather stable but negative (EUR -0.5 billion) in other cattle farms and varying close to zero in mixed farms. Arable farms show a continuously positive balance in the whole period and high balance levels in years of high crop prices. The pig sector is negatively affected in these years due to price transmission via feed costs. The milk sector is one of the most important in Germany; its performance is quite good but with a high variation in time. The beef meat sector, represented by other cattle farms, is in a weak position, expressed by declining production, income losses due to decoupling and by the shrinking demand from South-West EU countries, and last but not least due to the strong competition of land used for production of raw materials for biogas.

Figure 3.8. Development of balance (FNI minus opportunity costs)
– all farm types
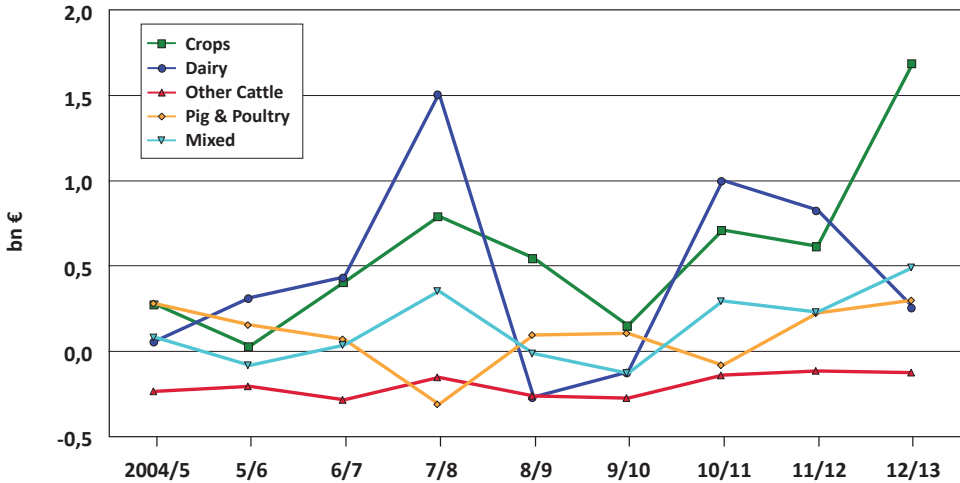
FNI vs opportunity costs by regions

Results aggregated for four regions are summarized in figure 3.9. Region North shows positive balances in the whole period, a rising tendency from EUR 0.4 to 1.2 billion with a strong drop to 0.1 billion in the years of economic crises due to the market situation for milk, pigs and arable crops, which are the main production lines in this region. The balance and development of region Centre is rather stable, but its share on FNI is rather low (horticulture and wine excluded in the analysis). Region South is critical in half of the period with negative balances in first three years as well in the economic crisis. Positive balances were observed in 2007/2008 and from 2010/2011 to 2012/2013 thanks to high milk prices and the high share of milk on gross output. On the other side, the differences against the North are also influenced by the higher share of beef production (other cattle farms) and farm structures dominated by small and medium sized farms with higher opportunity costs. Region East shows a slightly low or negative balance in the first years and 2008/2010, a significant increase in 2007/2008 and 2008/2009 and a strong increase in 2012/2013. This goes back to the following:

- A farm structure dominated by large sized farms organized as partnerships or legal entities. The latter do not have high shares of own factors – the high shares of rented land and hired labour are still covered by the costs of external factors.

- Land rentals are relatively low – about one third or half compared to the West but rising significantly in the last years.
- Farms are more oriented to arable crop production and less to livestock. The crop sector has been favoured by high market prices but also by heavily subsidized biogas production established in large farms.

Figure 3.9. Development of balance (FNI minus opportunity costs) by regions
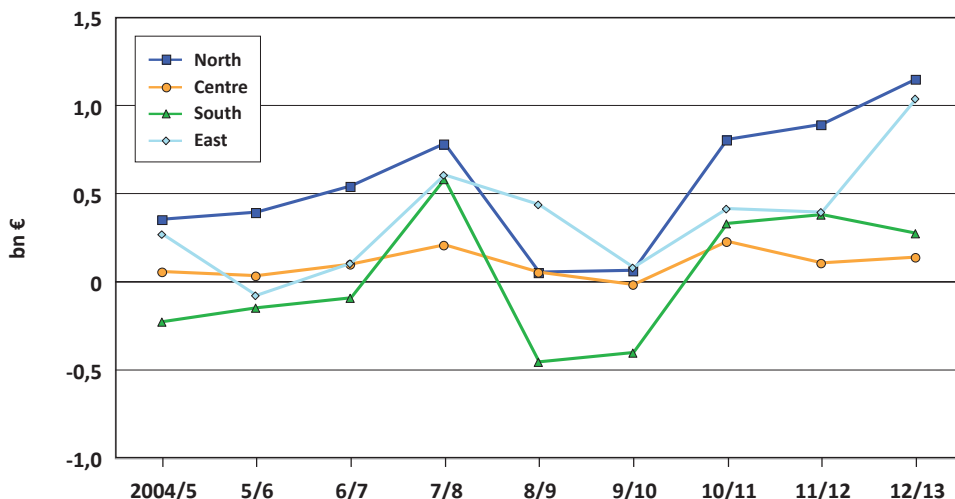
Source: Thünen-Institute (TI-BW), Kleinhanss [2014].

FNI vs opportunity costs by organizational forms, regions and farm types

As legal entities exist only in region East (the handful of them in the West are not included in FADN) it makes sense to distinguish between region East and the West. Results for region East are shown in figure 3.10. Family farms and partnerships are aggregated in the left part. Arable crop farms have an overall positive balance with an exceptional increase of the margin between FNI and opportunity costs in 2012/2013. Dairy farms show also a positive balance in seven years, but the values are rather low.

In the legal entities the balances for pig & poultry and other cattle farms are rather insignificant. For arable, dairy and mixed farms the balances were low or negative in the first years – which have been characteristic for this group since 2000. The balance for arable and mixed farms became positive since 2007/2008 and exceptionally good in 2012/2013, which is mainly due to high crop prices. For dairy farms the development is more stable and the balance was positive with the exception of 2005/2006 and 2009/2010.

Figure 3.10. Development and balance of FNI minus opportunity costs
by organizational forms (region East)
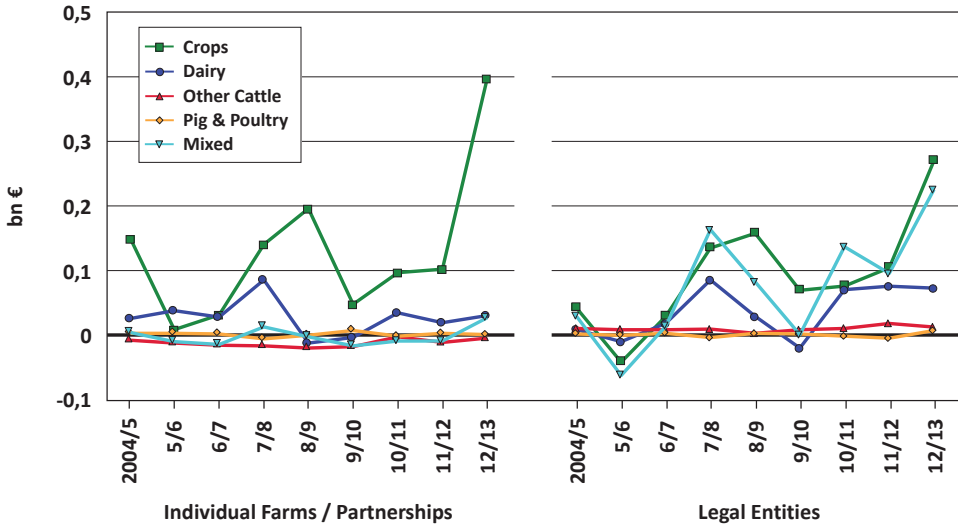
Source: Thünen-Institute (TI-BW), Kleinhanss [2014].

Results for region West are shown in figure 3.11. As region Centre shows only small amounts, the results are not interpreted, but trends are similar to region North. Other cattle farms are in a worse position with negative balances in all regions. Pig & poultry farms show a cyclical development with higher variation in the North – also on a positive side. Arable farms are in the best situation in all regions, especially in years of high crop prices. For dairy farms a dual situation can be seen: positive balances – with the exception of 2008/2009 – in region North and with an excellent performance in 2007/2008 and 2010/2011. The development is similar in the South, but on a significant lower level, resulting in negative balances in the first years, during the economic crises and the last year. Conclusions are that dairy farms in the North are in better economic position, also to adjust to challenges related to the phasing out of milk quota in 2015.

Figure 3.11. Development and balance of FNI minus opportunity costs
by farm types (West)
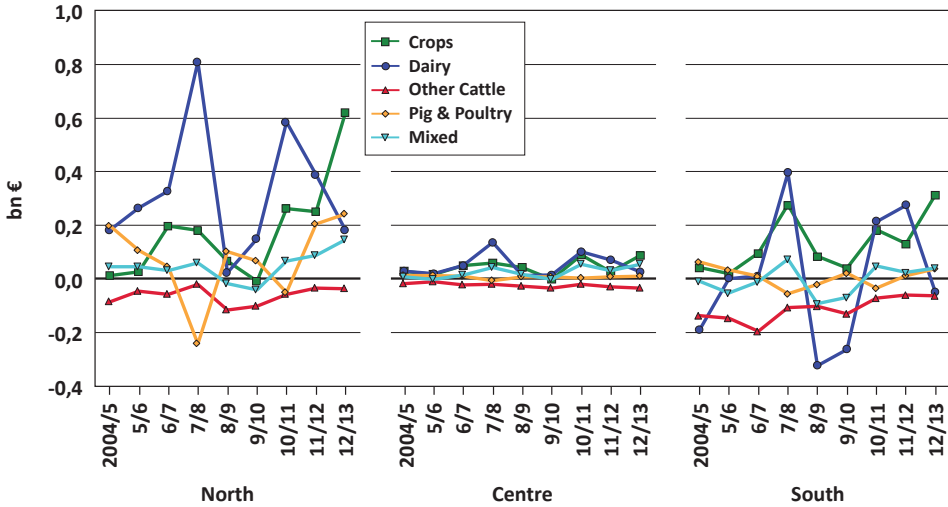
Finally, the share of farms able to fully remunerate own factors is summa-
rized in figure 3.12. On average, 37 to 50% of farms are in this situation and
therefore able to compete. Mixed farms are slightly below the average. The
worst position is for other cattle farms, where only 25 to 35% are able to fully
remunerate opportunity costs. Although the situation improved in the last years
– thanks to rising beef prices – there are indications that this farming type will
decline. For dairy farms the shares are above or close to average, but the high
variation between 35 and 65% indicates that the performance is significantly
influenced by the milk price; structural adjustments are required especially in
region South. Pig and poultry farms show a high variation around the average
with shares of 30% in bad and 60% in good years depending on prices and feed
costs. Arable farms are in a good position, because in most years 40 to 50% of
them are able to remunerate opportunity costs. Under price booms in 2007/2008
and 2012/2013, the shares even increased to 55 and 65%. Although the good
performance is mainly determined by the price boom of crops, the implementa-
tion of decoupled direct payments also plays a role, as by the regional flat rates
former livestock and milk premiums were redistributed to land. Another factor is
the continuous structural adjustments towards larger farm sizes.

Figure 3.12. Share of farms with at least full remuneration of opportunity costs
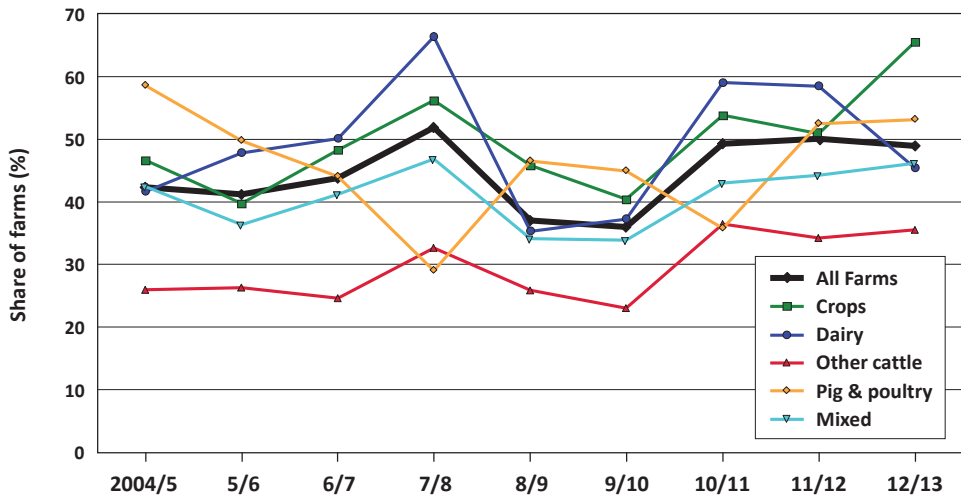
3.4. Conclusions

The central hypothesis of this paper – to which degree farmers are able to remunerate opportunity costs of owned factors by the income generated – can be answered as follows:

- In about 10% of farms income (FNI) is negative, so it is not possible to remunerate opportunity costs, and therefore they are unable to sustain farming activity in the longer term. The share of farms varies by the economic conditions, especially price level, by farming type and farm structure;
- 40 to 50% of all farms are only able to partly remunerate own factors. They have different options: a) they can accept remunerations being lower than opportunity costs; b) they can adjust their farms to become more profitable; c) they can go out of business and use resources otherwise;
- On the other hand 40 to 50% are able to fully remunerate opportunity costs and therefore finance investments, i.e., in farm growth. Their share of income is about two third to three quarters, indicating an unequal distribution of income.

The approach gives interesting results with regard to farming types:

- Arable farms show an overall positive balance of FNI minus opportunity costs for the whole period considered, starting with a low level from 2004/2005 to 2006/2007, but improving greatly due to rising prices of crop products. They were also slightly favoured by the implementation of decoupled payments inducing a redistribution of former coupled livestock premiums in favour of land;

- In dairy farms the share with negative FNI is rather low. They are in a quite good position with shares of 35 to 65% of farms with at least full remuneration of opportunity costs. Farms in the regions North perform better than in the South due to structural advantages;
- Mixed farms show a rather similar development at a lower level with negative balances in few years, but with lower increases at the end of the period considered;
- Performance of pig farms varies a lot depending on pig price cycles and rising feed costs resulting from booming crop prices. The share of farms able to remunerate opportunity costs varies between 30 and 60%. Competitiveness is better in the region North;
- The economic performance of other cattle farms, mainly oriented to beef meat production is rather weak. Only 25 to 40% are able to fully remunerate opportunity costs. The farms are negatively affected by premium losses during decoupling of direct payments, rising feed costs and the strong competition with the heavily subsidized biogas production, especially in the South.

Finally it can be concluded that crop production performs better. While in the livestock sector dairy farms perform quite well, the performance is critical in other cattle farms and it varies a lot in pig farms. Structural adjustment are necessary especially in dairy and other cattle farms to improve their competitive position also with regard to policy changes, i.e. the phasing out of milk quota.

References
1. Gallardo R., Ramos F., Ramos E., (2001), *The Farm Strategy Approach Towards Competitiveness under the CAP Reforms. The Case of Andalusia in Southern Spain,* European Association of Agricultural Economists Congress.
2. Depperu D., Cerrato D., (2010), *Analyzing International Competitiveness at the Firm Level: Concepts and Measures.*
3. Józwiak W., Sobierajewska J., Zieliński M., (2014), *Changes in the number of farms with competitive ability run by natural persons.* [in:] Kowalski et al. (2014): *Achievements and challenges in the food sector and rural areas during the 10 years after enlargement.* Institute of Agricultural and Food Economics. Warsaw, p. 58-68.
4. Latruffe L., (2010), *Competitiveness. Productivity and Efficiency in the Agricultural and Agri-Food Sectors*, OECD Food, Agriculture and Fisheries Papers, No. 30, OEDC Publishing.

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4. Competitiveness of the Polish farms – growth factors

4.1. Introduction

The Polish agriculture has for a long time distinguished itself from the majority of other European countries. Starting from the sixties of the last century, the key distinguishing feature was a large percentage of small farms owned by individuals with limited or no contact with the market. The holders of these farms derived their income mainly or in part from other sources. The most popular source of such incomes was employment outside of the agricultural sector.

The process of transformation of the socio-economic system in the late eighties and early nineties of the twentieth century destroyed this way of conduct. Rising unemployment outside of the agriculture meant that small family farms could not file for bankruptcy and were forced to persist as subsistence farms leading to poverty and deprivation. This phenomenon was accompanied by depreciation of fixed assets [Józwiak et al. 2013]. However, there were exceptions. Agricultural accountancy conducted in the IAFE-NRI in 1999 in farms that were in the possession of individuals indicated that among these farms an expanded reproduction of fixed assets was observed mainly among farms whose size was within the range of 16-100 ESU. It was an indicator that the share of farms owned by individuals increasing their capital could raise, should an improvement in economic conditions be observed. This would probably also lead to an increase in the level of income generated by them.

High and rising incomes are an indicator of a strong position of business entities in the market, and expanded reproduction of fixed assets allows adaptation to the changing environment, which is another important condition for their durability. Therefore, the farms characterized by such features differ from other farms by their ability to face the competition. Thus, they can be called the farms with an ability to compete or with a competitive ability.

The vast improvement of the conditions was noted in 2004. An analysis of the empirical material taken from the Polish FADN monitoring results, which included farms owned by individuals and a preliminary estimate prepared on

their basis showed [Józwiak 2012a] that in the years 2006-2008 there were about 90,000 individual farms conducting agricultural activity and operating on an area of more than 1 ha of utilised agricultural area (UAA), which had the characteristics of agricultural holdings with a competitive ability. The analysis also showed that among the remaining agricultural holdings, generally smaller ones, were those that had the traits revealing their ability to achieve competitiveness. For conducting this assessment technical performance indicators VRS (variable return to scale) were used. They were measured using the DEA method. Most suitable was its variant focused on the costs and benefits of management, calculated as the difference in farm income and remuneration for own work, own land and capital calculated at market rates applicable in agriculture. In total, it was estimated that in Poland in the years 2006-2008 there were about 290,000 farms owned by individuals having a competitive ability or showing traits that this ability can be achieved within a short timeframe.

The aim of this study was to verify these figures with the use of a more convincing method. On this basis, we assessed the changes that occurred in the number of agricultural holdings with the competitive ability and those that could achieve this ability soon in the period 2005-2012 that is the period after the Polish EU accession. We also identified factors that determined the scale of this phenomenon. In the following part of the study, based on the literature, we presented factors which hypothetically will affect the characterized phenomenon until 2020 and during the next two decades.

4.2. Change in the number of agricultural holdings with the competitive ability in 2005-2012 and those that can soon achieve this ability

Among the farms being monitored by the Polish FADN there were identified 5387 farms that in 2005-2012 conducted continuously agricultural accountancy. For each of these farms the amount of profit derived from farm's own assets and net investment value were calculated. Return on their assets was calculated as a difference of income from the family farm and remuneration for their own work on the farm calculated at market rates applicable in agriculture. The only exception was remuneration for one person working on the farm as a full-time employee (including manual and managerial work) charged according to the parity rates. The value of net investments was calculated as a difference between gross investment value and the amount of depreciation.

On the basis of the above assumptions the following groups of agricultural holdings were isolated:

- group with a profit and a positive net investment value, i.e. the ability to compete,
- group with a profit and a negative net investment value, i.e. the capacity of gaining the competitive ability,
- group without profit but with a positive net investment value, and thus with the capacity of gaining competitive ability,
- group without profit and a negative net investment value, and therefore without competitive ability and the capacity of achieving it.

The calculations enabling the answer to the posed questions were prepared based on the data from the years 2005-2007 and 2010-2012. The numbers characterizing the structure of farms in the analysed panel in the first of these periods and the corresponding number of farms in the whole country are presented in the table 4.1.

Table 4.1. Structure of the analysed panel and the corresponding number of individual farms in Poland in 2005-2007

Groups of farms	Structure of the farms belonging to the analysed panel (%)	Number of farms in Poland corresponding to the panel structure (in '000)
With a profit and positive value of net investment	41.4	90.7
With a profit and a negative value of net investments	33.0	68.5
Without a profit, but with a positive value of net investments	7.0	15.3
Without a profit and a negative value of net investments	20.3	44.7
Total	100.0	219.2[a]

[a] An average arable land area of farms in the analysed panel was 31.4 hectares. This figure corresponds to 219,200 of the largest farms owned by individuals, as determined based on [Characteristics ... 2007].

Source: calculations conducted by J. Sobierajewska and W. Józwiak based on the results of FADN monitoring and statistics of the Polish Central Statistical Office.

The table 4.1 shows that quoted earlier calculations overestimated the number of individual farms having the prerequisites to achieve competitive ability within a short timeframe. The estimation for the years 2005-2007 showed that there were about 91,000 individual farms with competitive ability and around 84,000 of those that have fulfilled the conditions enabling achiev-

ing this ability (farms with a profit and a negative net investment value and those without profit but with a positive net investment value). In total, therefore, in the years immediately after the accession, there were about 175,000 farms with a competitive ability and those that can achieve this ability. It was estimated that they had a share of around 35% in the area of agricultural land owned by farms, but their share in the domestic commercial agricultural production was probably larger.

Analogous findings based on figures characterizing the Polish FADN monitoring results covering the period 2010-2012 and the CSO data [Characteristics ... 2012] showed that the number of farms with a competitive ability remained almost at the same level as in 2005-2007, but the number of these that this ability can quickly achieve increased, and this meant that the total number of both reached in 2010-2012 about 209,000. There was therefore an increase of 1/5 compared to the situation in the period 2005-2007. There was also an increase of about 16 percentage points in agricultural area at their disposal. Moreover, it was estimated that in 2010-2012 these farms provided approximately one-half of the total national agricultural production (tab. 4.2).

Table 4.2. Number of farms owned by individuals with a competitive ability and those with the traits enabling them to achieve this ability in 2005-2007 and 2010-2012 and their characteristics

Indicators	Years:		2005-2007 = 100
	2005-2007	2010-2012	
Number of farms ('000) - With profits and an expanded reproduction - With profits and without an expanded reproduction - Without profits but with an extended reproduction	90.7 68.6 15.3	90.3 110.1 9.0	99.6 160.5 58.8
Total number of agricultural holdings with the competitive ability and those with the traits enabling them to achieve this ability	174.5	209.4	120.0
Participation in the national area of agricultural land (%)	35.3	41.1	116.4
Participation in the value of national agricultural production (%)	.	49.2	x

Source: as in the table 4.1.

A similar method of analysis was used to analyse farms owned by legal entities or limited companies, agricultural cooperatives and farms of the public sector. The results show that their situation is different from that observed in the case of agricultural holdings of natural persons. In the years 2007-2009 the share

of agricultural holdings with the competitive ability and the ones that may soon gain this ability (93-94%, which also means that holdings without an ability to compete accounted for only 6-7% [Kagan 2013, Kagan 2014]). The reason for this situation was the privatization of agricultural production cooperatives and farms of the public sector that was carried out after the change of the socio--economic system in the last decade of the previous century.

Estimates made on the basis of the data and previously disclosed figures relating to agricultural holdings of individuals indicate that the share of farms with a competitive ability and those that are able to achieve this ability in a short period of time amounts to 60-65% of the value of national agricultural production.

The factors determining the characterised phenomenon will be discussed later in this paper. However, at this point it should be mentioned that the conditions that occurred in the period 2010-2012 were different from those observed in the years 2005-2007. The rates of direct payments in the years 2011 and 2012, expressed in euro, ceased to grow and remained at the level of the year 2010, and rise in prices of agricultural products ceased to outpace the rise in prices of means of production (cumulative "price scissors" in the year 2012 remained exactly at the level observed in 2007). This downturn could discourage some farms with a competitive ability from undertaking investment on the scale that provides extended reproduction and consequently it could lead to a shift to a group of farms with the conditions enabling regaining this ability when conditions improve. This presumption is justified mainly by the fact that in agricultural holdings with the competitive ability the rate of reproduction of fixed assets declined by 5 percentage points, from 7.3% in the years 2005-2007 to 2.3% in 2010-2012.

In addition to the farms with the competitive ability and those that are able to achieve this ability in a short period of time there was and still is a large group of uncompetitive commercial farms and of those that produce primarily or exclusively for their own family and farm needs (tab. 4.3). The number of holdings in both of these groups decreased in the years 1999-2010, although to varying degrees. The number of uncompetitive commercial farms declined throughout this period by 11.4%, in part thanks to the fact that in the years 2002-2010 there was a reversal of the decline. The number of the ones that conducted the agricultural production mainly or exclusively for their own needs fell by as much as about 47%.

Based on the figures presented above it can be claimed that not only farms with a competitive ability and those with capacity that allow them to achieve this ability in a short period, but also part of the commercial agricultural holdings and non-competitive ones made use of improving economic conditions for farming that occurred after 2004 to sustain their existence by modernizing or expanding assets owned. Others, especially those with production taking place mostly or exclusively for their own needs, did not take advantage of this opportunity and did not allocate rising income to increase the value of assets and to develop their production. These farms mainly used this situation to improve the living conditions of the holders of farms and their families, or for some other purposes not related to their activities in agriculture. Such conclusions are presented in the publication written by B. Chmielewska [2013].

Table 4.3. Changes in the number of farms with agricultural production and the surface of more than 1 ha of UAA in 1996-2010 in Poland (in '000)

Types of farms	Years:		
	1996	2002	2010
Farms with a competitive ability and the ones that may soon achieve it	106[a]	174[b]	209[c]
Remaining farms selling all or most of their final production	866	739	767
Farms producing mainly or exclusively for the needs of the farm holder's family	941	705	503

a. The number estimated on the basis of information in 1999.
b. Total estimated on the basis of information from 2005-2007.
c. Total estimated based on information from 2010-2012.
Source: own elaboration drawn up on the basis of the development W. Józwiak [2014b].

4.3.   Factors determining the changes in the number of agricultural holdings with a competitive ability and those that can achieve this ability in short period

For 2004-2013

The opening of the access to the EU market was not to be underestimated by the Polish food producers, because until that time, this market was protected by customs and tariff systems. Since the cost of production and the prices of most food commodities in the economically developed countries of the former EU-15 were higher than in Poland, so the Polish comparative advantages could

be revealed. The growth of the Polish export was therefore faster than expected and the threat of imports was much lower [Urban 2010]. It was also important that the preparation of the national food industry for the integration was more advanced than had been earlier expected. As a result of the transformation and modernization of food industry we observed: its inclusion in the processes of globalization, ahead of the introduction of major control systems of agricultural markets (similar to the EU ones) and gradually adapting the EU standards, especially the ones regarding the quality of food produced.

Financial support for agricultural producers associated with accession had a conditional character. As the EU administrative authorities imposed requirements concerning agricultural production that were aimed at approaching the private optimum (seen as an appropriate level of economic benefits generated by agricultural producers) to the social optimum, which takes into account the interests of the future generations taking into account the protection of existing ecosystems [Zegar 2012] and other elements of environmental and animal welfare.

As expected, the inclusion of the Polish agriculture into the common agricultural policy mechanisms brought a significant increase in subsidies magnifying farm incomes. These subsidies, calculated at constant prices, were in 2004 about eight times higher than the annual average in the years 1998-2003, and in 2005 and the five subsequent years they continued to grow. As a result, the share of subsidies in agricultural income (agricultural income of farms owned by individuals and gains of agricultural enterprises) significantly increased. This share amounted to nearly 10% in 2003, a year later it increased to approximately 23% and in 2011 it reached 49.4%.

Subsidies are not the only external factor leading to an increase in agricultural producers' incomes. The changes in relative prices of agricultural products and prices of inputs purchased by farms were also beneficial for farmers. This is well shown in the cumulative indicator of the so-called price scissors, which in 2013 amounted to 108.3 compared to the year 2003 treated as 100.

It should be emphasized that the larger Polish farms showed more activity to adapt to the new circumstances than, for example, the Hungarian farms. The table 4.4 shows indicators characterizing the return on equity and the level of reproduction of fixed assets in farms with size 16 and more ESU in the years 2004-2006. The positive figure for the first indicator informs that the incomes earned by farms allowed them to pay market-level rates for the labour input offered by farm families in their farms. The surplus, in fact profits obtained, gives the information on the gains on equity (including land and other means of pro-

duction). This gain related to the equity value allowed us to assess the level of the profit on equity. The positive rate of reproduction of fixed assets announces the expanded reproduction, zero means a simple reproduction, and the negative rate shows a depreciation of the owned assets.

Table 4.4. Indicators of return on equity and reproduction of fixed assets in the Polish and Hungarian farms with the size of 16 and more ESU
(average values for 2004-2006)

Types of farms	Profitability ratios of farms' equity[a] (%):		Fixed assets' reproduction indicators[b] (%):	
	Polish farms	Hungarian farms	Polish farms	Hungarian farms
Cereals	6.8	9.1	3.7	1.5
Milk cows	9.1	9.0	5.3	-0.3
Pigs and/or poultry	7.0	4.7	4.0	-0.2
Mixed animal and plant production	11.4	6.5	16.8	2.5
Average	8.6	7.3	7.4	0.9

[a] The difference between income of agricultural entrepreneurs (agricultural incomes of individual farms and gains of farms operating as legal persons) and the estimated at market level wages for own executive and managerial work in relation to the value of the equity.
[b] The net investment (gross investment value less depreciation) in relation to the value of fixed assets.
Source: [Józwiak et al. *2013].*

The figures in the Table 4.4 also indicate that larger Polish and Hungarian farms representing all four types of products analysed were profitable throughout the period analysed (years 2004-2006). They were thus able to pay for labour at the market level and still some profits remained to pay for their own resources involved in production processes. The average rate of return on equity of the Polish agricultural holdings was slightly higher (1.3 percentage points) than in the case of Hungarian ones, and the average rate of expanded reproduction of fixed assets was higher by up to 6.5 percentage points. It is likely that the cause of this phenomenon was the pressure exerted by businesses and companies representing the Polish food industry. As a result, there has been a significant change in agricultural production structures and improvement in the quality of manufactured goods and at the same time agrarian structure remained fairly stable [Urban 2010]. This required the intensification of investment processes.

Farms reacted to changing circumstances also in other ways. They made their production more specialized and absorbed all kinds of innovation [Józwiak et al. 2012], and also resigned from the cultivation of agricultural land character-

ised by less favourable conditions to conducting agricultural activity. They also resigned from small scale animal production that was usually inefficient. According to figures from the Table 4.5, set at fixed prices, the cost of intermediate consumption in the years 2006-2010 was higher by 2.3% than in the period 1998-2002, but it was accompanied by a several times faster growth of revenues. This means that in the period analysed the cost efficiency of production increased. For a unit of costs of intermediate consumption a higher volume of revenues was achieved in the years 2006-2010 than in the period 1998-2002. This increase amounted to 10.5%.

Table 4.5. Changes in the cost-effectiveness of intermediate consumption in the Polish agriculture in the years 1998-2010 (constant prices of 2003)

Description	Average annual value in the years:		Values in the years 1998-2002=100
	1998-2002	2006-2010	
Revenues at basic prices[a] (PLN; '000000)	52,852	59,751	113.0
Costs of intermediate consumption (PLN; '000000)[b]	34,685	35,482	102.3
Gross value added[c] (PLN; '000000)	18,167	24,269	133.6
Revenue (in PLN) per 100 PLN of the intermediate consumption	152.4	168.4	110.5

[a] Product prices plus the unit amount of direct payments for those products.
[b] The costs of the means of production and production services (excluding the cost of taxes and foreign factors of production).
[c] The difference in revenues and cost of intermediate consumption.
Source: [Józwiak 2012a].

The specialization was one of the most important factors limiting the unit cost of production for farms with small production capacity, so in the case of the majority of the Polish farms. The specialization restricted the unit costs of obtaining information that facilitates effective management, and transaction costs related to: sales of finished products, purchase of production, applying for loans and subsidies, etc. In addition, the holdings with specialized production did not require so much equipment as farms with mixed production and therefore not specialized production. The farms with specialized production had therefore lower operating costs, depreciation and use of machines and buildings. The role of specialization is shown by the following figures. In the years 2002-2010 the total number of farms decreased by 24.3%, but the number of specialized farms

decreased only by 6.5%, while the number of farms with no specialized production (with different types of crops, with the breeding of different species of animals and mixed plant-animal production) decreased by 47.3%. Probably some non-specialized farms disappeared, while others limited the scope of the production and the number of farms specializing in the production of certain goods increased. The farms were absorbing innovations bringing technical, biological, marketing and managerial progress [Karwat-Woźniak 2013]. Although these innovations were introduced probably only by 18-19% of all agricultural holdings, they operated on a little more than half of the national agricultural area [Józwiak et al. 2012].

The economic performance of the agriculture at the beginning of 2008 was mitigated by rising costs (incurred costs of production and reduction of production volume) resulting from the implementation of cross-compliance, which consists in observing the rules of good agricultural practices [Niewęgłowska 2011] (with the implementation of rules governing animal welfare, which took effect in 2012). The administrative burden also grew [Józwiak et al. 2013b]. The benefits of compliance with those rules appeared belatedly and only partially balanced the costs previously incurred. Despite this the trend of increasing of agricultural income continued.

Concerning is the small share of farms with sustainable production which also contributes to the sustainability of farms over a longer period of time. It means the overall assessment of the economic situation and the impact of their agricultural production on the environment. The estimates made on the basis of the paper written by W. Wrzaszcz [2013] show that in 2008 only 5-6% of farms with a surface of 1 or more hectares of agricultural land could be considered as sustainable. Most of them have a size which is in the range of 16-40 ESU. Sustainable production does not create major threats to the natural environment, while the income from agricultural production – according to the cited author – enables modernizing farms and at the same time farmers and their families can live at a level not lower than families of workers with average wage in the national economy. It cannot be ruled out that the share of such farms would increase if in the assessment of this phenomenon the "charge" of farmers' own work was included, as in the assessment presented above, which was used to determine the number of farms with the competitive ability.

The share of farms that carry out only selected elements of the set leading to an overall sustainability was higher. The analysis showed [Zieliński 2014] for example, that 74.0% of farms with a specialization in the production of cereals

and crops technologically similar monitored by the Polish FADN in the years 2005-2010 were characterised by a positive balance of storage (sequestration) of carbon in the soil. These farms therefore exerted by their agricultural production only a limited negative impact on the climate.

This means that a relatively large part of the Polish farms may pose a threat to the environment, which is expressed, among others by: occurrence of severe diseases, pests and weeds; contamination of land, succession of wild and unwanted vegetation on land previously used for agriculture as extensive and progressive mineralization of soil's organic matter. The latter means: excessive emissions of carbon dioxide and nitrous oxide into the atmosphere, reducing the average level of crop yields and increase in the year to year yield fluctuations [Zieliński 2014].

To sum up this part of the study it can be concluded that among the conditions conducive to growth of the number of Polish farms with the competitive ability and those that can achieve this ability quickly in the years 2004-2013, the most important was the increase of income. This was enabled by a rise in subsidies for farms, which increased their income and by a rise of those instruments that support farms' investment activities. Another important prerequisite was the development of the food industry and the low level of wages, which led to an increase in exports of food products, and this resulted in a relatively rapid rise in prices of agricultural products. However, an opinion can be formed that these conditions on such a scale and scope will not be repeated, certainly not in the next few years.

To the emergence of competitive farms with the capacity and the possibility to increase the number of those that can quickly achieve competitive ability also contributed the proactive attitude of a part of agricultural producers, which led to finding and implementing various types of pro-efficiency measures. Some of them took the form of "simple rationality" involving the restraint of expenditure which does not generate sufficient income. Thus the amount of these "simple rationality" measures has been reduced and only to a limited extent it can contribute to improving the situation of farms in subsequent years.

Period 2014-2020

It can be assumed without fear of a large error, that a portion of our agricultural producers in order to improve their own farms will continue to use progress that is due to the implementation of various innovations to specialize production and increase its scale and other pro-effective solutions. We also know that pay-

ments will be less important in the growth of income than in the two previous periods of financial perspectives. However, the final phase of the current global economic recession should occur and be combined with an increase in the demand for products of agricultural origin in developing countries as a result of the globalization of the world economy, while at the same time there will be a limited capacity for an increase in the supply of these goods caused by the climate change. The experiences of the last few years also indicate that the demand for organic food will probably increase, although its share in domestic food production will be small in the last year of the characterised period [Drewnowska 2014]. All this will translate into prosperity for agricultural and food products, and because Poland since 2003, has been participating in the global division of labour in this area, so Polish agricultural producers will also benefit.

But we cannot completely exclude the development of the situation described in a pessimistic scenario, mainly due to the prolonged economic recession, which is indicated by the economic situation in the countries of southern flank of the European Union – Greece, Portugal, Spain and Italy [Stańczuk 2014]. The tension that exists in Eastern Europe and part of the Muslim countries in the Middle East can also contribute to a longer recession. All this could have a negative impact on the economic situation of the EU countries and be translated into several years limiting beneficial conditions for the agri-food products. In Poland, in addition there can also be expected other phenomena. The result of parliamentary elections may lead to a change of the political forces in power, and as a consequence – the reform of the national social security for the rural population, postponed for many years, and the implementation of income tax system for farms. A liquidation of milk quotas and a possible ban on imports of feed produced from the so-called GMO plants will have an impact on incomes of some groups of farms. Naturally, one can count on the adaptability of the domestic food industry and of the domestic farms. However, such a situation will likely reduce the rate of growth in a number of agricultural holdings with a competitive ability, and it is even possible that this number can be lowered by some farms moving to the group of these which can regain this ability in the event of economic recovery.

Period after 2020

Part of the issues relating to the period specified in this subsection title does not require forecasts because it is already the subject of political arrangements. One of the most important issues is the necessity of reducing greenhouse gas emissions within the European Union by 2030. Poland is one of the major

emitters of GHGs in the EU in relation to the produced GDP, so both the lack of investments aimed at reducing these emissions (paying stipulated penalties) as well as undertaking such investments with public funds may slow the economy in Poland for some time. This will have a negative impact on domestic demand for agri-food products and consequently on the number of domestic farms with a competitive ability and those that will be able to achieve this ability.

The issue of a need to make new changes modernising the Polish economy in the next 25 years is becoming more and more present in public debate. The modernization of the Polish economy and of the living standards is needed because the effects of the changes that have occurred in the last two decades are depleted [Józwiak 2014b]. These future changes are supposed to lead, inter alia, to the emergence of a creative society and to building of an economy based on the current knowledge acquired by applying scientific methods. Success in implementing these changes could result in the economic "leap forward" which will help solve the problems caused by: climate change, aging and possibly other factors. This economic development should lead to an increase of wages in the national economy, which will be followed by resigning from running small farms. Thus, in the agriculture we should expect the dominance of farms with average and high concentration of production. Most of these farms will be characterised by a competitive ability or will have features that indicate that this ability can be achieved.

One can attempt to identify yet further term future perspective. Futurists do formulate forecasts to indicate potential future threats and opportunities for further development.

In the media we are often shocked by images of a catastrophe concerning feeding world population and development of agriculture in the future, but there are indications of their falsity. Approximately 2/3 of the holders of farms in the world have farms very small in size, which are operated using hand tools [Mirkowska, Józwiak 2014]. Their income barely provides for a minimum standard of living for their holders and their families. Thus, they possess not enough financial resources to the purchase of machines and equipment that enable intensifying production. However, this situation is changing [Randers 2014]. The globalization intensifies the processes of urbanization, which leads to a concentration of land in the decreasing number of farms, intensification of production growth and income growth of the farming population, as it had been earlier observed in the now economically developed countries. The urbanization is another important aspect to this argument. It leads to a decline in the fertility rate of women, and thus it leads to a slower growth in demand for food.

The processes of concentration of land in the decreasing number of farms in the economically developed countries lose their importance and there is nothing extraordinary in this. The population in these countries almost does not increase, while the importance of the quality of life increases. Therefore, it becomes important to protect the environment and a particular emphasis is put on the procedures for the reduction of greenhouse gas emissions as the technically sophisticated agriculture has a negative impact on the environment, including its most important aspect – climate [Kundzewicz 2013]. The change of economic policy objectives in these countries, however, does not necessarily lead to a decline in the supply of goods of agricultural origin. To some extent, activities related to the sequestration of a portion of greenhouse gases (mainly of carbon dioxide) in the soil which are complementary with respect to the effects on agricultural income [Zieliński 2014] and they still are positively correlated with the size of agricultural production. On this basis an opinion is formed that in the middle of the century (that is in about 30 years) there will be enough food for everyone [Randers 2014]. However, the question of access to food remains, because not every potential consumer will be able to afford to buy it. Agriculture, therefore, may then feel the effects of the economic downturn. But in Poland, as in many other developed countries, this will then be an agriculture that employs a few people and farms will have a scale of production much larger than today, which will realize their economic objectives, but in a way that minimizes the negative impact of agricultural production on the environment.

4.4. Conclusions

The increase of the competitiveness of Polish farms is a process in which a growing share of farms can be characterised as having an outstanding competitive ability, and thus achieving income to meet the aspirations of the holders as to the standard of living and investing in the operated farms at a level sufficient to modernize and increase their scale of production. The Polish agriculture continued in 2004 and beyond the adaptive processes initiated earlier, but there were also launched new processes under the influence of a significant increase in subsidies and the impact of relatively well-developed domestic food industry. As a result, in 2010-2012, between ten and twenty per cent of domestic farms owned by individuals was characterised by a competitive ability or there was an evidence that this ability could be achieved if the economic conditions improve. It is estimated that they provide nearly 2/3 of the value of domestic agricultural production.

The analyses and estimates prepared on their basis suggest that the deterioration in economic conditions limits the rate of growth of the number of farms with outstanding competitive ability and an increase in the number of those having evidence that this ability can be achieved in the event of better economic conditions. A further increase of the number of farms with competitive ability and those that may soon achieve it will be determined by different conditions than those that existed in the years 2004-2012. But in any case the key will be whether these conditions will be conducive for products of agricultural origin or not.

The nominal amount of funds granted under the common agricultural policy in the new financial perspective (2014-2020) differs little from the allocation of funds for this purpose in the years 2010-2013. The threat to the further development of the Polish agriculture is associated with a possible prolongation of the period of world recession. The threat may also stem from the national policy. Limited revenues to the state budget may in fact lead to a revision of the social security system for people working on farms owned by them and taxation system in agriculture. The elimination of the EU milk quotas and domestic ban on imports of fodder produced from GMO plants can have a negative impact on some of the Polish farms. All of this can significantly reduce the positive trend that was seen after 2004. The Polish agriculture relies on increasing number of farms with an outstanding competitive ability and those that are able to quickly achieve it.

In Poland around the year 2030 there will probably be an increase in the costs of using energy and water. The first will be the result of the European Union's policy aimed at reducing greenhouse gas emissions and the second will be induced by the scarcity of water suitable for consumption and economic use. The process of emergence of a creative society and creating an economy based on knowledge from current scientific methods are also likely to occur. All these phenomena, combined with an aging population will lead to increased costs of doing business. As a result, the elimination of smaller and inefficiently functioning farms will increase, which will create conditions for growth and the consolidation of farms with a competitive ability and those capable of achieving it. It is probable that they will have to contend with unfavourable conditions for agricultural production.

References
1. *Charakterystyka gospodarstw rolnych w 2007 r.*, GUS, Warszawa 2008.
2. *Charakterystyka gospodarstw rolnych*, Powszechny Spis Rolny 2010, GUS, Warszawa 2012.

3. Chmielewska B., *Ekonomiczno-społeczna sytuacja gospodarstw domowych rolników po akcesji Polski do Unii Europejskiej*, IERiGŻ-PIB, Studia i Monografie, no. 158, Warszawa 2013.

4. Drewnowska B., *Boom na żywność ekologiczną*, Rzeczpospolita, 14.10.2014.

5. Józwiak W., *Polskie rolnictwo i gospodarstwa rolne w pierwszej i drugiej dekadzie XXI wieku*, IERiGŻ-PIB, Program Wieloletni 2011-2014, no. 53, Warszawa 2012a.

6. Józwiak W., *Rolnictwo węgierskie poszukuje drogi rozwoju*, Zagadnienia Ekonomiki Rolnej, no. 4(333), Warszawa 2012b.

7. Józwiak W., Kagan A., Mirkowska Z., *Innowacje w polskich gospodarstwach rolnych, zakres ich wdrażania i znaczenie*, Zagadnienia Ekonomiki Rolnej, no. 3, Warszawa 2012.

8. Józwiak W., Kowalski A., Wrzaszcz W., *Oczekiwania, korzyści i zagrożenia członkostwa w Unii Europejskiej dla polskiego rolnictwa*, IERiGŻ-PIB, typescript, Warszawa 2013a.

9. Józwiak W., Niewęgłowska G., Jabłoński K.*, Koszty realizacji zasady wzajemnej zgodności a dochody w rolnictwie polskim*, in joint work: *Z badań nad rolnictwem społecznie zrównoważonym (20). Wybrane zagadnienia zrównoważonego rozwoju rolnictwa*, IERiGŻ-PIB, Program Wieloletni 2011-2014, no. 93, Warszawa. 2013b.

10. Józwiak W., *Świat, Unia Europejska i Polska 2050 – refleksje nad paradoksami futurologii*, Zagadnienia Ekonomiki Rolnej, no. 2, Warszawa 2014a.

11. Józwiak W., *Rozwój krajowych przedsiębiorstw rolnych osób fizycznych w świetle idei „spirali wzrostu"*, IERiGŻ-PIB, typescript, Warszawa 2014b.

12. Mirkowska Z., Józwiak W., *Rozwój gospodarki świata i UE w perspektywie długoterminowej. Miejsce sektora rolnego*, IERiGŻ-PIB, typescript, Warszawa 2014.

13. Kagan A., *Stan i perspektywy wielkotowarowych przedsiębiorstw rolnych w Polsce*, IERiGZ-PIB, Warszawa 2013.

14. Kagan A., *Techniczna i środowiskowa efektywność wielkotowarowych przedsiębiorstw rolnych w Polsce*, IERiGŻ-PIB, Warszawa 2014.

15. Karwat-Woźniak B., *Zmiany w formach sprzedaży produktów rolnych w gospodarstwach indywidualnych*, IERiGŻ-PIB, Warszawa 2013.

16. Kowalski A., *Miejsce polskiego rolnictwa na globalnym rynku żywnościowym*, [in:] *Ekonomiczne i społeczne uwarunkowania rozwoju polskiej gospodarki żywnościowej po wstąpieniu Polski do Unii Europejskiej. Synteza*, joint work ed. by: A. Kowalski, IERiGŻ-PIB, Program Wieloletni, no. 186, Warszawa 2010.

17. Kundzewicz Z. W., *Cieplejszy świat. Rzecz o zmianach klimatu*, Wydawnictwo Naukowe PWN, Warszawa 2013.

18. Niewęgłowska G., *Koszty spełnienia wymogów wzajemnej zgodności w polskich gospodarstwach rolnych*, IERiGŻ-PIB, Program Wieloletni 2011-2014, no. 24, Warszawa 2011.

19. Randers J., *Rok 2052. Globalna prognoza na następne czterdzieści lat*, Dom Wydawniczy ELIPSA, Warszawa 2014.

20. Stańczuk M., *Kryzys w strefie euro jeszcze się nie skończył*, Rzeczpospolita, 5.06. 2014.

21. Urban R., *Polski sektor żywnościowy w pierwszych latach członkostwa*, [in:] *Ekonomiczne i społeczne uwarunkowania rozwoju polskiej gospodarki żywnościowej po wstąpieniu Polski do Unii Europejskiej,* joint work ed. by: A. Kowalski, IERiŻ-PIB, Program Wieloletni, no. 184, Warszawa 2010.

22. Wrzaszcz W., *Zrównoważenie indywidualnych gospodarstw rolnych w Polsce objętych FADN*, Zagadnienia Ekonomiki Rolnej, no. 1, Warszawa 2013.

23. Zegar J. S., *Współczesne wyzwania rolnictwa,* PWN, Warszawa 2012.

24. Zieliński M., *Emisja gazów cieplarnianych a wyniki ekonomiczne gospodarstw specjalizujących się w uprawach polowych*, IERiGŻ-PIB, typescript, Warszawa 2014.

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5. The assessment of the effects of the investment support scheme under Rural Development Programme in the Czech Republic

5.1. Introduction

The investment support has been considered as a principal vehicle for enhancing competitiveness of the Czech agriculture since the early days of the economic transition. However, little attention has been paid to the evaluation of actual effects of the corresponding support programmes. The need for a more rigorous assessment arrived with the EU rural development programmes, particularly the previous one (2007-2013) for which the Commission established the Common Evaluation and Monitoring Framework [EC 2006]. However, simple comparison of result indicators (as production or GVA) between supported and non-supported groups is methodologically problematic, since it omits their multiple factors formation and the fact that the measures are targeted to or exploited by only some groups of producers/regions [Michalek 2007]. To deal with these shortcomings a more precise counterfactual approach is needed investigating what would have happened if the supported producers did not participate in the programme and then comparing the result indicators [Khandaker et al. 2010]. In our previous research [Medonos et al. 2012] we showed using the propensity score matching approach (PSM)[23] that there were benefits of the investment support measures in terms of improved GVA and labour productivity on a sample of about 800 farming companies. However, when extending the sample to about 1400 the heterogeneity of farms increased and we faced a serious problem of heteroscedasticity. To deal with it we adopted an alternative matching approach suggested by Abadie and Imbens [2002].

5.2. Data and Methods

Since it is principally impossible to observe on the same farm the effects of participation and non-participation in the measure, one has to choose or to construct a control farm with "identical" characteristics from the pool of non-participating producers. We use probit regression to identify key structural variables for construction of control farms.

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[23] E.g. Caliendo and Kopeinig [2005], Khandaker et al. [2010].

The standard framework in evaluation analysis to formalise the above problem provides Roy-Rubin-model [Caliendo and Kopeinig 2008]. In this model, the parameter which has received the most attention of scholars is the Average Treatment Effect on Treated (ATT); it is defined as:

$$\tau_{ATT} = E[\tau|D = 1] = E[Y(1)|D = 1] - E[Y(0)|D = 1] , \tag{5.1}$$

where: $\tau=Y(1)-Y(0)$, $Y(D)$ is a result variable, D equals 1 if the unit got an investment support (treatment) and 0 otherwise. The sample ATT (SATT) takes the form of:

$$\tau_{SATT} = \frac{1}{N_1}\sum_{i\in particip}\left[Y_i^T(1) - Y_i^C(0)\right] , \tag{5.2}$$

where the upper indices T and C indicate participating and control farms respectively. Matching estimators are based on imputing a value on the counterfactual outcome for each unit. Abbadie and Imbens (2002), propose direct matching which is based on metric $||x||=(x'Vx)^{1/2}$, where x is a vector of structural variables and V is a positive semidefinite matrix. This metric is used to determine the nearest similar unit(s).

Let M denotes the number of nearest control units to the treated unit i. We define the distance $d_M(i)$, which follows:

$$\sum_{D_j=1-D_i} I\left(\left\|X_j - X_i\right\| < d_M(i)\right) < M$$

and $\sum_{D_j=1-D_i} I\left(\left\|X_j - X_i\right\| \le d_M(i)\right) \ge M,$ \hfill (5.3)

where: $I()$ is an indicator function which is equal to one if the expression in brackets is true and zero otherwise. Let $J_M(i)$ denote a set of indices of the control units which are as close as the Mth control unit and $card(J_M(i))$ is a number of the elements of $J_M(i)$. We define

$$K_M(i) = \sum_{j=1}^{N} I(i \in J_M(j)) \frac{1}{card(J_M(j))} \tag{5.4}$$

Obviously, the sum of $K_M(i)$ over all observations is equal N (i.e. to the number of all observations), over participating units to N_0 (i.e. to the number of controls) and over non-participating units to N_1. Now, we can construct a simple estimator:

$$Y_i^C(0) = \begin{cases} Y_i(0), & when \ D_i = 0 \\ \frac{1}{card(J_M(i))} \sum_{j \in J_M(i)} Y_j, & when \ D_i = 1 \end{cases} \tag{5.5}$$

Equation (5.5) means that a counterfactual is an average of the nearest control units. Putting (5.5) in (5.4) we yield a sample average treatment effect on treated (SATT):

$$\tau_{SATT} = \frac{1}{N_1} \sum_{i=1}^{N} [D_i - (1 - D_i) K_M(i)] Y_i \ . \tag{5.6}$$

In the same manner, we can derive estimators of the average treatment effect on controls (ATC, SATC) and the overall average treatment effect (ATE, SATE). The latter constructs the counterfactual matches to both – the participants and non-participants in the programme.

The simple estimator (5.3) will be biased in the finite set if the matching is not exact. Abbadie and Imbens (2002) propose a bias-corrected matching estimator (i.e. adjusting the difference within the matches for the differences in their covariate values) by using regression estimates of Y as a linear function of the considered structural variables (covariates); for SATT in the control group $(\hat{\mu}_0(x))$, for SATC in the sub-sample of participants $(\hat{\mu}_1(x))$ and for SATE using the both regressions. The adjusted estimator of the effect over controls is now:

$$\tilde{Y}_i^C(0) = \begin{cases} Y_i(0), & when \ D_i = 0 \\ \frac{1}{card(J_M(i))} \sum_{j \in J_M(i)} \left(Y_j + \hat{\mu}_0(X_i) - \hat{\mu}_0(X_j) \right), & when \ D_i = 1 \end{cases} \tag{5.7}$$

The adjusted SATT:

$$\tilde{\tau}_{SATT} = \frac{1}{N_1} \sum_{i \in particip} \left(Y_i - \tilde{Y}_i^C(0) \right) \ . \tag{5.8}$$

Similarly, SATC and SATE are constructed. With the new sample of Albertina (CreditInfo) in which the number of observations (farms) doubled, the problem of heteroscedasticity occurred. The heteroscedasticity affected the variance of the estimates and the significance of the results of the counterfactual analysis. It called for dealing with heteroscedasticity. First, we removed outliers, but the principal treatment rest in an improved estimation method. For SATT (as defined in (5.4)) the variance is given by:

$$V_{SATT} = \frac{1}{N_1^2} \sum_{i=1}^{N} ([D_i - (1 - D_i) K_M(i)])^2 \sigma_{D_i}^2 (X_i) \ , \tag{5.9}$$

where: $\sigma_D^2(X)$ represents the conditional of the performance indicator Y in respect to the vector of its covariates. If there is no heteroscedasticity, then:

$$\sigma_1^2 = \frac{1}{2N_1} \sum_{i \in particip} \left[\frac{1}{card(J_M(i))} \sum_{j \in J_M(i)} (Y_i - Y_j - \tau_{SATT})^2 \right].$$ (5.10)

In the same way one can express it also for SATC a SATE.

If the variance $\sigma_D^2(X)$ is unstable, we need to estimate it for each unit in the sample. It can be done by further matching. Define $d'_M(i)$ as a distance to the Mth unit with the same indication of the treatment (participation):

$$\sum_{D_j=1-D_i, i \neq j} I\left(\|X_j - X_i\| < d'_M(i) \right) < M \text{ and}$$

$$\sum_{D_j=1-D_i, i \neq j} I\left(\|X_j - X_i\| \leq d'_M(i) \right) \geq M.$$

Similarly, we construct $J'_M(i)$ as a set of the indices of the first M nearest neighbours to unit i. The conditional variance is estimated as a sample variance of this set extended of the unit i:

$$\sigma_1^2(X_i) = \frac{1}{card(J'_M(i))} \sum_{j \in J'_M(i) \cup \{i\}} (Y_j - \bar{Y}_{J'_M(i) \cup \{i\}})^2 ,$$ (5.11)

where:

$$\bar{Y}_{J'_M(i) \cup \{i\}} = \frac{1}{card(J'_M(i))+1} \sum_{j \in J'_M(i) \cup \{i\}} Y_j$$ (5.12)

is an average of the performance indicator in the set $J'_M(i) \cup \{i\}$.
This approach is implemented in STATA as the nnmatch procedure [Abadie et al. 2004].

If selected neighbours exhibit more or less identical values of the performance indicators as the participant at the time of launching the investment support programme, we can compare directly the values of the performance indicators at the time horizon t. The *ATT* will refer to the distance between the solid and dashed lines at the point t in Figure 1. However, often there is a considerable difference between the values of the performance indicators of the participants and counterfactuals. In this case, we compare changes over the time period t instead of the final figures. This approach is called "difference in difference" and the respective effect is marked as *ATT(d-i-d)* in Figure 5.1.

Figure 5.1. Support chart for relative effects
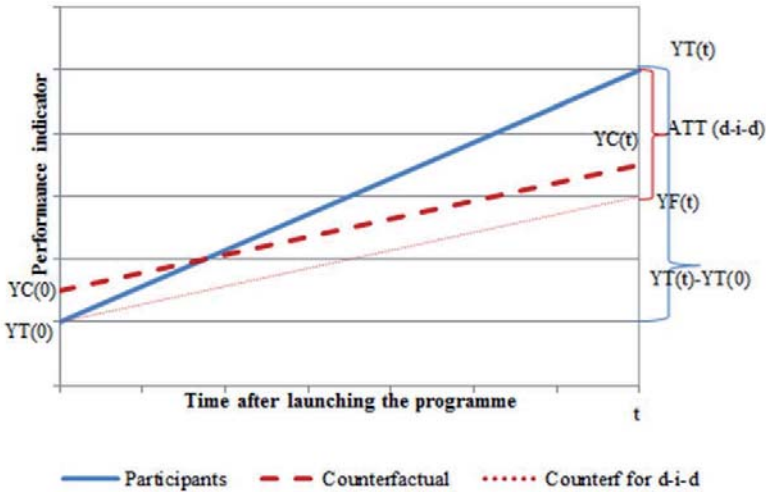
The advantage of using d-i-d estimators is demonstrated and discussed in Smith and Todd (2005). In addition we are introducing two relative indicators of the effects:

$$relATT_{fin} = \frac{ATT\_(d-i-d)}{Y^T(t)},$$

$$relATT_{change} = \frac{ATT\_(d-i-d)}{Y^T(t)-Y^T(0)}.$$

The former referring to the share of the *ATT* on the final value *(Y^T)* and the latter referring to the share of *ATT* on the change of the performance indicator over the time *t* (see Figure 5.1).

We used several sources of data on farm characteristics and performance: Albertina database, LPIS, data on agricultural supports published by SZIF[24]. Albertina is main source, it is database built on annual reports of companies which are obliged to publish their economic and book keeping figures. Since Albertina includes only financial indicators we linked information on utilised agricultural area (UAA) and on land use from LPIS. In order to investigate

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[24] State Intervention Fund for Agriculture – the paying agency.

differences in investment support impacts we have divided the sample in several subsamples by production conditions and orientation (given by the share of grasslands ≥ 20%, < 20%), and density of ruminants on utilised agricultural land (e.g. ≥ 0.2 resp. < 0.2).

5.3. Main results

In general, most of the support was directed to the livestock sector in terms of numbers (57%) as well as in terms of funds (72%). This bias against the livestock sector results to large extent from policy preferences. There were 1415 agricultural businesses in the Albertina database which provided all economic figures for all four years of the period 2007-2011. A slightly more than a third of them (583) were awarded an investment support from the Czech RDP (measures 121 and/or 123).

Factor analysis detected 13 factors representing 90% of variability for nearly 50 indicators of economic performance. For selecting the nearest neighbours we used 9 structural variables regarded as factors acting as possible determinants of farm participation in the mentioned measures. The total cash flow represents size of the business; the share of grasslands indicates whether a farm is in the less favoured area, density of ruminants indicates production specialisation and the rest are variables referring to financial sources for investment.

There are significant differences between participating and non-participating farms in the Albertina sample: the average utilised agricultural area of participating farms is substantially greater (1717 ha) than the one of non-participants (1038 ha). The participating farms are on average not only substantially larger but also more capital intensive than non-participating ones. In contrast the groups do not differ (statistically) in terms of the share of grasslands and investment activity.

The participation in investment support programmes is affected by various factors. Using probit regression we can say that size, and density of ruminants affects the participation positively while high capital intensity (cash flow/labour cost ratio) goes against it. Credit indebtedness is positive factor of participation contrary to total indebtedness which discourages or prevents the participation (Table 5.1 and Table 5.2).

Table 5.1. Results of probit analysis, significance of parameters

Probit model	RDP MOD 2008-10			RDP MOD+AV 2008-			RDP MOD 2008-11			RDP MOD+AV 2008-		
Structural variable	Coef.	P-value	Sig.	Coef.	P-value	Sig.	Coef.	P-value	Sig.	Coef.	P-value	Sig.
Cash-Flow (CF)	0,000	0,000	***	0,000	0,000	***	0,000	0,000	***	0,000	0,000	***
Labour productivity (CF/Labour costs)	-0,075	0,010	**	-0,075	0,009	***	-0,053	0,033	**	-0,055	0,025	**
Operational efficiency *)	0,090	0,462		0,095	0,433		0,026	0,818		0,043	0,705	
Land productivity (CF/UAA)	0,001	0,348		0,001	0,073	*	0,001	0,363		0,001	0,083	*
Investment activity (Investment/Fixed assets)	0,209	0,273		0,181	0,326		0,159	0,354		0,147	0,377	
Credit indebtedness	0,486	0,007	***	0,456	0,011	**	0,566	0,002	***	0,530	0,003	***
Total indebtedness	-0,456	0,004	***	-0,420	0,008	***	-0,361	0,017	**	-0,295	0,045	**
Share of grass in total UAA	0,226	0,177		0,208	0,208		0,121	0,458		0,129	0,421	
Intensity of ruminants (Livestock units/UAA)	0,689	0,000	***	0,659	0,000	***	0,838	0,000	***	0,801	0,000	***
Const.	-1,028	0,000	***	-1,001	0,000	***	-0,955	0,000	***	-0,939	0,000	***

*) (Net value added - personal cost)/(intermediate consumption + personal costs + depreciation)

UAA: utilised agricultural area

MOD+AV: treated farms under measures 121 Modernisation of agricultural holdings and 124 Adding value to agricultural and food products

Source: own elaboration.

Table 5.2. Results of probit analysis, statistics for the models

Structural variable	RDP MOD_10	RDP MOD+AV_1	RDP MOD_11	RDP MOD+AV_1
Number of observations	1386	1401	1383	1401
Number of fully determined participation	1	2	1	3
Number of fully determined non-participation	4	4	3	3
Number of structural variable + coefficient	10	10	10	10
Degree of freedom	9	9	9	9
Approximation R2	0,155	0,154	0,159	0,155
Likelihood function	-753,259	-767,581	-785,215	-802,824
chi2	275,374	278,750	296,495	293,484
P-value	0,000	0,000	0,000	0,000

Source: own elaboration.

We have chosen 6 performance variables (GVA, GVA/labour cost, profit, GVA/sales, operational efficiency[25] and credit indebtedness) on which we measure results of the investment support programme. Credit indebtedness and operational efficiency exhibit significant and positive average treatment effect on treated (ATT) in all types of participation and both methods of matching (see Table 5.3). It can be interpreted as a mobilisation of additional resources (bank credits) to finance modernisation of agriculture. From this point of view, we can judge on the rather low deadweight effect of Measures 121 and 123. Significant positive effect was estimated for GVA and GVA/Sales for period 2007-2011 in the case of PSM and also NNM. For NNM the effects in period 2007-2010 are much lower and not significant because of presence the financial crisis. Effects from participation are not significant in case of labour productivity (with exception of the period 2007-2011) and these effects are strongly variable. Effects for investment supports schemes are not significant for profit at all.

With regard to the fact that the differences between groups of farms are more significant under application of matching method according to Abadie et al. [2004] we present results in the rest of results only for this matching method.

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[25] (Net value added - personal cost)/(intermediate consumption + personal costs + depreciation).

Table 5.3. Comparison of the results according to the different matching methods

| D-I-D | PSM - kernel | | | | | | NNM according Abadie et al. (2004) | | | | | |
| | MOD 2010 | | | MOD 2011 | | | MOD 2010 | | | MOD 2011 | | |
Indicator	ATT	SE	Sig.	ATT	SE	Sig.	ATT	SE	Sig.	ATT	SE	Sig.
Gross value added (per farm)	1091	733		1796	870	**	1986	688	***	2195	793	***
Labour productivity	0.045	0.249		0.214	0.127	*	-0.098	0.159		0.108	0.159	
Profit (per farm)	524	619		621	833		789	545		307	1042	
Efficiency	0.221	0.141		0.269	0.162	*	0.188	0.075	**	0.209	0.073	***
Operational efficiency	0.048	0.015	***	0.041	0.014	***	0.043	0.019	**	0.028	0.010	***
Credit indebtedness	0.029	0.005	***	0.040	0.007	***	0.023	0.007	***	0.033	0.007	***

D-I-D: Difference in Difference between treated and non-treated farms and between years 2007 and 2010 or 2011

MOD: treated farms under measure 121 Modernisation of agricultural holdings

Labour productivity = GVA / Labour Costs

Efficiency = GVA / Total Sales

Operational efficiency = (Net Value Added - Labour Costs) / (Intermediate Consumption + Labour Costs + Depreciation)

Credit indebtedness = Bank Credits / Total Assets

Source: own elaboration.

When we split farms into two subsamples according to share of grasslands in total utilised agricultural area then the average treatment effects for both groups are more-less identical in the level as well significance for credit indebtedness and GVA/sales. Differences are rather evident in GVA per farm and profit per farm on one hand and in operational efficiency on the other hand. ATT for GVA per farm in case of farms with higher share of grassland (over 20%) is significant and high – 4 times higher than in opposite group. In case of arable farms (grasslands below 20%) there this effect is moreover insignificant. Much greater difference is in profit per farm but level of significance is only 0.1 in case of higher share of grassland and the effect is not significant in opposite group. On the other hand ATT for operational efficiency is significant in the subsample of arable farms and insignificant in opposite group. At the same time ATT for this variable is also higher in group with higher share of grassland.

Table 5.4. Effects from participation in investment measures for the subsamples divided according to the share of grassland in UAA
– NNM according to Abadie et al. (2004)

D-I-D	share of grassland>=20% MOD 2010			share of grassland<20% MOD 2010			share of grassland>=20% MOD+AV 2010			share of grassland<20% MOD+AV 2010		
Indicator	ATT	SE	Sig.	ATT	SE	Sig.	ATT	SE	Sig.	ATT	SE	Sig.
Gross value added (per farm)	2129	603.5	***	433	846.9		2049	607.7	***	370	842.6	
Labour productivity	-0.429	0.249	*	0.101	0.069		-0.423	0.245	*	0.124	0.070	*
Profit (per farm)	931	480.0	*	66	691.4		897	484.7	*	18	684.9	
Efficiency	0.370	0.168	**	0.028	0.012	**	0.364	0.166	**	0.029	0.012	**
Operational efficiency	0.063	0.039		0.024	0.009	***	0.062	0.039		0.024	0.009	***
Credit indebtedness	0.025	0.010	***	0.030	0.008	***	0.026	0.010	***	0.028	0.008	***

MOD+AV: treated farms under measures 121 Modernisation of agricultural holdings and 124 Adding value to agricultural and food products

Source: own elaboration.

The situation is different, let us say more contrast to previous, in splitting farms according to density of ruminants per hectare. Average treatment effect on treated is significant at the level 0.1 in both subsamples for GVA per farm and operational efficiency. Interesting is that ATT is for GVA per farm much higher in farms with lower density of ruminants. For operational efficiency are of similar values with difference in significance. On the other hand ATT for GVA/sales and credit indebtedness are more significant and higher for farms with higher density of ruminants. Both results can indicate lower deadweight investment support and their higher efficiency for farms with higher density of ruminants.

Table 5.5. Effects from participation in investment measures for the subsamples
divided according to the density of ruminants
– NNM according to Abadie et al. (2004)

D-I-D Indicator	Ruminants >=0.2 LU/ha MOD+AV 2010			Ruminants < 0.2 LU/ha MOD+AV 2010			Ruminants >=0.2 LU/ha MOD+AV 2011			Ruminants < 0.2 LU/ha MOD+AV 2011		
	ATT	SE	Sig.	ATT	SE	Sig.	ATT	SE	Sig.	ATT	SE	Sig.
Gross value added (per farm)	1565	588.5	***	2519	1232.3	**	1835	647.9	***	2155	1272.8	*
Labour productivity	-0.140	0.129		0.236	0.174		0.193	0.099	*	0.066	0.311	
Profit (per farm)	630	480.9		579	924.5		1128	536.2	**	-155	1196.9	
Efficiency	0.206	0.089	**	0.019	0.034		0.249	0.107	**	0.025	0.016	
Operational efficiency	0.037	0.010	***	0.044	0.023	*	0.031	0.011	***	0.028	0.017	*
Credit indebtedness	0.034	0.007	***	-0.001	0.012		0.038	0.008	***	0.006	0.014	

MOD+AV: treated farms under measures 121 Modernisation of agricultural holdings and 124 Adding value to agricultural and food products

Source: own elaboration.

If we take the effect of CZK 1,796,000 or CZK 2,195,000 in increasing of GVA per farm (EUR 71,847 and EUR 87,810 respectively) and 583 large farms participating in the programme measures "Modernisation of agricultural holdings" and "Adding value to agricultural and food products", then the overall effect amounts CZK 1,047,172,000 or 1,279,836,000 (EUR 41,887,000 or EUR 51,193,000, respectively) for the first four years of the programme (the period 2008-2011). Finally it represents 1.3-1.6% of the total agricultural GVA produced in this period.

5.4. Conclusions

Based on our results from the counterfactual analysis we can conclude that selected measures (Modernisation of agricultural holdings and Adding value to agricultural and food products) under the Rural Development Programme 2007-2013 have improved performance of the supported farms in the Czech Republic. Performance indicators that improved in comparison with counterfactual situation, differ as according to which investment measures we take into account, considered periods of evaluation and applied methods. This shows that in evaluation is not sufficient to demonstrate effects of investment support only on one or few performance indicators. It is necessary to follow more dimensions of the performance and also various periods of evaluation. Application of several matching methods also improve robustness of results – each method creates counterfactual pair in different manner (one can also assess the selection bias). The evident differences are among effects in subsamples. From this point of view it is useful to take in account various logical subsamples and observe how the average treatment effects on treated differ.

References

1. Abadie, A., Imbens G., (2002), *Simple and bias-corrected matching estimators,* Technical report, Department of Economics, University of California, Berkeley.

2. Abadie A., Drucker D., Herr J.L., Imbens G.W., (2004), *Implementing Matching Estimators for Average Treatment Effects in Stata*, The Stata Journal, 2004 (3): 290-311.

3. EC, (2006), *Handbook Common Monitoring and Evaluation Framework, Guidance document*, available at: http://ec.europa.eu/agriculture/rurdev/eval/ guidance/document_en.pdf.

4. Caliendo M., Kopeinig S., (2005), *Some Practical Guidance for the Implementation of Propensity Score Matching*, IZA DP No. 1588.

5. Khandker S.R., Koowal G.B., Samad, A.H., (2010) *Handbook on Impact Evaluation; Quantitative Methods and Practices*, World Bank 52099.

6. Medonos T., Ratinger T., Hruška M., Špička J., (2012), *The Assessment of the Effects of Investment Support Measures of the Rural Development Programmes: the Case of the Czech Republic*, Agris on-line, Vol. IV, No. 4, 35-48.

7. Michalek J., (2007), *Quantitative Tools for ex-post evaluation of RD Programmes.* Working Paper Advanced-eval, deliverable No. 2. Version: March 2007.

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6. Input-output modelling to assess the impact of the CAP on small farms efficiency in Bulgaria

6.1. Introduction

One of the main focuses of the CAP in the new programming period 2014--2020 is the sustainable development of small farms (SF). Having in view their place and role in almost all EU countries, the EC envisages support for the small farmers, aiming at their transformation into viable agricultural structures. The concern about the SF development existed in some degree also in the previous programming period 2007-2013. For the study purpose the term "small farm" is used as "semi-subsistence farm". To identify and overcome some imperfections in the past approach to the support of the semi-subsistence farms (SSF), the impact of the European funding has essential importance on their development. The report is a part of research project "Semi-Subsistence Farms Social-Economic Sustainability" elaborated at the Institute of Agricultural Economics in 2010.

6.2. Methodology and data

The production function method has been applied in a lot of researches for the assessment of the significance of the European support [Bruntrup et al. 1997; Pingali 1997; Varian 1993]. The quantitative relation between the factors of agricultural production in semi-subsistence farms and the obtained output are revealed through this method. According to L. Cramer et al. [1997] the volume of agricultural production generated from the combined use of production resources is in functional relation with these resources.

The most widely used are three types of production functions, which are interrelated: trans-logarithmic, with constant elasticity of substitution (CES) and the so-called Cobb-Douglas function. It is possible to obtain CES production function by placing a restriction for the coefficients of elasticity for substitution between the input variables. The Cobb-Douglas function could be obtained from the CES production function by the relevant transformation of elasticity coefficients.

For the research purposes we have used the specific features offered by the Cobb-Douglas function. This decision is grounded by the fact that in similar analyses of the specificity of the relation "resources – production results" the most appropriate proved to be the Cobb-Douglas function [Varian 1993].

The Cobb-Douglas function with three variables is presented in stochastic form through:

$$Y = A*L^{\alpha} * K^{\beta} * Z^{\gamma} * u \tag{6.1}$$

where:

Y – agricultural production quantity in terms of value;

L – labour input in the production (the total labour cost, used in the farm, including the paid and unpaid labour), assessed in hours;

K – capital input (the value of the long-term investments as machines and equipment, buildings etc.) at the end of the year;

Z – cultivated land in ha;

The variable K could be examined also in different variant, which includes the used agricultural land. In this case the variable Z will drop out. A, α, β and γ are parameters and u is the stochastic fluctuation.

The parameter A measure the production function efficiency or the production scale, i.e. the production quantity which could be created within the condition that each type of resource has changed by one unit. The parameters α, β and γ, called elasticity coefficients, measure the percentage change of the production volume at a change of the corresponding costs by 1 per cent.

The implementation of the Cobb-Douglas function requires firstly the assessing of the marginal production change per unit of one production factor, while other factors are unchanged.

The effect of the production scale change is defined by the elasticity coefficients α, β and γ. When $\alpha + \beta + \gamma = 1$, the Cobb-Douglas function is a linear homogeneous. There is a constant efficiency relating the production volume. At increase of each production factor by 10%, for example, the production will increase also by 10%. In the case when $\alpha + \beta + \gamma > 1$ there is an increasing efficiency with the production increase and if $\alpha + \beta + \gamma < 1$ there is respectively decreasing efficiency from the production volume change.

After the relevant transformation of the formula (6.1), the regression parameters were assessed. Their conceptual meaning expresses the elasticity of the final production in relation of the three production factors: labour, capital and land.

The FADN data collected within the Ministry of Agriculture and Forestry was used for the implementation of the production function method.

6.3. Direct results from the implementation of Cobb-Douglas function

The received assessments of production function parameters are presented in for consecutive stages: total for all semi-subsistence farms; for the farms specialized in field crops; for these with permanent crops and for farms with ruminant animals. We must notice that the indicated above farm groups are in correspondence to the typology of the FADN. Due to a lack of enough fixed capital in the production activity of semi-subsistence farms, growing vegetables and raising non-ruminants (pigs, poultry, etc.), for these two groups of farms the production function method has not been applied.

The following models of Cobb-Douglas production function were applied:

- **For all semi-subsistence farms:**

$$Y = 11.06 L^{0.494} Z^{0.122} K^{0.197}$$

where:

Y – gross output,

L – labour input, evaluated by the number of worked man-hours,

Z – area size,

K – fixed production capital amount used in the agricultural activity. It includes the value of the machines, technique, equipment, agricultural buildings, some main livestock types, as milk cows, bovines and other fixed funds.

- **For the semi-subsistence farms, specialized in field crops growing:**

$$Y = 46.34 L^{0.381} Z^{0.241} K^{0.252}$$

where the meaning of the dependent variable Y and of the independent values L, Z and K is the same as in the case of all semi-subsistence farms.

- **For the semi-subsistence farms, specialized in perennial crops growing:**

$$Y = 41.72 L^{0.593} Z^{0.105} K^{0.079}$$

In this case the variables **Y, L, Z** and **K** were also interpreted in the same way as described above.

- **For the semi-subsistence farms, specialized in breeding of ruminants (without horses and donkeys)**:

$$Y = 3.11 L^{0.573} Z^{0.08} K^{0.069}$$

In this case also the variables in the equation do not differ of these in the previous equations. In Table 6.1 are shown the specifications of production function parameters.

Table 6.1. Results from the implementation of the Cobb-Douglas production function

Type of SSF	Production functions parameters				
	Free member	Labour	Land	Fixed capital	Degree of return
Field crops	3.836	0.381	0.24l	0.252	0.873
Permanent crops	3.731	0.593	0.105	0.079	0.697
Ruminants	4.134	0.573	0.08	0.069	0.65
All SSF	2.403	0.494	0.122	0.197	0.813

Source: own calculations.

For all semi-subsistence farms, as well as for these specialized in the different production types the sum of elasticity coefficients is under 1. This shows that there is a negative return of the invested fixed production means in the semi-subsistence farms. The lowest degree of return is for the farms breeding ruminants and the least expressed is this trend for the farms specialized in field crops production. The received values of the coefficients of multiple correlation R^2 between 0.471 and 0.724, i.e. the interdependence between Y and the chosen factor magnitudes is from moderate to significant.

The received results show that for all specialized semi-subsistence farms **the efficiency of the invested fixed capital is lower than the efficiency of the invested labour.** This could be explained by the high cost of manual work, by the insufficient use of mechanized labour, especially for the permanent crops and ruminants. For the farms specialized in field crops the efficiency of agricultural technique and machines use is higher, compared to the average for all semi-subsistence farms (0.252). This means that at equal other conditions, if the investments in fixed capital for the field crops grow by 1%, the gross output will increase of 0.252%. For all the semi-subsistence farms this increase would amount to 0.197%.

Despite the good result for the field crops farms, from the aspect of efficiency of fixed production funds, we must notice that the gross production changes for these farms also are more sensitive to the labour force than to the fixed capital. The

low efficiency of fixed funds is due to the insufficient intensity of effective technique and technologies for the production. The used machines and equipment are predominantly physically and morally outdated. Still prevailing is the input of living labour, which is not in harmony with the actual European requirements and trends. This situation is in contradiction with one of the main laws of the economics – technical progress for partial and full substitution of the physical human work by the work and functions of machines and equipment.

In the other 2 sub-groups of semi-subsistence farms with perennial crops and ruminants the presence of the long term assets is scarcer. Their efficiency is unsatisfactory. Their increase by 1% would lead to an increase of the gross output level barely of 0.079% and 0.069%, respectively for the permanent crops and ruminants farms.

The results of implementation of the production function confirm the expected bigger importance of the land operated by semi-subsistence farms, oriented to field crops, compared to ruminants farms. For the farms with cereals and other similar crops the intensive land use has big significance, because the output size has direct dependence on the agricultural land size.

6.4. Use of obtained results from the production function application for assessment of the effectiveness of European support for semi-subsistence farms

The obtained characteristics of Cobb-Douglas production function for the four examined cases could be used further for the determination of the effect of the financial support of semi-subsistence farms under measure 141 "Support of semi-subsistence farms in process of restructuring". This measure is in effect for the period 2007-2013 and it is destined for the support of farmers having farms between 1 and 4 economic units. According the measure 141 for a period of five consecutive years, respecting some conditions, the semi-subsistence farms receive subsidy of EUR 1,500 annually. For the identification of the impact of measure 141 on achieving its ultimate aim, related to the restructuring and the transformation of semi-subsistence farms in viable structures, two research tasks were conducted:

1. Having in view the obtained four models of production function, the following outlooks for the expected increase of the gross production level, on average, for 1 semi-subsistence farm, in the first year of the subsidy under measure 141 (Fig. 6.1).

Figure 6.1. Gross output – rate of increase, average,
for 1 semi-subsistence farm (%)
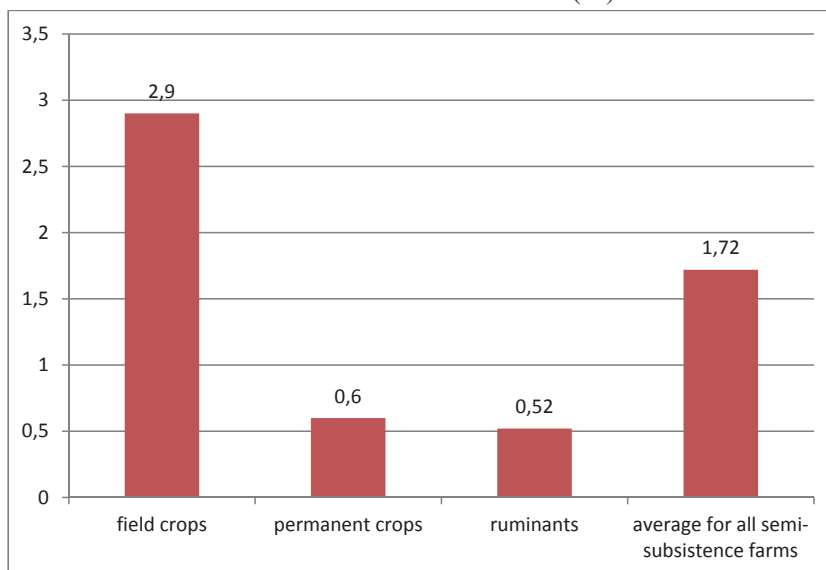
Source: own calculations.

It can be seen that in one semi-subsistence farm, on average, independent-ly of the production orientation, the expected change of gross output level after the first year of receiving the subsidy is slightly below 2%. In the first year this subsidy is expected to have favourable impact on farms specialized in field crops growing. The gross production increase in farms with perennial crops and livestock is expected to be almost at the same level that is much below the aver-age for all the semi-subsistence farms.

It should be noted that these are only potential opportunities for the in-crease in the level of gross output. They can become a reality if semi-subsistence farms can comply with all existing application requirements in measure.

2. The second research task is related to determining cases of semi-subsistence farms, which are expected to reach threshold of 4 economic units, if they re-ceive financial support from measure 141. The performance of this task is in accordance with the definition of economically viable agricultural holdings. Economically viable is the farm, which at the end of the period of assistance reaches more than 4 unit growth. For this purpose used are the results of the results from the previous research task and the relation between the gross production and the standard difference among agricultural holdings.

This is necessary because the economic size is conditionally expressed by the term economic unit and the equivalent of it is EUR 1,200.

The dependence of the economic size with the level of gross output can be expressed by the following regression equation:

$$E.S = 0.154*G.P \tag{6.2}$$

where:

E.S – economic size

G.P – gross output

The resulting regression model is sufficiently sustainable from a statistic point of view (coefficient of Fischer F=332.42). The coefficient R^2 reached 0.82 and indicates the presence of the very strong conditionality of the gross output. Clearly the results from the second research task can be presented on figure 6.2.

Figure 6.2. Expected proportion of the economically viable farms of PPS (%)
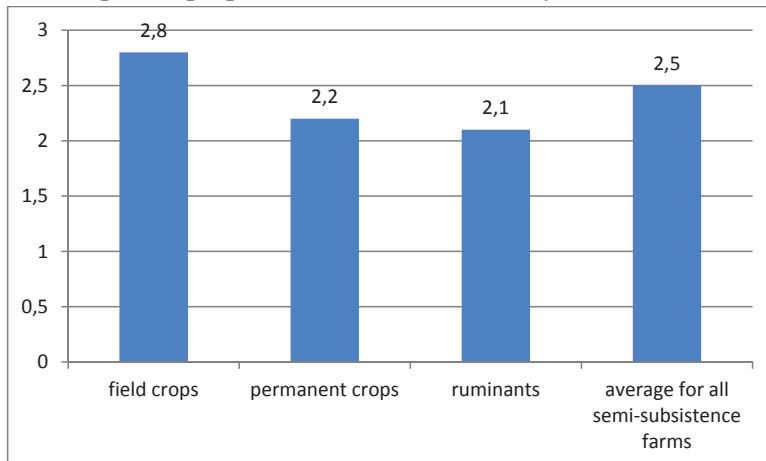
Source: own calculation.

From all surveyed semi-subsistence farms at the end of the year with the economic size equal to or bigger than 4 economic units will be 2.5% of them. That means only 2.5% of semi-subsistence farms will reach viable size. The chart shows that significant difference between specialized farms cannot be noticed. The share of farms specialized in cultivation of arable crops expected to reach the threshold of viability is under 2.8%. In the case of farms growing ruminants the per cent is 2.1. Insignificant is also the proportion of farms growing permanent crops that can become viable.

It seems untenable that there is almost equal ability to convert different semi-subsistence farms into viable ones. The reason for this apparent contradiction is the following. Field crops farms compared to other specialized farms generated a lower gross output per unit of utilized agricultural area. At the end of five-year period under measure 141 the share of semi-subsistence farms to be viable will be approximately 10%-15%. This will happen assuming that the same growth rate of gross output is continued.

6.5. Conclusions

We can make the following general conclusions. Estimated parameters of production functions show there is an existence of certain differences among farms with permanent crops, livestock farms and farms with field crops regarding the rate of return on investment for production. All semi-subsistence farms are characterized by greater sensitivity to changes in the labour than to changes of investment in long term assets.

Expectations for the low return on small farms which make them less efficient and unprofitable were confirmed. For all considered types of small farms the effect of the implementation of measure 141 will be insufficient to convert them into viable farms.

It can be concluded that in the new programming period there is a need of a new approach for solving the problems of small farms. First, they should not fulfil the same strict requirements as large farms when applying for subsidies. Secondly, the use of financial support provided for small farms is intended for investment. This will lead to a renewal of the long term assets. The rate of return and production and economic efficiency of small farms will increase.

References

1. Nikolov D. et al., (2010), *Socio-economic sustainability of subsistence farms,* Research projects SSA, Sofia.
2. Nikolov D. et al., (2011), *Impact of CAP on rural areas and households*, Avangard Prima, Sofia.
3. Nikolov D. et al*., (2011), *Socio-economic problems of semi-subsistence farms*, SAA , Sofia.
4. Nikolov, D. et al*., (2010), Semi- subsistence farms, SAA Sofia.
5. Antle J.M., Meijerink et al., (2005), *Econometric-Process Models of Semi-Subsistence Agricultural Systems: An Application of the Nutrient Monitoring Data for Machakos*, Kenya.

6. Bolch B.W., Huang C.J., (1974), *Multivariate Statistical methods for Business and Economics*, New Jersey: Prentice-Hall.

7. Bruntrup M., Heidhues F., (2002), *Subsistence Agriculture in Development: Its Role in the Processes of Structural Change*, Institute of Agricultural Economics and Social Sciences in the Tropics and Subtropics 8, University of Hohenheim, Discussion Paper No. 1/2002.

8. Cramer L.G., Jensen C.W., Southgate D.D., (1997), *Agricultural Economics and Agribusiness*, John Willey and Sons Inc., USA.

9. Dinh X.T., Rasmussen S., (2005), *Production function analysis for smallholder semi-subsistence and semi-commercial poultry production systems in three agro-ecological regions in Northern provinces of Vietnam*, National Institute of Animal Husbandry, Hanoi, Vietnam and The Royal Veterinary and Agricultural University, Box 1870 Frederiksberg, Copenhagen, Denmark.

10. Pingali P. L., (1998), *From Subsistence to Commercial Production Systems. The transformation of Asian Agriculture*, "American Journal of Agricultural Economics", 73, May 1998, 628-634.

11. Varian R.H., (1993), *Intermediate economics. A modern approach*, W.W. Norton and Company, Inc.. USA.

12. Vineta V., Narnicka K., (2003), *Semi-subsistence farming in Latvia: Its Production function and what will be the impact of proposed EU support?*, SSE Riga Working Papers, Stockholm School of Economics in Riga, Latvia.

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7. Projection of cereal and rape cultivation profitability by the year 2020 – a multi-variant approach

7.1. Introduction

Forecasting the development of various events is crucial in many fields of economy, including agriculture. The knowledge regarding the future conditions of functioning of farms and the situation on agricultural markets is of great importance to the farmers, especially given the volatility of the conditions and the precariousness of development. The market processes are interdependent and the relations between them are subject to certain patterns – e.g. the price formation depending on the demand and supply or taking place within a given time frame. The influence of external forces on agriculture has been getting even stronger since Poland became a member of the European Union. The process of globalisation is also exerting a certain influence. All those interconnections are reflected in the form and direction of changes within certain factors, e.g. in the levels and direction of changes in prices of agricultural products.

A drop in prices received by farmers or an increase in prices paid results in a decrease in the profitability of agricultural production. Farmers have to constantly keep adjusting to the changing conditions. In order to ensure that the adjustments are swift and properly directed, it is necessary to use suitable management instruments. Such instruments are supposed to allow making proper decisions and choosing the best option from various possible solutions under the given circumstances. Forecasting is one of the management assisting instruments, and forecasts can play several different roles.

Their most important functions include the informative function and the warning function. The former consists in notifying the society about the forthcoming changes, while the latter is aimed at warning about possible undesirable events and the consequences of certain actions [Hamulczuk, Stańko 2009].

The problem lies in the accuracy of forecasts. Because of the biological and technical aspects of agricultural production, it is impossible to make a forecast which would be completely free of error. Natural factors, including, among others, the air temperature, precipitation, hailstorms and ground frost, can show significant deviations from the norm, and in consequence influence the obtained effects (e.g. the yield). Moreover, the human factor which is present in all economic pro-

cesses makes them impossible to be accurately predicted. Therefore, all forecasts used by economists are always encumbered with more or less significant errors.

In order to justify their ways of linking the observations of the past to forecasting the future, economists use various models in their research. The most popular forecasting methods include mathematical and statistical methods (also known as quantitative methods). These methods involve statistical and econometric models in forecasting. Forecasting models are estimated basing on empirical data regarding the formation of particular variables, i.e. the dependent variable and the independent variable. The data take the form of time series. Making forecasts using these methods usually consists in projecting (extrapolating) the patterns observed in the past into the future. Therefore, using statistical and econometric models in forecasting assumes that structural relations described by the model remain stable over time and that it is acceptable to extrapolate the patterns beyond the sample. This justifies determining the future levels of a given phenomenon according to the model, which describes the patterns responsible for shaping this phenomenon over time [Nowak 2009].

The forecasting of future events may have an actual important influence upon those events. The dissemination of a forecast's results may lead to it becoming true, in the sense that it would not become a reality if it were not for the publicity. On the other hand, publicity may thwart certain predictions, just as the fact of releasing them may change the conditions which influenced the probability of occurrence of certain events. There can be no certainty in predictions. Even if scientific laws are employed as the basis of a forecast, accuracy cannot be guaranteed, as not all necessary conditions may occur for the law to be valid at a given time in the future [Kuc 2014].

In the case of agricultural products, forecasting the changes in economic performance is difficult, but it may also be helpful while making decisions. For instance, an early released information regarding the predicted levels of future agricultural production or of the demand, can be useful for planning the production volume. On a national scale it serves as a foundation for decision making in the area of agricultural policy as well as market regulation.

However, the forecast results should be approached with caution, as the direction of ongoing changes is of greater importance than any absolute values. The results of economic forecasts should not be regarded as free of error. Instead, their primary goal should be to inspire people to undertake actions aimed at strengthening the favourable direction of development or at countering the direction of development which is regarded as undesirable.

The goal of this research was to determine the influence of price changes in the means of agricultural production as well as of yield changes and product prices, forecasted for 2020, on the level of income obtained from growing winter wheat, winter rye, spring barley and winter rape. The impact strength of particular factors (yield, price and cultivation cost) on the deviations within the amount of unsubsidized income was also determined. The direction and dynamic of changes in production profitability (as a percent relation between the production value and production cost) were assessed as well.

The results of the calculations reflect the average levels within the respondent farm groups, therefore they should not be regarded simply as the average levels nationwide. However, they do indicate certain phenomena and relations, as well as the direction of the occurring changes, and in this context they provide a basis for formulating conclusions regarding not only the examined sample.

7.2. Research methodology

The projection model was constructed using the empirical material which characterises the main crops (winter wheat, winter rye, spring barley and winter rape) between 2011 and 2013. It was collected and processed according to the requirements of the Agricultural Products Data Collection System AGRO-KOSZTY. The Polish FADN database and official statistics were also taken into account. The model assumes that the structure and the amount of production expenditures remain unchanged. Therefore, the amount of expenditures reflect the average levels in the base years (2011-2013).

The information necessary for determining the trend line and constructing the projection model was taken from the official statistics elaborations. The time series for individual variables, i.e. the production value structure components (yield and price) and the cultivation cost (direct and indirect) spans over 19 years, from 1995 to 2013. Employing time series allowed to extrapolate the examined phenomena into the future. In order to model the time series and to project the results, quantitative methods basing on classic development tendencies models were employed.

The isolation of the development tendency was accomplished using the analytical method, through finding the trend function f(t) (t meaning time) which describes best the changes within the phenomenon over time [Wasilewska 2011]. The choice of the analytical form of this function was made using the heuristic method, which involves finding several forms of the trend function and then choosing one of them according to the applied criterion [Stańko 1999]. Two criteria picked as the basis for selecting the function were: the value of the

determination coefficient R^2 and the knowledge regarding the shaping of the examined phenomenon over time. Seven types of functions were then analysed: linear, quadratic, exponential, power and logarithmic, as well as the hyperbolic and linear hyperbolic trend functions. For each of the series, models of development tendencies were created in the following form:

$Y_t = \beta_0 + \beta_1 t + \varepsilon_t$ – linear trend model,

$Y_t = \beta_0 + \beta_1 t + \beta_2 t^2 + \varepsilon_t$ – quadratic trend model (of the second-degree polynomial),

$Y_t = \beta_0 e^{\beta_1 t} \cdot \varepsilon_t$ – exponential trend model,

$Y_t = \beta_0 (t + 2)^{\beta_1} \cdot \varepsilon_t$ – power trend model,

$Y_t = \beta_0 + \beta_1 ln(t + 2) + \varepsilon_t$ – logarithmic trend model,

$Y_t = \beta_0 + \beta_1 \frac{1}{t+2} + \varepsilon_t$ – hyperbolic trend model,

$Y_t = \beta_0 + \beta_1 t + \beta_2 \frac{1}{t+2} + \varepsilon_t$ – linear hyperbolic trend model,

where:

Y_t – value of the dependent variable over time t,

t – independent variable (time), assuming integer values from 1 to n,

β_0 – independent element,

β_1, β_2 – angular coefficients of the function,

ε_t – random component.

The trend function which was chosen for analysis, i.e. the values of variables describing the examined activities, was used for the extrapolation of a given phenomenon into the year 2020.

The presented procedure shows different stages of construction of the projection model under average production and cost conditions. Agricultural production, however, may be influenced by factors which make the deviation range of certain variables vary significantly from the determined trend. In order to present the influence of those changes upon the levels of income within a production activity, the results of the 2020 projection will be shown using a multi-variant approach.

The goal of **the first projection variant** was to present the influence of the variability of yield and prices set according to the official statistics data upon the changes of economic performance among the examined activities in 2020. In order to determine the amount of changes in yield and in price, a variation coefficient was calculated for the time span of the last 19 years (1995-2013). Its main objective was to examine random fluctuations which were unrelated to the long-term trend [Skarżyńska 2014].

While creating the projection model, the following assumptions were adopted: only the yield or the price is subject to those fluctuations, while the values of other variables change according to the trend. The influence of yield and price on income levels for individual activities were examined independently. That was possible because the correlation between the yield and the price shows no significant interdependences between those two.

The second projection variant was aimed at determining the influence of individual changes in yield and cultivation cost among the examined activities upon the changes in economic performance in 2020 (*individual changes mean a deviation from projection results related to the trend*). Both the positive and negative deviations were analysed for each individual activity in terms of changes in yield (+/-1 dt/ha), price (+/-1 PLN/dt) and cultivation cost (+/-100 PLN/ha).

The multi-variant approach towards the projection results for the year 2020 shows how the levels of income are influenced (both positively and negatively) by individual yield changes, price changes and cultivation cost changes, as well as by changes in production performance and prices, related to their variability over time. On the other hand, the projection model does not show certain interdependences, e.g. to what extent a change in supply in a given year can influence the price levels in the following year.

7.3. Results

The official statistics for the last decade and more indicate that the increase in prices of means of agricultural production was taking place faster than the increase in prices of sold agricultural products. Between 1995 and 2013 the cumulative price scissors index was 75.2%. That means that the prices of means of agricultural production were increasing by almost 25% faster than the prices of sold agricultural products.

What can be expected in the upcoming years? An attempt to answer this question is made by means of a projection which uses the direction of changes observed in the past and which is constructed upon the average values from 2011-2013 (Table 7.1.).

According to the research results, the annual increase in income (production value) for **winter wheat** will equal to about 3.4-3.8%, while the general expenditure will be increasing at a rate of 3.4-4.2%. As a result, in 2020 the dynamics of the production value increase (27.8%) will be lower than the expenditure increase (30.0%) by 2.2 pp. As a consequence, the profitability index will drop to 141.71%, while in 2013 it equalled 144.7%. Between 2011 and 2013, growing winter wheat was a profitable farming activity and, accord-

ing to the projection results, it will stay this way for a few upcoming years. In 2020 the income from unsubsidized farming activity will exceed the base year levels by 22.9%.

Having similar soil requirements as wheat, **winter rape** is regarded as a competitive plant for wheat. For the last few years growing winter rape has been profitable, taking into account both the profitability index and the fact that the surplus can be used by the farmer. It can be expected that until the year 2020 the revenue will increase annually by 3.9-4.8% and in 2020 it will exceed the base year levels by 34.5%. The production cost, on the other hand, may increase by 29.8% with an annual increase rate of 3.4-4.2%. This means that by the year 2020 the dynamic of the production value increase will be stronger than the increase of cost by 4.7 pp. As a result, the profitability index will grow by 4.8 pp and reach the level of 138.2%. The income that the farmers will be able to obtain without any subsidies in 2020 will be higher than in 2013 by up to 48.6%. It is estimated that its level will be similar to that from growing winter wheat.

It is expected that by the year 2020 the revenue from growing winter rye will be increasing annually by 4.2-4.8%, while the cost will be increasing by 3.4--4.2%. The results for the final year of the projection (2020) indicate that the dynamics of cost increase (by 29.5%) will be 6.4 pp weaker than that of production value (by 39.5%). It is a favourable situation for the farmers, as it means that the economic efficiency of rye production will increase. The profitability index will reach the value of 131.0%, which means that it will be higher than in the base year of the projection by 6.2 pp. The amount of unsubsidized income, in turn, can increase by 61.8%. However, regardless of such a significant increase, the income levels will be still lower than those for growing wheat and barley.

By the year 2020, the annual increase rate of the revenue from growing **spring barley** may equal 2.8-3.2%, while the cost will be increasing by 3.5--4.3%. That means that in 2020, as compared to 2013, the income will increase by 22.9%, while the cost will increase by 30.3%. Despite the fact that the dynamics of cost increase will be stronger than that of income increase, in 2020 the unsubsidized income is expected to constitute 108.5% of that in 2013. However, there will be a decline in the economic efficiency of production. The profitability index, that is – the ratio of interest between the production value and the total cost – will drop by 8.6 pp (from 151.3% to 142.7%). The decrease in profitability signifies that the increase in production value occurs at too high a price. Nevertheless, growing barley may still remain a profitable activity, providing farmers with a surplus in the form of unsubsidized income.

Table 7.1. Results of cereal and rape cultivation in the base year 2013* and the projection for the year 2020 (current prices)

Specification	Levels in 2013*	Projection for 2020	Change index (2013=100)	Levels in 2013*	Projection for 2020	Change index (2013=100)
	Winter wheat			**Winter rape**		
Number of respondent farms	161		—	149		—
UAA [ha]	23.84		—	16.29		—
Grain/seeds yield [dt/ha]	56.3	61.1	108.4	25.9	27.9	107.8
Selling price of grain [PLN/dt]	79.13	93.42	118.1	173.99	217.05	124.7
	Per 1 ha, in PLN			Per 1 ha, in PLN		
Production value	4482	5731	127.8	4499	6053	134.5
Direct cost	1420	1900	133.8	1711	2278	133.1
Gross margin w/o subsidy	3062	3830	125.1	2788	3775	135.4
Income w/o subsidy	1372	1686	122.9	1125	1672	148.6
Subsidy**	969	1008	104.0	970	1008	104.0
Income	2341	2694	115.1	2095	2680	127.9
TOTAL COST	3111	4044	130.0	3374	4380	129.8
Profitability index [%]	144.1	141.7	98.3	133.4	138.2	103.6
Total cost/1 dt [PLN]	55.23	66.23	119.9	130.47	157.08	120.4
Income w/o subsidy/1 dt [PLN]	24.36	27.61	113.4	43.52	59.97	137.8
Total cost/1 PLN of income w/o subsidy [PLN]	2.27	2.40	105.8	3.00	2.62	87.4
	Winter rye			**Spring barley**		
Number of respondent farms	118		—	142		—
UAA [ha]	9.39		—	11.09		—
Grain yield [dt/ha]	32.2	35.9	111.6	43.3	44.8	103.5
Selling price of grain [PLN/dt]	58.31	71.17	122.1	70.79	84.15	118.9
	Per 1 ha, in PLN			Per 1 ha, in PLN		
Production value	1890	2569	135.9	3079	3784	122.9
Direct cost	665	889	133.7	954	1275	133.6
Gross margin w/o subsidy	1225	1680	137.1	2124	2509	118.1
Income w/o subsidy	376	608	161.8	1043	1132	108.5
TOTAL COST	1515	1961	129.5	2035	2652	130.3
Profitability index [%]	124.8	131.0	105.0	151.3	142.7	94.3
Total cost/1 dt [PLN]	47.10	54.65	116.0	47.01	59.19	125.9
Income w/o subsidy/1 dt [PLN]	11.68	16.94	145.0	24.10	25.27	104.9
Total cost/1 PLN of income w/o subsidy [PLN]	4.03	3.23	80.0	1.95	2.3	120.1

w/o – without

* The year 2013 was the base year for the projection model. The results reflect the average values in 2011-2013.

** In the years 2011-2013 the subsidies included the Complementary Area Payment and the Single Area Payment. For the years included in the projection, the assumed amount of subsidies equalled 240 EUR/ha (according to the principles of CAP for the years 2014-2020). The exchange rate used for the calculations was 1 EUR = 4.20 PLN.

Source: calculations based on own research.

However, significant deviations from the figures predicted for the year 2020 and related to long-term trends may occur. Variable weather conditions are often responsible for large fluctuations in the yield. It also happens that farmers obtain a lower yield in spite of high expenditure. The selling prices of products and the cultivation cost can also be subject to fluctuation. The dynamics of their changes does not have to reflect the trend observed in the last few years.

Therefore it was necessary to construct models which would allow to determine the degree of influence of individual factors (such as yield, price and cultivation cost) upon the range of changes within the levels of agricultural income. It is important to consider the fact that the range of presented changes is influenced also by the data that served as a starting point for the research. That means that changes in income in terms of value are related only to the research sample of farms. The boundaries of variability as well as the direction of changes within the obtained effects allows to formulate more general conclusions than those regarding only the examined sample.

The calculations based on the official statistics data show that for 19 years (1995-2013) the variability of winter wheat, winter rye and spring barley yield remained similar. It equalled to about 6.1-8.3% and it was two times smaller than that for winter rape (12.6%). That indicates that rape is a plant which shows a significantly stronger reaction to cultivation conditions. The variability of selling prices of cereal grain and rape seeds exceeded the variability of yield and amounted to 19.0-23.9%.

Table 7.2. Influence of yield and price variability in 1995-2013 (according to CSO) on the deviation from the projection results for the year 2020 in terms of yield, price and unsubsidized income within the research sample of farms

Specification	Yield variability according to CSO (%)	Deviation from the projection results for 2020 in terms of yield variability according to CSO		Price variability according to CSO (%)	Deviation from the projection results for 2020 in terms of price variability according to CSO	
		Yield (dt)	Unsubsidized income (%)		Price for 1 dt (PLN)	Unsubsidized income (%)
Winter wheat	6.1	+/-3.7	+/-20.8	19.8	+/-18.46	+/-66.8
Winter rye	7.9	+/-2.8	+/-33.0	23.9	+/-17.02	+/-100.5
Spring barley	8.3	+/-3.7	+/-27.7	19.0	+/-15.96	+/-63.1
Winter rape	12.6	+/-3.5	+/-45.5	20.9	+/-45.45	+/-75.8

Source: calculations based on own research.

Table 7.2. presents the deviations (both positive and negative) within the levels of unsubsidized income from the levels predicted for the year 2020, considering the yield and price variability observed in the last few years. That means that the variability calculated by the Central Statistical Office was expressed in absolute figures (dt or PLN) and its influence on unsubsidized income levels was shown for the research sample of farms. As it has already been mentioned, the model takes into account only the fluctuations of yield and price levels, while other variables are subject to changes according to the main trend.

According to the projection for winter wheat, it is estimated that:

- in case of yield change by 3.7 dt, the fluctuations of unsubsidized income will equal +/-350 PLN/ha, which means – taking into account the predicted amount of income for the year 2020 (1686 PLN) – an increase amounting up to 2036 PLN/ha or a drop to 1336 PLN/ha (a change of +/-20.8%),
- in case of price change by 18.46 PLN/dt, the fluctuations of unsubsidized income will equal +/-1127 PLN/ha, which means – taking into account the predicted amount of income for the year 2020 (1686 PLN) – an increase amounting up to 2813 PLN/ha or a drop to 559 PLN/ha (a change of +/-66.8%).

In the last 19 years (1995-2013), the price variability was higher than the yield variability. As a result, the changes in selling prices of wheat grain had a stronger influence on the amount of income. Taking into account the price variability, in 2020 the income deviation from the projection results may be three times higher than that of yield variability. However, even under the most pessimistic scenario, growing wheat will remain a profitable agricultural activity.

Given the yield and price variability of rye over the years, the calculations show the following:

- in case of yield change by 2.8 dt, the fluctuations of unsubsidized income will equal to +/-201 PLN/ha, which means – taking into account the predicted amount of income for the year 2020 (608 PLN) – an increase amounting up to 809 PLN/ha or a drop to 407 PLN/ha (a change of +/-33.0%),
- in case of price change by 17.02 PLN/dt, the fluctuations of unsubsidized income will equal to +/-611 PLN/ha, which means – taking into account the predicted amount of income for the year 2020 (608 PLN) – an increase amounting up to 1219 PLN/ha or a drop to -3 PLN/ha, which would render the cultivation of rye unprofitable (a change of +/-100.5%).

The price variability for rye was three times higher than that for yield, which in an extreme case rendered the cultivation of this cereal unprofitable. According to the analysis of results, rye cultivation is risky in terms of high fluctuations of its selling price.

According to the results of the projection model for spring barley, it is estimated that:

- in case of yield change by 3.7 dt, the fluctuations of unsubsidized income will equal to +/-313 PLN/ha, which means – taking into account the predicted amount of income for the year 2020 (1132 PLN) – an increase amounting up to 1445 PLN/ha or a drop to 819 PLN/ha (a change of +/-27.7%),
- in case of price change by 15.96 PLN/dt, the fluctuations of unsubsidized income will equal to +/-715 PLN/ha, which means – taking into account the predicted amount of income for the year 2020 (1132 PLN) – an increase amounting up to 1847 PLN/ha or a drop to 417 PLN/ha (a change of +/-63.1%).

The results of the research show that higher fluctuations of income from spring barley cultivation can be expected because of an instability of selling prices of grain. That indicates that farmers can either make a large profit or suffer a large loss. The decline in income can be reduced by higher yield as well as rational production expenditure.

The results of the model constructed for winter rape indicate that:

- in case of yield change by 3.5 dt, the fluctuations of unsubsidized income will equal to +/-761 PLN/ha, which means – taking into account the predicted amount of income for the year 2020 (1672 PLN) – an increase amounting up to 2433 PLN/ha or a drop to 911 PLN/ha (a change of +/-45.5%),
- in case of price change by 45.45 PLN/dt, the fluctuations of unsubsidized income will equal to +/-1267 PLN/ha, which means – taking into account the predicted amount of income for the year 2020 (1672 PLN) – an increase amounting up to 2939 PLN/ha or a drop to 405 PLN/ha (a change of +/-75.8%).

According to the conducted analysis, the instability of the selling price of rape seeds can influence the economic performance to a greater extent than the changing yield. It is estimated, however, that by the year 2020 the farmers, even under the least favourable yield and price conditions, will make a profit from growing rape.

The calculation results included in Table 7.3. indicate how much the amount of unsibsidized income can change because of the fluctuations of factors by which it is determined. For instance, a change in rape yield by 1 dt may cause a 13% change in the amount of unsubsidized income from 1 ha, while in the

case of winter wheat there will be only a 5.5% change. A change in the selling price of rye by 1 PLN will cause a 5.9% change in the amount of income, while in the case of rape – only a 1.7% change. A change in cultivation cost by 100 PLN will, in turn, result in a 16.4% change in the amount of unsubsidized income from rye cultivation and a 8.8% change in the case of spring barley cultivation. Similarly as the amount of unsubsidized income, the cultivation profitability as a quotient is also subject to change (the relation between the production value and the total cost).

Table 7.3. Percent changes in projection results for cereals and rape
for the year 2020 in terms of individual changes in yield, price and total cost
within the research sample of farms

Specification	Yield		Price		Total cost	
	+1 dt	-1 dt	+1 PLN	-1 PLN	+100 PLN	-100 PLN
Winter wheat						
Unsubsidized income	+5.5	-5.5	+3.6	-3.6	-5.9	+5.9
Profitability index	+1.6	-1.6	+1.1	-1.1	-2.4	+2.5
Winter rye						
Unsubsidized income	+11.7	-11.7	+5.9	-5.9	-16.4	+16.4
Profitability index	+2.8	-2.8	+1.4	-1.4	-4.9	+5.4
Spring barley						
Unsubsidized income	+7.4	-7.4	+4.0	-4.0	-8.8	+8.8
Profitability index	+2.2	-2.2	+1.2	-1.2	-3.6	+3.9
Winter rape						
Unsubsidized income	+13.0	-13.0	+1.7	-1.7	-6.0	+6.0
Profitability index	+3.6	-3.6	+0.5	-0.5	-2.2	+2.3

Source: calculations based on own research.

The presented calculations indicate that there is a high risk of interpreting the projection results verbatim, that is – assuming that the forecast is completely free of error and its results can be taken for granted. Changes in yield, prices of products or means of production cannot be predicted with 100% accuracy and, as the research results show, even small individual deviations from the projection assumptions can influence the amount of income. The main goal of making forecasts is to present the direction of changes and to show what kind of transformations within the results can be expected in the future under given production and market conditions. Therefore, the role of forecasts is to point out dangers, but also the expected profits that can be obtained from a certain kind of production.

7.4. Summary

According to the projection made under average conditions (related to a long-term trend), an improvement of price and production performance can be expected for winter wheat, winter rye and spring barley by the year 2020. The annual growth rate for their yield will amount to 0.5-1.6% and 2.2-3.2% for grain prices. At the same time, the annual increase in production cost may reach 3.4--4.3%. Under such conditions, the cost increase for wheat and barley cultivation will be higher than the income increase, therefore, in comparison with the input data for the projection, a decrease in production profitability can be expected, by 2.4 and 8.6 pp respectively. The profitability of rye production, on the other hand, will most probably increase by 6.2 pp due to a stronger increase in income.

The projection results show that the winter rape yield will be annually increasing by about 1% by the year 2020, the seed price – by about 3% and the production cost – by about 3.4-4.2%. As a result, the dynamic of income increase will be stronger and the production profitability will increase by 4.8 pp.

However, in the case of the aforementioned cereals and rape, unpredictable annual deviations from these general trends may occur, exerting significant influence on the production and economic performance. According to the research, even individual fluctuations within the factors responsible for income levels (yield, price and cultivation cost) influence the amount of income to a significant extent. In the case of particular activities, e.g. growing rye and rape, the influence was especially strong.

References

1. Hamulczuk M., Stańko S., *Uwarunkowania prognozowania w agrobiznesie: teoria a decyzje gospodarcze*, [in:] *Zarządzanie ryzykiem cenowym a możliwości stabilizowania dochodów producentów rolnych – aspekty poznawcze i aplikacyjne* (scientific ed. Hamulczuk M., Stańko S.). Program Wieloletni 2005-2009, no. 148, IERiGŻ-PIB, Warszawa 2009, pp. 138-178.
2. Kuc B.R., *Przewidywanie jako funkcja nauki*. http://wydawnictwoptm.pl/ content/8-artykuly-naukowe [access: August 2014].
3. Nowak E., *Zaawansowana rachunkowość zarządcza*, issue. 2, PWE, Warszawa 2009, pp. 69-72.
4. Skarżyńska A. (scientific ed.), *Nadwyżka bezpośrednia z wybranych produktów rolniczych w 2013 roku oraz projekcja dochodów na 2020 rok*. Program Wieloletni 2011-2014, no. 105, IERiGŻ-PIB, Warszawa 2014, pp. 119-129.
5. Stańko S., *Prognozowanie w rolnictwie*, wyd. 2, SGGW, Warszawa 1999, pp. 52-74.
6. Wasilewska E., *Statystyka opisowa od podstaw*. SGGW, Warszawa 2011, pp. 391-396.

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8. Special taxation modes in the Ukrainian agricultural sector

8.1. Introduction

Tax policy is the key element in state economy regulation. Its significance shows during shaping supportive environment for businesses, supportive investment climate and stimulation of innovation processes. Efficient usage of this element of fiscal policy depends on existing taxation mechanism, which influences businesses' economical motivation and peculiarities of their financial assurance severely.

Unique feature of taxation of agricultural enterprises is using special taxation modes (STM). The latter allow special (usually simplified) tax collection procedure, the goal is to shape supportive tax environment for development of agricultural business. Using STM in general and in agriculture specifically is controversial in scientific sphere, so the problem of their performance requires additional research.

Recently discussions about practicality of STM for agriculture have emerged in Ukraine [UCAB, Doing business in agriculture in Ukraine, 2013]. Those discussions are mostly about role of these modes in state financial support system for agricultural development [Laiko 2010; Yushko 2009], without thorough analysis of their efficiency and weak points. Some authors [Demianenko 2008; Makarenko and Bezkrovnyi 2012; Prokopenko 2009] analyse multiple-choice of taxation for agricultural producers in case of STM using (from the corporative tax management point of view) only, leaving behind macroeconomic aspects of STM using (impact on structural changes, efficiency, etc.). It means the necessity of economical grounding enhancement of future usage of STM in agriculture of Ukraine and the development of ways for efficiency increase for specific producers' categories.

The paper's goals is generalization of existing problems in functioning of special taxation modes for agricultural businesses, estimation of their efficiency in agriculture of Ukraine and outlining perspectives for development.

8.2. Main results

The majority of scientists that are researching the problem of taxation of agricultural producers emphasize the specifics of tax mechanism in agricultural economy. The authors of research "Exploring agricultural taxation in Europe" [Veen et al. 2007] note significant influence of tax incentives on making production and investment decisions in agricultural economy. This requires using specific tools, which would stimulate investment activity at the cost of special tax tools and levels, in their opinion.

Established researcher of tax problems A. Tate in his research, which was dedicated to the problems of value added tax (VAT) collection, also notes objective foundation of using special taxation modes for farmers. He identifies as the key goal of them providing simple tax relations for this special category of tax payers [Tait 1988].

Authors of another IMF research, which is dedicated to VAT functioning problems, also emphasize that during shaping taxation mechanism in agriculture special approach is used frequently [Ebrill et al. 2001]. In their opinion, this is determined by two main factors: first, low rate of record keeping and tax control difficulty in this sector of industry; second, government is not willing to increase tax pressure on food products (which will take place in full scale taxation of producers).

Authors of OECD research, which is dedicated to the taxation problems and social security [OECD Policy Brief 2006] also mention using special taxation modes as necessity for farmers. In case of this approach, privileged taxation modes are seen as some alternative to direct government support programmes for agricultural development. In their opinion, efficiency of such indirect support is generally lower compared to direct budget financing. This is explained by lower level of financial control, absence of corresponding record keeping and proper monitoring system of budget funds, which are managed by businesses in case of receiving tax privileges.

This assumption is rather logical as using STM in Ukrainian agriculture anticipates formation of additional financial resources for businesses, which makes them a specific form of indirect state support of agricultural production' development and the instrument for stimulation of investment activity in this sector of industry. On the other hand, such form of state support is not distinguished by level of financial control, which is common for direct budget financing programmes, and that may influence negatively the efficiency of this particular instrument of financial support.

Ukrainian researchers, generally, agree with above mentioned thesis. In particular, Ukrainian researcher of taxation problem, professor T. Yefymenko in his paper [Yefymenko, 2011] emphasizes special functional characteristics of taxation system in agriculture in conditions of using STM.

Special taxation system for agricultural production in Ukraine is represented, mostly by the following STM:

- special taxation mode for revenue of agricultural business – fixed agricultural tax;
- special mode of VAT collection in agriculture (VAT accumulation mode, which allows VAT liabilities to remain with business of this special mode);
- special mode of VAT management in agricultural products processing sphere (milk and meat producers donation mode in cost of VAT-liabilities of processing enterprises);
- others special taxation modes and taxation procedures (in particular, which are used for peasant households).

Exercising special taxation modes (that allow privileged procedure of revenue taxation, value added tax collection, covering resource taxes, etc.) provides shaping substantial additional financial resources for businesses, greatly increasing profitability of agricultural activity.

Therefore, the key feature of tax mechanism's functioning in Ukraine is its direction to support development of agricultural economy. This situation is determined by budget resources deficit and low efficiency of budget support (donation) in Ukraine.

Special taxation modes in the last fifteen years became inseparable part for state financial support mechanism of agricultural enterprises development (Fig. 8.1). As can be seen on the figure 8.1, state financial support volumes of agriculture development in Ukraine were rising until 2013. However, the support's structure was changing substantially. Until 2009 (before the financial crisis), 55% of the total volume of state financial support were provided with STM and just 45% were provided through direct budget support measures (costs from corresponding budgets, which were allocated for direct subsidies). Although, in 2009-2011 balance between particular support forms was 90% to 10% in favour of special taxation modes, in 2012-2013 it rose to 95%.

Figure 8.1. Dynamics and structure of state financial support
of agricultural production development in Ukraine
(excluding costs, allocated with return in future and measures
of price regulation)

Indirect support using special taxation modes
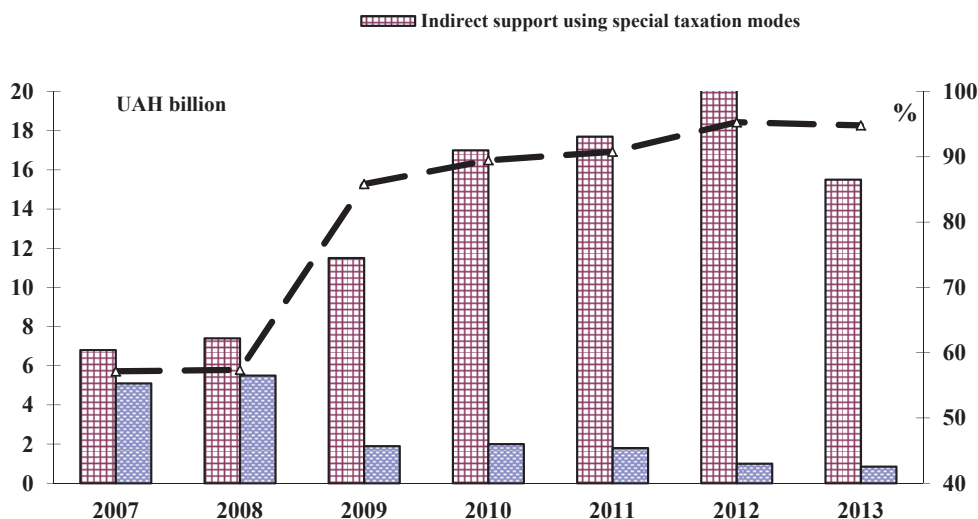
Source: State Tax Agency of Ukraine and Ministry of agricultural policy and food supplies.

State financial volume of the support for this sector's development in the years 2010-2012 was in the range UAH 19.1-22.5 billion (excluding expenditure that are to be returned in future and measures of price regulation). The main part of the state financial support for agricultural development were accumulated VAT sums within the special collection mode according to regulations in Chapter 209 of Tax Code of Ukraine. While measures of direct budget financing of agriculture development in framework of targeted budget programmes practically were not financed in recent years.

One of the key components of special taxation of agricultural enterprises in Ukraine is fixed agricultural tax (FAT), which allows revenue tax immunity for those businesses, that fulfil state established limits (share of revenue from agricultural production in general revenue volume).

This mode is actually a form of property tax, as the tax base stands normative monetary land valuation carried out by a special technique. Nowadays average cost of agricultural land per hectare in Ukraine for taxation purposes is about USD 260 (exchange rate 15.4 UAH/USD), average sum VAT for hectare – about USD 0.4.

When imposed, FAT consisted of twelve mandatory payments to the state (almost all existing at that time), including social contributions – in fact, it served as the only mandatory payment. FAT was planned as temporary mode – for five years, but first it was prolonged to January 1, 2010, and at the present time it is permanent according to the Tax Code of Ukraine.

Starting from January 1, 2005 social contributions were excluded from VAT – its key component, which made 70% of the tax. Other substantial changes were not made in the mechanism of its collection. After that, single tax stopped functioning as single mandatory payment paid by agricultural producers and its mission became as follows: provide agricultural businesses exemption from paying revenue tax and appropriate control for finance results from tax agencies.

Imposing special mode of direct taxation in the end of the nineties was economically wise, given that goals were reached – agricultural businesses' profitability (which happened also because of the decrease of the tax pressure) and tax payment rate was substantially increased (rate of tax debt decreased greatly).

Though today usage of FAT is under scrutiny, and necessity of reforming active special mode of direct taxation is explained by the following reasons:

- during FAT's active period the structure of Ukrainian agriculture changed substantially: holding corporations are now much more present than in the beginning of 2000s; special mode was implemented mostly to support farmers and "classical" agricultural businesses (meaning representatives of small- and middle-sized agricultural businesses), which were not in vertically integrated holding organizations and contributed to social development of the territories, where they were operating;
- agricultural business' profitability increased substantially – today revenue in some types of agricultural production is rather high and even higher than in some industries (this applies especially to poultry production and certain types of crops);
- schemes of tax optimization became widely applied, which were not possible at the time of FAT implementation – they provide for lower tax burden not for agricultural business only, but for related businesses as well (processing and trade businesses, which are in agricultural holding organizations), and that leads to substantial budget losses.

Because of FAT usage small and middle agricultural businesses are driven out from profitable agricultural spheres, and part of affiliated agricultural businesses with processing and trading organizations is increasing swiftly. This

influences negatively rural employment rate and profitability of rural house-holds, and in conclusion has a negative impact on rural population's welfare and financial stability of agriculture.

Tax stimulation through STM in Ukraine is mostly directed to profitability increase and agricultural production volume gain. The latter is reached through investment amount increase. However, despite the presence of significant tax incentives in the form of STM, investment activity in agriculture of Ukraine has stalled in recent years.

Until 2008 part of agriculture in total amount of capital investments was climbing steeply – in 2008 it was UAH 16.7 billion or 7.2% of total amount.

In post-crisis 2009-2010 years volumes of capital investments in the branch decreased, but in 2011 they reached almost UAH 18 billion or 7.5% of total amount in the whole economy. From the 2011 year capital investments amount in agriculture has been decreasing in relative term, and from 2012 year – in absolute terms.

Similar situation took place in the development of food industry investments: up to 2008 the investment volume was increasing in absolute terms, but relatively it was decreasing. As a result, the volume of capital investments generated in agriculture in 2008 exceeded such indicator for the food industry. In recent years the volume of capital investments in food sector has been decreasing in relative terms, but more slowly than in agriculture.

Substantial rise of the foreign direct investments (FDI) in agriculture (cumulatively) was observed up to 2009 (directly and relatively), while at the beginning of that year FDI volume was USD 813.3 million or 2.3% of total amount of FDI in Ukrainian economy.

From 2009 FDI volume is practically stable (around USD 800 million), which is confirmed by annual changes – 2009 – USD -20.3 million, 2010 – USD 45.7 million, 2011 – USD -25.3 million, 2012 – USD -12.7 million, 2013 – USD 38.6 million. In 2011 foreign investments were not present in the industry.

The share of FDI flowing to agricultural economy in total amount of FDI coming to the Ukrainian economy has been decreasing in recent years – from 2.3% in the beginning of 2009 to 1.3% – in the beginning of 2014. The FDI is directed more intensively into food industry (respectively surpassing it four times in 2013-2014).

Tax incentives may be considered effective if the volume of capital investments exceeds tax privileges. But in Ukraine in recent years, the corresponding inequality is not provided.

The balance between the volume of tax privileges received by the agricultural producers and capital investments in agriculture (Fig. 8.2) means that in 2006-2008 the volume of capital investments substantially prevailed over the volume of indirect support from special taxation modes (moreover, in 2008 it was almost twice larger). However, in the years 2009-2010 the volume of tax privileges exceeded capital investments by 1.3-1.5 times. Starting from the year 2010 the volumes of capital investments and tax privileges have been approximately the same (the latter exceed with 5-10%), which corresponds to the situation in 2005-2006, when investment processes in the agriculture were just growing.

Figure 8.2. Balance between volumes of tax privileges
and capital investments in agriculture
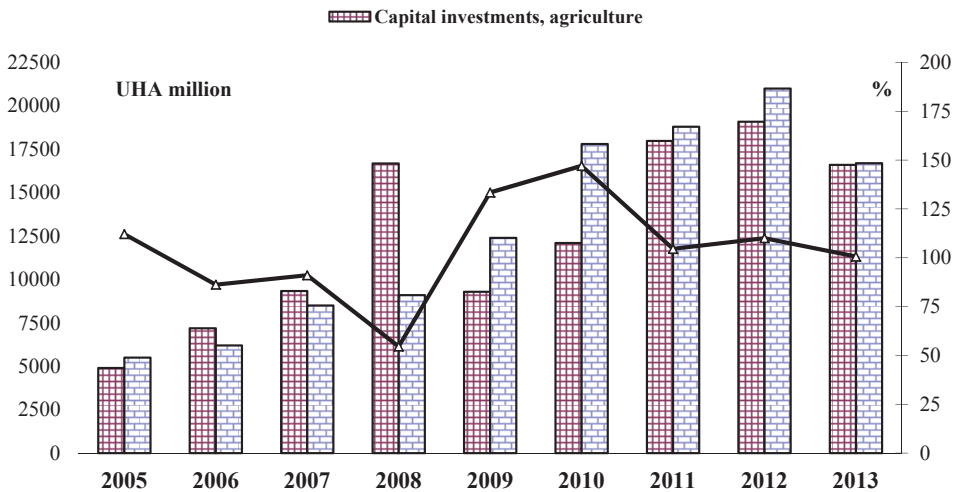
Source: State Statistics Agency of Ukraine (statistics bulletin) "Capital investments in Ukraine" for corresponding years.

On the basis of the above, it is possible to say that STM does not have substantial influence on investment activity in the agriculture.

The main reason for revenue tax exemption for agricultural businesses (through VAT implementation) were chronic losses in agriculture in second half of the nineties. However, today profitability of agricultural activity substantially exceeds profitability of economic activity in the whole economy and profitability of industrial production (Fig. 8.3).

Figure 8.3. Profitability of operating activity of agricultural businesses, %

Therefore, accomplished profitability level of operational activity of agricultural businesses focuses attention on the problem of rationality of unconditional (de-facto, without any limits) exemption from revenue taxation. Moreover, absence of connection between tax liabilities and activity results is only typical of Ukraine – in other Eastern European countries contribution of agricultural businesses to a budget is usually linked with results of their activity.

The conducted research studies show that practically none of the East European countries with more or less developed agriculture is using similar mode of direct taxation of agricultural businesses – regarding that special taxation modes are present in multiple post-USSR countries.

However, in Russia, Belarus and Kazakhstan usage of special taxation modes requests connection between tax liabilities and results of business activity – at least, they are related to the amount of received profit. In Poland special taxation mode is used on real ground (on the basis of land registry estimation), but here small volume production prevails, which is taken into account accordingly during shaping of taxation mechanism; secondly, average size of Polish agricultural tax is 2.5 quintal of oats in value equivalent (for comparison, in Ukraine in 2014 – less than 0.03 quintal or more than 100 times lower).

The continued until now practice of direct taxation in agriculture will lead to further development of the Ukrainian agriculture towards the increasing importance of holding organizations with corresponding to it advantages and threats for the agricultural economy.

Special modes of value added tax collection are not less important for stimulation of development of agricultural production in Ukraine. Its key part is the special mode of VAT collection, which is allowed by Chapter 209 of Tax Code of Ukraine (accumulation mode).

As visible from data on figure 8.4, sums of VAT support from 2008 to 2012 rose in 2.5 times, however until 2010 increase rate was higher than the income rise rate, but starting from the year 2011 it was quite opposite that is lower. Excluding the "anomaly" in 2010, sums of VAT support in relation to the net operative income of agricultural businesses varied within limits of 9.5-12.0%. In 2013 after rather steep profitability fall in the agricultural production in Ukraine, relation of the VAT support to the net operative income decreased to 8%.

Figure 8.4. Dynamics of operative profit and VAT support
of agricultural businesses
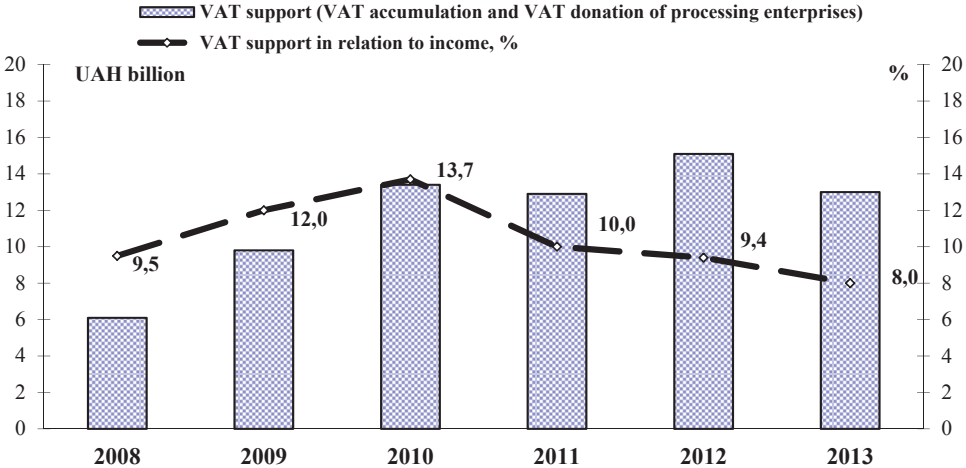
Source: State Statistics Agency of Ukraine and State tax agency of Ukraine.

The sums of tax support realised through special taxation modes in 2008-
-2013 exceeded those sums of total revenue agricultural workers, excluding 2011-2012. The sums of VAT support until 2010 also exceeded total revenue of businesses, and in 2010-2013 varied between 50% and 80% in relation to total revenue. Thus, at least half of revenue of agricultural businesses is shaped through using special modes of VAT collection.

Simultaneously, using special mode of VAT collection (accumulation mode) is caused by non-uniform allocation of sums of such support according to particular types of agricultural products. As the key part of added value is

revenue, so more profitable types of agricultural activity have more VAT support. In particular, in 2012 almost 70% of VAT support was related to crop production. However, it is animal production that requires state support much more.

From the whole volume of UAH 10 billion of VAT support, which fell at crop production branch, almost 70% supported only three types of crops: wheat, corn and sunflower. And profitability of the two was high even without VAT support, after including the support it rose by 10.5-12% (these crops generated more than third of total sum of VAT accumulation and almost half of the sum, which was directed for development of crops production branch).

Simultaneously, financial support must be provided primarily to producers of those types of agricultural products, which are characterized by a low profitability – to stimulate corresponding activity. Therefore, state financial support's resources are being spent inefficiently, and the mechanism of such support requires improvement.

Key faults of VAT's special collection mode in agriculture sphere are the following: non-uniform financial support depending from specialization, putting a halt to investment processes, as production factors' increased purchase leads to decrease of indirect financial support volume through VAT accumulation.

8.3.   Conclusion

Using STM in agriculture economy was a main part in revival of its potential, providing increasing dynamics of production volume of agricultural products and producers' profitability. However, in present conditions efficiency of using STM in agricultural production is decreasing. Modern tax policy towards the agriculture in Ukraine breaks competitive conditions in the branch and causes inefficient budget expenses, in some cases.

STM's improvement must allow fixing of present faults by the principle of maximum efficiency of using the tax liabilities sums, which are in agricultural businesses management and specializing possibilities of optimization of application of tax schemes.

Economic development in Ukraine shows that there is no alternative to indirect financial support – in conditions of state financial resources deficit a government is not capable to provide sufficient amounts of financing for agriculture (especially comparing to the level of state support, which is common in the EU common agricultural policy). In these conditions, refusal to support development in agriculture through STM revoking is not rational, moreover, agriculture is a sector that drives the economy itself and it is the key to full scale revival of export-oriented sectors of economy.

The main direction of STM's mechanism improvement is limitation of their target sphere at the cost of eliminating businesses with the profitability of production high enough even without special taxation modes, also through clear regulation of activity types that may use support in the form of special taxation. In our opinion, the state must present certain requirements regarding activity to the particular business before making STM available.

In our opinion the optimal way to improve STM in Ukraine for its agriculture is to apply it to small and middle-sized businesses (depending of activity extent and acreage) only.

References

1. Ведение аграрного бизнеса в Украине – 2013 / Информационно-аналитические материалы Украинского клуба аграрного бизнеса. – К.; УКАБ, 2013.

2. Дем'яненко М.Я. Проблеми адаптації податкової системи до умов агро-промислового виробництва / М.Я. Дем'яненко // Економіка АПК. – 2008. - №2. – С. 17-24.

3. Єфименко Т.І. Податки в інституційній системі сучасної економіки : наук. вид. [Текст] / Т.І. Єфименко: НАН України, ІЕП. –К. ІЕП, 2011, 688 с.

4. Жук В.М. Стан і розвиток спеціальних режимів оподаткування аграрного бізнесу / В.М. Жук // Фінанси України. – 2011. - №7. – С. 33-42.

5. Крисоватий А.І. Інституційне середовище фіскального регулювання соціально-економічних процесів / А.І. Крисоватий, Т.В. Кощук // Фінанси України. – 2011. - № 9. – С. 18-32.

6. Лайко П.А. Податкове стимулювання діяльності сільськогосподарських та переробних підприємств [Текст] / П.А. Лайко // Зб. наук. праць ВНАУ. – Серія: Економічні науки. – 2010. - №5-2. – С. 108-118.

7. Макаренко Ю.П. Альтернативні системи оподаткування малого і середнього бізнесу у сільському господарстві [Текст] / Ю.П. Макаренко, О.В. Безкровний // Управління проектами та розвиток виробництва. – 2012. - №1. – С. 77-82.

8. Малініна Н.М. Концептуальні засади побудови системи прямого оподаткування сільськогосподарських товаровиробників [Текст] / Н.М. Малініна // Зб. наук. праць Нац. ун-ту Державної податкової служби України. – 2012. - №1. – С. 242-260.

9. Непряма державна підтримка як визначальний фактор впливу держави на розвиток аграрного сектору економіки / Міністерство аграрної політики та продовольства України. – К.: 2013, 21 с.

10. Прокопенко Н.С. Податкове регулювання агропромислового виробництва : монографія / Н. С. Прокопенко / Акад. аграр. наук; ННЦ ІАЕ. – К.: ННЦ ІАЕ, 2009 – 316 с.

11. Рыманов А.Ю. Налогообложение сельскохозяйственных товаровирозводителей: региональные сопоставления / А. Ю. Рыманов // Экономист. – 2009. - №1. – С. 72-74.

12. Синчак В.П. Концепція удосконалення системи оподаткування у сільському господарстві [Текст] / В.П. Синчак // Університетські записки. – 2008. - № 4. – С. 425-429.

13. Юшко С.В. Фіксований сільськогосподарський податок: історія та перспективи застосування [Текст] / С.В. Юшко [Текст] // Фінанси України. – 2009. - № 11. – С. 63-72.

14. Ebrill L., Keen M., Bodin J.-P., Summers V. The Modern VAT. - International Monetary Fund, Washington, D.C., 2001.

15. Seligman E.R., *The income tax: a study of the history, theory and practice of income taxation at home and abroad*, 3rd printed edition, New Jersey, USA, 2005.

16. Tait A.A. Value Added Tax, A.A. Tait., Wash.: International Monetary Fund, 1988.

17. Veen H.B. van der, Meulen H.A.B. van der, Bommel K.H.M., Doorneweert B., *Exploring agricultural taxation in Europe*, Report 2.07.06., The Hague, LEI, 2007.

18. Taxation and social security in agriculture, The OECD Policy Brief, July 2006, URL: http://www.oecd.org/tad/37174811.pdf.

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9. The role of international marketing in the process of increasing competitiveness of agricultural and food products[26]

9.1. Introduction

There are many definitions that describe the concept of international marketing. Albaum and Peterson defined this concept by focusing on what it actually contains, arguing that international marketing is "a set of activities associated with marketing in foreign markets"[27]. This definition should include, among other things, exporting, importing and managing foreign operations, and related to marketing activities relevant to the products and services that cross national boundaries. This definition later was rewritten by Albaum and associates, who defined it as "the marketing of goods, services and information across political boundaries"[28]. Ghauri and Cateora took a slightly different stance, defining it as "the performance of business activities that direct the flow of goods and services available to consumers or users of a large number of countries to achieve profit"[29]. Mühlbacher with associates also contributed to this issue, adopting a more comprehensive perspective, stating that "international marketing is implementation of marketing orientation and marketing potential in international affairs"[30] while Czinkota and Ronkainen claimed that "international marketing is process of planning and conducting transactions across national borders for the exchange which meets the objectives of individuals and organizations[31]". Finally, Doole and Lowe do not agree with the practice of a unified definition, arguing that the

[27] G. Albaum, R.A. Peterson, (1984), *Empirical Research in International Marketing: 1976-1982*, "Journal of International Business Studies", 15 (1), pp. 161-73.

[28] G. Albaum, E. Duerr, J. Strandskov, (2005*), International Marketing and Export Management*, Pearson Education, Essex.

[29] P. Ghauri, P. Cateora, (2006), *International Marketing*, McGraw-Hill Education, Berkshire, p. 8.

[30] H. Mühlbacher, H. Leihs, L. Dahringer, (2006), *International Marketing: A Global Perspective,* Thomson Learning, London, p. 38.

[31] M.R. Czinkota, I.A. Ronkainen, I.A. (2007): *International Marketing* (8 ed.), Mason, OH: Thompson Higher Education, p. 4.

way in which international marketing defined and interpreted depends on the degree of involvement of companies in the international market, and therefore distinguish export marketing, international marketing and global marketing[32].

The key issue in all definitions of international marketing lies not in the way in which researchers describe the actual process, activities or transactions of international marketing, but in the fact that this process, these activities and transactions, take place across national and political boundaries.

On the other hand, the marketing of agricultural and food products basically means that agricultural producers and processors can achieve long-term goals and ensuring vitality, if they are in their production and also in their overall business orientation facing to customers and their needs. The functions involved in the marketing process of agricultural and food products are classified into three groups[33]:

- exchange, which involves buying and selling;
- physical function, which includes storage, transport and processes (determined by the processing of agricultural products before presenting to the market);
- improvement of the process, including standardization, financing, carrying the risk and marketing intelligence collection, processing and interpretation of information for marketing decision-making.

Reasons for turning company business to international market are numerous: production, market, technological, competition and financial issues. It is interesting that Serbian companies active in the field of agriculture the primary motive for export are financial issues, while marketing and technology are almost unidentified[34]. Accordingly, international marketing can be described as a market direction and coordination of business activities in order to achieve successful internationalization of business entities and their adequate integration into the foreign environment.

From the standpoint of the company, the international marketing strategy enables it to target marketing activities in a way that contributes to achieving its goals. At the level of the national economy, design of international marketing strategy leads to achieving a surplus in merchandise trade.

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[32] I. Doole, R. Lowe, (2008), *International Marketing Strategy*, Cengage Learning EMEA, London.

[33] I.M. Crawford, (1997), *Agricultural and Food Marketing Management* (2), FAO, Rome, pp. 6-10.

[34] Rakita B., (2001), *Medjunarodni marketing*, Ekonomski fakultet, Beograd, pp. 36-37.

9.2. The basic assumptions of competitive exports of agricultural sector

The basic assumptions of providing modern concept of competitiveness of domestic agricultural sector can be stated as follows:

- Increasing investment in technology and innovation, and productivity growth;
- Achieving higher production, changing its structure and ensuring stable export supply;
- Achieving the strict standards of quality control (adapting to EU standards in the field of veterinary, sanitary and phytosanitary requirements, environment protection) and the overall harmonization of legislation with the WTO rules and the EU;
- Developing marketing strategies, accentuating non-price elements of competition and product brand;
- Organized activities of domestic producers and exporters. One of the ways to increase the competitiveness of the Serbian economy and the agrarian sector is the development of the business environment through clusters or "sectoral clusters". Clusters are groups of related, export-oriented enterprises, with related institutions at the same location (customers, suppliers, competitors, universities, schools, advertising agencies, financial institutions, etc.).

Finally, not less important prerequisite for achieving competitive exports of agricultural products from Serbia is the entry into the WTO, which accounts for about 95% of world trade. WTO has a very big importance for all countries in the world, a key element is the idea of reducing customs tariffs among member countries and subsidies to the domestic market, as well as the elimination or minimization of export subsidies. The advantage to all members is that to their trade MFN customs tariffs (Most Favoured Nation) also apply. This basically means that whenever one member agreed to reduce tariffs on a bilateral basis, all other states benefit from this as they gain the same conditions. It is certain that in the process of Serbia's accession negotiations WTO members opposed keeping in place the tariff rates and incentives that Serbia applied which belonged to the prohibited so-called amber box. The WTO members required that most of the support, from the "amber box" be moved to so-called "green box", which includes investment in rural development, environment, transport, packaging and other permitted action. Actually, as part of its access range, WTO is trying to make a distinction between subsidies that are harmful to international markets (the so-called amber box) and those that are not (green box). Entering the WTO is in accordance with national interest of Serbia. It is necessary, first of all, to

increase the overall productivity of domestic agriculture and its efficiency in terms of price and quality in order to compete in export markets and the domestic market, which will be opened by the very act of lowering tariffs. This would be done in the EU accession process, which most of its rules based on those of the WTO. In this process, the most important is to determine a national strategy and set priorities in order to protect the domestic market and the most vulnerable segments of the agricultural production in Serbia.

9.3. International marketing of agro-food products

Using comparative advantages and traditions, which Serbia has in the field of agricultural production requires entering into a process of transformation of local agriculture and all forms of business entities in the industry. At the same time, characteristics of agricultural products and their use, as well as the characteristics of supply and demand, cause marketing activities of these products to be considerably specific. In designing international marketing of agricultural and food products it is useful to explore Philip Kotler's thoughts on marketing challenges faced today by businesses.

Namely, Philip Kotler in his seminars received responses from a numerous of managers on the issue of how they see today's customers, which may be useful for the analysis of emerging trends in the international classification of agricultural products. Some of the responses are as follows[35]:

- customers are becoming more sophisticated and sensitive to price;
- customers do not have time and require greater convenience;
- customers less sensitive to the producer's brand and reseller brand and generic products are gaining acceptance.

Moreover, Philip Kotler asked the assembled manager's whether their marketing tools were working well, the answers were as follows:

- their products are not much different from the ones offered by their competitors;
- they undertake a large number of expensive services and extras to get to the sale;
- their prices form promptly reacting to price forming of competitors;
- advertising becomes more expensive and less efficient;
- too much is spent on sales promotion.

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[35] Kotler, P. (2003): *Kako kreirati, upravljati i dominirati tržištem*, Adižes, Novi Sad, p. 19.

Product

The specificity of the product in the marketing mix of agricultural products derived from the very specifics of agricultural production, which is a consequence of its biological character. Namely, production programme of agricultural producers is largely determined by the nature of soil, crop rotation, climate, the presence of vegetation period in crop and cycle of livestock production, and taking into account all of these factors needs to be done when adapting products to market requirements. In addition, given that agricultural products in a large percentage are homogeneous, there is little room for product differentiation, especially in the case of those products that are inputs for the food industry. But, for those agricultural products, which are sold directly to consumers and/or through the supermarket, there are some possibilities for differentiation primarily through two main characteristics of products, including: packaging and marking. A particular aspect of agricultural products is the quality and brand.

Packaging products for international markets. Packaging problems in international marketing are related to: overcoming major geographic distance; overcoming numerous cultural differences; dealing with various environmental standards in the world. There is general agreement that the two dominant and unavoidable functions of a modern packaging: protective and promotional. It should be noted that the ecological thinking in the field of packaging ("green thinking") has become an imperative in the EU, and despite the higher cost, this adjustment is often cheaper and more acceptable than the alternative – be excluded from the "market game". At the same time, the export of Serbian fruit to the European market is not limited by quality, but by firms not fulfilling the strict procedures of harvesting, freezing, packing, loading and transportation. The quality of Serbian fruit (plums, raspberries) is unmatched on the rigorous European market, but the price is often reduced due to poor packaging and not respecting some elements clearly specified in the contracts (e.g. delivery). Therefore, the superior packaging and properly harvested fruits achieved higher product prices, for example, plums from Poland, Czech Republic, Hungary, Turkey, whose quality is behind the Serbian fruits.

Product marking is an essential element of the whole package, i.e. the status of agricultural products (these are the foods that affect people's health, are subject to deterioration, etc.). Product labelling (trademarks, declarations of origin and quality) significantly contributes to the differentiation of the product, which can be done from the perspective of various autochthonous, in terms of health, organic food, etc. Product marking plays a crucial role because of the

increasing presence of genetically modified foods (soy bean, sweet corn varieties BT 11, which is only allowed in the EU for distribution, but not for growing). In the EU-25 since April 2004, in force have been requirements concerning marking of genetically modified foods in order for partial protection of consumers, but clearly only for those with higher incomes. The poor will still opt for the price, and another, and even the medical criteria will be of no interest to them.

Constantly ensuring quality and compliance with standards of quality family ISO 9000-2000 (adopted by the International Organization for Standardization in Geneva), technical regulations, and compliance with ISO 14000 standards (standards in the field of ecology), TQM (a process of continuous quality improvement of all processes, products and services, which includes all employees), and the like. It is one of the most important strategic elements competitiveness in domestic and international markets. The overall quality is derived from the following premises of improving quality: quality in the eyes of the customer; quality must be reflected not only in the products of the company, but in all activities of the company; quality requires the commitment of all employees; requires partners with high quality; quality can always be improved; quality does not have to cost more. However, quality is important, but not sufficient[36].

Price

There is less room for influencing prices of agricultural products than in the case of prices of industrial products. For a large number of agricultural products, generally speaking, there is a market of perfect competition. Both, the supply and the demand side, there are more participants in the exchange of the product are homogeneous. Regarding the impact on prices, both, in theory and practice, can be distinguished between two types of actors in the market for agricultural products: first, those who have the potential to significantly affect the market price of their products and secondly, those who by nature of their activities (work mainly in exchange products – wheat, industrial plants) do not have that option. Since, most agricultural products have a stock exchange price, it is clear that international competition based on price, is more intensive. In this sense, Serbian producers and exporters (which cannot achieve these product price competitiveness), turn to export of agricultural and food products, which require more processing stages, and for which there is a possibility of differentiation, either through views of autochthonous products, high quality and/or environmental safety. The export of agricultural products from Serbia, an important

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[36] Senić, R. (2000): *Marketing menadžment*, Prizma, Kragujevac, p. 73.

element of competitiveness in the future will be developing and improving non-
-price related aspects of competition: quality, innovation, design, packaging, re-
liability and speed of delivery, trademark, ability to satisfy the specific demands
of consumers and the like.

Distribution

In Serbia the producers of agricultural products have a limited choice of
alternative sales channels on the domestic market. Namely, a large number of
farmers directly sell their products to the nearest local market consumers and/or
retailers (middlemen), while a certain number of sales goes to processors[37]. In
Serbia this area is a major marketing problem. Namely, the lack of a well-
-organized system of purchasing, efficient trade network and a traffic infrastruc-
ture – prevents the mobilization of all available market surplus in all areas of
low demand and, at the same time, limiting the exercise of two fundamental
objectives: consolidation of supply for export and balance, and decrease in the
price in the domestic market.

Specifics of agricultural production and agricultural products (unevenly
spatially distributed agricultural production, seasonality, bulky products subject
to deterioration) lead to a problem of distribution, namely sales channel, trans-
portation and storage (stocks) of agricultural products in large, developed coun-
tries. Therefore, the role of the productive world's stock exchanges and auctions
in trade of agricultural products.

Promotion

Promotion has less important role in the agricultural marketing pro-
gramme, compared to industrial products. In general, large producers or associ-
ated manufacturers can have products with their own brand. To stimulate prima-
ry demand for certain agricultural products, it is possible to go for a cooperative
economic advertising of associated producers. In this context, it should be noted
that in many countries there are joint programs of certain groups of producers,
aiming to better place their products on the domestic market or for export. This
is about a strategy that is normally implemented through generic advertising and
promotion of certain products.

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[37] A large share of the demand for agricultural products, people satisfy on the market places,
which will have a significant role, until the trade is radically reorganized and properly
equipped (with adequate cold stores and warehouses) do not qualify for the high-quality and
cost-competitive supply of the population.

In addition, the generic advertising and promotion are not just to be seen as an instrument of market competition, but as a phenomenon that has overall benefits from the point of spreading the knowledge to consumers about adequate nutrition.

Numerous companies have internationalized their businesses by franchising. Namely, the franchising system represents cooperation and mutual business relationship between independent economic entities, which regulate franchising agreement, pursuant to which a franchise holder gives right to a franchisee to use the trademark or commercial formula marked by a sign (trade mark) according to clearly defined terms of the contract, with the obligation for permanent professional help with easier operation, and a charge paid by a franchisee.

Companies, such as McDonalds, KFC (Kentucky Fried Chicken) and Avis, entered the market of numerous countries just on the basis of its retail franchise concepts, and at the same time made sure that their marketing is culturally relevant. For example, the KFC company in the United States is the world's largest chain of fast-food chicken, which owns or gives franchise licence to 12,800 stores in 90 countries – 60% of these restaurants are located outside the United States[38]. The benefits of expansion of sales and the company's business beyond the borders of the own country are unquestionable. However, the company must keep in mind numerous risks that accompany each international appearance. For example, a company might not understand foreign customer preferences and fail to offer sufficiently attractive product, the company may not understand the business culture of a certain country or do not know the legal aspects of the trade on foreign markets, the risk of political revolution, the devaluation of currencies and the like. The following are some examples of incorrect assessment and decisions relating to international marketing[39]:

- Kellogg Pop-Tarts cake collapsed in the UK, because the percentage of British households owning toasters is much lower than in the United States, and the product was too sweet for British tastes;
- General Foods Tang failed in France because it was advertised as a substitute for orange juice for breakfast; at the same time, the French drink a little orange juice and almost never for breakfast;

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[38] P. Kotler, K.L. Keller, (2006), *Marketing menadžment*, Data status, Beograd, p. 676.
[39] P. Kotler, (2001), *Marketing Management*, Prentice-Hall, Inc., New Jersey.

- General Foods spent millions of dollars trying to introduce a mixture of cakes on Japanese market. The Company did not know that only 3% of Japanese households own oven. Then they offered the idea of baking cakes in pans for preparing rice. However, they did not realize that the Japanese use these pans a whole day in order to keep the rice warm and ready to eat.

9.4. International marketing on the example of indigenous products of protected origin

In Serbia, there are a number of specific and sensitive ecosystems, within which the present flora and fauna with a large number of biological types of international importance. Extremely rich gene pool of wild plants and animals, as well as a large number of indigenous populations of cultivated plants and domestic animals are very important as genetic resources for medicine, agriculture, forestry, biotechnology and can be used for the further economic development of our country. Serbia should exploit existing potential and capacity to become a regional leader in conservation, management and utilization of genetic resources.

Traditional knowledge and cultural heritage are also an important component of agro-biodiversity of the Republic of Serbia. According to the Biodiversity Strategy of the Republic of Serbia for the period from 2011 to 2018, the role of agro-biodiversity is to increase production and food security, reducing pressure on the various, including vulnerable ecosystems, forests and endangered species[40]. It also contributes to the stability and sustainability of agroecosystems, diversification of organisms in nature, preservation of soil fertility, preservation of other ecosystem, etc.

Genetic resources from Serbia can be used for obtaining autochthonous products of protected origin in conditions of global change and placing them on the European market. These products can be offered as products that are the result of the comparative advantages of Serbia in relation to the European market.

International marketing program for autochthonous products of protected origin provides orientation to real and anticipated needs of European citizens as consumers, the economy and society, and effective product sales in the European market. Specifics of these products and their use, as well as the characteristics of supply and demand make the marketing activities conducted for these products considerably specific. The primary importance of marketing in this area is reflected in the establishment of the communication flow between producers of local products of protected origin from Serbia and European consumers.

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[40] Biodiversity Strategy of the Republic of Serbia for the period from 2011 to 2018, the Ministry of Environment and Spatial Planning, Belgrade 2011.

The product is a very important tool in the marketing programme for autochthonous products protected origin. In addition, it is important to make a distinction between products for direct consumption, for which there is no processing performed, except for cleaning, sorting and packaging (e.g. vegetables) and the second group, consisting of products for industrial processing as raw materials (e.g. crops and livestock). A large number of the products falls into both categories, because they are used both for direct consumption of households and large consumers, and as a raw material for industrial processing. Briefly, the specificity of autochthonous products protected origin in the marketing mix of agricultural products derived from very specifics of agricultural production, which is a consequence of its biological character. The production program of agricultural producers is largely determined by the nature of soil, crop rotation, climate, the presence of vegetation period in crop and livestock production, and taking into account all of these factors needs to be done to adapt the products to the market.

Regarding brand development of autochthonous products of protected origin from Serbia, it is important to point out that Serbia is still mainly exporting only raw agricultural products and that no other product in this sector with the name of the most recognizable in the world or European market. Here we are at the very beginning, and the creation of the brand, especially in the category of healthy food, can be developed only toward products with higher levels of processing, with respect for all internationally known and recognized certificates, quality standards, standards of food safety and the like. A very small number of agricultural and food products with geographical indications is standardized on national level (ham from Zlatibor, kačkvalj Pirot), and at an international level, as already pointed out, these products do not exist. In late nineties, Bulgarians and Slovaks have protected production of "plum brandy", and in the meantime Slovenes "take" Serbian distinctive product – chutney. We are now at the turning point. For example, we have the famous "sour cherry", with by far the highest content of ascorbic acid – vitamin C, which is bought mainly by Austrians and Germans. It succeeds in southern Serbia and no other kind of sour cherries in the world has this kind of composition. With respect to the content of bioactive substances, it can have a functional food label. Unfortunately, this kind of sour cherry we did not protect and in exports Serbia achieves much lower price than its competitors (Chile and Poland). True, we have positive examples, but these are exceptions. Brandy "Bojovčanka" and "Yellow Wasps" have already protected the name, and as such, they are recognized across national

borders. Our "Ariljska" and "Valjevo" raspberry is quite famous in the world, but we have failed to protect the genotypes of the raspberry, and there has been a loss of identity.

From the standpoint of *price competitiveness of brand autochthonous products with protected origin*, Serbia has different characteristics. Due to small holdings, it has higher costs of production for basic types of grain, which causes the price competitiveness in trade of these products. On the other hand, because of the relatively cheap labour, favourable climatic conditions and high quality, Serbia is competitive in vegetables, with beef and lamb meat (meat-specific, namely with the high quality of young cattle, which are exported to the markets of Greece and Italy, to charge higher export prices, the global average). Generally, the ability to influence the prices of agricultural products is lower than in the case of industrial products.

The distribution is an activity that includes all those activities that are necessary to transfer a product of protected autochthonous origin from the manufacturer to European consumers and users of products. The producers of autochthonous products of protected origin are expected to:

- identify and define European geographical areas and identify potential customers;
- assess the level of unsaturated demand among customers within a defined market area;
- consider the competition in the market (knowledge of current and potential competitors, where are they located and what services they provide).

The basic role of promotion in this area is to inform potential European customers and develop a preference; incite an action, i.e. purchase the product. Promotion is the only instrument of communicative character, it is the best instrument, which is directly associated with creating a name and reputation in the European market. Promotion at the international level has an additional form, which could be characterized as promotion of national identity and national export promotion. In this context, improving the image of the country of origin "Made in Serbia" (development of the image of environmentally clean earth) is very important because it directly affects the image of certain products, which is reflected in the positive economic effects of the placement of indigenous products of protected origin.

9.5. Conclusion

Most of agricultural products have stock exchange value, and international competition based on price is more intense. Bearing in mind the current level of production and the competitiveness of domestic producers, it can be concluded that we are assuming the fulfilment of quality control standards, in the global market regarding terms of export of agricultural products – we are competitive only if we differentiate offer, in terms of exports of high-quality products at higher processing stages, organic food products with the brand and/or mark of autochthonous origin. Agricultural products have little opportunity to implement strategy of differentiation, but with these products can be best checks of a talent for marketing. Namely, the possibilities of differentiation are limited by the fact that the largest number of agricultural products and some food (raw meat) is homogeneous in its basic market, commercial and technological decisions. The exception is certainly production of food products, healthy, organic food (where there are significant opportunities for the development of the brand), and placement of agricultural products through supermarkets, where the possibilities of differentiating offerings, mainly based on the packaging marking and labelling products. Finally, the implementation of international marketing strategies, as a prerequisite for the competitiveness of agricultural producers and exporters in the world market, basically means the selection of the optimal combination strategy of market segmentation and product differentiation, which are often used simultaneously.

References

1. Albaum G., Peterson R.A., (1984), *Empirical Research in International Marketing: 1976-1982*, "Journal of International Business Studies" 15 (1), pp. 161-73.
2. Albaum G., Duerr E., Strandskov J., (2005), *International Marketing and Export Management*, Essex, Pearson Education.
3. Crawford I.M., (1997), *Agricultural and Food Marketing Management* (2), FAO, Rome, pp. 6-10.
4. Czinkota M.R., Ronkainen I.A., (2007), *International Marketing*, Mason, OH: Thompson Higher Education.
5. Doole I., Lowe R., (2008), *International Marketing Strategy*, London, Cengage Learning EMEA.
6. Ghauri P., Cateora P., (2006), *International Marketing*, Berkshire, McGraw--Hill Education.
7. Kotler P., (2001), *Marketing Management*, Prentice-Hall, Inc., New Jersey.

8. Kotler P., (2003), *Kako kreirati, upravljati i dominirati tržištem, Adižes*, Novi Sad.

9. Kotler P., Keller K. L., (2006), *Marketing menadžment*, Data status, Beograd.

10. Mühlbacher H., Leihs H., Dahringer L., (2006), *International Marketing: A Global Perspective,* London, Thomson Learning.

11. Rakita B., (2001), *Medjunarodni marketing*, Ekonomski fakultet, Beograd, pp. 36-37.

12. Senić R., (2000), *Marketing menadžment*, Prizma, Kragujevac.

13. Biodiversity Strategy of the Republic of Serbia for the period from 2011 to 2018, the Ministry of Environment and Spatial Planning, Belgrade 2011.

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10. Food market diversification approach – Lithuanian case

10.1. Introduction

Globalization processes in foreign trade are one of the most important factors affecting the country's economic development, as it not only enables the development of trade relations between countries, but also promotes the country's competitiveness on the global area, leads to new technologies and innovations, creates new jobs. Therefore, maintaining the competitiveness of exporters becomes a real challenge. All decisions in the development of international trade must be taken quickly and decisively, with adequate risk assessment. One of the most important ways to reduce the risks in exports is market diversification, when risks are split.

The goal of this paper is to investigate the market diversification approach in Lithuanian agricultural and food sector. Main tasks are as follows:

- to analyse the transformation of Lithuanian international trade conditions before and after the EU accession;
- to investigate the dynamics of international trade flows in agricultural and food products;
- to compare export geography of Lithuanian agricultural and food products before and after the EU accession;
- to explore the level of agricultural and food products exporters' orientation on international markets.

Analysis is based on generic market diversification strategy. Chosen approach leads to discover main opportunities and threats coming from dynamic changes in international trade development for the agricultural and food sector in Lithuania.

Analysis based on country's case covers periods before and after the accession to the EU, when the whole legal regulating system on international trade became centralized. The period 1999–2013 was chosen for the comparison of trade volume dynamics and common structure of agri-food exports.

In order to present the importer countries of Lithuanian origin agricultural products they were divided into the main groups. The statistical data sequence of products imported to these countries was sorted from the smallest to the largest importer in selected years (2003, 2008 and 2013). According to the data distri-

bution uniformity by the value shares of exported products from Lithuania the major importer groups were formed (huge importer; strong importer; big importer; significant importer, small importer; very small importer; no exports). According to the same principle the levels of exports of Lithuanian agricultural products into the new importing countries or changes in export values by countries were formed in 8 groups (new countries; huge breakthrough, strong breakthrough; big breakthrough; significant breakthrough; low breakthrough; contraction; no exports).

Statistical quantitative analysis was supplemented with qualitative analysis – expert evaluation. For the expert assessment sector-specific organizations were selected, ex. business associations, leading exporting companies, leading food producers. Total 16 experts were under the survey. In order to get multifaceted evaluation, both the public and private sector representatives were selected. The questionnaire for experts was composed of several sets of questions, investigating the current situation of the company, export share, future plans and orientation on the foreign markets, product development perspectives and market diversification strategies.

10.2. Theoretic background

There are several different ways of analysing the various marketing strategies. The Ansoff matrix was chosen for the examination of strategies in terms of the products offered to the markets. In the Ansoff matrix are four different strategies: marketing penetration, market development, product development and diversification (Figure 10.1).

Diversification strategy is where the business introduces new products into new markets. This is an inherently more risk strategy because the strategy involves moving into markets in which the business has little or no experience in. For a business to adopt a diversification strategy, it must have a clear idea about what it expects to gain from the strategy and an honest assessment of the risks.

M. Turner and D. Winter [2003] assert that the main factors influencing the decision to diversify or not main business activities are as follows [Gargasas and Mugiene 2012]:

- External factors: policy, market opportunities, growth of the demand for agricultural products and services and spatial factors (favourable geographic location);
- Internal factors: managerial and executive personnel and experience expertise, material-technical base of the corporate infrastructure and development options.

Figure 10.1. Marketing strategies in connection with risk level
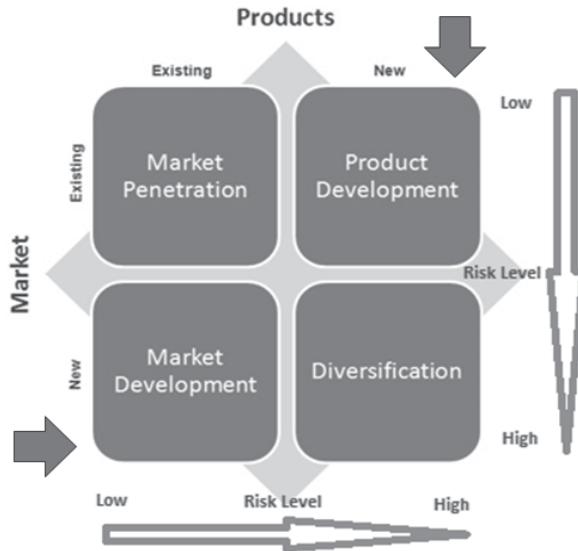
Source: [Ansoff Matrix modified by authors 2014].

First group of factors is more related to the geographic diversification connected with the situation on global markets and the second group of factors comes from the internal firm capacities and leads to the product diversification.

In some research studies it was found, that exporting firms simultaneously seek to balance their growth across both the geographic and product diversification domains. To achieve this balance, businesses commonly adopt a strategy of expanding an under-diversified direction at the expense of an over-diversified one [Hashai and Delios 2012].

The development of new products and markets is a critical component of a successful business strategy, as Pöyry [2013] indicates the innovative businesses deliver above average sales growth and profitability.

10.3. Transformation of Lithuanian international trade conditions

Changes in international trade conditions in Lithuania refer to several important dates. First important date was the 11th of March 1990, when the independence of Lithuania was restored. Active trade liberalization processes started in 1993, when significant changes in national legislation appeared. Later on Lithuania, as an independent country, sought to be established on the international arena and to become a member of the most important international organizations, like World Trade Organization (WTO) and later European Union (EU).

Restoration of Lithuanian independence in 1990 led to radical political, economic and social changes. Changes in foreign trade were partially conditioned by changes of economic policy and new international agreements. Specifically, foreign trade was liberalized due to a number of unilateral decisions and treaties, which created the current Lithuanian foreign trade regime and trade policy structure.

Signing bilateral and regional free trade agreements, particularly with the EU and the two other Baltic countries (Latvia and Estonia), was another important step in the development of Lithuania's foreign trade policy [Bagdanavicius 1999].

Changes in customs tariffs on export/import of Lithuanian goods to/from the EU took place even before the accession to the EU, whereas, following the Europe Agreement establishing an association between the European Communities and its Member States on the one hand and the Republic of Lithuania on the other hand, a one-sided reduction of the EU customs tariffs on goods of Lithuanian origin was started as of 1995, and by the year 2001 all duties on the non-agricultural products were eliminated by the Lithuanian side.

On the 31th of May 2001, Lithuania acceded into the WTO and became its 141st member. The status of a Member in this organisation not only led to international recognition but also brought real benefits such as larger foreign investment flows, new markets for national exporters and their increased reliability in markets of the WTO member states. Upon accession to the WTO, Lithuania also obtained the right to defend its commercial interests both through involvement in the process of further liberalisation of global trade and negotiations regarding more favourable trade conditions with acceding countries to the WTO [European Commission 2013].

It is noteworthy that membership in the WTO has contributed to successful accession to the EU in view of the fact that WTO membership is one of the most important aspects of the EU *acquis communautaire* in the area of external relations.

From the 1st of May 2004 Lithuania applied EU contractual relations with third countries and international organizations. Thus, the foreign trade policy making was delegated to the Council and the European Commission as Republic of Lithuania joined the EU common trade policy area. Enlargement of the EU has opened additional opportunities for business in Lithuania as it joined the common market, with more than 450 million consumers.

For the new EU Member State it was important to cope with increased competition, and, on the other hand, to penetrate larger markets in order to increase its own economic growth. Lithuania, like any of the EU countries,

applied relatively low conventional duties, despite suffering itself from certain free trade distortions, especially in the area of trade with the EU in "sensitive" agricultural products and textile goods [Travkina et al. 2009].

10.4. International trade flows in agri-food products in Lithuania

Total exports of agri-food products increase year by year and they reached EUR 4.7 billion in 2013. In 2013, compared with the crisis in 2009, Lithuanian agri-food product export value increased more than 2 times. Exports of agri-food product grew more than 5 times during the EU accession period (from 2004 till 2013) (Figure 10.2).

Figure 10.2. Exports, imports and foreign trade balance of Lithuanian agri-food products, billion EUR
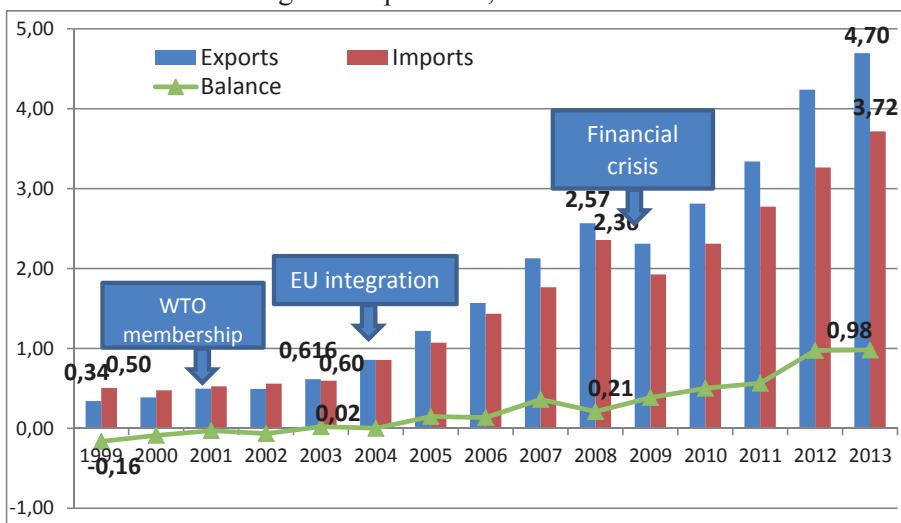
Source: [Statistics Lithuania 2014].

Imports of agri-food products from the world to Lithuania rose more than 4 times during the 2004-2013 period and reached 3.7 billion EUR. In 2013 the agricultural and food exports and import growth rates was the slowest since 2010, respectively 10.8 and 13.8 per cent. More rapid import growth rate than the growth rate of exports was influenced by the growing domestic demand, the need for raw materials in food production industry and the possibility of re-export.

Trade balance was improved already before the accession to the EU. In 2003-2004 the volumes of agri-food exports and imports was at the same level and later on foreign trade balance started to grow rapidly and reached almost EUR 1 billion surplus in 2013, i.e. approx. 20 per cent of the total agri-food exports.

Foreign trade is very important for a small and open economy as Lithuania. This is confirmed by the fact that the foreign trade volume growth was a key factor in the rapid economic recovery in Lithuania after the world financial-economic crisis that occurred in the years 2008-2009.

Animal products were dominant in agri-food exports before the accession into the EU. From 2004 the tendency has changed for the benefit of plant products. One of the main reasons for that was the larger EU and national financial support for crop sector. According to the data of 2013 the export proportions between crop and animal products are as follows: live animals and animal products comprise 24 per cent in the whole agri-food exports, vegetable products comprise 40 per cent in the whole agri-food exports, prepared foodstuffs, beverages, and spirits, vinegar and tobacco comprise 35 per cent in the whole agri-food exports (Figure 10.3).

Figure 10.3. Structure of agri-food exports by CN sections, per cent
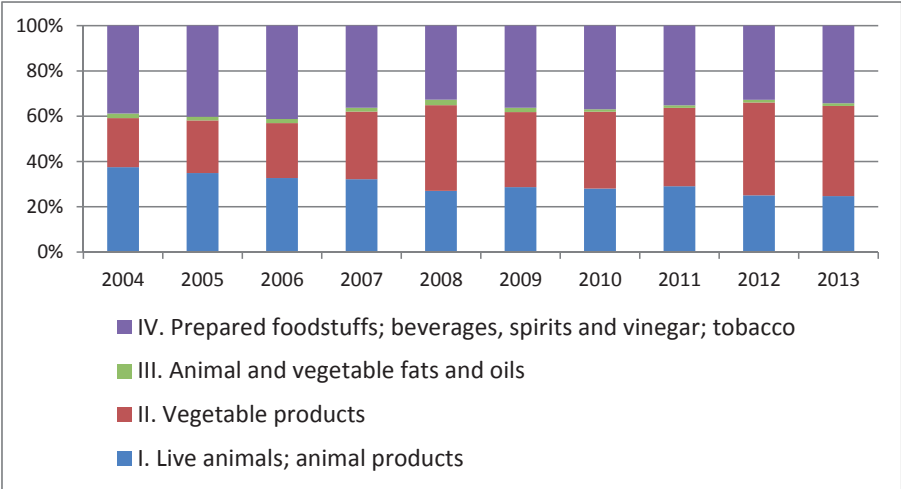
Source: [Statistics Lithuania 2014].

Agri-food exports structure by products has changed from the year 2003. After the accession to the EU re-exports appeared, because of the favourable geographic conditions of Lithuania, export subsidies allocated from the EU, etc. The share of Lithuanian origin products in total exported agri-food products decreased from 89.2 per cent in 2003 to 64.3 per cent in 2013. Main exported agri-food products from Lithuania to the World before the accession to the EU were dairy products, tobacco and cereals. These three groups counted almost a half of total Lithuanian agri-food exports (Figure 10.4).

Figure 10.4. Lithuanian agri-food exports by products in the year 2003, per cent
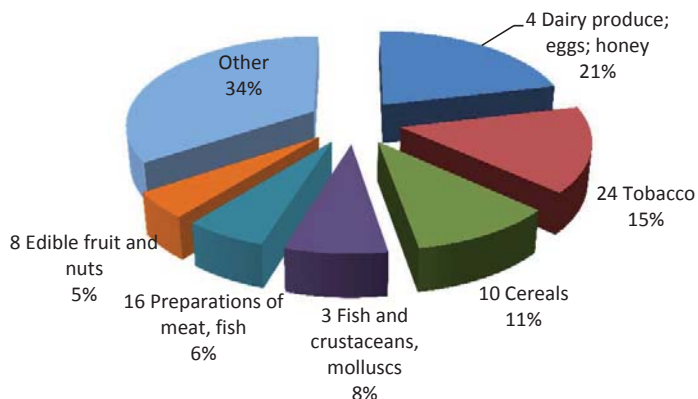
Diversification of Lithuanian agri-food exports appeared after the accession to the EU. Broader product range was offered to the market both inside and outside the EU. Importance of the agri-food product re-exports grew. Already in 2008 one fifth of the total Lithuanian agri-food exports formed re-exports of fruits and vegetables. Lithuanian agri-food exports structure became even more diversified in 2013 (Figure 10.5).

Figure 10.5. Lithuanian agri-food exports by products in the year 2013, per cent
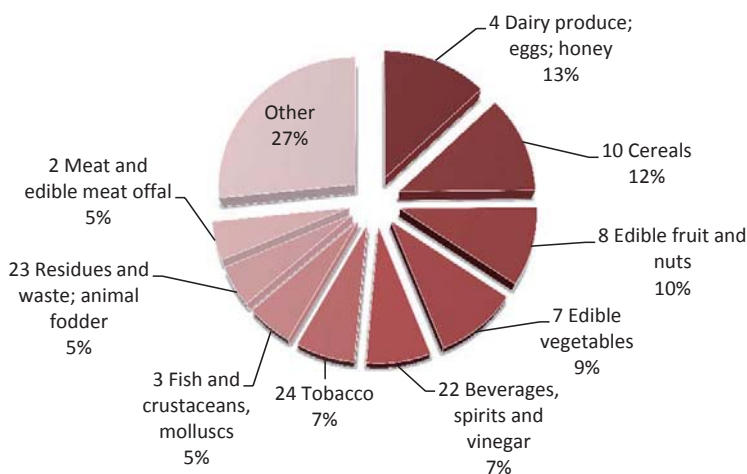
The value of the products of Lithuanian origin exported in 2013 amounted to EUR 3.0 billion. 61 per cent of the value of the agri-food products of Lithuanian origin included milk and dairy products, eggs and honey, cereals, tobacco products, residues and waste from the food industries and prepared animal fodder, fish and crustaceans.

In 2013 over 50 per cent of export consisted of the products of Lithuanian origin under fifteen chapters out of products under twenty-four CN chapters, mostly – over 90 per cent – tobacco products, cereals, products of the milling industry, milk and dairy products, live animals, and oil seeds. Various beverages manufactured in Lithuania accounted for 32 per cent, vegetables 12 per cent, fruits – 5 per cent, coffee, tea and spices – 5 per cent of exports of the respective products [Agricultural 2014].

Lithuanian origin dairy products mostly go to Russia (26 per cent of the total export of dairy products), Poland, Italy (15 per cent each), Germany (9.6 per cent), and Latvia (7.8 per cent). Shipment to these countries in 2013 accounted for 73 per cent of the dairy products.

The key export partners for cereals were the Islamic Republic of Iran (39 per cent of the total exports of cereals), Saudi Arabia (23 per cent), Latvia (6.8 per cent), and Sweden (5.5 per cent).

Third ranked in terms of export value was fruit, with exports amounting to EUR 0.46 billion. Fruit of Lithuanian origin accounted just for 5.1 per cent (in 2012 – 6.1 per cent). 68 per cent of the total exported fruit and nuts were shipped to Russia, 13 per cent to Belarus, and 5 per cent to Latvia. 26 per cent of fruit and berries of Lithuanian origin was exported to Germany, 13 per cent to China and 12 per cent to Poland.

10.5. Export geography and market diversification trends

The largest portion of agricultural and food products were exported to the market of the EU countries. Analysis of export of agricultural and food products into different countries over the period of 2009-2013 showed that in spite of the annual increase of the value of export into the EU countries, this market covers still more decreasing share of export, which dropped from 64 per cent in 2009 to 52 per cent in 2013. The key partners of export to the EU countries were Latvia, Germany, Poland, Estonia, the Netherlands, Italy, and Sweden. Export to these countries covered 75% of the total export to the EU [Agricultural 2014].

Agri-food exports destinations are spread world-wide and it was even before the accession to the EU (Figure 10.6).

Figure 10.6. Exports structure of Lithuanian origin agri-food products
by countries in 2003, per cent
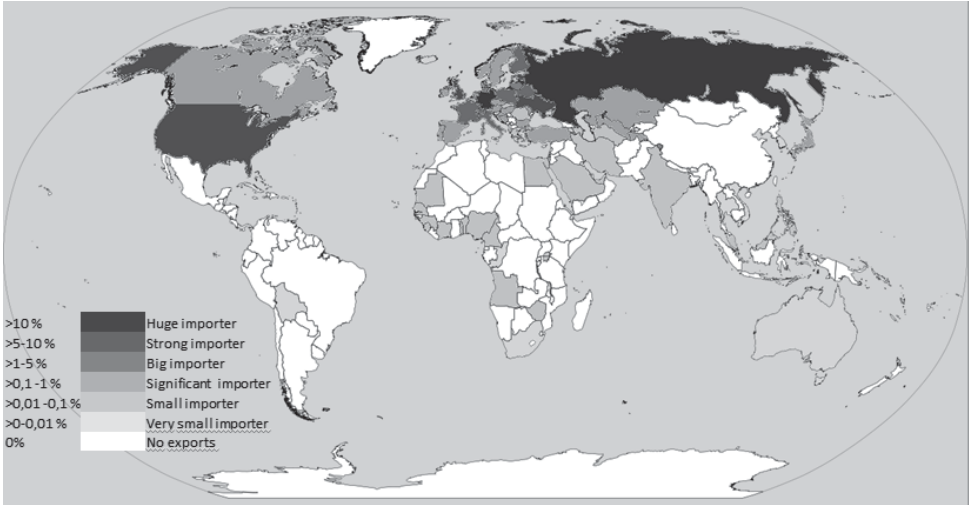
Source: own elaboration.

Figure 10.7. Exports growth rate of Lithuanian origin agri-food products by
countries, 2008 in comparison to 2003, per cent

Source: own elaboration.

Agri-food exporters' orientation on international markets was calculated
as an agri-food exports growth rate change. According to these changes the
countries were grouped. While the export structure remained essentially un-
changed since 2003, some export diversification trend was intensified. Export

volumes rose from Lithuania to Iceland and Saudi Arabia in 2008 compared to 2003. Agri-food export volumes increased also in the case of Lebanon, Guinea Bissau, Romania, Belgium and Norway (Figure 10.7).

In 2013, after 5 years since 2008, Lithuanian origin agri-food exports became even more diversified and strong orientation outside the EU is seen. For example, to Cuba, Iran, South Africa, Hong Kong, Egypt, South Korea, Nigeria, Vietnam, Turkmenistan, Thailand (Figure 10.8).

In 2013 Lithuania exported goods to 188 countries, agricultural and food products were exported into 134 countries (of Lithuanian origin into 133 countries). Nevertheless, main agri-food export markets still remain the same as in 2003: Russia, Germany and Latvia.

In the past years the market of third countries has become still more important for the exports of Lithuanian agricultural and food products. The share of exports to third countries went up from 36 per cent in 2009 to 48 per cent in 2013. 70 per cent of the products shipped to third countries belonged to the Customs Union countries (Russia, Belarus, and Kazakhstan). The main partners of export to third countries are Russia, the Islamic Republic of Iran, Belarus, Saudi Arabia, Norway, Turkey, and Egypt. Export to the above countries accounted for 89 per cent of the total export to third countries [Agricultural 2014].

Figure 10.8. Exports growth rate of Lithuanian origin agri-food products by countries, 2013 in comparison to 2003, per cent

Source: own elaboration.

Expert evaluation showed that export is quite important for the Lithuanian agricultural and food producers. Lithuanian agri-food exporters already have strong positions on the EU internal market. A wide range of products is exported to many countries all over the world.

Meat producers foresee big breakthrough to the US market. More than 50 percent of export growth is expected. The second very important market is Russia, where in recent years has travelled the large scale of production. Meat and meat products exporters actively work with Kazakhstan, Azerbaijan and other countries in Southeast Asia markets. It is also planned to export meat and meat products to Saudi Arabia, Philippines, Japan, South Korea, China and some African countries.

Milk and milk products exporters have chosen a different sales strategy. They do not plan to compete with standardized mass production of milk, and invest in a new and unique product development (e.g. sugar lactose). Such new markets are planned to be USA, Japan and China.

Expert evaluation showed dual approach to fish and fish products export development opportunities. On the one hand, fish re-export volumes do not increase and trade volumes are stable year by year. But on the other hand, it is expected to raise exports by 20 per cent on specific fish products (e.g. crab sticks, surimi, etc.). Focus is made on distant markets such as the US and Brazil.

The demand for grains, as raw materials, is sufficient in relatively short--distance markets such as the EU, Iran, Saudi Arabia, Egypt. The demand for grains, as processed products, is stable and constantly growing, so a further growth in this sector is expected on the long term.

10.6. Conclusions

Despite many efforts for liberalizing foreign trade of agri-food products in early nineties and the membership in WTO in 2001, the real benefit of enlarged trade volumes was received after Lithuania entered into the EU. Agri-food exports and imports volumes rose intensively, on average 23 per cent for exports and 21 per cent for imports, during the period 2004-2013.

The analysis showed that exporting firms simultaneously seek to balance their growth across both the geographic and product diversification domains. Lithuanian agricultural products, which get higher EU support (e.g. direct payments), prevail on foreign markets (e.g. milk products, grains, wheat gluten, etc.). After the EU accession Lithuania became a gateway for other European exporters for reaching Eastern countries. The volumes of Lithuanian origin products in total agri-food exports fell down from 89.2 per cent in 2003, till 64.3 per cent in 2013.

The analysis of the export geography of Lithuanian origin agri-food products showed that Lithuania has three stable markets (Russia, Germany and Latvia) and is strongly dependent on them. Nevertheless market diversification appeared in 2008. In 2013 this tendency was strengthened. A breakthrough in agri-food exports is expected in the case of African, Asian, Scandinavian countries and Australia.

The expert evaluation showed that there is expected a strong breakthrough in the case wheat gluten, meat and meat products and bakery products exports from Lithuania. Smaller, but no less important export growth is projected in dairy sector.

References
1. *Agricultural and Food Sector in Lithuania 2013.* Vilnius: Lithuanian Institute of Agrarian Economics, 2014.
2. Bagdanavicius J., (1999), *Tarptautinės prekybos politikos pokyčiai*, Lietuvos ūkis 11/12, Vilnius.
3. Business growth services, (2010), *Innovate New Products. Diversify into New Markets. Improve Sales and Marketing*, California Manufacturing Technology Consulting, Torrance.
4. European Commission, (2013), *Trade development and regional integration in Lithuania*, Development and cooperation, EuropeAid, Trade development and regional integration – Lithuania, Brussels.
5. Gargasas A., Mugiene I., (2012), *Koncentrinės diversifikacijos strategijos taikymas grūdus superkančiose įmonėse*, "Management theory and studies for rural business and infrastructure development", 2012, Vol. 33. No. 4, pp. 46-53, Kaunas.
6. Hashai N., Delios A., (2012), *Balancing growth across geographic diversification and product diversification: A contingency approach*, "International Business Review", Dec2012, Vol. 21 Issue 6, p. 1052-1064.
7. Jefferson & Associates, Inc., (2009), *Marketing Strategy – Market Diversification* [Interactive], http://www.jeffersonassoc.com/, mktdiversificationstrategy.htm, [Date: 11.07.2014]. Westlake, Ohio.
8. Pöyry, (2013), *New Products and New Markets: A Process for Successful Innovation*. Executive wire, North America / 2013 - 1.0, New York.
9. Travkina I., Dudzevičiūtė G., Maciukevičienė L., (2009), *Accession to the European Union: impact of legislation change on performance of Lithuanian companies.* Business: Theory and Practice, 2009, 10(2), p. 142–149, Vilnius
10. Turner M., Winter D., (2003*), Farm Diversification Activities: Benchmarking Study 2002*, Centre for Rural Research Report. – Exeter. No. 4.

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11. Competitiveness of agri-food exports and decomposition of its changes in the period of the Polish membership in the European Union

11.1. Introduction

Competitiveness in the literature is variously defined, and individual authors draw attention to the different aspects of competitiveness and analyse it at different levels. According to the definition adopted by the IAFE-NRI, food manufacturers' competitiveness is the ability of domestic producers to place their products in foreign markets – both in the EU and in third country markets – and the ability to develop effective export.

Adopting the above definition as a basis, for the purpose of the studies on the international competitiveness of the Polish food sector conducted by the IAFE-NRI, we highlight the following elements of the "competitiveness": competitive potential, competitive strategy, competitive instruments and the competitive position (Fig. 11.1). Each of these subsystems can be further broken down into component held (pre-built) and currently being built. The individual elements of the "competitiveness" concern its different areas and show a strong cause-and-effect relationship. Generally it can be stated that the competitive potential held by a given company determines adopting a specific competitive strategy. This strategy creates a base for selecting specific instruments of competition, which in turn help to achieve a specific competitive position.

In fact, the relationship between the four elements of the "competitiveness" system are multi-faceted and much more complex. Decisions taken within one subsystem affect the functioning of the others. The competitive position – as is clear from the basic dependence – is the result of competition, but at the same time the foundation to compete on the level resulting exactly from that position. Aiming for a target competitive position in turn, requires the formulation of competitive strategies, selection of effective instruments of competition, and is preceded by a detailed analysis of the competitive potential. The potential may prove to be insufficient, and only acquiring of new resources and competencies (i.e. construction of a new competitive potential) will enable the implementation of the defined competition strategy and the creation of

instruments to compete, and ultimately to achieve the planned competitive position. Not without significance is also maintaining adequate quality of cooperation with the external surrounding, on the one hand affects the company, and on the other changes under its influence[41].

Figure 11.1. "Competitiveness" system and cause-effect relationships between its elements
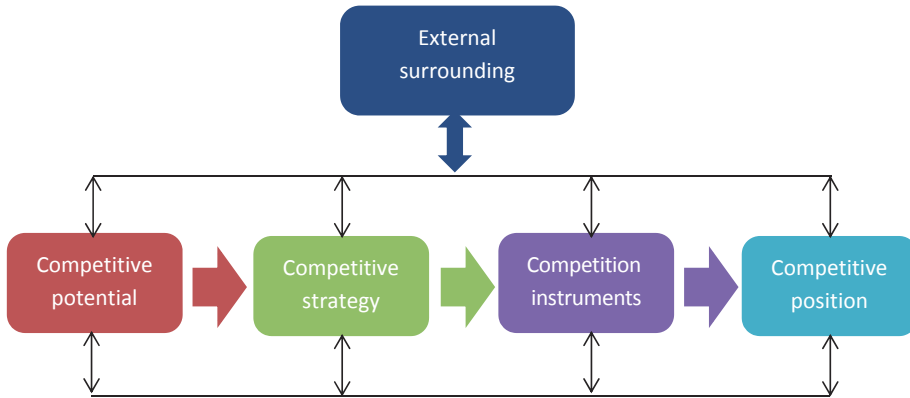
The IAFE-NRI's research studies on the competitiveness of Polish food sector often referred to the various elements of the "competitiveness" system, treating this issue very extensively and in subsequent publications analysing its various aspects. In this study, it was decided to present two issues. First shown is the change in the competitive position of the Polish food producers in the world market. This was done based on the analysis of selected quantitative indicators, i.e. trade coverage index, the B. Balassa revealed comparative advantage index and the Lafay index of export-import relations. The choice of indicators used in this analysis resulted from the adopted research objective and took into account the fact that in similar analyses it is good to use several measures. From the point of view of the correctness of reasoning important was the fact that the selected indicators could be calculated on the basis of the same data source and for the same time horizon [Ambroziak, Szczepaniak 2013, pp. 38-74]. Subsequently we decomposed Polish agri-food exports, using the method of constant market share, i.e., we focused on four components

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[41] More information about the relationship between the individual elements of the "competitiveness" see: Szczepaniak [2014a, pp. 9-24].

having impact on the Polish agri-food exports: increase in worldwide demand, changing geographical structure, changing product structure and competitiveness. The presentation of these two issues is preceded by descriptions of the methods used.

11.2. Assessment of the Polish competitive position in the export of agri-food products in 2003-2013 – an analysis based on selected indicators

Research method

The assessment of changes in the competitive position of Polish trade in agri-food products was made on the basis of three quantitative indicators. These were: trade coverage index, B. Balassa revealed comparative advantage index and Lafay index of export-import relations[42]. These indicators for the purposes of this study are determined as follows:

1. The trade coverage index (TC) measures the extent to which revenues from exports of the group of agri-food products is covered by expenditure on their imports. The value of TC > 100% means having a surplus in the Polish trade in a given product group, while TC < 100% means there is a trade deficit in this product group.

2. The Balassa revealed comparative advantage index (RCA) allows us to determine whether the share of a given agri-food product group in the total Polish exports (including agri-food and industrial products) on the world market is higher or lower than the share of this group of products in world exports. The value of RCA > 1 means that Poland has revealed comparative advantage (compared to global competitors) in the export of a given group of products on the world market, and RCA < 1 shows that Poland does not have such advantage.

3. The Lafay index of export-import relations (LFI) allows us to specify the nature of trade in a given group of agri-food products, when the total trade (including agri-food and industrial products) would be balanced. Positive index values indicate that Poland has competitive advantages over foreign competitors in the export of a given product group, equal to a surplus in the trade. Negative values of this index indicate a lack of competitive advantage, thus a trade deficit.

The total assessment of the competitive position of Polish trade in agri-food products on the world market was based on the analysis of the values of all three aforementioned indicators. This combination allows the identification

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[42] These indicators are presented in detail in: Szczepaniak [2012, pp. 51-70], Ambroziak, Szczepaniak [2013, pp. 38-62], Szczepaniak [2014b].

of eight variants of the situation (Tab. 11.1). From the point of view of this analysis, particularly important are the variants in which the values of all three indicators lead to the same conclusions concerning the competitiveness in the export of a given product group. These two situations are:

- possession of comparative advantages in trade in the product group on the world market by a given country is confirmed by the ratio of TC (TC > 100%), the rate of RCA (RCA > 1) and the Lafay index (LFI> 0);
- no comparative advantages of the country in the trade of a given product group on the world market is confirmed by the ratio of TC (TC < 100%), the rate of RCA (RCA < 1) and the Lafay index (LFI <0).

The remaining options do not show a clear picture of the assessment of the competitive position in trade in agri-food products on the world market, since the results indicated by the applied measures are divergent. They can only serve as a complementary analysis.

Table 11.1. Overall competitive position in foreign trade in agri-food products on the world market, according to indicators TC, RCA and LFI

Value of an indicator in a given year			RCA	
			> 1,0	< 1,0
TC	> 100%	LFI	> 0,0	+ + +	+ – +
			< 0,0	+ + –	+ – –
	< 100%		> 0,0	– + +	– – +
			< 0,0	– + –	– – –

Source: own elaboration.

The assessment of the competitive position of the Polish trade in agri-food products on the world market was conducted for individual product groups according to the HS division. The analysis relates to the competitive position in 2013, and changes during the years 2003-2013, while omitted are those cases in which the trends of these indicators were divergent. The analysis used data from a database WITS-Comtrade.

Research findings
The overall assessment of the competitive position of Polish trade in agri--food products in the global market was conducted on the basis of indicators: TC, RCA and LFI. It shows that the number of sectors in which Poland had a comparative advantage in the global market (as indicated by all three

measures) increased in 2003-2013 from eight to ten. In 2013 the export of these product groups accounted for 69% of Polish agri-food exports to the world market, i.e. by 10 percentage points more than in 2003 (Fig. 11.2).

Figure 11.2. Structure of the Polish agri-food exports to the world market according to the overall assessment of the competitive position in percent
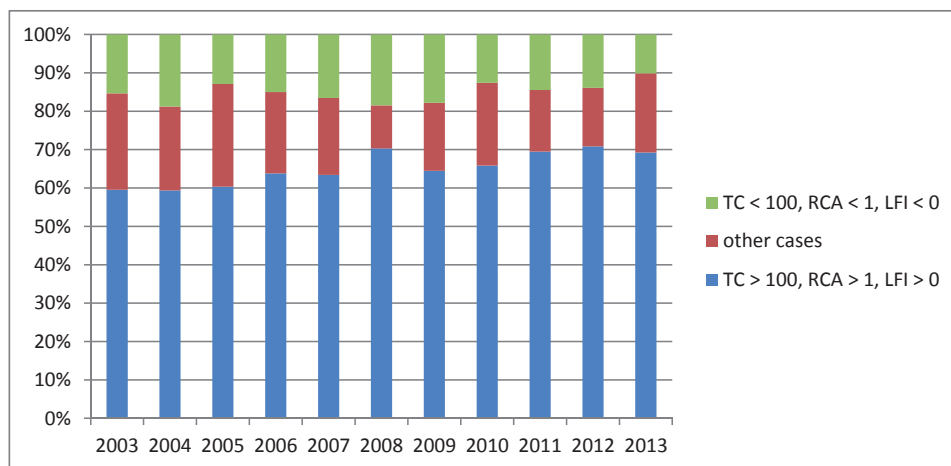
Source: own elaboration based on WITS-Comtrade data.

In the Polish agri-food trade in the years 2003-2013 as by far the most competitive product groups can be considered the following product groups: meat and offal (02), dairy products (04), vegetables (07), processed meat and fish (16), cereal and pastries (19) and processed fruits and vegetables (20). To this indicate the values of all three indicators (in Tab. 11.2, this situation is shown graphically in the form of three pluses in each year). A good competitive position had also sugars and confectionery (17), although in this case between 2009 and 2011 LFI index values were lower than zero. The comparison of these indicators shows that the comparative advantage of these groups on the world market are relatively stable.

Throughout this period, Polish food producers did not possess comparative advantages in trade in the global market in the following product groups: live plants and cut flowers (06), plant extracts (13), fats and oils of animal or vegetable (15), waste and feed animals (23). This is evidenced by the values of all three indicators (Tab. 11.2 shows this graphically in the form of three minuses of each year). In most years, the comparative advantage was also held by manufacturers of fish and seafood (03), coffee, tea and spices (09), cereals (10), products of milling, malt and starch (11), seeds and oleaginous fruits (12), other

plant products (14) and soft drinks and alcoholic (22). In these sections only in individual years the satisfactory values had only some indicators. The competitive position of these groups can therefore be regarded as poor.

In some sectors the years 2003-2013 brought sweeping change in indicator value (at least one), which resulted in gaining or losing comparative advantages in trade in these product groups on the world market. Product groups whose competitive position improved significantly include: tobacco and tobacco products (24) – since 2006, various food preparations (21) – since 2008 and cocoa and cocoa preparations (18) – since 2011. The competitive position, resulting in the loss of comparative advantages on the world market was observed in the case of live animals (01) – in 2013.

Another group are the product groups in which competitive position in the global market is not clear, i.e. in all or most years, the level of some indicators is satisfactory and the level of remaining ones is below the threshold. These product groups include other animal products (05), and fruits and nuts (08). In Table 11.2, this situation is shown graphically in the form of two pluses and one minus or a plus and two minuses.

Interesting conclusions are provided by the analysis of changes in the value of indicators that took place between 2003 and 2013, (the last column of the table 11.2). We should pay particular attention to two situations. The first concerns product groups that during almost the entire analysed period maintained their comparative advantage in trade on the world market, despite a decrease in all three indicators. These include the following groups: vegetables, sugars and confectionery and processed fruit and vegetables. The second case concerns departments that did not have during the analysed period comparative advantages, but for which we observed an increase in the value of the three analysed indicators. These include the following groups: coffee, tea and spices, cereals, milling products, seeds and oleaginous fruits, fats and animal or vegetable oils, soft drinks and alcoholic waste and animal feed. In the future, we can expect significant changes in the competitive position of those product groups.

Table 11.2. Overall assessment of the competitive position of the Polish agri-food trade in the world market, based on indicators of TC, RCA and LFI

(+ or – in individual fields of the table correspond to the indicators in this order), by HS heading

HS	Description	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Change in 2003–2013
01	Live animals	+–+	+++	+++	+++	+++	+++	+++	–+–	–+–	–+–	–––	↓↓↓
02	Meat and edible meat offal	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	↓↑↑
03	Fish and crustacea	–––	–––	+++	–––	–––	–––	–––	–+–	–+–	–––	–+–	↑↑↑
04	Dairy products	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	↓↑↑
05	Other products of animal origin	–+–	–+–	–+–	–+–	–+–	–+–	–+–	–+–	–+–	–+–	++–	↑↑↑
06	Live plants and cut flowers	–––	–––	–––	–––	–––	–––	–––	–––	–––	–––	–––	↓↓↑
07	Vegetables	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	↓↓↑
08	Fruit and nuts	–+–	–+–	–+–	–+–	–+–	–+–	–+–	–+–	–+–	++–	++–	↑↑↑
09	Coffee, tea and spices	–––	–––	+––+	–––	–––	–––	–+–	–+–	–––	–+–	–+–	↑↑↑
10	Cereals	–––	–––	+––+	–––	–––	–––	+––+	+–+	–––	+–+	+–+	↑↑↑
11	Products of milling industry malt and starches	–––	–+–	–––	–––	–––	–––	–––	–+–	–+–	–+–	++–	↑↑↑
12	Oil seed and fruit	–––	–––	–––	–––	+––	–––	–––	–––	–––	–––	+––	↑↑↑
13	Plant extracts	–––	–––	–––	–––	–––	–––	–––	–––	–––	–––	–––	↑↓↑
14	Other plant products	+–+	+++	+––	–––	+––	–––	–––	–––	–––	–––	–––	↓↓↓
15	Animal/vegetable fats and oils	–––	–––	–––	–––	–––	–––	–––	–––	–––	–––	–––	↑↑↑
16	Meat and fish products	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	↑↑↑
17	Sugar and sugar confectionery	+++	+++	+++	+++	+++	+++	++–	+++	++–	+++	+++	↓↓↓
18	Cocoa and cocoa products	–+–	++–	++–	++–	++–	++–	++–	++–	+++	+++	+++	↑↑↑
19	Cereal products and pastry	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	↓↑↑
20	Fruit and vegetable products	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	↓↓↓
21	Miscellaneous edible preparations	–+–	–+–	++–	++–	++–	+++	+++	+++	+++	+++	+++	↑↑↑
22	Alcoholic and non-alcoholic beverages	–––	–––	+––	+––	–––	–––	–––	–––	–––	–––	–––	↑↑↑
23	Residues and animal fodder	–––	–––	–––	–––	–––	–––	–––	–––	–––	–––	–––	↑↑↑
24	Tobacco and tobacco products	+–+	–––	++–	+++	+++	+++	+++	+++	+++	+++	+++	↑↑↑

Source: own elaboration based on WITS-Comtrade data.

11.3. Decomposition of changes in the Polish agri-food exports in 2003-2013 – analysis using the method of constant market share

Research method

One of the methods used in the study of trade flows is the method of constant market share – CMS[43]. The essence of this method is to divide the change in the share of the country in world exports into two factors: the structural factor and the factor expressing competitiveness. A structural factor determines the hypothetical growth of a country's share in world exports between the base year and the year of calculation, if it maintained its shares (i.e. the one observed in the base year) in each of the world's commodity markets. The difference between the actual participation of the country in world exports in the base year and its hypothetical share in the exports achieved assuming that its current position on all global commodity markets (structural effect), expresses contribution to this growth of the factor expressing the change in the country's competitiveness in the period [Marczewski 2014].

The original concept has been repeatedly modified. The authors of one of modification of the method of constant market share were: E.E. Leamer and R.M. Stern [1970], who extended the original model of geographic markets exports. In such a form, this method was used in this study to decompose changes in the Polish agri-food export. According to the formula proposed by E.E. Leamera and R.M. Stern we explained the value change in exports of the Polish agri-food products between the base year and the year the calculation were made for:

$$V_t^A - V_0^A = rV_0^A + \sum_{i=1}^{n}(r_i - r)V_{i0}^A + \sum_{i=1}^{n}\sum_{j=1}^{m}(r_{ij} - r_i)V_{ij0}^A + \sum_{i=1}^{n}\sum_{j=1}^{m}(V_{ijt}^A - V_{ij0}^A - r_{ij}V_{ij0}^A),$$

$$\qquad\qquad\quad (1)\qquad\quad (2)\qquad\qquad\quad (3)\qquad\qquad\qquad (4)$$

where:

V_t^A – value of the Polish agri-food exports in the period t;

V_{it}^A – value of the Polish export of the product i in the period t;

V_{ijt}^A – value of the Polish export of the product i sold on the market j in the period t;

r – growth rate of the world agri-food export between the year 0 and t;

r_i – growth rate of the world agri-food export concerning the product i between the year 0 and t;

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[43] Tyszyński [1951] was the first to use the method of constant market share in the study of trade flows.

r_{ij} – growth rate of the world agri-food export concerning the product i sold on the market j between the year 0 and t;

n – number of products in the Polish agri-food export;

m – number of trade partners in the Polish agri-food export.

The change in the Polish agri-food exports in a given period is therefore influenced by four components:

1) The effect of the increase in global demand (rV_0^A) – change in the value of exports which followed developments in world trade in agri-food (positive effect of an increase of global food exports);

2) The effect of product structure ($\sum_{i=1}^{n}(r_i - r)V_{i0}^A$) – change in the value of exports resulting from the commodity structure of agri-food exports of the country (positive result means that Poland specializes in the export of these groups of food products whose world exports grow faster than total agri-food export);

3) The effect of the geographical structure ($\sum_{i=1}^{n}\sum_{j=1}^{m}(r_{ij} - r_i)V_{ij0}^A$) – change in the value of exports resulting from the geographical structure of agri-food exports of a given country (positive result means that Poland is concentrated on exports to those countries in which the global agri-food export is growing faster than the total agri-food export);

4) The effect of competitiveness ($\sum_{i=1}^{n}\sum_{j=1}^{m}(V_{ijt}^A - V_{ij0}^A - r_{ij}V_{ij0}^A)$) – the difference between the current value of exports and the value of the above three components; change in the value of exports, which cannot be explained by these effects (positive result means that the Polish agri-food products are competitive on foreign markets for reasons other than those mentioned, i.e. their competitiveness may result from such factors as price or other characteristics of them).

The period of analysis covers the years 2003-2013. Calculations were made based on bilateral trade data at the six-digit HS classification derived from WITS-Comtrade database, expressed in USD. Decomposition of changes in the value of exports was prepared for each year, as well as the aggregated value of the individual effects for the entire period 2004-2013.

Research findings

Changes in the Polish agri-food exports in the years 2003-2013 were largely the result of changes in global trade in agri-food products. With the exception of 2009, the effect of changes in global demand was positive (Tab. 11.3

and Fig. 11.3). A large part of the growth in Polish exports in 2007-2008 and 2010-2011 can be explained by this effect. Geographical structure effect was positive in 2003-2008 and 2013. This meant that Poland exported its products to countries in which the total agri-food export grew faster than the global agri--food exports in general. Strong concentration on the market of the EU countries (mainly countries of the EU-15) meant, however, that after 2009, during the financial and economic crisis and the debt crisis in the euro zone geographical structure effect was mostly negative. Demand for food in the EU-15 grew more slowly than for other countries. During most of the period analysed was a negative effect of commodity structure (with the exception of 2005-2006 and 2013). This means that in the structure of Polish agri-food exports were dominated by products whose world exports grew more slowly than the global agri-food exports in general. While the competitive effect was particularly significant in the first three years after accession to the EU. In the following years the contribution of this effect to the growth of the Polish agri-food exports was markedly smaller, and in 2011 it was even negative. Again, the effect of competitiveness gained in importance in the years 2012-2013, when it was a major source of growth in the Polish exports of agri-food products.

Table 11.3. Decomposition of changes in Polish agri-food exports
in the years 2003-2013, in USD billion

Specification	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2004--2013
Effect of change in global demand	686.9	691.6	631.3	945.8	2188.1	3025.8	-1740.7	2346.1	3740.7	326.6	344.4	12499.7
Effect of product structure	-52.3	-18.1	130.4	108.6	-8.0	-599.1	35.8	-787.2	-162.9	-299.5	646.1	-953.8
Effect of geographical structure	60.9	99.8	296.4	145.7	454.9	513.3	-519.0	-414.6	222.1	-628.8	388.5	558.1
Effect of competitiveness	528.0	1291.1	1230.4	584.9	383.7	306.4	982.1	774.2	-446.8	1832.2	2430.7	9368.8
Change in export	1223.4	2064.2	2288.6	1784.9	3018.7	3246.3	-1241.8	1918.5	3353.2	1230.5	3809.7	21472.8

Source: own elaboration based on WITS-Comtrade data.

Figure 11.3. Decomposition of changes in the Polish agri-food export
in 2003-2013, in % compared to the previous year

■ The effect of competitiveness

■ The effect of the geographical structure

□ The effect of product structure

■ The effect of a change in global demand

◆ Change in agri-food exports
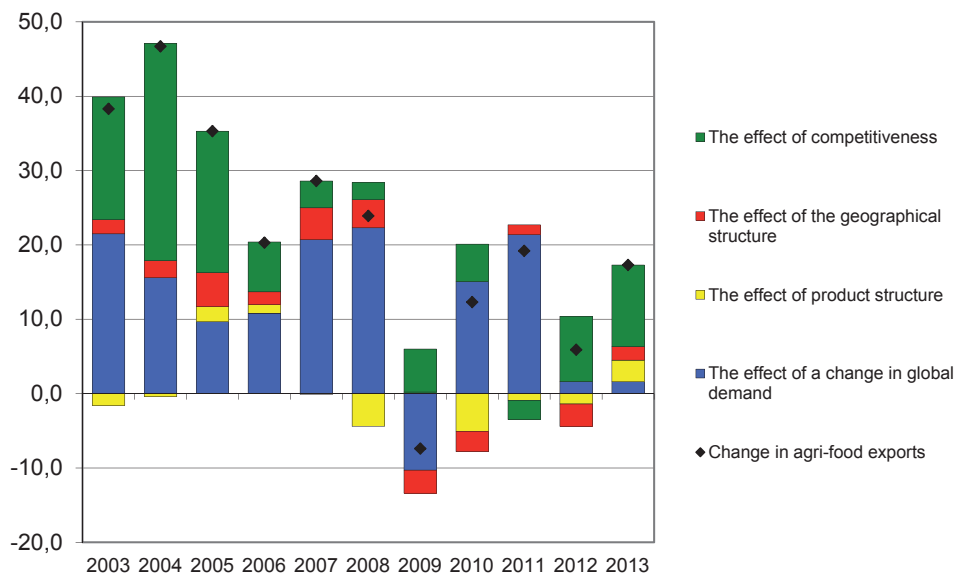
Source: own elaboration based on WITS-Comtrade data.

In order to assess the contribution of individual effects to the growth of agri-food exports during the Polish EU membership we prepared an aggregation of the effects of the individual years from the period 2004-2013. The cumulative value of these effects was related to cumulative changes in agri-food exports in 2004-2013 and expressed as a percentage.

During the EU membership the largest contribution to the growth of Polish agri-food exports had the effect of changes in the world demand world – it was responsible for over 52% of the cumulative increase in agri-food exports Polish in 2004-2013 (Fig. 11.4). Also of a great importance was the effect of competition, whose contribution to the growth in the Polish agri-food exports in 2004-2013 amounted to nearly 44%. Positive, albeit modest was the contribution of the geographical structure. A study also shows that Poland had an unfavourable structure of commodity exports, i.e. exports was concentrated on those groups of products for which world import demand grew more slowly than import demand for food products in general. This is evidenced by a negative value of the effect of product structure.

Figure 11.4. Decomposition of accumulated changes in export of
Polish agri-food sector in 2004-2013, in % of the cumulative value of its growth
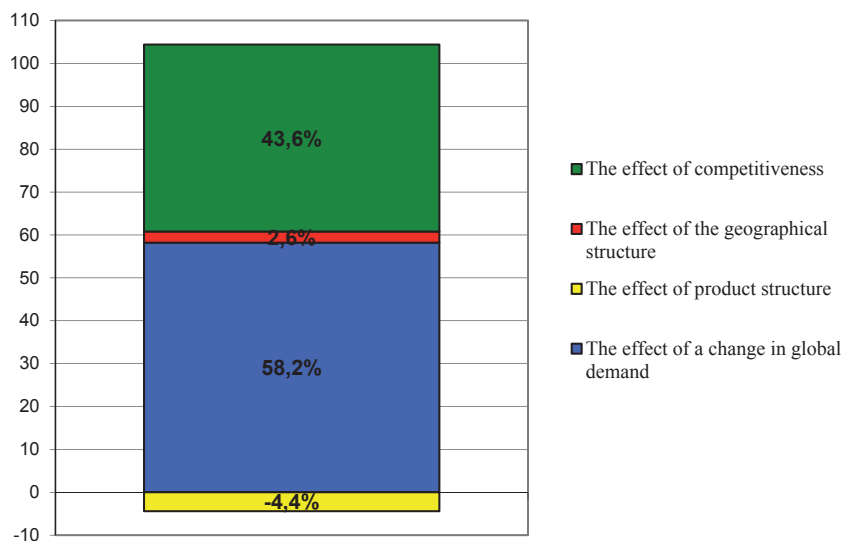
Source: own elaboration based on WITS-Comtrade data.

Decomposition of the effect of the geographical structure in the case of the major groups of trading partners leads to the conclusion that in 2004-2013 negative contribution to the growth of the Polish agri-food exports had the EU--15 (the cumulative value of the effect of exports to these countries amounted to – 8.2% of the cumulative export growth of the agri-food industry in the investigation period). While it was positive in the case of the contribution of the new Member States (EU-13) and countries outside the EU – the effect of the cumulative value of exports to these groups of countries amounted to 5.6% and 5.2% of the cumulative growth in agri-food exports in 2004-2013. The EU-15 was a key recipient of Polish food, and its share in the export of the Polish agri-food sector increased during the period of the Polish EU membership. The global agri-food exports to these countries grew, but at a slower rate than the global agri-food export, hence the negative impact of the EU-15 on the growth of the Polish exports. The biggest negative effect was generated by Germany, Italy, Spain, Netherlands, United Kingdom and Denmark.

While import demand for food in some new Member States (and thus global food exports to these countries) was dynamically increasing, e.g. in the Czech Republic, Slovakia, Lithuania, and Romania. Hence, a positive value of effect of geographical structure in the exports to the EU-13. A similar situation

also concerned some non-EU countries, especially Russia, Belarus and Ukraine. While the negative impact of the geographical structure was generated by third countries, such as Turkey, USA, Mexico and South Korea.

Decomposition of the cumulative effect of product structure can however answer the question of which group of products contributed most to the negative effect of product structure. Global import demand for agri-food products, which dominated in the Polish exports grew more slowly than the global import demand for food products in general. Hence, the largest negative contribution to the cumulative effect of the product structure of exports had tobacco and tobacco products, meat and offal, vegetables, preparations of meat and fish, dairy fruit and vegetables, live animals. The positive contribution had: waste and animal feed, fats and oils, seeds and oleaginous fruits.

Decomposition of the cumulative effect of the competitiveness of individual product groups showed that in the vast majority of these groups we observed positive competitive effect. The biggest positive contribution to the competitiveness effect was generated in 2004-2013 by products such as meat and offal, tobacco and tobacco products, dairy products, various food preparations, preparations of meat and fish, cereal processed products and pastries, cereals. While negative contribution to the competitiveness effect had live animals.

11.4. Conclusions and summary

The overall assessment of the competitive position of Polish trade in agri-food products on the world market during the period of membership in the European Union, based on an analysis of selected three indicators of competitiveness (TC, RCA and LFI) shows a varied situation in the sector depending on the product group. Poland had a comparative advantage in trade of following product groups: meat and offal, dairy products, vegetables, processed meat and fish, cereal processed products and pastries and processed fruit and vegetables. The competitive position of sugars and sugar confectionery and tobacco and tobacco products was also good. In the years 2003-2013 in the case of many product groups there was a significant improvement in the value of individual indicators. Thus, we observed an increase from 59% to 69% in the share in the agri-food export of products in respect of which Poland had a comparative advantage in the global market.

Decomposition of the changes in the Polish agri-food exports in the years 2004-2013 (conducted using constant market share – CMS) indicates that nearly 60% of the cumulative export growth in that period was a result of increasing global demand for food. A small positive effect of geographical structure appeared primarily due to the concentration of Polish exporters in the EU-15,

where the demand for agri-food products grew, but more slowly than the world average. While negative was the cumulative effect of commodity structure, which was due to the dominance in the Polish agri-food exports of product groups, for which global demand was growing relatively slowly. Over 40% of the cumulative growth in Polish agri-food exports was due to the competitive effect. The greatest value of competitive effect of trade was generated by such products as meat and meat products, tobacco and tobacco products, dairy products, cereals and cereal preparations.

Conclusions stemming from the overall assessment of the Polish competitive position on foreign markets are largely consistent with the findings received when using of the method of constant market share. The highest *stricte* competitive effect was observed in these groups of products that were competitive (as pointed by three indicators) in the whole or the larger part of the period analysed. These were: meat and offal, tobacco and tobacco products, dairy products, various food preparations, preparations of meat, fish and cereals and pastries. Throughout the period, or in most years in Polish exports competitive were also: fruit and vegetable products, vegetables, sugars and confectionery products and live animals, however, in the period of Polish membership in the EU there has been a clear weakening of the Polish competitive position in the export of these products. This may explain the relatively low intensity of the competitive effect.

References

1. Ambroziak Ł., Szczepaniak I., *Monitoring i ocena konkurencyjności polskich producentów żywności (4). Pozycja konkurencyjna*, seria "Program Wieloletni 2011-2014", no. 74, IERiGŻ-PIB, Warszawa 2013.
2. Ambroziak Ł., *The agri-food exports of the new EU Member States: a constant market share analysis,* [in:] *Proceedings of 28th International Business Research Conference*, 8-9 September 2014, ed. Md. Mahbubul Hoque Bhuiyan, World Business Institute Australia, http://www.wbiworld conpro.com /pages/previous_confo/spain-conference-2014.
3. Bednarz J., *Konkurencyjność polskich przedsiębiorstw na rynkach europejskich na przykładzie wybranych branż,* Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk 2013.
4. Leamer E.E., Stern R.M., *Quantitative International Economics*, Allen & Bacon, Boston 1970.
5. Marczewski K., *Dekompozycja zmian salda obrotów polskiego handlu zagranicznego na czynniki zewnętrzne i wewnętrzne w konwencji modelu CMS*,

[in:] *Koniunktura gospodarcza świata i Polski w latach 2011-2014*, joint work ed. by: K. Marczewski, IBRKK 2014.

6. Stankiewicz M.J*., Konkurencyjność przedsiębiorstwa. Budowanie konkurencyjności przedsiębiorstwa w warunkach globalizacji,* Wydawnictwo TNOiK "Dom Organizatora", Toruń 2005.

7. Szczepaniak I. (ed.), *Monitoring i ocena konkurencyjności polskich producentów żywności (5). Synteza*, seria "Program Wieloletni 2011-2014", no. 115, IERiGŻ-PIB, Warszawa 2014(a).

8. Szczepaniak I. (ed.), *Monitoring i ocena konkurencyjności polskich producentów żywności (2)*, seria "Program Wieloletni 2011-2014", no. 40, IERiGŻ-PIB, Warszawa 2012.

9. Szczepaniak I., *Competitiveness system – selected theoretical and empirical aspects*, [in:] *Assessment of the competitiveness of Polish food producers in the European Union*, joint work ed. by: I Szczepaniak, series "Multiannual Programme 2011-2014", no. 126.1, IAFE-NRI, Warsaw 2014(b).

10. Tyszyński H., *World trade in manufactured commodities, 1899-1950*, The Manchester School of Economic Social Studies 1951, vol. 19, pp. 272-304.

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12. Polish food demand in the shade of export's successes

12.1. Introduction

Polish economy in comparison with other countries showed a relatively high resilience to the last global financial and economic crisis. Moreover, in comparison to the region of Central and Eastern Europe and the whole European Union, in particular the euro area, it reached almost a resounding success. According to Eurostat, in 2009-2013 the GDP in Poland increased by 15.4%, while in the EU-28 and the euro area (18 countries) it decreased respectively by 1.2% and 2.3% [Real GDP, 2015]. The main factors supporting Polish economic growth were: total consumption and net exports, while in 2009-2010 the role of stimulator of economic growth was played by consumption. During the second wave of the global crisis, i.e. in the years 2011-2013, the contribution of net exports to GDP growth exceeded the contribution of consumption[44] [Informacja 2014, Informacja 2015a].

According to Central Statistical Office (CSO) data, in 2013 exports calculated at current prices amounted to EUR 155.0 billion and was by EUR 38.8 billion or 33.3% higher than in 2008. Imports increased from EUR 142.4 billion to EUR 157.0 billion, i.e. 10.2%. As a result, the negative balance of trade in goods decreased from EUR 26.2 billion to EUR 1.98 billion. A significant impact on reducing the overall Polish foreign trade deficit had an increase in the surplus of foreign trade in food products. In 2013 receipts from exports of agri-food products reached EUR 20.4 billion and increased by 74.7% as compared to 2008. The share of agri--food products sold abroad in total exports amounted to 13.2%, whereas in 2008 it was 10.1%. In 2013 the value of agri-food products imported to Poland amounted to EUR 14.3 billion, compared to EUR 10.3 billion in 2008 and the share of these products in the total value of Polish imports accounted to 9.1% (in 2008 it was 7.2%). The balance of Polish foreign trade in agri-food products in 2013 was 6.1 billion euros, against 1.4 billion in 2008 [Handel 2009, Handel 2013].

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[44] According to CSO estimates, in 2011-2013 the contribution of net exports to GDP growth was 1.53 pp, while total consumption contributed 0.97 pp. In 2009-2013, total consumption and net exports raised the average annual GDP growth rate of 2.9%, respectively, by 1.44 and 1.32 pp. Accumulation had a zero impact on the GDP growth rate, which was due to the low investment growth.

The dynamic growth of agri-food exports in recent years was a special reason for satisfaction and determinant of a positive assessment of Polish economy. Its intensification was accompanied by a significant reduction in the rate of growth of individual consumption and the absolute reduction in domestic demand for food.

CSO national accounts show that in 2009-2013 the average annual growth rate of private consumption in the household sector (personal income) was 2.0% and was more than twice lower than in 2004-2008. Consumption of food and non-alcoholic beverages, after a rise of 11.7% in 2004-2008, decreased by 5.6% in 2009-2013.

After a strong slowdown in mid-2013, the Polish economy entered a path of growth. Increased economic activity in most areas, positive developments on the labour market, accelerated growth in real wages, slowed down dynamics of consumer prices and improving consumer attitudes turned the domestic demand, based largely on private consumption and it once again become a stimulator of the GDP growth. CSO's national accounts, retail sales statistics, results of household budgets surveys and internal market observations show a significant recovery in demand for food.

The aim of this chapter is to present the main macroeconomic determinants of food consumption in the years 2009-2013, disclosing developments on the demand side influenced by an economic slowdown, illustrating changes in the level and structure of consumption of food in terms of macro- and microeconomic, indicating the directions of its development in 2014 and to attempt to answer the question of whether post-crisis recovery in domestic demand for food will have the characteristics of durability.

This study is based mainly on two sources of statistical information, i.e. the macroeconomic data and the results of the CSO household budget survey. The first source helped to identify macroeconomic determinants of demand for food. In assessing the income of individuals, data from CSO national accounts and the results of the household budget survey were used. In order to characterize price determinants of demand the estimated by CSO aggregate indicators of retail prices of goods and services were used. The source of information about changes in the real global food demand in value terms was data from CSO national accounts for spending in the household sector, data from the CSO's Department of Trade and Services on food retailing and data from the household budget survey on expenditure for food consumed within household. To quantify changes in food consumption we used balance sheets of agricultural products and the results of the household budget survey prepared by the CSO.

An important source of information also were the results of own analysis of market statistics and specialized publications of Polish and foreign research centres, organizations and statistical offices (IBRKiK, the IMF, NBP, Eurostat). The study used statistical analysis and economic reasoning, inductive and deductive synthesis, and methods of market analysis and benchmarking. The study mainly related to years 2009-2013, but in justified cases, reference was made to previous years. This resulted in a clearer picture of changes in food consumption, which allowed for drawing more precise conclusions.

12.2. Macroeconomic determinants of demand for food in 2009-2013

Tight framework of this study does not allow for an analysis of all of the variables affecting the overall level of demand for food. The focus is therefore on a few basic economic conditions determining consumption at the macroeconomic level, such as GDP, unemployment rates, personal income and the prices of food products, which fundamentally set the trend of consumption [Bywalec 2010, Wierzejski 2010].

The main factors shaping the demand for food in 2009-2013 were the slowdown of GDP growth, negative trends on the labour market, low income growth of the population, including in particular in the group of consumers deriving incomes from employment, real increase of food prices and changes in the structure of family living costs associated with a significant increase in the prices of domestic services.

The turmoil in global financial markets started in mid-2008, the global recession and the debt crisis in some EU countries led to a significant slowdown of the world economy, which had an impact on the Polish economy. In the period 2009-2013, the average growth rate of the Polish GDP amounted to 2.7%, against 5.5% in 2004-2008, which was an effect of not only external but also of internal processes related to the reduction of imbalances in public finances. In 2013 the GDP was 14.3% higher than in 2008 (in the EU-28 it fell by 1.3%), while in 2004-2008 increased by 30.0% (Fig. 12.1).

The slowdown in economic growth was reflected in the intensification of the negative trends on the labour market and in the registered unemployment rate rising from 9.5% at the end of 2008 to 13.4% at the end of 2013 (Fig. 12.2) [Rynek 2015].

Figure 12.1. GDP growth in Poland and the European Union (EU-28)
in 2004-2013 (constant prices, previous year = 100)
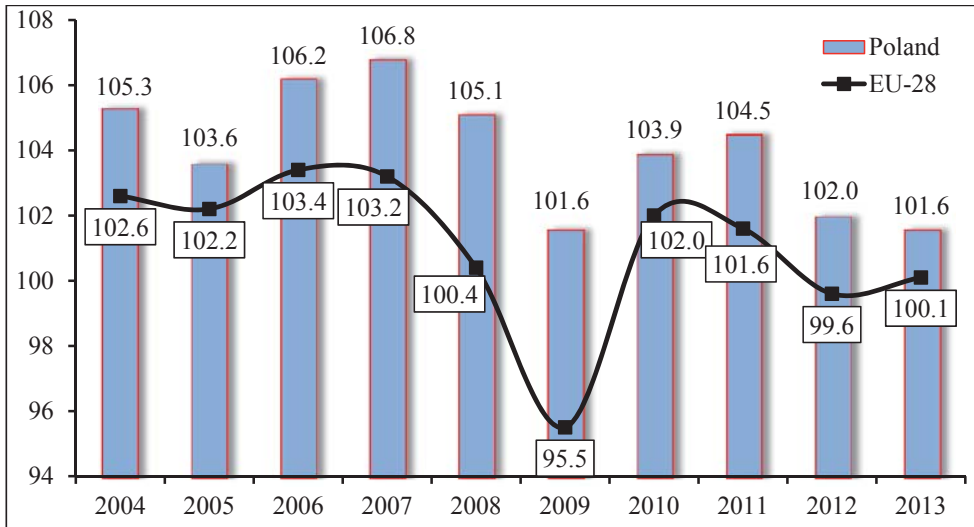
Source: CSO and EUROSTAT (ESA95) data.

Figure 12.2. Registered unemployment rate (at the end of the year, in %)
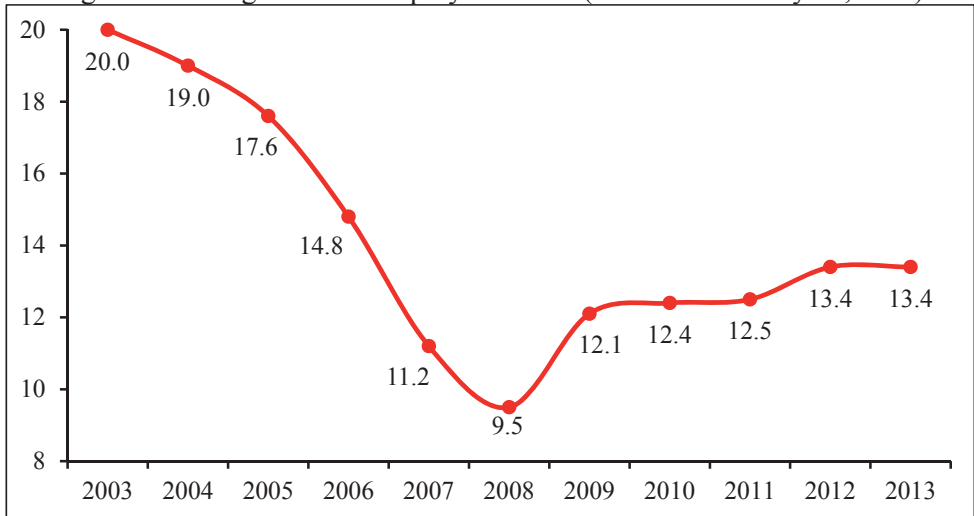
Source: own elaboration based on CSO's data.

The high level of unemployment limited wage pressure. In 2013, compared with 2008, average monthly real wages in the enterprise sector increased by 4.7%, i.e. more than 4 times less than in 2004-2008. The income growth in the case of employees and self-employed outside agriculture and individual farmers also slowed. The real value of remittances from people working abroad fell as well as loans to households for consumption, reflecting both the tightening of criteria and conditions for granting loans, and the simultaneous weakening of demand for loans. Significantly slowed the growth of farmers' income [Rocznik 2011, Rocznik 2013], while the growth rate of pensions increased (in 2009 pensions were valorised).

Table 12.1. Indicators of real wages, pensions and
gross disposable income of households

Specification	2008	2009	2010	2011	2012	2013	
	2003=100	Previous year = 100					2008=100
Average monthly real gross wages	119.1	102.0	101.4	101.4	100.1	102.5	107.6
in enterprise sector	120.4	101.1	100.8	100.9	99.8	102.0	104.7
Average monthly real gross pension from non-agricultural social security system	111.6	104.3	103.6	100.3	101.3	104.4	114.6
Average monthly real gross pension received by farmers	101.4	101.9	101.9	98.6	102.8	105.1	110.6
Real disposable gross income in the household sector	**117.1**	**103.5**	**102.0**	**101.3**	**100.4**	**101.4**	**108.9**

Source: own elaboration based on CSO's data.

Figure 12.3. Changes in real disposable gross income in the household sector
(in % compared to the previous year)
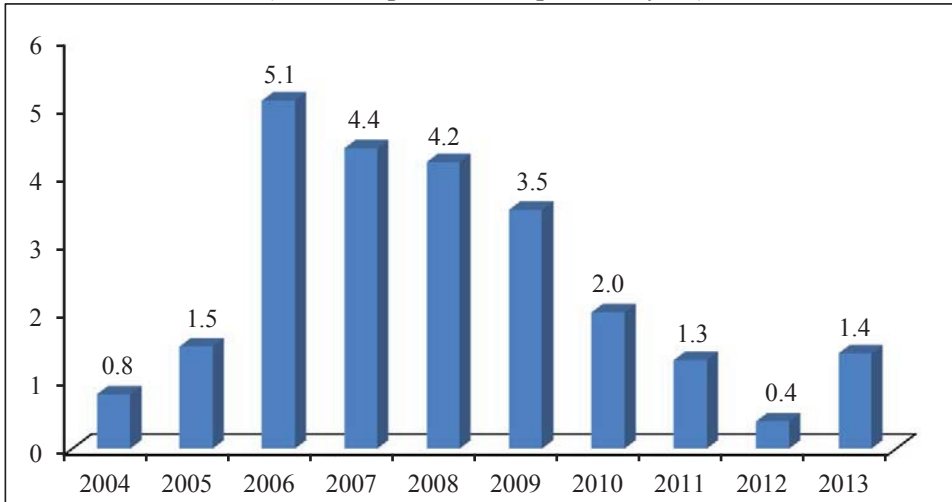
Figure 12.4. GDP growth and real disposable gross income
in the household sector (2003 = 100)
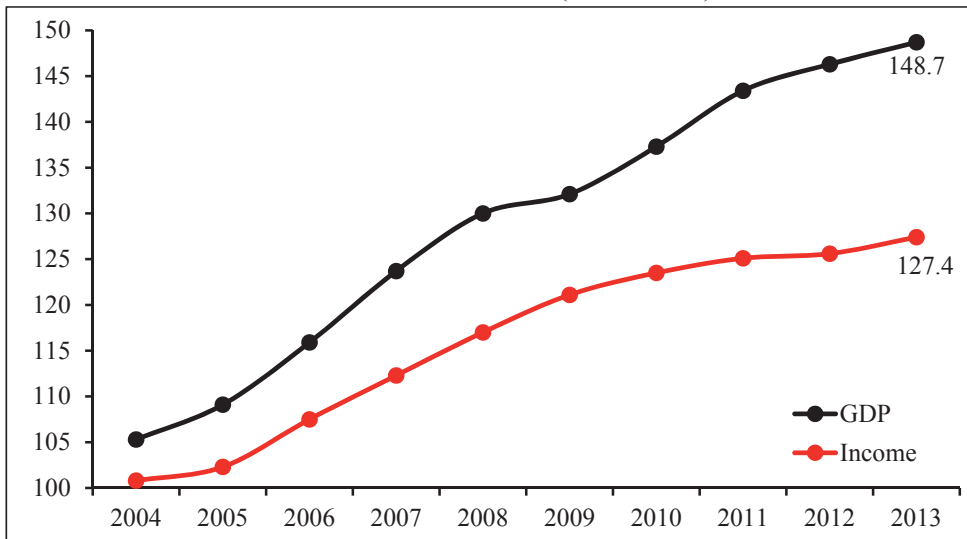
In Poland during the recent economic crisis a relatively high inflation persisted. It was generated by increases in the prices of food, energy and fuel. Significant acceleration of food prices in the period 2011-2012 resulted mainly from global factors, among which the key role played the changes in global food demand and adverse supply conditions in world agricultural markets favouring the growth of Polish exports (Fig. 12.5).

Figure 12.5. Dynamics of global food prices (2003 = 100)
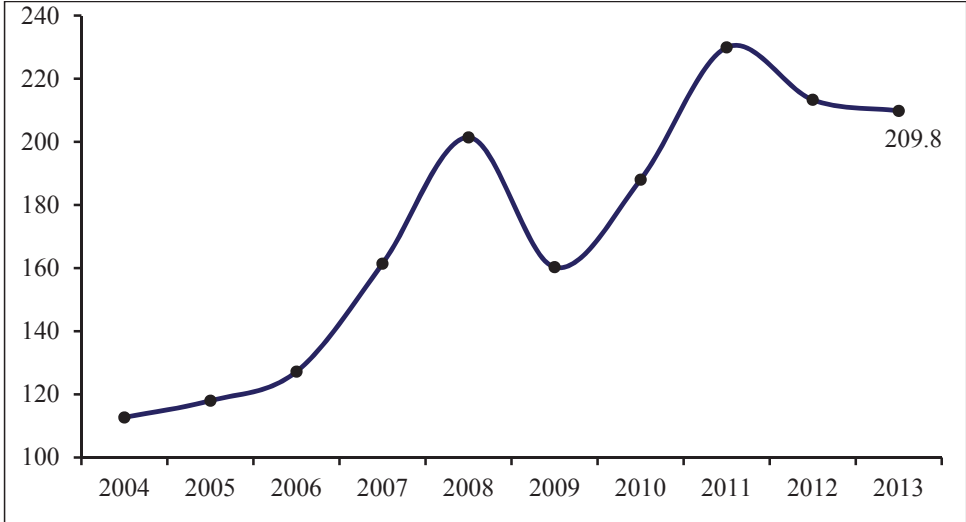
In 2013, in relation to 2008, in Poland prices of food and non-alcoholic beverages increased by 19.9%, with inflation of 15.9%. In the case of many basic food groups the increase rate was higher than the average. These products include sugar (76.2%), eggs (63.1%), bread and cereals (56.7%, while flour and rice 67.0% and bread 64.0%), fats (56.3%, while pig fat 94.4% and butter 66.4%) and fruits (51.9%, including bananas 58,0% and apples 54.2%). Prices of meat and meat products increased on average by 47.1%, including beef by 137.0%. The increase in prices of other food groups, e.g. vegetables and vegetable products, fish and fish products and dairy products was lower than the average, although individual products significantly exceeded it (e.g. the rise in prices of potatoes amounted to 88.0%) (tab. 12.2).

Table 12.2. Indicators of prices of chosen food product groups

Specification	2008 2003=100	2013 2008=100	2013 2003=100
Food	**122.3**	**120.5**	**147.3**
Eggs	117.4	138.9	163.1
Baker's goods and cereal products	129.6	120.9	156.7
Edible fats	127.7	122.4	156.3
Fruit and fruit products	127.8	119.0	151.9
Sugar, confectionary products and honey	121.5	122.1	148.3
Sugar	128.5	137.2	176.2
Meat and meat products	118.5	124.1	147.1
Fish and fish products	110.2	131.1	144.5
Potatoes, vegetable and vegetable products	119.6	118.7	141.9
Milk products	123.7	109.3	135.2

Source: own elaboration based on CSO's data.

A real increase of food prices was accompanied by a prominent increase in prices of goods and services related to housing, energy products, health and transportation, especially of fuels for private means of transport, of alcoholic beverages and tobacco (tab. 12.3, Fig. 12.6). The need to increase household spending on household services, most of which constitutes "fixed expenditure" significantly burdened the budgets of families and limited opportunities to increase household expenditure on food to the extent compensating for the increase in food prices.

Table 12.3. Price indices of selected groups of consumer goods and services in 2009-2013 (previous year = 100)

Specification	2009	2010	2011	2012	2013
Consumer goods and services	103.5	102.6	104.3	103.7	100.9
Food and non-alcoholic beverages	**104.1**	**102.7**	**105.4**	**104.3**	**102.0**
Food	104.1	102.8	105.6	104.3	102.2
Alcoholic beverages and tobacco	109.4	105.3	103.7	104.1	103.5
Housing and energy products	108.5	103.8	106.2	105.8	102.0
Energy products	110.4	104.1	107.4	106.7	99.5
Transportation	97.6	106.2	107.7	107.0	98.2
Fuels for public means of transport	93.1	111.9	113.7	110.9	96.0

Source: own elaboration based on CSO's data.

Figure 12.6. Dynamics of prices for selected groups of consumer goods
and services in 2004-2013 (2003 = 100)
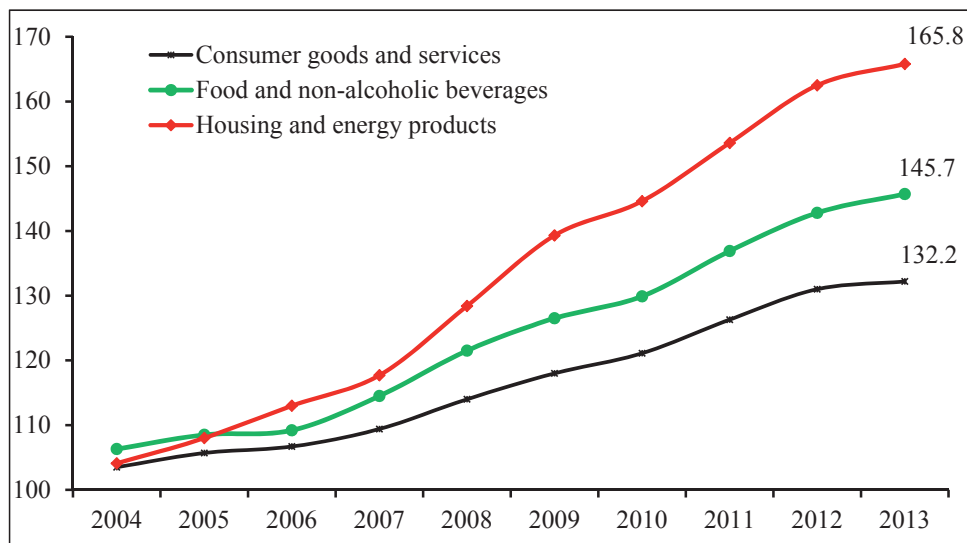
12.3. Food consumption according to national accounts

CSO national accounts show that the consumption of food and non-alcoholic beverages in the household sector, financed with personal income, after an increase of 11.7% in 2004-2008 (in constant prices) and stabilization in 2009-2010, began to decline as of 2011. In 2013 it was at a level 5.6% lower than in 2008, accompanied by an increase in total consumption expenditure of households by 11.4% (Fig. 12.7). At the same time there was an increase in consumption of all non-food commodity groups and consumer services, including most of clothing and footwear products, health, housing and energy products [Rocznik 2014].

This trend is reflected in trade statistics (Fig. 12.8), which show that in 2009--2013 retail sale of food (in constant prices) decreased by 5.3%, with an increase in sales of non-food products by 23.4%. The decrease in food sales in retail trade was partially offset by an increase in sales in catering establishments (by 6.7%).

The research carried out for the purposes of this study suggests that an important factor limiting demand for food was not only a real increase in food prices and domestic services, but also the continued relatively high demand for non-food goods. Detailed analysis of household expenditure leads to the conclusion that consumers save on food to meet their non-food needs according to their preferences.

Figure 12.7. GDP and private consumption in the sector
of households in 2004-2013 (in constant prices, 2003 = 100)
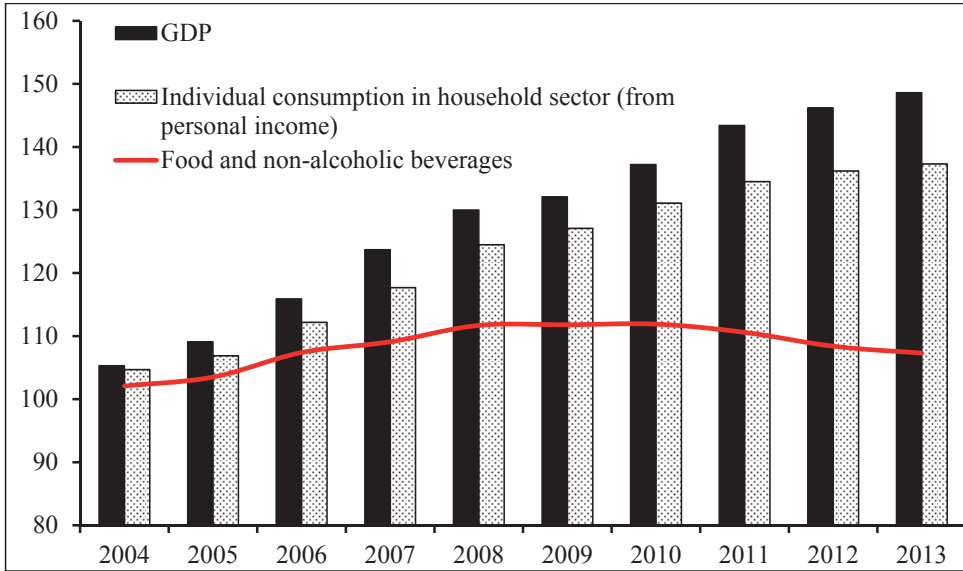
Source: own elaboration based on CSO's data.

Figure 12.8. Retail sales growth in 2004-2013 (constant prices, 2003 = 100)
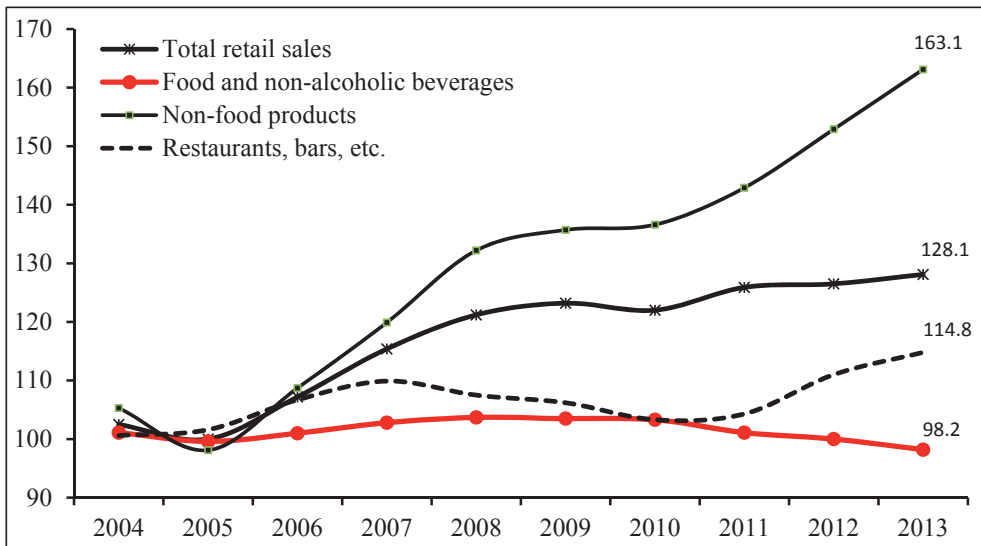
Source: own elaboration based on CSO's data.

12.4. Balance food consumption

Changes in the consumption of basic foods in the years 2009-2013 were multidirectional, with a predominance of downward trends. Analysis of the CSO's balance calculations for agricultural products shows that in 2013, out of ten basic food groups, the consumption of seven was lower, and of the other three higher than in 2008 (Tab. 12.4). Significantly decreased the consumption of cereal products, potatoes, vegetables, fruit and meat and offal, especially of red meat, with an increase in the consumption of poultry. Consumption of fish and eggs decreased. Consumption of milk, sugar and fats increased mainly due to a significant increase in the consumption of vegetable fats, offsetting the reduction in the consumption of animal fats.

Table 12.4. Consumption of certain foodstuffs (according to the balance calculations per 1 inhabitant)

Specification	2008	2009	2010	2011	2012	2013	2014[a]
Grain of 4 cereals calculated for cereal products – kg [c]	112	111	108	108	108	108	107.5
Potatoes – kg [c]	118	116	110	111	111	102	103
Vegetables – kg	115	116	106	104	103	102	104
Fruit – kg	55.0	55.5	44.0	42.0	46.0	46.0	48.0
Meat and offal [e] – kg	75.3	75.0	73.7	73.4	71.0	67.5	71.0
including: meat – kg	71.2	70.8	69.9	70.1	67.3	63.8	67.5
pork – kg	42.7	42.4	42.2	42.5	39.2	35.5	38.5
beef – kg	3.8	3.6	2.4	2.1	1.6	1.5	1.6
poultry meat – kg	24.1	24.0	24.6	25.0	26.1	26.5	26.9
Fish and fish products [f] – kg	13.7	13.3	13.1	12.2	11.7	12.2	13.2
Edible fats [g]	31.5	31.8	32.1	32.0	32.1	31.8	32.7
animal – kg	6.4	6.0	6.3	6.1	6.0	5.1	5.5
plant	20.8	21.1	21.5	21.9	22.2	22.6	23.0
butter – kg	4.3	4.7	4.3	4.0	4.1	4.1	4.2
Cow milk – l [h]	182	187	189	194	193	206	207
Hen eggs – pcs.	205	206	202	172	140	148	148
Sugar – kg	38.4	38.8	39.9	39.4	42.5	41.9	43.6

[a] Estimates
[b] IAFE-NRI's forecast.
[c] Data for economic year, that is from 1st July of a given year to 30th June of the following year, [d] IAFE-NRI's estimates, [e] including meat and offal used for meat products, [f] in fresh weight, [g]in trade weight, since 2005 IAFE-NRI's estimates, [h] including milk used for milk products, without milk used for butter.
Source: CSO's and National Marine Fisheries Research Institute's data and IAFE-NRI's forecasts and estimates.

12.5. Food consumption of households

The decline in domestic demand for food are estimated based on CSO national accounts is confirmed by the household budget survey, which shows that in 2009-2013 the average monthly nominal household expenditure on food and non-alcoholic beverages (per 1 person) increased by 14.4%, which with an increase in average level of retail prices of food of 19.9% means a reduction of 4.6% in their real value (tab. 12.5). The real value of the total expenditure increased by 1.6% [Sytuacja 2005, Budżety 2013]. The slowdown in real consumption growth in 2009-2013, compared with previous years, was significant, and the absolute decrease in household expenditure on food was a reversal of the long-term trend[45].

Table 12.5. Average total monthly income and expenditure
for 1 person in 2008-2013

Specification	2008	2009	2010	2011	2012	2013
	in PLN					
Disposable income	1045.52	1114.49	1192.82	1226.95	1278.43	1299.07
Total expenditure	904.27	956.68	991.44	1015.12	1050.78	1061.70
Food and non-alcoholic beverages	231.14	240.08	246.14	254.13	263.85	264.30

Source: Sytuacja gospodarstw domowych w 2004 r. w świetle wyników badań budżetów gospodarstw domowych, GUS, Warszawa, 2005, pp. 10-11; Budżety gospodarstw domowych w 2013 r., GUS, Warszawa 2014, pp. 283-284.

Demand of households (measured by the real value of expenditure) decreased in the case of all food groups, with the exception of fish, dairy products, confectionery and soft drinks[46]. Detailed analysis of household expenditure shows that the decrease in demand for food mostly involved the households with lowest income and middle-income households.

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[45] In 2004-2008 the average real disposable household income grew by 28.8%. The real total expenditure increased by 17.1% by a slight increase in real expenditure on food and non--alcoholic beverages.

[46] Household budget survey includes only food purchased for consumption at home or obtained from one's own farm plots or other activity conducted on one's own. It does not include food products sold for direct consumption by restaurants, cafés, bars, kiosks, street vendors, vending machines, canteens and buffets. It does not include consumption in hospitals, nurseries, kindergartens, boarding schools, prisons, barracks, convents, etc.

In 2009-2013, the real decrease in demand for food in the poorest house-holds was 6%, while in the richest households it was twice smaller. A reduction in by 6% real spending on food was observed in each of the first three quintiles, i.e. approximately 60% of the surveyed households. At the same time the wealthiest households significantly increased food consumption outside of home, which means that in reality their level of consumption did not decrease[47].

The effects of the recent economic slowdown were much more severe for the poorest households than for the richest ones. For the former they meant the need to reduce food expenditure and a significant reduction in the level and deterioration in structure of nutrition, and were imperceptible to others, they did not weaken their demand for food and the desire to improve the quality of life.

12.6. Consumption of food on the growth path

In 2014 despite the negative impact of the global situation an increase in the economic activity was observed in Poland. The Russian-Ukrainian crisis and tense political situation in the East, a weak recovery in the euro area and related to it reduction in demand for Polish exports, and an embargo imposed on certain Polish goods by Russia and other countries of the East did not influence the overall condition of the Polish economy. Strong economic growth, positive developments on the labour market and low inflation resulted in the acceleration of growth of real incomes of the population. There was a significant increase in domestic production and the supply of agricultural commodities, particularly grains, animals for slaughter and milk. Agro-natural conditions favoured the growth of fruit and vegetable production. The prices of most basic agricultural and horticultural products were lower compared to prices a year earlier. Lower cost of agricultural raw materials and other processing and marketing costs related to a drop in energy prices and of gas and fuels prices resulted in a reduction of selling prices of products of the food industry and of the retail price paid by consumers. Deflation in food market was a phenomenon not observed after 2002-2003. In addition, the decline in prices of agri-food products on world markets intensified.

Stable economic growth, improvement in the incomes of the population, low rate of increase in the prices of goods and services, absolute decline in food prices and positive consumer attitudes favoured the growth of consumer de-

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[47] In 2013, in comparison with 2008, in these families nominal spending on catering grew by 56.6% and was 6.5 times higher than in the poorest households. In 2013 the share of expenditure on catering in spending on food and non-alcoholic beverages was 18%, compared to 13.3% in 2008. In the poorest households, this percentage increased respectively to 5.4% from 4.1%.

mand. Preliminary CSO data suggest that in 2014 there was a reversal of persisting since 2011-2013 downward trend in demand for food. In 2014, in comparison with 2013, retail sale of food, beverages and tobacco, in constant prices in enterprises employing more than 9 persons, increased by 4.8%, while in the previous year it increased by only 0.3%. In the fourth quarter, its growth was 7.6% year on year, against a drop of 0.3% in the same period a year earlier. In 2014, in contrast to previous years, the growth rate of food sales was almost twice higher than total retail sales [Informacja 2015b]. The survey of household budgets shows that in 2014 real household expenditures on food and non-alcoholic beverages were 1.0% higher than in 2013. There was a rapid increase in household expenditure on feeding outside of home and increase in the share of gastronomy in meeting the food needs of the population. There was an increase in household demand for products with a higher degree of processing, ready meals and semi-finished products that save time needed for preparing meals. The value of food generated from one's own production decreased. The decrease in self--supply was offset by the increase in the value market purchases [Popyt 2015].

The increase in the total amount of wages based on rising wages and employment and stabilization of non-food costs of living in conjunction with the reduction in food prices will provide the foundation for the growth of food consumption in 2015. Presumably, however, this increase will not be large and will reach a maximum of 1.5-2.0%. The key factors limiting growth in domestic demand for food is persistence of relatively large stratification of the society [Czapiński, Panek 2014; Sytuacja w 2014] and the changes in behaviour and attitudes of customers generated during the crisis. The crisis sharpened the consumer awareness, which means that more buyers started to look at their expenditure. They exhibit a greater tendency to control household budgets, cost management and reduction of food waste. Market research shows that "post-crisis" consumers are more selective in relation to their needs, carefully analyse their purchasing decisions, spend less and more wisely, optimize their purchases according to the idea "of shopping smart", using modern technology [Smart 2014].

References

1. *Budżety gospodarstw domowych w 2013 r.*, GUS, Warszawa 2014.
2. Bywalec Cz., *Konsumpcja a rozwój gospodarczy i społeczny*, Wydawnictwo C.H. Beck, Warszawa 2010, pp. 91-108.
3. Czapiński J., Panek T., *Diagnoza społeczna 2013. Warunki i jakość życia Polaków*, Rada Monitoringu Społecznego, Warszawa 2014, p. 16, http://ce.vizja.pl (access: 21.10.2014).

4. *Handel zagraniczny styczeń-grudzień 2008 r.*, GUS, Warszawa 2009, pp. 16-18, http://www.stat.gov.pl, (access: 10.10.2014).

5. *Handel zagraniczny styczeń-grudzień 2013 r.*, GUS, Warszawa 2014, pp. 17-20, http://www.stat.gov.pl, (access: 10.10.2014).

6. *Informacja o sytuacji społeczno-ekonomicznej kraju w lutym 2014 r.*, GUS, Warszawa, 24 March 2014, p. 78.

7. *Informacja o sytuacji społeczno-ekonomicznej kraju w lutym 2015 r.*, GUS, Warszawa, 23 March 2015, p. 80(a).

8. *Informacja o sytuacji społeczno-gospodarczej kraju w 2014 roku*, GUS, Warszawa, 26 January 2015, p. 63(b).

9. *Popyt na żywność. Stan i perspektywy*, joint work ed. by: K. Świetlik, IERiGŻ-PIB, MRiRW, ARR, Warszawa, March 2013, seria: Analizy rynkowe, no. 14, pp. 10-11.

10. *Popyt na żywność. Stan i perspektywy*, joint work ed. by: K. Świetlik, IERiGŻ-PIB, MRiRW, ARR, Warszawa, March 2014, seria: Analizy rynkowe, no. 10, pp. 11-16.

11. *Popyt na żywność. Stan i perspektywy*, joint work ed. by: K. Świetlik, IERiGŻ-PIB, MRiRW, ARR, Warszawa, kwiecień 2015 r., seria: Analizy rynkowe, no. 16, pp. 25-32.

12. *Real GDP growth rate – volume*, Eurostat, http://epp.eurostat.ec.europa.eu, (access: 13.04.2015).

13. *Rocznik Statystyczny Rzeczypospolitej Polskiej 2011*, GUS, Warszawa 2011.

14. *Rocznik Statystyczny Rzeczypospolitej Polskiej 2013*, GUS, Warszawa 2013.

15. *Rocznik Statystyczny Rzeczypospolitej Polskiej 2014*, GUS, Warszawa 2014.

16. *Rynek pracy w Polsce w 2013 r.,* Ministerstwo Pracy i Polityki Społecznej, Warszawa 31.03.2014, https://psz.praca.gov.pl/documents/10828/153766/Rynek%20pracy%29w%20Polsce%/0w%/202013%20roku (access: 28.10.2014).

17. *Smart shopping – czy Polacy robią rozsądne zakupy?* http://www.zafinansowani.pl/oszczędzanie/smart-shopping-raport (access: 21.10.2014).

18. *Sytuacja gospodarstw domowych w 2004 r. w świetle wyników badań budżetów gospodarstw domowych,* GUS, Warszawa, 2005, pp. 10-11.

19. *Sytuacja gospodarstw domowych w 2013 r. w świetle wyników badania budżetów gospodarstw domowych*, GUS, Warszawa, 26.05.2014, Informacja sygnalna, pp. 7-8.

20. Wierzejski T., *Makroekonomiczne determinanty internacjonalizacji gospodarki na przykładzie sektora rolno-spożywczego*, PTE Oddział w Toruniu, Toruń, 2010, pp. 179-188.

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13. Sustainable development of agriculture in the light of
the competitiveness paradigm

13.1. Introduction

The strategic direction of agricultural development towards sustainability is basically decided, despite the fact that industrialization of agriculture deepens and spreads, covering virtually the entire world. It is only an apparent contradiction, because on the one hand, industrial agriculture more and more often uses more environmentally friendly practices, on the other hand there is growing interest in agri-ecologic methods. Acceptance of a strategy for sustainable development is probably in part due to the fact that the term "sustainable development of agriculture" is not clearly understood. This term is understood very broadly, as well as ways to achieve it. Generally speaking, the sustainable development is mainly about an increase in the volume of agricultural production, according to the need to ensure food security without increasing pressure on the natural environment and meeting the other requirements of sustainability. This is an enormous challenge, because the need to increase agricultural production is enormous (up to 2050 by approx. 70%), while the possibility of increasing the acreage is very limited (not exceeding 10%) [Zegar 2012].

In this situation, the key issues is the need to increase the productivity of land, which can only be achieved through intensification of production and this marks the main dividing line in the discourse. Some participants of this debate in fact opt for an increase in industrial intensification, while others opt for transition to agro-ecological intensification. The first is associated with agricultural model, referred to as industrial (or alternatively conventional), the second one – with a model of sustainable agriculture. In both cases, the increased productivity makes sense when the generated production can be realized in the market, i.e. sold[48]. While sales of agricultural products in oversupply conditions will take place when these products are competitive – generally cheaper. That cheapness may be the result of more efficient management and larger scale of production, but also can be caused by the use of technology (agricultural practices), resulting in negative externalities, or weakening the positive externalities.

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[48] We omit here a case of production for own use, because the situation outside of the capital's control.

Mainstream economics textbooks deal with the economic competition, also referred to as market competition or classical competition. Such competition is suitable for economic operators. Market participants – in the case of farms – guided by the principle of maximizing return on capital, rarely maximize productivity, and even more rarely maximize efficiency (productivity) of land. As a rule, the latter criteria are subordinate to the first one. Therefore, guided by the criterion of micro-economic efficiency, mainly price competition is important for them, which occurs when a manufacturer offers a product at a lower price than other manufacturers. This may be due to lower production costs or a lower fee of the used resources. Lower production costs may be the result of a more rational management – more efficient use of productive resources involved, as well as favourable natural and social conditions. At the same time they can also be the result of omitting externalities and other values which when taken into account change the competitive landscape. To this situation we refer the issue of total (social) competitiveness. There is a need to introduce the category of social competitiveness due to the growing importance of social not valued by the market externalities, which are of increasing importance to human wellbeing and social welfare. These effects must include food security and the preservation of the natural environment. Meanwhile, free-market economic mechanism is not directly oriented on food security or environmental protection. It is oriented on accumulation by maximizing economic benefits (profit). This results in a significant discrepancy between the optimum micro-economic and social optimum. To the first corresponds the microeconomic calculation and to the second the macroeconomic (social) one [Zegar 2008; Zegar 2012b].

Agriculture covers a large range of forms differing in organization, economic efficiency, environmental friendliness and the consequences in the social and cultural aspects. This diversity is explained by the different natural conditions and socio-economic and personal qualities of a given farmer. It can be concluded that there is no single optimal forms of agriculture and optimality must be sought in the structure of the agricultural sector including various forms. Farms that can be classified as one of the forms differ in the level of market competition, but also in their total competitiveness. It creates a policy which, depending on the preference may support one or another form of agriculture.

Competitiveness of agricultural products, is to a large extent determined by the scale of production, *ergo* by the resources, which translates into the competition for the latter (especially water, land, minerals energy, atmosphere, biodiversity). In the case of farms – at the microeconomic level – a rarity phenomenon (resource constraints) is mainly an economic dimension. More competitive farms

overcome the barrier of rarity eliminating less competitive farms. On a macro level, especially on a planetary level, the situation is different because there are absolute limits of natural growth and broader development of civilization – there are thresholds beyond which the natural foundations of life planet Earth are threatened.

The key to eco-economy is to bring this to the situation in which the market (price) takes into account the full costs of the generated products [Brown, 2011, p. 183]. Then, the results of microeconomic competitiveness will be the closest to the social optimum. This will not be done by the market itself. State intervention is needed. It is a well-known dichotomy: state vs. market[49].

A kind of novelty is putting competitiveness as a political objective. If the aim is the market competitiveness, for which the economic lobby opts, but what is also critically important for economic growth (especially employment), then the taxpayers will have to pay for the accompanying damage caused by the environment and/or loss of public goods or they will be passed on future generations. If, however, the political objective is social competitiveness, then it will diminish businesses' benefits, but perhaps also social welfare (smaller budget revenues – reduced social spending), resulting in a negative assessment of the effects of political institutions by the electorate. The issue is therefore extremely complex, requiring to navigate between Scylla and Charybdis. The complexity of the issue intensifies the need to determine the extent of competition in the field of microeconomic and macroeconomic aspects and regional (*vide* EU) and the planetary as well as competitiveness as an aim and as an instrument for achieving the objectives of sustainable development of agriculture.

Signalled issues are the subject of reflection presented in this paper. The aim of the chapter is to point to the need of involving the political factor in the actualization of the concept of sustainable development of agriculture due to separated paths followed by such a development and the classic competitiveness. Conducting a rational and effective policy in this area could make it easier to operate the total competitiveness [Zegar 2011]. Justification for it is based on research carried out in the framework of "Competitiveness of sustainable agriculture", a part of Multi-Annual Programme 2011-2014, implemented in the IAFE-NRI.

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[49] Without referring to the multiannual discourse on this topic, we invoke only arguments presented by Eckersley [2004, p. 161]: (1) market institutions are not able to express the value of environmental assets, as ecological rationality requires a holistic approach; (2) the state can better express very diverse social preferences, especially when there are conflicts between the often intangible values that cannot be aggregated using money; (3) market differentiates access to resources. It ignores the social effects.

13.2. Competition paradigm

Competitiveness is the credo of modern economic and social thought. It sees in it a *panacea* to solve all the problems of socio-economic development. In the competitive struggle an economic criterion, namely the price, comes to the fore. The imperative of competitiveness raises the temptation to use all possibilities, including resorting to unfair practices to make the product's price as low as possible. Dishonesty of practices stems from the desire of achieving benefits at the expense of others.

The mechanism of competition in the ideal conditions of a market economy undoubtedly helps to maximize the economic benefits of efficient operators, while reducing the volume of production, and even eliminating less efficient (non--competitive) entities. However, the final result of the competition may have an adverse effect from a social or more general point of view. This is a known issue of Smith's invisible hand, Pareto optimum, Kaldor-Hicks optimum, and the fallacy of aggregation. Overall, the problem of market mechanism (competition) is, as a general rule, due to the known market failure, leads to an excess production of negative effects and of positive ones (public goods) in insufficient volume.

The forces of socio-economic development marched far beyond economic entities and local communities and covered the state, continents and even the entire planet – Earth. This creates a new, more complex situation also in terms of competition, which takes on a global character. Classic competitiveness, and thus microeconomic one, requires correction of the macroeconomic policy, which was already in the 30s of the twentieth century the subject of research conducted by I. Kalecki and J.M. Keynes, and now also it needs to take into account the problems that the development of civilization, including economic development, faces globally.

Classic (market) competitiveness ignores externalities associated with the production of market goods, which are, however, important for social welfare. Taking into account the external effects in the analysis of the competitiveness leads to the category of social competitiveness. The last category is particularly important in the case of agriculture due to the substantial size of externalities, both negative and positive.

For a specific ordering of issues of competitiveness it seems reasonable to consider it at all levels of decision-making, namely economic operators, state / regional groupings and at the level of the planet – the Earth (planetary level) (tab. 13.1). At each of these levels the role of individual actors in the market is different, other are criteria for competitiveness and the nature of rationality.

Table 13.1. Competition levels

Level	Entities	Competition criteria	Type of rationality
Microeconomic	Economic entities: producers, consumers	Economic benefit	Private
Macroeconomic	Economic entities State/regional organisation	Social benefit	Social
Planetary	Economic entities, international organisations, networks of NGOs	Existential benefit	Planetary

Source: own elaboration.

Competitiveness at the microeconomic level represents the potential opportunities and the ability of an entity to meet market competition from other operators in the same industry in the market. Sellers compete to win consumers and buyers compete for limited resources on the market. At this level the externalities are ignored and it is assumed that the market will provide the Pareto optimum of welfare. In the competition at this level entities are driven by an economic motive – economic advantage: in general the income or profit. Operators (farms) may obtain short- or medium-term competitive advantage at the expense of the future, at the expense of the natural environment, or of other entities – participants in social and economic life. In fact, it is all about achieving a competitive advantage by omitting the negative externalities that involve a cost borne by other operators or mute market participants, i.e. the nature (ecosystems) and future generations. The temptation and the possibility of avoiding the consequences (costs) of negative externalities *ergo* of flipping them on others, and in this way increasing the competitive advantage grows with increasing openness of economies and the rise in dominance of multinational corporations.

The competitiveness of agricultural holdings, i.e. *ex definitione* microeconomic competitiveness, does not translate clearly into the competitiveness of our agriculture. The objectives and the interests of the agricultural sector as a whole, can be achieved only in a supervisory system – in the social system. Due to the fact that the imperative of competitiveness *ceteris paribus* stands in opposition to the imperative of protection of the environment and other social values, there is the question of broadening the category of competitiveness and including within it non-monetary and non-market issues, while so far this category was clearly formulated as a monetary economic category integrally related to market issues. The concept of (micro)economic competitiveness, i.e. purely private competitiveness, must be supplemented by macroeconomic competitiveness, which can be equated with social competitiveness. The idea is

to supplement the market – an autonomous pillar – with a political pillar – thereby creating a mechanism to control the development of socio-economic system – in this case agriculture. Thus, of fundamental importance in this regard is to focus on the dominant model of agriculture, i.e. industrial or balanced ones, to which fundamental decisions in the field of agriculture policy should be subordinated.

At the macroeconomic level (states and possibly their groups) it is assumed that political institutions will protect competition and the externalities will be included in the economic calculus of competing entities. The intervention of the political factor is to ensure the honesty and fairness of the competition, to take into account the interests of mute market participants and to ensure that the allocation of resources serves in increasing the welfare of citizens[50].

At the planetary level the issue of competitiveness is put in a new light because of impassable environmental (ecological) barriers. The players competing at this level are more and more often corporations (supra- and transnational) and large retail chains – liberated from political and ethical constraints (money making corporation). They conduct unabated competitive struggle at the lowest levels. One corporation's win is in its benefit, but the loss of the other – because at this level there is a zero-sum game. Due to the fact that corporations are not rooted in local communities, it is easier for them to get rid of any ethical qualms, use any tricks in competition – even reprehensible, including harming the environment or using child labour, and to avoid social responsibility.

13.3. Models and form of agriculture

In developed countries dominates an industrial agriculture model (conventional). This model, developed with industrialization, achieved an indisputable success in terms of increasing the agricultural production and reducing the cost of manufactured products. This was possible thanks to the increased use of inputs from outside agriculture (fertilizers, pesticides and other measures to increase productivity and new agricultural technologies), advances in biological progress (new varieties of plants and animals for breeding), an increase of irri-

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[50] In terms of the regional group, as in the case of the European Union, the issue of competitiveness has two dimensions. The first relates to the provision of "fair" competition in the common market, which should not ignore externalities and social objectives appropriate to the stage of development of individual countries of the regional group. The second is focused on improving the competitive capacity of the entities of the regional group competing in the global market.

gated and drained lands. However, the golden era of agriculture, which took place in the period from the World War II to mid-70s. (first oil crisis), is irrevocably over. The focus, as reflected in numerous discussions and publications, has become a transition from the industrial model to a model of sustainable agriculture understood differently. The need for such a transition was unequivocally demonstrated with more or less firmness and precision in many works [IAASTD 2009; GOS in 2011; Brown 2011; Zegar 2012]. Both of these models take various forms, more or less meeting the requirements of sustainability. Such forms of industrial agriculture, such as precision agriculture and integrated agriculture are close to meeting the criteria of sustainable agriculture. In turn, forms of sustainable agriculture, such as organic farming and Norfolk farming, meeting the criteria for environmental sustainability, might not meet sustainability in the economic sphere or (and) the social one.

Sustainable agriculture grows to the level of a strategic goal in many countries and regions and at the planetary level. This issue has already been the subject of numerous studies and research, but nevertheless it is still a matter of dispute, which concerns even the most basic elements of sustainable development as natural capital (nature) and artificial, renewal or maintenance of operability of basic ecosystems minimum standards and thresholds, intergenerational justice [van Loon, Patil Hugar, 2005; Atkinson Dietz, Neumayer (eds.) 2007; Pretty 2008]. In practical terms it is about the way enabling reconciling the aspirations for growth with preservation of ecosystems that sustain life on Earth [Kates, Harris, Leiserowitz 2005]. We will not deal with it, but only – to avoid confusion – we will draw attention to the need to distinguish two concepts: sustainability of agriculture (or farms) and sustainable development of agriculture. In the first case it comes to the compliance of the farm (agriculture) with certain requirements in relation to the realms of sustainability – in terms of a certain state, therefore a static perspective. In the second case we expect a change towards a desired state (more sustainable) – therefore the idea of progress, dynamism. The issue of sustainability is, however, more complex, assuming that we determine, what balance and what development is expected. Sustainable development is a change from less sustainable to more sustainable state. But emerging new constraints, new challenges and new opportunities arising from technological progress and accumulated knowledge should be taken into account. Thus, sustainability refers not so much to a certain harmony between the orders of (aspects of) sustainability, but rather to a choice of the "degree of durability" [Majewski 2008].

The issue of sustainability, analogous to the issue of competitiveness also requires consideration at different levels. Yet, we can come across of both the fallacy of aggregation and synergies. For example, balancing individual farms may not lead to the sustainability of agriculture at the national level (i.e. fallacy of aggregation). At the same time a given farm structure according to its degree (level) of balance can produce a synergistic effect. This situation appears when farms on the best soils are allowed to a relatively high level of input intensity, thus saving the natural environment in the areas of High Natural Value.

The foundation of sustainable agriculture is its multi-functionality[51]. The functions of agriculture correspond to its objectives, of which the most important are economic and environmental ones. The first ones are related to the incomes of people employed in agriculture and their families – achieving satisfactory income from agriculture is the primary economic objective of farmers. These secondly – environmental objectives – are associated with the natural environment. At any given time, these objectives are generally divergent [Zegar 2013].

The large number of targets inevitably brings to the agenda the problem of allocation of scarce productive resources among these objectives. Nowadays of particular importance is the allocation of natural resources between economic objectives, shaping the material well-being and ecological objectives, necessary for lasting (sustainable) development. In this allocation the main role play market mechanisms, in particular the mechanism of economic competition. This mechanism, ignoring the externalities, leads to a divergence between economic efficiency and social efficiency and thus a hole between an economic and social optimum. The multiplicity of objectives finds a particular expression in the concept of sustainable agriculture (socially sustainable agriculture) [Woś, Zegar 2002]. These objectives can be recognized in dimensions of sustainability: environmental, economic and social dimension. With regard to environmental dimension formulated are such ecological objectives as: 1) renewal (durability) of agroecosystem (soil fertility, organic matter balance); 2) sustainable use of natural resources (land, water, minerals, ...); 3) maintaining greenhouse gas emissions to the environment at a level not exceeding its capacity; 4) maintaining the

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[51] In general – apart from the function of producing food and other raw materials (fibres, leather, medicines, fuel ...) – there are such functions of agriculture as: maintaining the traditional landscape, maintaining habitats of the wild flora and fauna (biodiversity), preservation of cultural heritage, vitality of rural areas and regulatory functions (services) in terms of ecosystems (flood protection, absorption of CO_2 and other pollutants, protection against soil erosion, elements circulation, photosynthesis, soil formation ...). See: [Brouwer (ed.) 2004; MEA, 2005; Ten Brink in 2011; Zegar 2012].

carbon balance (balancing emissions and sequestration); 5) protection of biodiversity. With regard to the social dimension formulated are such objectives as: 1) preserving the viability of rural areas; 2) preserving cultural heritage; 3) food security; 4) food safety. In the case of an economic dimension as the most important objectives can be considered: ensuring the livelihoods of the rural population and parity remuneration of labour input.

In relation to the objectives it is necessary to distinguish between the objectives of economic operators (farmers) of a microeconomic (private use) character and social goals. In some cases, these targets may be strongly related to each other, but they can also be contradictory. Research conducted by W. Wrzaszcz [Wrzaszcz 2012] and Arkadiusz Sadowski [Sadowski 2013] on this issue, based on FADN data showed that the higher economic potential of farms conducting agricultural production enables a higher level of sustainability, although in the case of environmental issues, this dependence is associated with certain restrictions. It was found that on the one hand the largest farms (over 40 ESU) most threaten the natural environment, on the other hand, agricultural production in small entities (particularly those with size 2-4 ESU) is also not sufficiently balanced in the environmental respect. These findings are confirmed by the data of the Agricultural Census 2010, which were used to analyse the sustainability of groups of individual farms according to criteria of agricultural area and economic size classes [GUS 2013].

In the case of area groups we have confirmed the well-known statistical regularities that with increasing area of the farm, decreases land productivity and increases labour productivity. With regard to environmental sustainability we see deterioration in indicators of environmental sustainability on the largest farms in terms of their agricultural area. On average, an increase in farm size affects positively their economic efficiency (measured both at farm level, as well as per fully employed persons).

Results of the analysis confirmed the importance of land – utilized agricultural area – for the operation and development of sustainable forms of agriculture. The larger the area, statistically speaking, the easier it is to reconcile environmental goals and economic objectives. Sustainable forms of agriculture are characterised not only by the larger area of farmland, but also by qualified farm managers, especially in the case of organic farms. In the case of such farms certainly more knowledge and skills are needed than in the case of conventional farms – even highly specialized ones, when the knowledge is pumped into agriculture with industrial means of production. These qualifications are growing

with area farms. Farms of the distinguished forms of environmentally sustainable agriculture are more often managed by younger individuals. Young farmers also often managed medium and large farms, while a large part of farmers in a retirement age managed small farms [Wrzaszcz, Zegar 2014].

13.4. Competition for resources

Increasing the ecological footprint of the human population exceeding in some cases the biosphere capacity limits, forces us to take a new look at the goods related to natural resources. In this regard, we witness a fundamental change involving the transformation of free goods into economic goods. This transformation is a very complex process and it is advanced in varying degrees depending on the type of good. The specificity of competition for emerging new economic goods consists of their involvement – through the resource consumption needs – in competition for the conventional market goods (consumption and investment), but also in competition for resources necessary for the production of quasi-markets of these resources, limited by political action oriented towards a wider range of purposes. As regards agriculture, five types of resources that are becoming rarer have a special importance, namely: land, water, minerals, atmosphere and biodiversity. The specificity of competition for these resources is that for these resources compete both commercial goods manufacturers, as well as mute market participants, particularly ecosystems.

The land for centuries has been an economic good, but the land market is subject to many restrictions. Currently, we are witnessing increasing competition for land, both globally and nationally. There are several reasons for this. First and foremost obvious is the need to increase the amount of food to enhance food security, particularly in the countries being importers of these products. It is difficult, as experience from the years 2007-2008 teaches us to base ourselves solely on the market. The need to ensure energy security through the production of energy from biomass is also increasing. Corporations increasingly treat the land purchase as a good capital investment. On the other hand countries with unused agricultural land are interested in attracting foreign capital for infrastructure (ports, roads, warehouses, processing, new technologies, new jobs, ...) [GOS in 2011; Deininger et al. 2011; Kugelman, Levenstein (eds.), 2013]. At the same time the idea that the land is also a public good is spreading and it is used to justify restrictions imposed by the political institutions deciding on ways of managing this land.

Water as such is still widely regarded as a commonly available free good, only its delivery to the user is burdened with a cost. Only to this extent the water becomes an economic good. However, a need is growing to integrate water in

the full extent to the set of economic goods, and also of public goods. There is no substitute for fresh water, and its resources are limited – even by human activities (pollution / degradation) and the demand is increasing [Allouche 2011; Hanjra, Qureshi 2010]. Water demand is expected to double by 2050; Meanwhile, many groundwater reservoirs are low: Punjab, Egypt, Libya, Australia. Currently agriculture's share in the total consumption of fresh water drawn from groundwater resources and underground and surface (flowing) amounts to 66--70%. Groundwater level is reduced due to the use of water for the purpose of irrigation of crops in countries where more than half the world's population live. Water scarcity is particularly acute in China, India, Middle East, North Africa and North America. The three largest producers of cereals: China, the USA and India depend on the water in varying degrees – the most water dependent is China, where 70% of cereals is produced on irrigated soils, in India and in the US it is respectively 50% and 15% [Brown et al. 2002, pp. 40]. In many countries, the dilemma of whether to allocate water for the purposes of industry and population, reduce the cost of water for agriculture, will take increasingly stringent forms. We can also expect taking into account water consumption of individual products in external trade policy [Le Vernoy 2010].

Energy minerals resources are steadily depleted, and the discovery of new resources only postpones the exhaustion of resources, and further extraction is generally more expensive. Estimates indicate that at the current oil consumption level there is enough oil for the next 40-50 years, natural gas for 60-70 years and coal for 140-150 years, i.e. two of the major energy sources will be exhausted within the life of one generation [Pawłowski 2010, p. 9]. Demand for energy will double, and its prices will rise, which will affect the prices of fertilizers and pesticides [GOS 2011]. This opens a new opportunity for agriculture – the production of biomass for energy purposes, but the case is not clear.

A textbook example of a free good was atmospheric air (atmosphere) in terms of emissions to it of substances produced as a by-product (an externality) of human activity. Most attention in this regard is paid to the greenhouse gas emissions affecting the climate. Agriculture is a major emitter of carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O), while absorbing carbon. Farming practices that can significantly reduce the emission of greenhouse gases without limiting production are of great importance in this regard [Faber, 2014].

Association of agricultural with biodiversity is manifold and strong. Primarily due to the fact that agriculture uses about 40% of the Earth's land surface (excluding Antarctica). The number of known plant species is about 250 thou-

sand. However, only 9 of them provides 3/4 of power drawn by humans from plants. While three crops (wheat, rice and maize) are responsible for 2/3 of calories consumed by human [Cassman 1999, p. 5952]. The variety of crops is reduced – at present 95% of the calories consumed stems from 30 crops[52]. In contrast, 75% of the food supply falls to 12 species of plants and 5 animal species [Bhullar, Bhullar, 2012, p. xvii].

The impact of agriculture on biodiversity depends on the farming system [Feledyn-Szewczyk 2014]. It has been shown that industrial agriculture has a very negative impact on biodiversity due to the use of agricultural chemicals, monocultures, increasing the field area, destroying many habitats of plants and animals, the use of different kinds of preparations to boost growth, mechanization of harvesting and the continued reduction of the diversity of crops and livestock that are basic food, but also has a positive impact if it saves land from involvement in agriculture[53]. Reducing biodiversity affects the fertility of the soil, the absorption of nutrients (and hence yields), the presence of weeds and pests and the provision of environmental services, which in turn negatively affects the well-being of people [Ten Brink in 2011; Chappell, LaValle 2011].

The need to increase agricultural production leads to questions about the impact on biodiversity. There have emerged two positions. The first involves an inevitable contradiction between increasing production and the preservation of biodiversity. To minimize the reduction of biodiversity it is proposed to intensify industrial agriculture, which supposedly is the only type of agriculture able to feed the world [Emsley 2001; Avery 2007]. Second position assumes that both objectives (growth of production and preservation of biodiversity) can be achieved in a complementary way through the implementation of alternative farming system (organic farming) [Badgley et al. 2007; IAASTD 2009; Chappel, La Valle, 2011]. Alternative farming can increase production by 50% and biodiversity by 30% and in the case of some species by as much as 50% or more [Chappell, La Valle 2011, p. 7 and p. 12].

Farms guided by the criterion of microeconomic efficiency include the cost of use of these resources in so far as it is expressed by the price. It takes place in relation to expenditure of energy minerals (chemical fertilizers and pes-

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[52] In the history of mankind we have used about 7 thousand plants, and the first 10 are: rice, wheat, corn, soybeans, sorghum, millet, potatoes, sweet potatoes, sugar (cane and beet) and bananas, which provide three-quarters of calories [Weis 2007, p. 16].

[53] The publication [Imhoff, Baumgartner (eds.) 2006] tries to answer the questions: How much biodiversity (wildness) can a farm maintain, while remaining economically viable? How much agriculture can survive in the area maintaining optimal levels of biodiversity?

ticides), water (in some countries) and to some extent to the land. As a rule, farms are not burdened with "costs" related to emissions of greenhouse gases and other pollutants into the atmosphere and to reducing biodiversity. Protection of these resources is important for society – particularly for future generations, and of course for ecosystems.

13.5. Market

In a capitalist economy the major force behind the development of agriculture is a market mechanism. This mechanism has proven to be highly efficient in the development of capitalism, including the so-called farmer technological treadmill, consisting of a sequence of events: increase in production (supply) more than the demand → reduction in prices of agricultural products → change in technology to increase production → increase in supply (overproduction) → price reduction → .... In competitive market conditions it necessitated an increase in labour productivity and potential concentration of production in agriculture. This also served specialization, guided by the principle of reductionism and Fordism. The scale of production began to outgrow the framework of the traditional peasant farm, shattering its base, which started the evolution towards family farms and agricultural enterprises [Tomczak 2005]. The main direction began to be shown by commodity production and the private microeconomic benefit, which is supposed to provide increasing productivity. Labour productivity has become a major competitive factor.

The market mechanism "corresponds" to the fundamental questions relating to the manufacturing process: what ?, where ?, how? and how much? Allocation of production of various agricultural products (what and where?) in a liberalized trade is conducive to lower prices of agricultural products that can be supplied by the manufacturers producing them cheaply – either because of more favourable natural conditions, or more efficient farms, or not taking into account external costs. The resulting products are then sold to regions where there is real demand. This is the case in many less developed countries, where corporations locate their production of products for export to rich countries, where consumers are willing to pay a higher price. In such a situation – the global food market – no country will have a "real" food security [Ikerd 2008, p.18]. A country capable to purchase cheaper basic agricultural products (food) imports them, which may affect their own agriculture, if it is not competitive. In such a situation the problem arises of the fate of local farmers and their families, if they have no alternative source of income. This can cause the expansion of poverty. The effects of stopping or weakening of their farming can be devastat-

ing when a break occurs in supply and prices rise sharply as in 2008. It will affect wealthy countries by causing a tsunami size emigration. This another argument supporting the position that food security cannot be based solely on the market. Naturally, cheap food is good for consumers, but not for farmers or for combating poverty, as 70% of the poor live in the countryside, with the lion's share of them being related to agriculture. Globalized market shortcomings therefore lead to increased poverty among farmers, environmental degradation, increasing food dependency on others [Wise 2010].

This is linked with the question of the mode of production (how?). Managing to cope with the basic challenge of the coming decades in the field of agriculture and the entire agri-food system (food provision) – increasing the supply of food, while reducing pressure on the environment – requires focusing on increasing yields[54]. The current method of increasing crop yields by enhancing industrial methods (increasing expenditures of industrial origin) is rather out of the question due to accompanying significant externalities (environmental and health ones). This gave impetus to the search for alternative ways of achieving this – sustainable intensification, i.e. higher production per unit area at a reduced pressure on the environment. Hence the situation that increasing crops and in general increasing agricultural productivity, is carried out under the industrial model or alternative model. The first – extracted from the rural community and using new technologies (including GMOs) and large-scale production – is oriented to the mass market. The second one – more located in rural communities, smaller-scale production and using more traditional technologies – is focused on shorter food chains.

The first position, referred to metaphorically as business as usual, involves accelerating pace, according to the industrial road. It formulates the thesis that the best way to protect ecosystems is the intensification of production on land already in use, so as not to reduce the area of forests and other ecological land. The position of second promotes alternative agriculture (based on agro-ecology) as a way to increase production through sustainable intensification. Its starting point is the criticism of industrial agriculture, which created the possibility of eradicating hunger and malnutrition (abundant and cheap food) – despite the enormous population growth – but it also created an even greater threat to human health (obesity, many diseases, pandemics), not to mention the disappearance of many delicious

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[54] In addition to crops, agricultural intensification can be enhanced by increasing the intensity of field crops (2-3 crops) and other inputs (water) and change in the structure of crops from less to more productive (efficient).

products and the effects on environment, society and culture, which forces us to spend the next decades on fighting with the costs of this victory [Roberts 2008, p. 28]. What is needed is a fundamental transformation of agriculture – a departure from the status quo and embracing sustainable production using environmentally sound agricultural practices [Federoff et al. 2010]. This position is supported in particular by the social movements, which blame industrial agriculture for the tasteless food, low nutritional quality and practices destructive to the environment, and maintain that organic food would be better. Organic farming – although in the short term it has a lower productivity than industrial agriculture, but in the long term its productivity is higher, because it does not degrade soil, it reduces pressure on climate change and better solves the problem of weeds and pests, creates more jobs (higher workload ergo employment – is the productivity the most important?), in the longer term organic farming is better prepared to ensure food security than industrial agriculture) [Azadi et al. 2011]. However, as many claim, organic food can be a luxury for the rich, but it cannot feed the world [The Economist 2011, p. 3].

With respect to further increase in the production (the question how much?) emerged two opposing phenomena, both of which agree with the need to protect the environment and emphasize the need for sustainable intensification, but realizing it differently [Pretty et al. 2011; Conway in 2013].

In conclusion, we can say that the high efficiency of the market mechanism should relate to commercial goods. However, in relation to other goods there is a need to engage the political factor. Synthetically prof. Jerzy Wilkin put it as follows: "*The market and competition are not conducive to multi-functionality and implementation of the principles of sustainable development. Multifunctional agriculture and sustainable development can only be achieved by an appropriate combination of public policies (national and EU) with regulated market mechanisms*" [Wilkin 2011, p. 30].

13.6. Politics

Politics, guided by the values should primarily have in mind the common good and social welfare. This means that the policy should not ignore issues such as food security, protection of the environment and the food component of health welfare. However, it should also not disregard the economic interests of economic entities.

Food security, as a political objective is not questioned, including the fact that it cannot rely solely on the global market – on large commercial networks. However, there is the problem of food self-sufficiency scope and role of local

markets. Many reasons can be cited for increasing the role of the latter. An important element of food security is an extension of its understanding, stepping outside energy (calories) and taking into account macronutrients, vitamins and minerals, the quality of food products and supplements. The modern global food system cannot be clearly evaluated from this point of view. On the one hand, attention to quality of food products is higher, but on the other hand enriching the food done by the food industry has dangerous consequences for health, especially when taking into account the changes in the model of diet (popularisation of the western type of diet). Hence, we are dealing with one of the biggest contradictions of the system, namely the simultaneous occurrence of large-scale phenomena of abundance and obesity and hunger and malnutrition (particularly in the rural areas of South Asia and sub-Saharan Africa, but also even in the rich USA).

Domination in the global food system of corporations[55] results in the taking hold of the economic surplus by them primarily at the expense of farmers. Corporations seeking to maximize profits put on the altar of greed nutritional value of food, ignoring the health effects and then economic effects of low--quality food. Corporations are interested in profits, not in a healthy diet. Resistance to the global food system is revealed by social movements (e.g. La Via Campesina), but also in science there is growing disappointment with a corporate system of conventional agriculture and food [Morgan et al. 2008; Roberts 2008; Friedland et al. 2010; Delinda 2011; Oosterveer, Sonnenfeld 2012]. The reason is the growing awareness of the importance of food and nutrition to health, which, in addition to the impact on the environment, can be treated as an externality of agricultural production and the entire food system. Health care absorbs rapidly increasing amounts of funds, ignoring the effects of health care for the quality of life and economic activity. Unfortunately, the quality of food products produced in vertically integrated food chains, highly effective economically, with high added value in the agri-food processing and trade, is in inverse proportion to their nutritional value. According to the World Health Organization (WHO) in developed countries 30% of the population is suffering due to the food, and in the developing countries this share is much more [GOS 2011, p. 42].

The policy should ensure proper control (monitoring), and increase education on healthy nutrition. This is an important prerequisite for local alternatives.

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[55] This system is compared to an hourglass: a large number of farmers – few corporations – the vast number of consumers.

Environmental factors must be taken into account in the study of social competitiveness and increasingly – also economic competitiveness. The first is the message of the sustainable development strategy, while the latter is the primary objective of the Lisbon Strategy. In agriculture, these strategies are reflected in the European Model of Agriculture (EMR), which also sets the direction for Polish agriculture through the CAP solution: the principle of cross--compliance, greening, animal welfare, RDP, including agri-environmental program. Also, the state – in the name of attracting capital for economic gains – provide incentives for domestic companies and even transnational corporations by launching various factors of economic competitiveness, such as lower wages, lower rents and land rent, lower environmental standards and lower standards of product quality. The case is not clear-cut, simple and easy to resolve. The outflow of capital would lead to a decline in employment, lower budget revenues and population, or diminution of prosperity. But achieving economic competitiveness by using the above-mentioned factors also diminishes welfare. Also, for example, maintaining high environmental standards and quality of products on the one hand increases the cost of production, on the other, paradoxically, it may contribute to the improvement of competitiveness, because this is a new field of providing opportunities for business, it expands the number of consumers who create demand for high-quality products, while globalization creates a virtually unlimited market for niche products. In rich countries the food ceases to be a necessity and becomes a consumer good, which is expected to meet the highest quality standards. Farmers face a choice: either to produce more at a lower price or less at a higher price. Farmers, however, are not philanthropists quality has to pay off, as production is not linked entirely to public goods. Consumer awareness of food quality as well as environmental friendliness of the production methods used is very important – in the long run more important than support (subsidizing) such production. However, the consumer must have confidence in the quality of production, which is why of such importance are certificates, possibly even licenses, labelling, monitoring, etc. However, price plays a fundamental role in creating demand. Hence the importance of productivity and of internalising externalities. In general, higher productivity or skipping expenses related to negative externalities lower unit costs and create a possibility of lower prices. The reorientation of policy on social competitiveness requires joint action by all countries of the European Union. We must therefore create a coherent concept of new strategic solutions compatible with sustainable development.

The state policy must also promote competitiveness. Favourable circumstances for doing so pose, without prejudice to the rules of the market, the increasing role of knowledge and innovation as a driver of competitiveness. It must be taken into account that with development the socio-economic field of competitiveness shifts from cost / price (less developed countries) to the quality of products (developed countries) and innovation (highly developed countries).

Economic competition is guided by the sole criterion of market efficiency. It is determined by the equilibrium price fixed by the mechanism of demand and supply. The equilibrium price does not include the externalities inherent with the production of market goods. Skipping the cost of negative externalities, such as the cost of environmental degradation leads to decrease in prosperity. Criticism limited only to the competition is therefore well founded. Therefore, there is scope for action and justification to bring appropriate adjustments by institutional factors (political). In this regard, Professor Augustyn Woś said: *"The expansive competition leads to the destruction of the environment and the costs of its rebuilding are borne by the whole society.... The concept of total competition of each against all, gives an advantage to narrowly interpreted "economism" at the expense of structures and social goals. Between these two systems we have to seek a reasonable balance"* [Woś 2003, p. 10].

Is adequate and ethical competition possible in the agri-food sector in conditions of consolidation (integration) and the globalization of food markets? The search for an answer to this question continues [Harvey 2013]. It is worth recalling that classical economics (classical liberalism) accepted that ethics is a *sine qua non* condition for the competition[56], which was forgotten, or rather, what was ignored in the period of neoliberalism. Today, the ethicality of competition is again mentioned [Harvey 2013]. A great failure of competition is undermining intergenerational justice – obligations to future generations. It is difficult to accept the view of Robert Solow, which is based on the fact that the current generation lives a lot better than the previous one, stated that the previous generation could consume more than it did without much hindrance to the welfare of the present generation – generation of the early 1970s [Solow 1974]. The issue of a transgenerational use of the environment is not only an ethical issue, but a new great challenge for economic theory – we need to include in the theory sustainable preferences and sustainable markets [Chichilnisky 2012].

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[56] Alfred Marshall raised this issue in the published in 1920 textbook *Principles of Economics*, and Frank Knight, in *The Ethics of competition* published in 1935.

At the end we refer to the relationship between competition and cooperation. Capitalism refers to absolute competition, omitting cooperation, which "*affects in a disintegrating way social networks, creates a culture conducive to aspirations to dominate, mainly economically, linked to political power (...) economic and political elites increasingly alienate themselves from the rest of society, and the impact of ordinary people to the ongoing socio-economic processes is becoming smaller*" [Pawłowski 2010, p. 10 (referring to T. Fotopolousa)]. Meanwhile, cooperation is particularly recommendable in the context of growing scarcity of natural resources. It is high time that these resources be treated as natural common goods. Natural resources are a gift of the Creator for the whole mankind, and in fact all beings of the planet, not this or another ethnic group or state. This is a very complex and delicate matter. Long ago John Stuart Mill made a distinction between the situation of what man created or acquired from another manufacturer, and what from the nature: "*Are the earth itself, its forests and waters, and all other natural resources above and below its surface a human product? They are the heritage of the human race and there must be rules governing the sharing of the wealth. It cannot be left without determining what rights and the conditions under which an individual can carry out on part of the common heritage*" [Mill 1966, p. 554]. This is undoubtedly a universal message, but, unfortunately, the reality turns out to be brutal – the states or corporations seek to appropriate as much as possible of the natural resources without looking at the needs of others. The latest example is the issue of Arctic resources.

13.7. Conclusions, summary and recommendations

The new situation in the development of agriculture, in particular developmental challenges and conditions, requires revision of the accounting for issues of competitiveness, which is crucial for economic theory and the mainstream market economy. It is advisable to distinguish between economic competitiveness and social competitiveness. The first follows the criterion of economic efficiency, while the latter the criterion of social efficiency. The first leads to a private optimum and the latter to a social optimum. Both economic and social competitiveness seek to gain advantage in the market. The main difference between them lies in the fact that the first takes into account only economic factors valued by the market (i.e. it is guided only by the market game), while the second takes into account the external effects, which generally are not even valued by the market and often they cannot be measured in monetary terms.

The market, *ex definitione* based on economic competitiveness, leads to generating negative externalities in excess and positive ones in too small amount. Basic models of agriculture – industrial and sustainable – differ in scope and magnitude of the externalities they generate. The industrial model creates more of the negative external effects and less of the positive ones, while sustainable model acts in an opposite way – it generated less of the negative external effects and more of the positive ones. The problem is that industrial agriculture has an advantage in terms of productivity, *ergo* creating conditions of supply to ensure food security and economic efficiency in generating agricultural products. Solving this problem requires the involvement of the political factor to enable reasonable inclusion of the external effects in the economic accounting, which would allow us to reduce the gap between the private (microeconomic) optimum and social optimum.

A state (political factor) has a certain set of instruments with which it can delimitate the permissible area of solutions for farmers, as well as to support or encourage them to take into account externalities in the decision making process. The thing is that the policy of the state, in charge of a competitive society, does not violate market rules, among which crucial is the economic competitiveness. Due to the fact that reconciling economic and social requirements, including environmental ones is easier in a model of sustainable agriculture, so the orientation towards such a model should be the basis for state policy towards agriculture.

In the era of globalization, possibilities of conducting policies focused on social purposes, and not just to the tastes of the markets are limited. This represents one of the major challenges of the present times.

At the microeconomic level basic ways to increase competitiveness is to increase production volume (scale) and to lower unit costs. This is the aim of, part from the actions undertaken by farms, the intensification of cooperation (cooperatives, companies, clusters, producer groups), which allows, in particular, to reduce transaction costs.

Competition in the market for agricultural products is associated with competition for resources and the policy (regulations) with respect to these resources. Management of natural resources is gaining in importance with their increasing rarity, which translates into a need of taking them into account in the process of agricultural production.

References

1. Acemoglu D., *Świat, jaki odziedziczą nasze wnuki*, [in:] *Gospodarka za 100 lat,* Ignacjo Palacios-Huerta, Kurhaus, Warszawa (original ed. 2013 r., Massachusetts of Technology), 2014, pp. 23-70.

2. Allouche J., *The Sustainability and resilience of global water and food systems: Political analysis of the interplay between security resource scarcity, political systems and global trade*, Food Policy, 2011, vol. 36, pp. 3-8.

3. Atkinson G., Dietz S., Neumayer E. (eds.), *Handbook of Sustainable Development*, UK, 2007.

4. Avery A., '*Organic abundance' report: fatal flawed*, Renewable Agriculture and Food Systems, 2007, vol. 22, no. 4, pp. 321-323.

5. Azadi H., Schoonbeek S., Mahmoudi H., Derruder B., De Maeyer P., Witlox F., *Organic agriculture and sustainable food production system: Main potentials*, Agriculture, Ecosystems and Environment, 2011, vol. 144, pp. 92-94.

6. Badgley C., Moghtader J.K., Quintero E., Zakem E., Chappell M.J., Avilés Vázquez K.R., Samalon A, Perfecto I., *Organic agriculture and the global food supply*, Renewable Agriculture and Food Systems, 2007, no. 22(2), pp. 86-108.

7. Bhullar G.S., Bhullar N.K. (eds.), *Agricultural Sustainability. Progress and Prospects in Crop Research*, Elevier, Amsterdam, Boston, 2012.

8. Blatt H., *American's Food: What You Don't Know About What You Eat*, The MIT Press, Boston, 2008.

9. Brouwer F. (ed.), *Sustaining Agriculture and the Rural Environment*, Edward Elgar, Chaltenham, UK-Northampton, MA-USA, 2004.

10. Brown L., Larsen J., Fischlowitz-Roberts B., *The Earth Policy Reader*, Earth Policy Institute – W.W. Norton & Co., New York-London, 2002.

11. Brown L.R., *World on the Edge. How to Prevent Environmental and Economic Collapse*, W.W. Norton&Company, New York, London, 2011.

12. Buttel F.M., Magdoff F., Foster B. (eds.), *Hungry for Profit: The Agribusiness Threat to Farmers, Food and the Environment*, Monthly Review Press, New York, 2000.

13. Cassman K.G., *Ecological intensification of cereal production systems: Yield potential, soil quality, and precision agriculture*, Proceedings of National Academy of Sciences, 1999, Vol. 96, pp. 5952-5959.

14. Chappell M.J., LaValle L.A., *Food security and biodiversity: can we have both? An agroecological Analysis*, Agriculture and Human Values, 2011, Vol. 28, No. 1, pp. 3-26.

15. Chichilnisky G., *Economic theory and the global environment*, Economic Theory, 2012, vol. 49, pp. 217-225.

16. Conway G., *Sustainable Argicultural Intensification: A Practical Solution for the Global Development Agenda*, Huffpost Business, London, UK, 2013.

17. Deininger K., Derek Byerlee B. with Lindsay J., Horton A., Selod H., and Stickler M., *Rising Global Interest in Farmland. Can It Yield Sustainable and Equitable Benefits?* The World Bank, Washington, D.C., 2011.

18. DeLind L.B., *Are local food and the local food movement taking us where we want to go? Or are we hitching our wagons to the wrong stars?* Agriculture and Human Values, 2011, vol. 28, pp. 273-283.

19. Eckersley R., *The Green State: Rethinking Democracy and Sovereignty*, MIT Press, Cambridge, MA – London, England, 2004.

20. Emsley J., *Enriching the earth: Fritz Haber, Carl Bosch, and the transformation of world food*, Nature, 2001, vol. 410, no. 6829, pp. 633-634.

21. Faber A., *Bilanse emisji gazów cieplarnianych oraz ekonomia węgla w rolnictwie*, [in:] *Z badań nad rolnictwem społecznie zrównoważonym (23)*, ed. J.St. Zegar, IERiGŻ-PIB, Warszawa 2014, pp. 39-72.

22. Federoff N.V. et al., *Radically rethinking agriculture for the 21st century*, Science, 2010, vol. 327, pp. 833-834.

23. Feledyn-Szewczyk B., *Wpływ systemów produkcji rolnej na bioróżnorodność i świadczenia ekosystemowe*, [in:] *Z badań nad rolnictwem społecznie zrównoważonym (24)*. Praca zbior. ed. J.St. Zegar, IERiGŻ-PIB, Warszawa, 2014, pp. 11-30.

24. Friedland W.H., Ranson E., Wolf S.A., *Agrifood. Alternatives and Reflexivity in Academic Practice*, Rural Sociology, 2010, vol. 75, no. 4, pp. 533-537.

25. GOS, *Foresight. The Future of Food and Farming. Challenges and choices for global sustainability. Final Project Report*, The Government Office for Science, London, 2011.

26. GUS, *Zrównoważenie polskiego rolnictwa*, joint work ed. by: J.St. Zegar, Główny Urząd Statystyczny, Warszawa, 2013.

27. Hanjra M.A., Qureshi M.E., *Global water crisis and future food security in an era of climate change*, Food Policy, 2010, vol. 35, pp. 365-377.

28. Harvey S.J., Jr. (ed.), *The Ethics and Economics of Agrifood Competition*, Springer Dortrecht, Heidelberg, New York, London, 2013.

29. IAASTD, *Agriculture at a Crossroads. Global Report*, International Assessement of Agricultural Knowledge, Science and Technology for Development, Island Press, Washington D.C., 2009.

30. Ikerd J, *Zrównoważony kapitalizm i kwestia etyki i moralności*, Problemy Ekorozwoju, 2008, vol. 3, no. 1, pp. 13-22.

31. Imhoff D., Baumgartner J.A. (eds.), *Farming and the Fate of Wild Nature: Essays in Conservation-Based Agriculture*, Watershed Media/Wild Farm Alliance, Healdsburg, California, 2006.

32. Kates R.W., Harris T.M., Leiserowitz A.A., *What is Sustainable Development? Goals, Indicators, Values, and Practice*, Environment: Science and Policy for Sustainable Development, 2005, Vol. 47, No. 3, pp. 8-21.

33. Kugelman M., Levenstein S. (eds.), *The Global Farms Race. Land Grabs, Agricultural Investment, and the Scramble for Food Security*, Island Press, Washington, Covelo, London, 2013.

34. Le Vernoy A., *Agriculture and Virtual Water*, [in:] *2020 European Agriculture: Challenges & Politics*, P.H. Boulanger, P.A. Messerlin (eds.), The German Marschall Fund of the United States, Washington, 2010, pp. 32-36.

35. Majewski E., *Trwały rozwój i trwałe rolnictwo. Teoria i praktyka gospodarstw rolniczych*, Wyd. SGGW, Warszawa, 2008.

36. MEA, *Ecosystems and Human Well-being*: *Current State and Trends*, vol. 1, Millenium Ecosystem Assessment, Island Press, Washington, DC., 2005.

37. Mill J.S., *Zasady ekonomii politycznej i niektóre jej zastosowania do filozofii społecznej*, vol. 2, PWN, Warszawa, 1966.

38. Morgan K., Marsden T., Murdoch J., *Worlds of Food. Place, Power, and Provenance in the Food Chain*, Oxford Univ. Press. Oxford, New York, 2008.

39. Oosterveer P., Sonnenfeld D.A., *Food, Globalization and Sustainability*, Earthscan, London-New York, 2012.

40. Pawłowski L., *Czy rozwój współczesnego świata jest zrównoważony*, Problemy Ekorozwoju, 2010, no. 2, pp. 9-12.

41. Pretty J., *Agricultural sustainability: concepts, principles and evidence*, Philosophical Transactions of The Royal Society, B Biological Sciences, 2008, vol. 363, pp. 447-465.

42. Pretty J., Toulmin C., Williams S., *Sustainable intensification in African Agriculture*, International Journal of Agricultural Sustainability, 2011, vol. 9, no. 1, pp. 5-24.

43. Roberts P., *The End of Food*, Houghton Miffin Co., Boston & New York, 2008.

44. Sadowski A., *Zrównoważony rozwój gospodarstw rolnych z uwzględnieniem wpływu Wspólnej Polityki Rolnej Unii Europejskiej*, Rozprawy Naukowe, z. 447, Uniwersytet Przyrodniczy w Poznaniu, Poznań, 2013.

45. Solow R.M., *The economics of resources or the resources of economics*, American Economic Review, 1974, vol. 64, pp. 1-14.

46. Ten Brink P. (ed.), *The Economics of Ecosystems and Biodiversity in National and International Policymaking*, Eartscan, London-Washington, DC, 2011.

47. The Economist, *The 9 billion – people question. A special report on feeding the world*, 2011, February 26th.

48. Tomczak F., *Gospodarka rodzinna w rolnictwie: uwarunkowania i mechanizmy rozwoju*, IRWiR PAN, Warszawa, 2005.

49. Van Loon G.W., Patil S.G., Hugar L.B., *Agricultural Sustainability. Strategies for Assessment*, SAGE Publications, New Delhi/Thousand Oaks/London, 2005.

50. Wilkin J., *Wielofunkcyjność wsi i rolnictwa a rozwój zrównoważony*, Wieś i Rolnictwo, 2011, no. 4 (153), pp. 27-39.

51. Weis T, *The global food economy: the battle for the future of farming*, Zed Books, London*New York – Fernwood Publishing, Halifax*Winnipeg, 2007.

52. Wise T.A., *The True Cost of Cheap Food. The globalization of the food market has made food cheap, but who is benefiting?* Resurgence, Issue 259, 2010, March/April.

53. Woś A., *Konkurencyjność polskiego sektora żywnościowego*, IERiGŻ, Warszawa, 2003.

54. Woś A., Zegar J.St., *Rolnictwo społecznie zrównoważone*, IERiGŻ, Warszawa, 2002.

55. Wrzaszcz W., *Poziom zrównoważenia indywidualnych gospodarstw rolnych w Polsce*, Studia i Monografie nr 155, IERiGŻ-PIB, Warszawa, 2012.

56. Wrzaszcz W., Zegar J.St., *Sprawność ekonomiczna wybranych form rolnictwa zrównoważonego środowiskowo*, [in:] *Z badań nad rolnictwem społecznie zrównoważonym (23)*, IERiGŻ-PIB, Warszawa, 2014, pp. 9-38.

57. Zegar J.St., *Konkurencyjność rolnictwa w dobie globalizacji*, Roczniki Naukowe SERiA, 2008, vol. X, issue 1, pp. 503-514.

58. Zegar J.St., *Konkurencyjność rolnictwa zrównoważonego. Zarys problematyki badawczej*, [in:] *Z badań nad rolnictwem społecznie zrównoważonym (11)*, IERiGŻ-PIB, Warszawa, 2011, pp. 11-42.

59. Zegar J.St., *Współczesne wyzwania rolnictwa. Paradygmaty-globalizacja-polityka*, WN PWN, Warszawa, 2012a.

60. Zegar J.St., *Konkurencyjność ekonomiczna versus konkurencyjność społeczna w rolnictwie*, [in:] *Polityka ekonomiczna*, ed. J. Sokołowski, M. Szaniawski and A. Żabiński. Prace naukowe Uniwersytetu Ekonomicznego we Wrocławiu, 2012b, vol. 246, pp. 563-572.

61. Zegar J.St., *Konkurencyjność celów ekologicznych i ekonomicznych w rolnictwie*, [in:] *Z badań nad rolnictwem społecznie zrównoważonym (20)*, IERiGŻ-PIB, Warszawa, 2013, pp. 28-46.

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14. Rural development in the context of European integration of Ukraine

14.1. Introduction

In this paper the key aspects of rural development in Ukraine are described. Attention is focused on the interpretation of a concept of "rural areas" as an object of scientific researches on economics of nature management and environment protection. The importance of Ukraine's transition to the sustainable rural development concept has grown in recent years. It is characterized the advantages and disadvantages of basic components of sustainable rural development: economic, social and ecological. The fundamental problems and factors of present-day unsatisfactory conditions for rural development in Ukraine are presented. It is proved the usefulness in providing into the following researches the normative and legal factors in order to improve state administrative system and management. Perspective directions of Ukrainian government support for sustainable rural development are suggested. The European experience of sustainable rural development and possibility of its application in Ukraine is discussed.

14.2. Main results

Due to its favourable geographical conditions, temperate climate and fertile soils Ukraine has traditionally been considered as an agricultural country, as the share of agricultural production in GDP in Ukraine is one of the highest in Europe (8.2%). The nominal GDP for the II quarter of 2014 was UAH 372,770 million. Real GDP for the II quarter of 2014 compared with II quarter of 2013 (at constant prices of 2010) was 95.4% and compared with the I quarter of 2014, seasonally adjusted – 96.8% (excluding the temporary occupied territory of the Autonomous Republic of Crimea and Sevastopol).

The priority and dominance of agricultural sector caused the appropriate attitude of people to the land, formed special traditions of carrying out personal farming and "culture of behaviour" towards the environment protection. Along with this, an identity of a villager (peasant) deserves particular attention. The villager (peasant) is the owner of land plot who not only has the relevant

knowledge and skills of economic activity, but also refers to his work with respect, that is, its anthropogenic activities should not lead to soil depletion, water pollution, poor quality of agricultural production, etc.

However, not only peasants, but also other agricultural producers must be responsible for their activities (for example, agricultural cooperatives, farmers, agricultural holdings) and for this purpose suitable conditions for doing business should be created for them. Unfortunately, Ukrainian rural areas have been going through prolonged economic and social crisis. Therefore, it is the most problematic link of an economic activity, especially towards crop and livestock production realization. In addition, the situation becomes more complicated because living standards in the rural areas continue to be very low.

Decline of rural areas and socio-economic crisis of Ukrainian rural areas are accompanied by a systemic decrease of living standards of rural population and reduction of the volume of agricultural production.

The successful development of rural areas is very important because:

- it is a guarantor of food security, its economic independence, investment attractiveness and strong export positions;
- a village has always been the carrier of historical values, cultural traditions, transformer of mentality and spirituality as well as national identity.

But because of the scientific and technological revolution and industrial development, innovation in agriculture, intensive production, natural population growth and from another hand destruction of humus layer of our planet, impoverishment of biodiversity, depletion of natural resources, pollution, etc., rural areas as a separate system of the social structure of society gradually started to lose its value, which led to numerous degradation processes.

That is why for Ukrainian village it is right time to realize the concept of sustainable development of rural areas. World tendencies show that the development of rural areas should be characterized by the balance of its three main components, namely: economic, social and ecological sustainability.

After the adoption of Declaration of Independence of Ukraine (August 24, 1991) and a long period of socio-economic reforms in Ukraine, socio--economic situation and living conditions remain at a low level, particularly in the rural areas. The main problems of rural development in Ukraine:

- unemployment and low level of wages, absence of work motivation;
- demographic crisis;
- internal and external migration;

- unsatisfactory condition of social infrastructure and public services, transport and communication connections;
- cultural and educational decline;
- unsatisfactory health services;
- inability of comprehensive human development (spiritual, aesthetic, physical, etc.);
- imperfect regulatory and legal framework and lack of well-defined rural development policy and support;
- contamination of the natural environment;
- low level of environmental consciousness and responsibility.

According to the National Rating Agency "Rurik", on the market of agricultural products there are some improvements: in January-September 2013 the index of agricultural production compared to corresponding period of 2012 increased by 3.0%, including agricultural enterprises – by 1.8%, and households – by 3.9%. During the first 9 months the indexed amount of crop production against the respective period of 2012 amounted to 119.8%, including agrarian enterprises – 133.4% and households of population – 109.6%. (Fig. 14.1)[57].

Figure 14.1. Dynamics of agricultural production in 2013,%
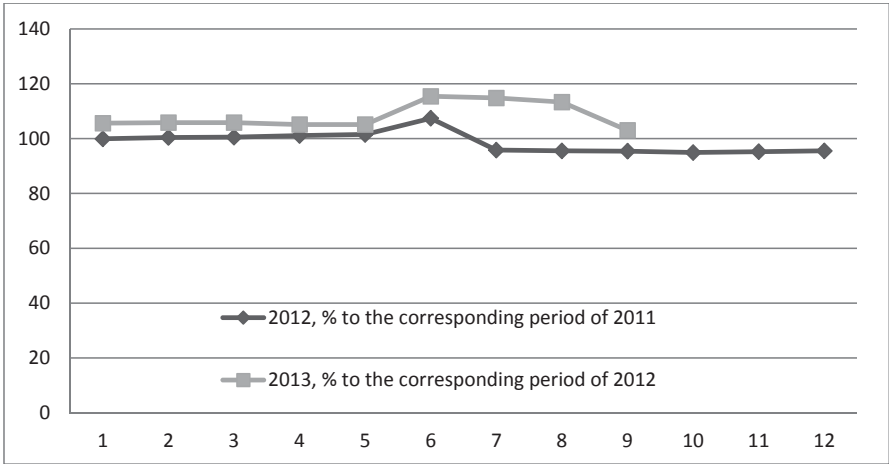
Source: own elaboration.

[57] Market overview of Agriculture in Ukraine for the 9 months 2013. National Rating Agency "Rurik".

Studying the problems of rural development first of all it is need to define the term "rural areas". This term is a widely debated issue not only among the scientific community and government officials, but nevertheless still this term has no accurate definition, identification and classification, which is unacceptable for scientific research[58]. Among Ukrainian scientists who investigate this issue it is usual to use a number of synonyms, that causes an ambiguity about research subject, as each researcher offers their own interpretation of the corresponding term, for example:

- rural areas,
- rural settleable areas,
- rural zones,
- rural territories,
- rural settlements,
- villages,
- countryside.

This situation is complicated by the fact that there is no unified definition of the term "rural areas" in Ukrainian legislation, that is why in various normative acts this concept is presented based on the researched object.

Therefore, in our research we decided to examine the term "rural areas" as an object of scientific research in environmental economics and environmental protection, and on this basis identify and carry out the classification of rural areas by using the European experience.

In order to do this, we used Physiocratic approach by which land is the only source of the additional value and not just a natural resource or basic means of production. And when we omit the word "rural", the word "area" in the vast majority of encyclopaedic publications is treated as a "land space limited by boundaries". That is on the basis of the term "rural areas" the main natural resource is – LAND and its boundaries will be determined by an adjective "rural".

Thus, rural areas – part of the land space, which is characterized by appropriate boundaries as a result of administrative and territorial division where principal activity is LAND USE.

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[58] H.M. Prytula. *European practice of identification and classification of rural areas*. Bulletin of Agricultural Science of the Black Sea Region, Issue 3, Mykolayiv, Ukraine, 2011, pp. 94-99 [in Ukrainian].
A.I. Pavlov. *Rural areas as object of scientific research*. Access: http://nbuv.gov.ua/j-pdf/DeBu_2007_1(1)__6.pdf [in Ukrainian].

On the basis of literature review of domestic legislation, rural areas are characterized by relevant administrative and territorial boundaries and surface, which is outside of urban areas, has low-density settlement, low-rise residential buildings with household plots and small population where the vast majority of residents are engaged in agriculture, and according to the number of inhabitants, is divided into large rural settlements (from 2 thousand to 5 thousand or more), medium (1 to 2 thousand) and small (up to 1000 inhabitants).

The European Commission developed a new urban/rural typology which is based on a classification of grid cells of 1 km^2 as either urban or rural. To be considered as urban, grid cells should fulfil two conditions: population density of at least 300 inhabitants per km^2 and a minimum population of 5 000 inhabitants in contiguous cells above the density threshold. The other cells are considered as rural[59].

NUTS 3 regions have been classified into three groups based on the classification of these grid cells:

- **predominantly urban region:** population in grid cells classified as urban makes up more than 80% of the total population;
- **intermediate region:** population in grid cells classified as urban makes up between 50% and 80% of the total population (population in rural cells between 20% and 50%);
- **predominantly rural region:** population in grid cells classified as rural makes up 50% or more of the total population.

According to this classification, 41% of the population of the EU-27 lived in urban regions, 35% in intermediate regions and 23% in rural regions. Speaking about Ukraine as a future EU member, it belongs to the intermediate type, because the share of urban population account for 69%.

Within the context of popularization of the ideas of sustainable development in Ukraine various programs of national, regional and local level have been developed. In the EU countries such practice has been widely used that demonstrates the efficiency and effectiveness of its implementation, since to each region an individual approach is applied at the level of vertical and horizontal structures, considering specific climatic and geographical conditions, etc., on the base of which concrete plan of action for a certain period of time is created[60].

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[59] *Eurostat News Release 51/2012* from 30 March 2012.

[60] S.M. Moroz, (2010), *Changes in rural areas of Ukraine: problems and opportunities*, European Association of Agricultural Economists 118th Seminar, August 25-27, 2010, Ljubljana, Slovenia. Access: 118th Seminar, August 25-27, 2010, Ljubljana, Slovenia.

As the national scientific community has not yet defined the boundaries of "rural areas", it is advisable to use the experience of European countries and the classification towards urban/rural typology. In our research we decided to do it on three levels – national (by regions of Ukraine), regional (by districts of region) and local (by rural areas of district). In this way we want to study to exactly what type (urban, intermediate or rural) Ukrainian regions, districts and rural areas belong to. And on the basis of this develop a strategy for sustainable rural development adapted to Ukrainian realities.

We started our researches with the comparison of urban and rural population in Ukraine and European countries and noticed essential differences. In the Figure 14.2 and Figure 14.3 the statistical distribution of the proportion of urban and rural population in Ukraine and European countries are presented.

Figure 14.2. Statistical distribution of the proportion of urban population in Ukraine and European countries
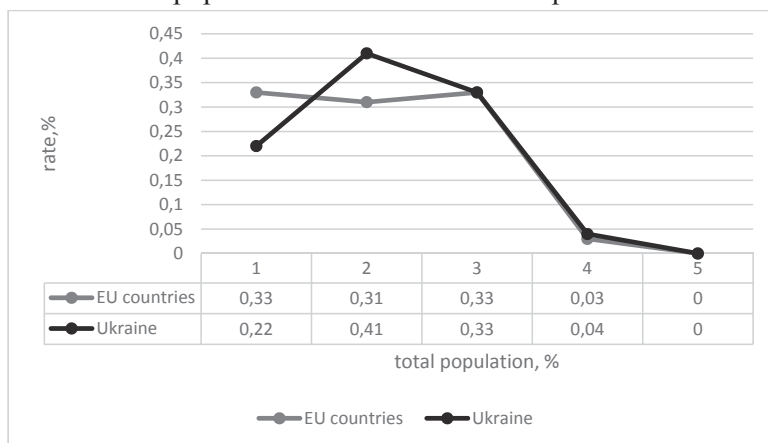

	1	2	3	4	5
EU countries	0,27	0,41	0,18	0,11	0,03
Ukraine	0	0,07	0,31	0,41	0,21
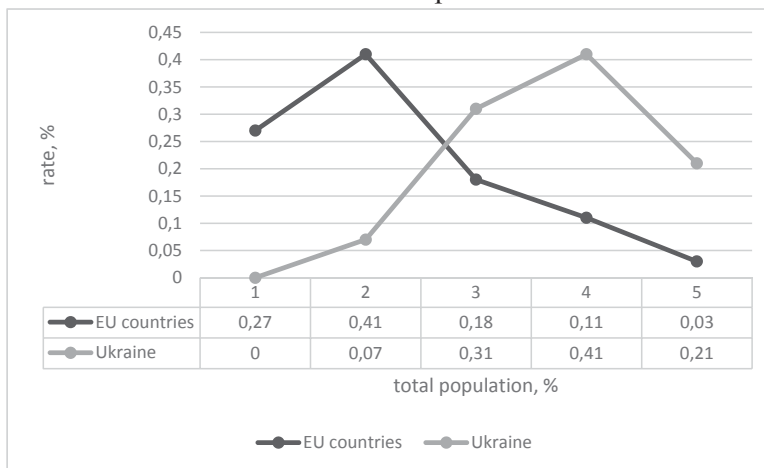
Source: own elaboration.

In the next step of our researches we decided to focus on the local level. For this reason we selected representative district of Lviv region and began to analyse the data.

Social and economic conditions of rural areas of the investigated district are as follows. Actual values of 12 indicators of socio-economic condition of human settlements (population, surface of agricultural lands, distance to the district centre, number of pensioners, number of cultural institutions, number of educational institutions, number of infrastructure facilities, number of pupils in school and number of empty households) considered as random variables to

identify possible patterns – interdependence between them (by correlation analysis) and through the mechanism of formation of these indicators as a statistical aggregate (by clarifying the kind of distribution laws of them as random variables). At the same time we take into consideration that some of them are continuous values (surface of agricultural lands, distance to the district centre), others – discrete (number of corresponding institutions), and some of them, which essentially are discrete (population, number of pensioners).

Figure 14.3. Statistical distribution of the proportion
of rural population in Ukraine and European countries

		1	2	3	4	5
	EU countries	0,33	0,31	0,33	0,03	0
	Ukraine	0,22	0,41	0,33	0,04	0

total population, %

EU countries   Ukraine

Therefore, having data about rural population, number of empty households and surface of agricultural land for researches we choose representative for Lviv district – Stryi district – and described the socio-economic situation in rural areas. For this purpose on the basis of data on population, number of empty households, distance from the district centre, surface of agricultural land, number of cultural and educational institutions, number of pensioners, number of pupils in school, number of infrastructure facilities in all 70 rural areas of Stryi district of Lviv region we found statistical characteristics (simple mean, standard deviation and coefficient of variation) of statistically average (representative) rural area of the district.

According to the results of statistical treatment, an average rural area in the examined district has 248 households, 6% of which are empty, that is nobody lives there. The average rural population is 900 people (30% of whom are pensioners). The total surface of agricultural land occupies 725 hectares. The

average distance from the district centre is 12 km and in each rural area there is one educational institution and one infrastructure facility. The educational system in rural areas of investigated district is poorly developed, as the share of rural areas where there is not even the primary school is 30%, and with kinder-gartens are provided only 12% of rural areas. The average number of pupils who learn at school amounts to 103 persons. It should be mentioned that in all rural areas there is at least one religious building (church or chapel)[61]. According to these data graphical interpretation of each of the studied indicators is created. For example, a graphical interpretation of the distribution of empty households in rural areas and surface of agricultural land in rural areas is presented below (Figure 14.4 and Figure 14.5).
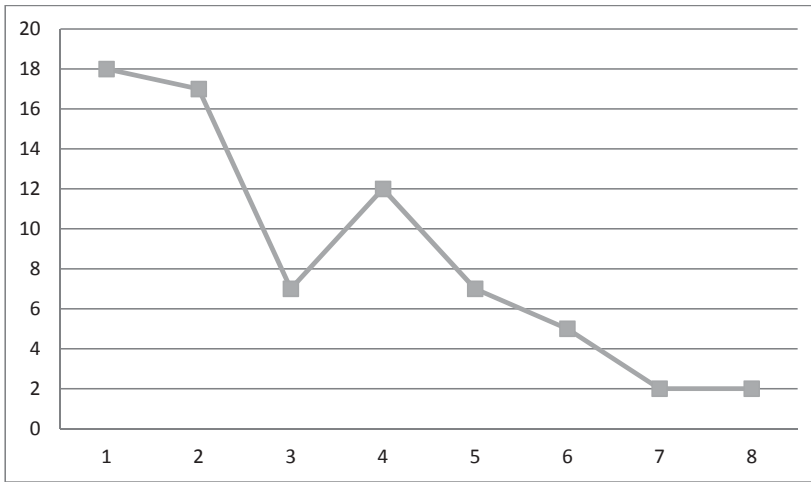
Figure 14.4. Statistical distribution of agricultural land in rural areas
(Stryi district)
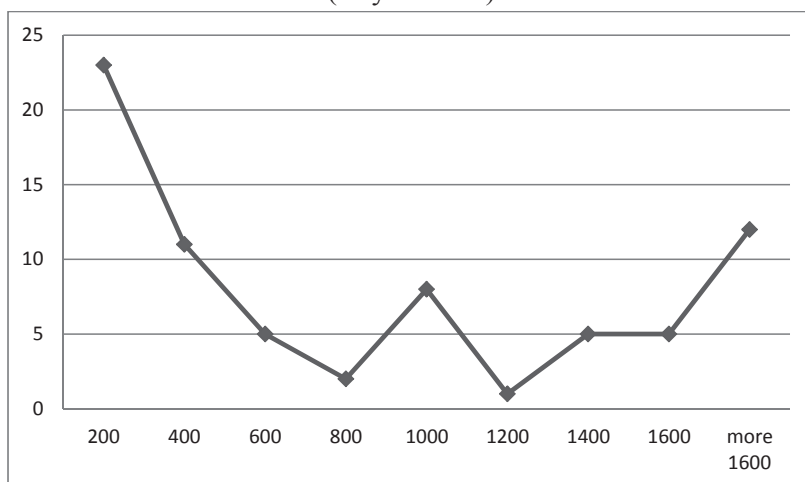
Source: own elaboration.

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[61] V. Romanjuk, R. Pastuch. Stryi district. Stryi, Ukraine, 2012, 688 p. [in Ukrainian].

Figure 14.5. Statistical distribution of empty households in rural areas
(Stryi district)

These distributions differ significantly by the type, what may be the object of separate studies. Therefore, in the next researches it is expected to find out the kind of distribution of socio-economic condition. Also it is important to detect regularities of these indicators and estimate its connection with GDP values and indicators of agro-ecological condition of rural areas.

Speaking about the sustainable rural development, very interesting is an idea of agricultural holdings cooperation with private households of rural population that grow agricultural products for sale. In accordance with legislative framework every 5 years private households of the peasants should be monitored. However, the difficult economic situation and lack of money make it impossible for such investigations, and in some private laboratories such experiments are quite expensive and peasants have not a possibility to verify the correspondence of cultivated agricultural production with the requirements of state standards of quality[62]. Therefore, agricultural holdings could offer such examinations of agricultural production for peasants following the contractual terms.

For example, in 2013 an agricultural holding "HarvEast"[63] created a special entity – Agency of Rural Areas Development. The main target of the Agency's work is assistance in development of rural areas in Ukraine.

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[62] N. Palapa, S. Senchuk. *Agroecological peculiarities of agricultural land assessment*. Technique and technology of agriculture No.2, Lviv, Ukraine, 2011, pp. 36-39 [in Ukrainian].
[63] Webpage of the agricultural holding "HarvEast". Access: http://harveast.com/.

Main areas of activity of the Agency:
- assistance in development of entrepreneurship, small and medium business, creation of conditions for rise in the level of people's employment;
- support of public initiatives, facilitation in rise of social and civil activity of the inhabitants; encouragement of self-organization of communities for solving the problems of economic, social and cultural development;
- assistance to inhabitants of rural areas in implementation of their own creative, sports and organizational abilities as well as ensuring the realization of cultural, public and social interests;
- conducting investigations, collection and analysis of information about regional problems;
- participation in implementation of regional social-economic development programs;
- increase of energy effectiveness of rural areas, implementation of energy saving projects for facilities of social and communal infrastructure;
- engagement of rural areas inhabitants to healthy lifestyle;
- organization and conducting of trainings, cultural and educational, entertainment, training, scientific, health-improving and recreational events;
- establishing cooperation with agencies, organizations, grantors, business representatives and state authorities.

14.3. Conclusion

Today the issues of European integration are topical for the whole social structure of the Ukrainian society. These questions are particularly actual in the context of sustainable rural development, that provides a harmonious combination and inter conditionality of such main components, namely economic, social and ecological aspects. However, for Ukraine at this stage of joining the EU structure it is especially important to develop its own strategy of advancing rural development (in opposition to "catch-up modernization strategy"[64]) given the characteristics of economic activities, social relations, and economic situation and so on.

For this purpose first of all it is necessary to modernize normative and legislative framework that would allow rural population providing for decent living standards and due to favourable conditions generate agricultural products under the system of privileges and subsidies. It is also important not only to support small agribusiness, but also medium sized agribusiness through the creation of advantageous basis for cooperative farms. With regard to powerful agricultural

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[64] V. Pasichnyk. *Social and economic component of European integration strategy of Ukraine*. Academic papers collection, Issue 5, Lviv, Ukraine, 2010 [in Ukrainian].

enterprises (agro-holdings), then it is advisable due to their payments to fill local budgets in order to improve social infrastructure of rural areas as well as oblige renters to carry out annual monitoring of the environment in connection with their production activities, and in the case of harmful impact on natural resources, there is a need to develop new technologies and innovative methods to improve agro-ecological condition of rural areas.

Thus the main factors of unsatisfactory condition of rural areas are socio--economic difficulties, absence of state control, unsatisfactory legal framework and lack of scientifically justified recommendations for agricultural production keeping in private households. So peasants cultivate the land, follow crop rotation, use chemical and mineral fertilizers, etc. with the help of those methods and skills that historically formed in their village and handed down from generation to generation. Furthermore, peasants are unable to use innovative technologies for farming because of low awareness how to do it and the shortage of money. Unproductive manual labour still dominates in private agricultural sector in comparison with mechanization of agriculture production in agri--enterprises that not only could save time and resources, but also let to receive much more profit. Topical problem is the realization of cultivated agricultural products and utilization of agricultural waste. That is why, in order for successful integration of the Ukrainian rural areas into European community we need to solve these problems immediately.

References

1. *Eurostat News Release 51/2012* from 30 March 2012.
2. *Market overview of Agriculture in Ukraine for the 9 months 2013*. National Rating Agency «Rurik».
3. Moroz S.M., (2010), *Changes in rural areas of Ukraine: problems and opportunities*. European Association of Agricultural Economists 118th Seminar, August 25-27, 2010, Ljubljana, Slovenia.
4. Palapa N., Senchuk S., (2011), *Agroecological peculiarities of agricultural land assessment*. Technique and technology of agriculture No.2, Lviv, Ukraine, pp. 36-39 [in Ukrainian].
5. Pasichnyk V., (2010), *Social and economic component of European integration strategy of Ukraine*, Academic papers collection, Issue 5, Lviv, Ukraine [in Ukrainian].
6. Pavlov A.I., (2007), *Rural areas as object of scientific research*. Access: http://nbuv.gov.ua/j-pdf/DeBu_2007_1(1)_6.pdf [in Ukrainian].

7. Prytula H.M. (2011), *European practice of identification and classification of rural areas.* Bulletin of Agricultural Science of the Black Sea Region, Issue 3, Mykolayiv, Ukraine, pp. 94-99 [in Ukrainian].
8. Romanjuk V., Pastuch R., (2012), *Stryi district*, Stryi, Ukraine [in Ukrainian].
9. *Rural realities in the European Union*, Access: http://ec.europa.eu/agriculture/envir/report/en/rur_en/report_en.htm.
10. Web page of the agricultural holding «HarvEast». Access: http://harveast.com/.

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15. Impact of the Common Agricultural Policy (CAP) on the sustainability and competitiveness of Bulgarian vegetable production

15.1. Introduction

The CAP is directed towards the efficient and sustainable development of agriculture in all member-states of the European Union (Bulgaria inclusive). After the accession of Bulgaria into the European Union the basic goal of the ongoing policies has been a complete restructuring of the agricultural sector in accordance with the requirements of the Community. A number of analysts [Kuzmanova 2008; Atanasov 2008; Gerganov and Blazheva 2012; Petkov 2012] identify the need to increase the competitiveness of agricultural production as a precondition for the sustainable development of the sector in view of the strong pressure of the European market.

Vegetable production has always been an inseparable part of Bulgarian agriculture and it is distinguished by its dynamics and intensity. At the same time this sub-sector has the potential for development, especially in rural areas where a significant part of the population lives.

The increasing expectations laid upon the agriculture of united Europe call for continuous changes in the CAP. It has to meet the constantly growing requirements for food quality, conservation of natural resources and the fragile ecological balance. Last but not least, it has to create conditions for the development of rural areas and to provide a higher standard of living for agricultural producers [EC 2010a].

The competitiveness and sustainable development of Bulgarian agriculture are essential for its integration with the common agricultural production in the context of CAP. The purpose of this article is to analyse the impact of the CAP on the development of vegetable production in Bulgaria with a view to enhancing its competitiveness and sustainable development.

15.2. Material and methods

To achieve the objective set above, the statistical yearbooks and reference books of the National Statistical Institute (NSI) were used as well as the agricultural reports of the Ministry of agriculture and food, newsletters of the Agrostatistics Directorate to the Ministry of Agriculture and Food, and own research

studies. For the purposes of this research different information sources were used – scientific journals, publications of Bulgarian and foreign authors, on-line periodicals as well as the author's own research [Stoeva, 2013].

15.3. Results and discussion

The state of vegetable production is predetermined by the favourable natural and geographical conditions in our country. Due to its economic and social importance, vegetable production is a main sub-sector of Bulgarian agriculture. The production of fresh vegetables is of greatest significance for the sector. However, there is a decrease in production of almost all vegetable crops.

The analysis of vegetable production for the period 2001-2012 shows that the total production of vegetables follows an unfavourable trend of reduction of production output (Fig. 15.1).

Figure 15.1. Production of main vegetable crops for the period 2001-2012
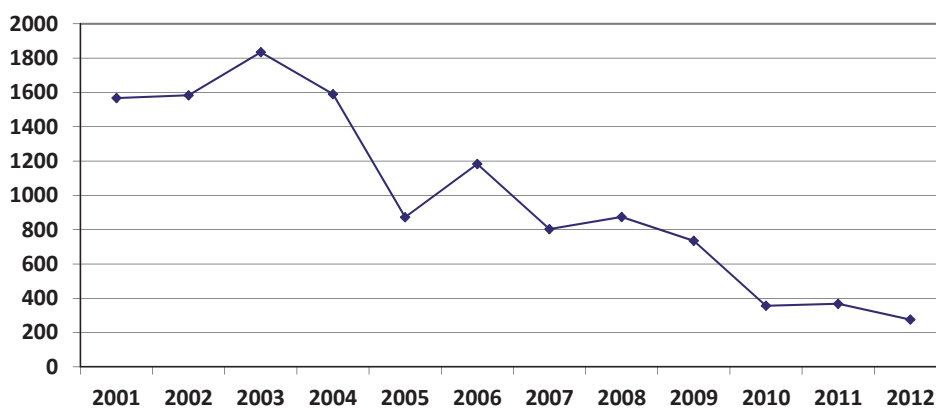
Source: own elaboration based on the data from Ministry of agriculture and food, Agrostatistics Directorate.

The reasons for the low level of efficiency in the production of vegetables and the relatively weak competitiveness of vegetable production, observed after the accession of Bulgaria into the EU in 2007, are rooted in the failure of the land reform. As a result of this reform, small-sized farms which are ineffective due to the low degree of specialization, insufficient availability of agricultural equipment and modest level of production organization, dominate the structure of specialized vegetable outdoor farms. The strong competition of vegetable production from other European countries after the accession of Bulgaria to the Common European market in 2007 and the imports of fresh vegetables have further pressed Bulgarian vegetable producers.

Another typical feature of the outdoor vegetable production is that due to the relatively small size of the farms the average yields of the unit of area tend to decrease, thus reducing the competitiveness of the production. The fragmentation of the basic production resource – the land, the inevitable dependence of vegetable production on geographic and climatic conditions, the outdated agricultural equipment, the low level of mechanization of production process and the low wages of those employed in vegetable production are just a small part of the current issues that Bulgarian vegetable production is facing. Besides the strong dependence on climatic conditions, a number of factors responsible for the economic situation in this sub-sector also have a negative impact on the competitiveness of vegetable production, namely: the unfavourable trend in demographic structure of population; a high concentration of population in large cities; high average age of the workforce; relatively low degree of mechanization and low labour productivity; and strong fragmentation of the arable land.

Our conclusions are in line with Popov's conclusions [2012], who by analysing the competitiveness of Bulgarian vegetable production argues that the small and medium size of farms and the absence of cooperation between them, hence the small scale of production, as well as the slow uptake of innovations in the vegetable production sector are the main reasons for the inability of Bulgarian producers to satisfy the needs of processors.

For the period 2007-2012 the harvested areas of the studied vegetable crops tend to change – the areas planted with tomatoes, potatoes and green pepper are decreasing while there is an insignificant increase of the areas planted with the rest of the vegetable crops (Table 15.1).

The average yields obtained for the researched period are crucial for the final economic results. Taking into account Bulgaria's good opportunities and traditions in the sphere of vegetable production, the average yields of the main vegetable crops are relatively low, but they somehow manage to keep their cost at a lower level in comparison with the prices at which the production is realized (Table 15.2).

Table 15.1. Size and dynamics of harvested areas (dca) planted with some vegetable crops in all categories of farms in Bulgaria, for the period 2007-2012

Total crops	Years						Dynamics - %					
	2007	2008	2009	2010	2011	2012	2007	2008	2009	2010	2011	2012
Tomatoes	48,280	34,740	30,070	29,240	38,600	34,010	100	-28.1	-37.8	-39.5	-20.1	-29.6
Cucumbers	4,960	1,250	3,690	7,490	5,500	5,660	100	-74.8	-25.7	51	10.0	14.1
Pepper	54,970	37,505	50,130	47,035	46,205	30,130	100	-31.8	-8.9	-14.5	-16.0	-45.2
Onions	12,620	12,813	11,792	16,664	14,988	12,790	100	1.5	-6.6	32	18.7	1.3
Cabbage	22,460	20,928	15,958	26,157	25,542	20,840	100	-6.8	-28.9	16	13.7	-7.2
Potatoes	224,270	217,108	140,016	138,050	162,187	149,060	100	-3.2	-37.6	-38.5	-27.7	-33.5
Water-melons	33,830	35,071	38,590	33,022	37,935	30,910	100	3.6	14	-2.4	12.0	-8.6
Melons	11,890	12,423	17,343	9,909	15,044	12,670	100	4.5	45.8	-16 /7.	26.5	6.6

Source: Ministry of agriculture and food, Agrostatistics Directorate.

Table 15.2. Average yields (kg/dca) of the main vegetable crops in all categories of farms in Bulgaria for the period 2007-2012

Total: Crops	Years						Dynamics - %					
	2007	2008	2009	2010	2011	2012	2007	2008	2009	2010	2011	2012
Tomatoes	1,970.9	2,834.5	2,418.2	2,854.5	1,757.6	2,166.6	100	43.8	22.7	44.8	-10.8	9.9
Cucumbers	1,148.8	1,528.1	1,433.5	2,520.9	2,073.4	1,000.2	100	33	24.8	119.4	80.5	-12.9
Pepper	1,439.5	1,512.4	1,364.8	1,401.4	1,371.7	1,524.2	100	5.1	-5.2	-2.6	-4.7	5.9
Onions	839.6	1,248.5	697.3	1,148.9	1,117.5	809.1	100	48.7	-16.9	36.8	33.1	-3.6
Cabbage	2,205.5	3,095.7	2,463.6	3,012.4	1,746.4	2,267.4	100	40.4	11.7	36.6	-20.8	2.8
Potatoes	1,331.7	1,625.8	1,653.9	1,819.3	1,432.0	1,015.0	100	22.1	24.2	36.6	7.5	-23.8
Water-melons	2,273.5	2,271.9	2,302.0	1,876.3	1,792.6	1,802.0	100	-0.1	1.3	-17.5	-21.2	-20.7
Melons	1,564.8	1,095.5	1,249.6	889.3	1,007.4	1,393.4	100	-30.0	-20.1	-43.2	-35.6	-11.0

Source: Ministry of agriculture and food, Agrostatistics Directorate.

The average yields realized during the researched period are quite instable. What is impressive is that they are far from the biological potential of the vegetable crops grown in Bulgaria and do not meet the favourable agro-climatic conditions in our country. The reasons are of organizational and economic nature – crops that are more cost-effective and less labour-intensive are much more preferred. Moreover, producers often do not comply with the technological requirements and they do not possess specialized agricultural equipment.

The CAP is not a postulate value. It has undergone various changes of different priorities in its development [Gerganov and Blazheva 2012]. In recent years (after 2013), a main goal for its renewal has been the strengthening of market orientation of agricultural farms, with a focus on demand and consumers' requirements [EC 2010b]. This objective can be achieved by increasing the competitiveness of the sector, which is a prerequisite for getting quality food. The efforts should be directed towards a viable food production; sustainable management of natural resources and actions in relation to climate change; preservation of the territorial balance, diversity and identity of rural areas. Taking into account the analysis of the present condition of Bulgarian vegetable production, all of the above-mentioned measures for achieving the CAP objectives are adequate and extremely urgent. According to Petrov et al. [2010] the possibility of increasing the competitiveness manifests itself in the consistent implementation of strategies and practices. In this sense the vegetable sub-sector needs a combination of agricultural and economic strategies and innovations to contribute to its sustainable development and increase of competitiveness. Stoeva [2013] identifies the following measures: Improving the organization of vegetable production by means of establishing vegetable producers' associations; Improvement of the specialization of vegetable production; Increase of vegetable production efficiency through consolidation of production.

According to Slavova [2012], in order to promote the national identity products, a policy is needed that not only complies with the CAP, but also supports the development of dynamic and competitive agriculture. All these recommendations relate even more strongly to the vegetable production being one of the most intense and dynamic sectors of agriculture.

15.4. Conclusion

The opportunities for increasing the competitiveness and sustainability of vegetable production in Bulgaria are revealed by means of the effective implementation of the CAP in the EU. The resources to achieve the European levels of these indicators can be identified in different areas: rapid deployment of technological

solutions and modern innovations developed by scientific organizations; promotion of good agricultural practices; encouraging vegetable producers to expand their vegetable repertoire by growing not only traditional vegetable crops but also new ones that are sought in the market and can be grown in our soil and climate; improving the quality of the vegetable production; enhancing the national support for the vegetable production sector; modernization of vegetable production by utilizing the resources provided under the Rural Development Programme measures. It is very important for our country to develop and use the potential of this sector as a basis for the enhancement of Bulgarian vegetable producers' welfare.

References

1. Stoeva T.,(2013), *Economic effectiveness of vegetable production in Plovdiv region*, Thesis, Agricultural university of Plovdiv, Bulgaria (Bulgarian).
2. Atanasov D., (2008), *Influence of the common agricultural policy on the sustainability of dairy cattle in Bulgaria*, International scientific journal: Science & Technologies (Publisher "Union of Scientist – Stara Zagora").
3. Gerganov G., Blazheva V., (2012), *Challenges facing the agricultural sector in Bulgaria in the second decade of 21st century in the context of the common agricultural policy of the European Union*, "Dialog Magazine", Institute of Scientific Researches, extraordinary thematic issue I, August 2012, pp. 68-77.
4. EC 2010a., Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions *The CAP towards 2020: Food, natural resources and territorial challenges of the future*, Brussels, 29/09/2010, COM(2010).
5. EC 2010b., *The common agricultural policy in 2020: preparation for future challenges in the sphere of food supply, natural resources and territorial balance*, European Commission, Brussels, 2010.
6. Kuzmanova Hr., (2008), *Characteristics of competitiveness in Bulgarian agricultural sector*, New knowledge journal of science – ISSN 1314-5703, pp.82-91, Anniversary international scientific and applied conference – UARD, Bulgaria.
7. Petkov V., (2012), *Competitiveness of Bulgarian agriculture within the single market of the European Union*, Author's summary, University of National and World Economy, Sofia, pp. 35-38.
8. Petrov, V., Blazheva V., Grozeva D., Linkova M., (2010), *Agricultural management*, Svishtov, p. 199.
9. Slavova Y. (2012), *Impact of the CAP on the agricultural export – evaluation and issues*, Economics and management of agriculture, No. 3, p. 22.

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16. Human Capital – catalyst or limiting factor of rural Romania's competitive capabilities

16.1. Rural Romania face to face with the EU 2020 Strategy

A smart growth, like that proposed by the *EU 2020 Strategy* is based on the human capital open to innovation and able to adopt new technologies so as to increase their resilience to global change. In the same context, the *second pillar of the Common Agricultural Policy* is focused on competitiveness and innovation, climate change and environment, as important components that require the involvement of the *human capital* as catalyst factor. A successful implementation of these strategically priorities depends equally on the business environment dynamics and entrepreneurs' innovating capacity, on one hand and, on the other hand, upon the available labour force, whose characteristics: age, professional training, availability can become an opportunity or a risk for a successful private initiative.

In the last decades there are more and more debates around the terms of entrepreneurial economy and entrepreneurial capitalism [Baumol et al. 2007]; researchers around the world have demonstrated that high levels of entrepreneurial activity can have a positive effect on the rise of employment level, economic growth and improvement of the general standard of living [Lafuente and Driga 2007]. New economic growth models point out to a positive impact that initiating a new business can have over the economic growth both for developed economies and emergent ones. While the theoretical economic models developed for the countries with an emergent economy centre on the idea that the entrepreneurship represents the "spark" and the "accelerator" of economic growth, in the developed economies the entrepreneurial initiatives are credited the role of new sources for productivity growth – having positive effects on competitiveness [Naude 2008]. Dynamics of the entrepreneurial initiative in terms of size, diversification and openness to innovations decisively impact the level of competitiveness.

The human capital, defined as the set of skills, knowledge and aptitudes characteristic to individuals and acquired through education, professional training and experience, became the core element of research and public policies from the moment when the empirical evidence proved the positive effects of the

human capital upon economic growth and labour employment. In 2009, Paul Hofheinz (President of the Lisbon Council)[65] made the statement that "The world has entered a new era where the newly-created economic value will no longer depend on combining land, labour and capital, but rather on the knowledge, skills and ingeniosity with which the traditional production factors can be recombined into new products and services with increasingly higher value. It is a world in which the development stage of the human capital in a certain region or nation will make the difference between the economic development opportunities, in which the labour force quality becomes decisive for the prosperity level". The available labour represent a support of entrepreneurial development when, owing to its characteristics, it can be immediately and efficiently mobilized in a rural business; or it can become a constraint to private business initiative development if it is an old-aged, poorly trained labour force, it does not have the necessary skills for the new business development and/or it is not available on the local market.

16.2. Research questions

In Romania, rural development represents an important national issue due to the relevance of countryside areas[66]: 45% of the Romanian population and 44% of the country's active population lives there. In this respect, the dynamics of the rural business environment and human capital availability have a crucial role for the Romanian rural vitality preservation and increase its resilience to regional and global changes. Starting from these considerations, *the goals* of this paper targets the evaluation of the context in which the Romanian rural area has evolved from the perspective of opportunities to respond to the EU 2020 Strategy desiderata. In other words, the paper tries to provide an answer for the following questions: do and to what extent the current characteristics of the rural human capital and their evolution trends represent a supporting point for a smart and inclusive growth of the Romanian rural area?

16.3. Data analysis and facts

According to the data of the Romanian National Institute of Statistics, the stable population in the Romanian rural area amounts to 9.21 million people, with an activity rate of 54.7%, index that experienced a permanent descending trend in the transition period due to the rural demographic processes in the last twenty years: birth rate decrease, rural population (demographic) ageing (Fig-

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[65] Hofheinz, P.(2009) *Europe 2020: Why Skills are Key for Europe's Future* (Lisbon Council).
[66] Rural areas – rural communities as local administrative units with status of villages.

ure 16.1), internal and external migration flows. The labour force recruitment pool in the rural area has permanently narrowed. The volume of the population of active age (15-64 years) in the Romanian rural area decreased from 6.9 million people in 1992, to 6.4 million people in 2012 and its qualitative structure was deteriorated in terms of age and education structures. We assist not only to an aging process at the level of total rural population, but at the same time, this process characterized the potential labour force from the Romanian rural area.

Figure 16.1. Post-communist evolutions of the rural demography in Romania
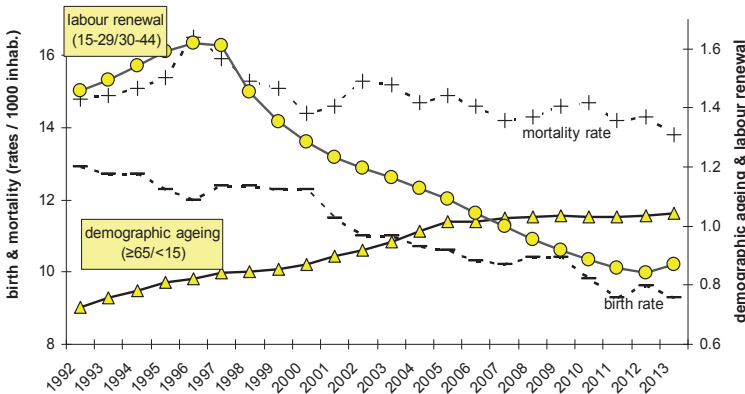
Demographic ageing – the ratio of the population aged 65 and older to the population under 15.
Labour renewal – the ratio of the population at the beginning of the active period (age group 15-29) to the population in the middle of active life (30-44).
Birth rate – total number of live births per 1,000 of a population per year.
Death rate – number of deaths per 1,000 of a population per a year.
Source: NIS data – TEMPO on-line database.

Therefore, the labour renewal experienced an accelerated decreasing trend (Figure 16.1) especially after 1998, under the impact of urban-rural migration flows, and it became less than one in the year 2008. This evolution will determine an accelerated ageing of labour force itself, as in the age structure of the active population, the young people will have an increasingly lower share, while the share of the mature and old population will increase. Labour force ageing is accompanied by the decrease of the labour force innovating capacity, occupational mobility and of the capacity to assume the risk of occupational status change. All these represent risks for the implementation of new entrepreneurial initiatives in the rural area.

16.4. Internal and external migration

After 1989, the restructuring of the socialist economy, generally material-ized into closing down of the socialist industrial enterprises (mostly located in the urban areas) generated a significant loss of job supply and vast contingents of un-employed peoples with redundant professional skills. Thus, the skilled workers of communist Romania's heavy industry became unemployed, with minimum inte-gration opportunities on the labour market (in Romania or elsewhere in the world) as the abilities and qualifications acquired by these in the communist industry did not match the technical and technological requirements of a modern economy. Practically, in ten years, i.e. 1990-2000, the number of employees in Romania was down by half and got stabilized at this level (Figure 16.2) in the absence of consistent initiatives for the development of new private business, on the market economy basis, which should make up for the job deficit.

Figure 16.2. Evolution of the number of internal migration flows and employees in Romania, in the post-communist period
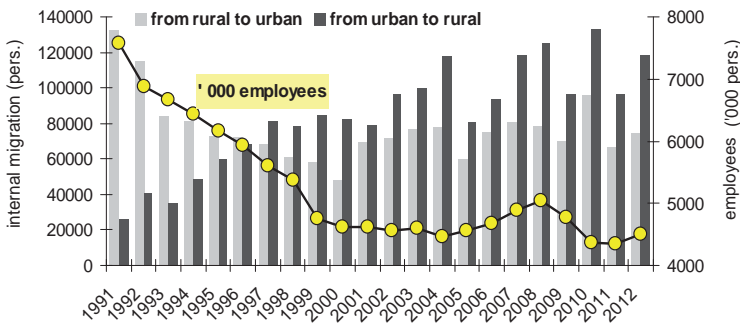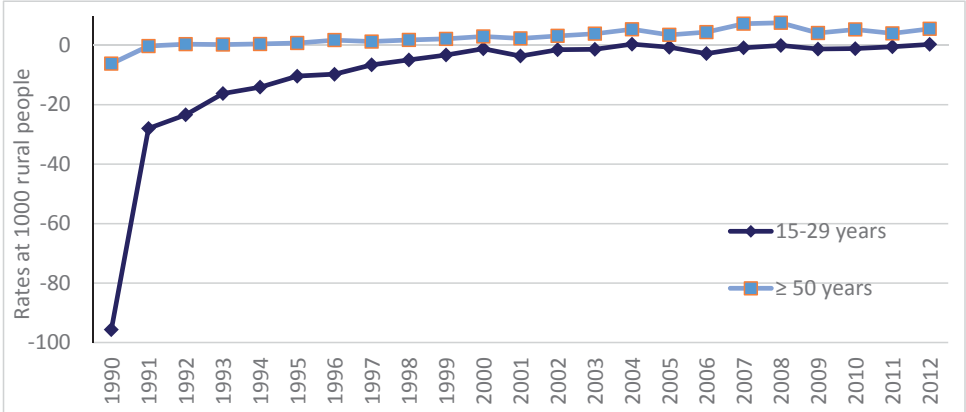

Source: NIS data – TEMPO on-line database.

The other important aspect of the post-communist reforming process was represented by the reconstitution of the private ownership on agricultural land (by which the land owners got back their right to work on the small land proper-ties on individual basis). As effect of industrial restructuring and land property reconstitution, part of urban population was confronted with severe difficulties in the access to the labour market and, because they regained their agricultural land, they become actors of the re-ruralisation process. Especially after 1997, with the intensification of communist industry restructuring process in Romania, the internal migration flows from the urban to rural areas became more intense than those from the rural to urban areas (Figure 16.2).

After 1991, the balance of changes of domicile between the residence areas in Romania (urban-rural "minus" rural-urban) remained positive in the case of older population (over 50 years) and negative in the case of young population (15-29 years). This shows that in the rural area the population's ageing process had not only natural causes, but happened also due to migration. Furthermore, the Romanian rural areas lost important young population numbers, at the beginning of their active life, who preferred to leave for the urban areas; this has had a negative impact upon the future demographic regeneration opportunities (Figure 16.3).

Figure 16.3. Internal migration balance for Romanian rural area, by ages

Source: NIS- TEMPO on-line database.

The rural areas (and the small agricultural households) represented only a social safety net, and not a space of professional progress as the development and diversification level of the rural business environment continues to be low, the rural job supply being dominated by the primary sector. In this context, the external migration was adopted as a solution to the crisis of the domestic labour market, both by the rural and urban population from Romania.

In general, the Romanians' emigration after 1989 is largely represented by migration for work. In the recent history of the Romanians' temporary migration abroad there are four distinct stages, marked by the periods 1990-1995, 1996-2001, after January 1, 2002 (free movement of people within the Schengen area) until the moment of accession to the EU (2007) and the last stage – after the accession into the EU. The maximum emigration rates for work amounted to 3‰ in the first period, 7‰ in the second period and 28‰ in the period 2002-2006 [Sandu et al. 2006]. The intensity of this phenomenon grew higher mainly

after 2002, with the liberalization of the free movement for the Romanian people in the Schengen area. After the accession into the EU, at present the temporary migration for work abroad has not been intensified, yet it suffered a structural modification to which we shall refer next.

Initially, in the period 1990-1995, the leavings for work abroad were highly selective. More men left than women, more city dwellers than villagers, more persons of mature age than young people. Afterwards, beginning with the year 2002, the flows have been more balanced: the share of women leaving for work abroad is getting closer to that of the men; the share of rural population becomes almost equal to that of urban population; the share of secondary school graduates in total migrants increased; the young people tend to prevail in the emigration flows for work [Sandu et al. 2006].

The fourth stage of the Romanian emigration followed Romania's accession into the EU and it overlapped the recent economic-financial crisis. The global crisis has not determined a massive return of the Romanians to their native country, as it was initially foreseen (Figure 16.4).

Figure 16.4. The flow of emigrants and immigrants
during the period 2003-2012
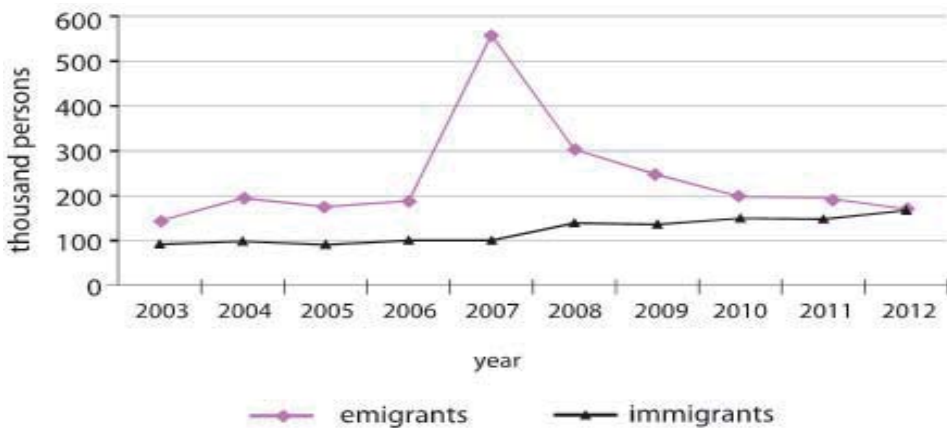
Source: NIS (2014), Statistical Leaflets - International migration of Romania, p. 7.

This fact is relevant for the migrants' belief that they could face the crisis more easily abroad than in Romania [Alexe 2011]. What is particular for this new stage of the Romanian emigration is the foreign mobility for work of professionals in the context of the economic-financial crisis, which seems to lay the basis of emigration for work of the qualified and highly qualified staff [Alexe 2011].
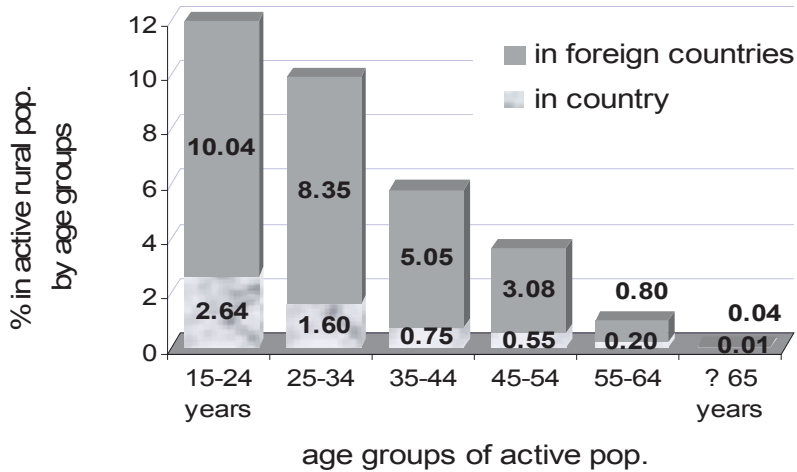
The obligation to obtain visas for leaving abroad and/or work permits in the destination countries makes the Romanian emigration for work be a circular/pendular mobility phenomenon (the entry visas on the territory of different countries with legal purposes and for legal activities are usually temporary). After Romania's accession into the EU, the definitive emigration intensified, the number of the Romanians who established their residence abroad increasing from 48.6 emigrants[67] in one thousand residents[68] in the year 2002, to 68.1‰ in 2007, to reach 118.9‰ on January 1, 2014 (NIS data). At the level of rural area, the phenomenon of circular migration for work – both in Romania and abroad – results in a significant decrease of the young active population that *effectively* supports the labour force supply. According to the data of the last Census of Population, in the year 2011, out of the young active population aged less than 35 years, *11% are temporarily absent*[69] being either involved in occupational arrangements in the country or abroad or looking for a job or they left for business. The 12.7% of the rural active population aged 15-24 years and the 9.9% of the young active population aged 25-34 years (Figure 16.5) who are absent from the rural labour supply *represent a significant loss for the innovative capacity of the rural human capital*. Furthermore, the conclusion on innovative capability decrease of rural labour force is sustained by the fact that more than half of those who temporarily migrated to foreign countries for work have an educational level higher than *secondary school,* which is similar to a "brain drain" for Romanian rural areas.

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[67] Number of emigrants on January 1st of the reference year represents the number of persons who emigrated from Romania, respectively settled as usual residents abroad for a period of at least 12 months.

[68] The number of the usual resident population, at a definite date, is calculated according to international methodology and regulations in this field and comprises all the persons with usual residence in Romania, for a period of at least 12 months.

[69] Temporarily absent – according to the Census of Population and Housing 2011, they are persons who are part of Romania's stable population, but are absent from their domicile for periods ranging from 1 to 11 months.

Figure16.5. Share of persons temporarily absent for work and business
in rural active population by age groups, 2011

16.5. Education and the labour market participation

Human capital theory rests on the assumption that formal education is highly instrumental and necessary to improve the productive capacity of a population. Throughout western countries, education has recently been re-theorized under human capital theory as primarily an economic device; it is increasingly seen as a key determinant of economic performance. In the modern economy, the level of education is crucial for the productivity and efficiency of workers. The higher the educational level, the higher the cognitive stock of economically productive human capability. All of these are a product of innate abilities and investment in human beings. The provision of formal education is seen as an investment in human capital, which proponents of the theory have considered as equally or even more worthwhile than that of physical capital [Psacharopoulos & Woodhall 1997]. Almendarez pointed out, in 2010, that human resources constitute an ultimate basis of the wealth of nations.

In this theoretical context we try to identify the main tendencies of the education level in Romanian rural areas and their chances to contribute to a smart economic growth. The analysis of the statistical data series for the period 1996-2012 reveals that the educational level of the rural population tends to improve (the share of the rural population category with low educational level – who graduated less than 8 schooling years – decreased from 65% to 56% in the investigated period). At the same time, the share of rural population with

a high educational level (short and long time higher education, including master's degree and PhD) doubled in relative figures, from 1.3% in 1996 to 3.1% in the year 2012 (Figure 16.6a). Unfortunately, the improvement of the population's educational level over 15 years of age (that represents the labour recruitment pool) is not a direct consequence of the improvement of the young rural population's schooling years.
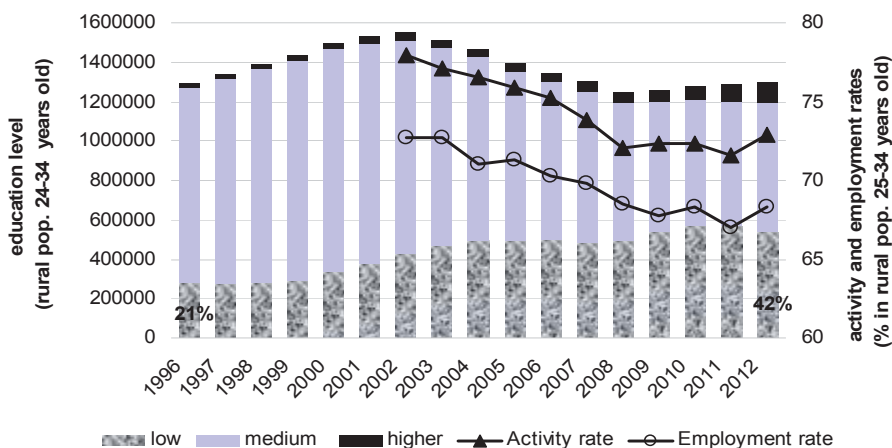
Figure 16.6. The education level and labour market participation of rural population 15 years and over on (a) total and for and (b) the younger groups
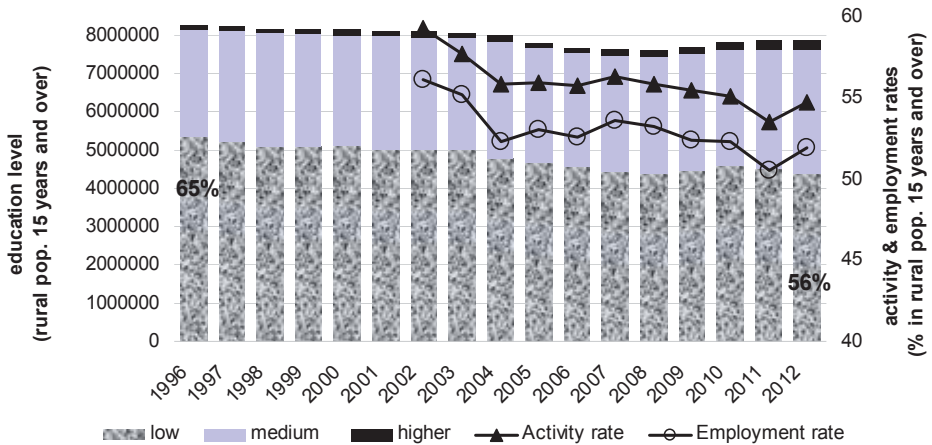
(a) evolutions at the level of the entire rural population 15 years and over
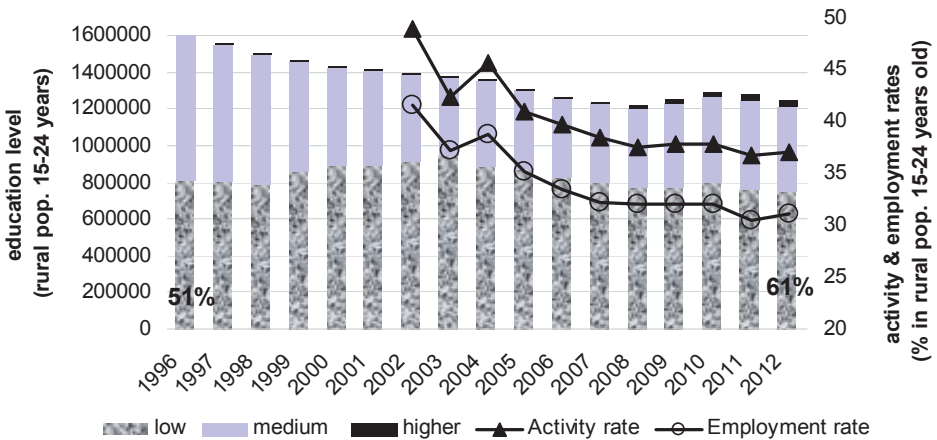

(b1) 15-24 years old

(b2) 25-34 years old

In the Romanian rural area, the young people are becoming less and less interested in graduating secondary and higher education levels than older generations. In the period 1996-2012, the number of rural people aged 15-24 years who graduated a low educational level increase form 51% to 61% and for the age group 25-34 years this share practically doubled (from 21% to 42%) (Figure 16.6b). As consequences, the young population risks to endanger its access opportunities and active involvement in the labour market. Besides this, in the ten investigated years – 2002-2012 – we could notice an accelerated decreasing tendency of the younger generation access and participation to the labour market, much more accelerated trends than in the other EU member states. In rural Romania, these decreasing trends are positively correlated with the decrease of the young generations' educational level (aged under 35 years) and are also conditioned by the rural labour market development level.

The occupational structure of the Romanian rural was and continues to be dominated by the primary sector (represented by agriculture for its most part). Although the number of persons working in agriculture decreased by one-fifth in the period 2002-2012, the share of agriculture in labour employment is above 60% in rural Romania. In general, the young people under 35 years old and the persons over 50 years old exited from the farming activity. The population working in agriculture is, in reality, underemployed. According to the data of the 2010 Agricultural Census, the average number of days effectively worked in agriculture by a person employed in this sector is 47 days/person/year and most of them perform agricultural work on their own holding and for their own

subsistance needs. Today the average size of Romanian farms is 3.6 ha utilised agricultural area, 93% of farms operates less than 5 hectares and, around 80% of Romanian holdings use for their own consumption, more than a half of their own farm production.

Figure 16.7. Evolution of rural employment by activity sectors and age groups
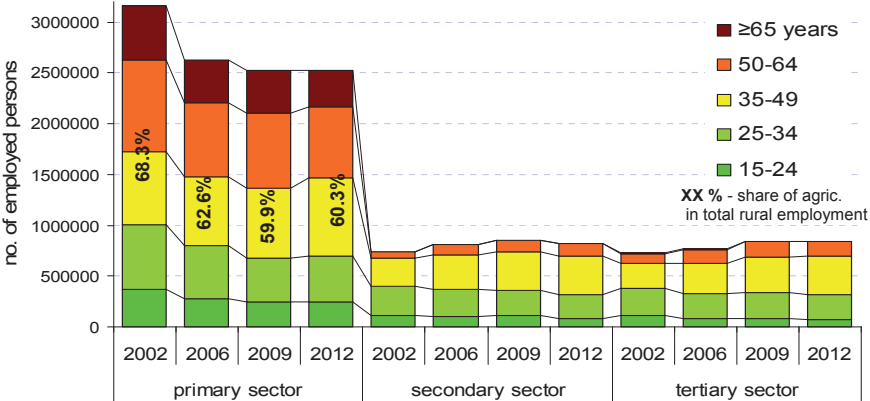
The level of poverty in rural Romania is high and, generally speaking, without self-consumption of their own agricultural products, the Romanian rural population would be at risk of poverty because the average disposable income per person was equal or lower than the poverty threshold even after Romania's joining the EU [Tudor 2014]. In this critical context, the active rural population was and continues to be forced to seek alternative employment to provide satisfactory income, outside the rural area and even abroad.

Although the young labour force is ready to accept an ascending occupational mobility, the weak development of the Romanian non-agricultural rural economy system results in low occupational opportunities; furthermore, the rural population's training is also a factor that constrains the ascending occupational mobility of the rural population. Although the educational structure of the rural active population slowly improved, in the year 2012, more than 42% of the employed population continued to have a low educational training (graduates of maximum 8 years of school) in rural Romania (Figure 16.8).

Figure 16.8. Educational structure of employed rural population
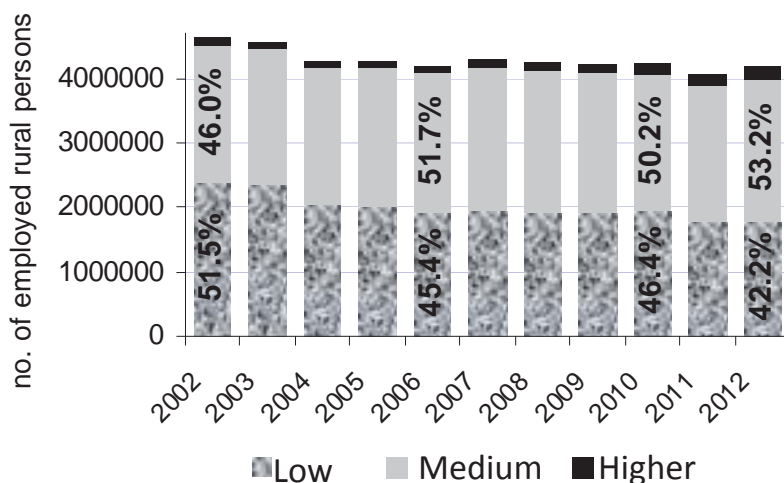
The fact that throughout the investigated period (2002-2012) we could notice the increase by 67%, in absolute figures, of the employed population with higher education reveals that the rural labour market has an increasing demand for a better trained and skilled labour force. This evolution proves the ability of the rural business environment to adopt production techniques and technologies with a higher technological level, the utilization of which presupposes a labour force with a higher specialization/qualification level. As the development stage of the rural economy does not provide sufficient occupational alternatives for its active population, the intra-rural occupational mobility is substituted by searching for a job in the urban area and/or in foreign countries.

16.6. Rural entrepreneurship – catalyst factor for smart economic growth

The measure of the entrepreneurship capacity in a rural area to be open, to understand, internalize and even generate innovating models is put into direct correlation with the age of people who initiate a self-employed activity. The structure by age of employers reflect the share that each age category has in total employed population with employer status; this structure provides significant signals with regard to *the potential innovating capacity* of the employers in a given area. Thus, an age structure of employers where the young people have a greater importance is associated with greater opportunities to accept innovation, to internalize new ideas of business management, new technical and tech-

nological procedures and to generate innovatory ideas due to a larger opening towards risk assumption, which is associated to younger age [Jung and Ejermo 2014]. The opening to innovation also stems from the fact that usually young people have a higher educational capital compared to older people and their social independence permits them a much higher mobility.

With 2.5 employers/1000 rural inhabitants in 2012, the number of private rural businesses is still far to be sufficiently high so as to determine a steady and sustainable economic growth in the long run. The analysis of the rural entrepreneurship development after the collapse of the communist regime reveals the increasing tendency of the number of private entrepreneurial initiatives in the economic growth periods. In the period 1996-2012 (for which available data exist) we can find two intervals of continuous demographic growth of the number of rural entrepreneurs. Thus, in the evolution of the number of employers from the next figure, we can notice the first continuous growth interval in the period 1999-2002 and the second interval from the year 2006 until the year 2009[70]. Therefore, extent to which the active population of the Romanian rural areas perceives the opportunities of business development and it is able to assume the risks of business initiation and continuation had a general increasing trend before the recent economic crisis.

Figure 16.9. Dynamics of rural employers structure by age groups in Romania
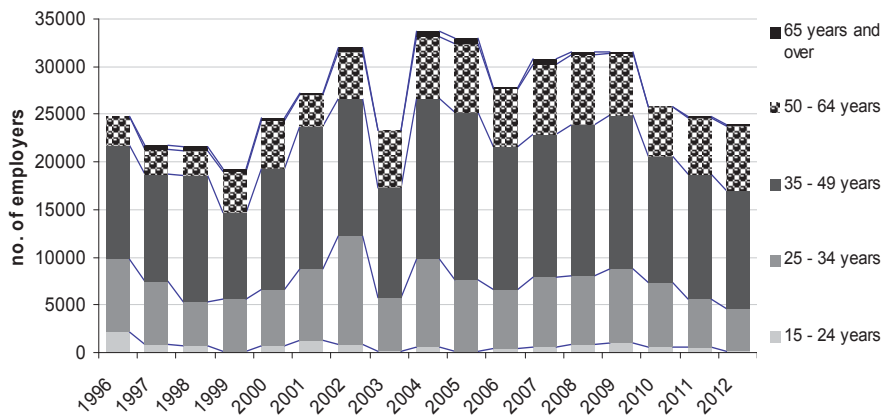
Source: NIS data – TEMPO on-line database.

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[70] It has to be mentioned that the decline in the years 2003 and 2006 was not the result of economic conditions, but rather of applying certain legal administrative provisions.

The share of the young entrepreneurs' generation (under 35 years old) in total employers in the Romanian rural area was extremely volatile, their business being mostly affected by the economic fluctuations due to their lack of managerial experience. Thus, while in the 1996 the share of young employers (under 35 years old) amounted to maximum 39%, it decreased to 25% in 1998, to increase up to 38% in the year 2002. After the liberalization of the free movement of people within the Schengen area, a part of the young rural people with innovating potential focused their occupational interest on the external migration for work. Consequently, their interest to initiate and develop a business in Romania decreased.

After Romania's joining the EU (January 1st, 2007), the business environment became more stable and stimulating for the young potential entrepreneurs and their share in total number of employers increased from 24% in 2006 at 28% in 2009. These evolutions indicate a foreseeable process of accelerated rejuvenation of the category of employers in the Romanian rural areas that could have a positive influence upon the entrepreneurs' appetence for innovation, as the younger employers are much more open to innovation and technological transfer in business initiation, management and administration.

But the Romanian rural private entrepreneurs' enthusiasm, after Romania's accession to the EU, was cut short by the economic crisis that led to the contraction of demand for goods and services. 24% of the small rural firms did not have enough resources to survive after the demand contraction even on medium term and they had to close down their business after 2009. Rural entrepreneurs who succeeded in keeping their business alive were older employers, with greater experience in business; in the year 2012, the share of younger employers dropped to 19%.

16.7. Main conclusions and "smart" opportunities for rural Romania

In Romania, the human capital seems to be rather a limiting factor for a smart growth capacity at the level of rural economy. There is a potential deficit of labour force availability in Romanian rural areas due to: i) labour force ageing; ii) low educational and training level (aggravated in the case of younger generations); iii) external and internal migration for work of the young and better-educated people; iv) occupational and existential dependency on agriculture of rural active population and households; v) early development stage of innovative entrepreneurial initiatives in the rural areas.

However, we think that there are a few "smart" opportunities to turn the low development level of the Romanian rural area into a comparative advantage. One of these solutions, and not the only one, we hope, would be "*greening of*

Romanian rural economy". This option is supported by the fact that the rural areas in Romania benefit from the comparative advantage of preserving the traditional agricultural production techniques and certain archaic agrarian landscapes (in the hilly and mountain areas, which represent two-thirds of the country's area) as well as from a significant agricultural potential in the plain areas (in Romania the arable land has a significant ecological potential that was evaluated by the experts from the Academy of Agricultural and Forestry Sciences at about 7000-7100 kg/ha conventional cereals), which would permit the coverage of the agri-food consumption needs for 38.5 million people [Steriu et al. 2013].

One of the "smart" solutions could be supporting the Romanian small farms to become *providers of (environmental) public goods* through the development of: green agriculture; agro-tourism services; traditional agri-food products delivered through short channels; production of raw materials for green energy and other alternative uses, such as slow food, etc.

References

1. Alexe I. (coord.), (2011), AL *PATRULEA VAL. Migraţia creierelor pe ruta România-Occident*, in the programme „Migraie şi Dezvoltare", Soros Foundation, Romania, http://www.funatia.ro/sites/default/files/Al%20 patrulea%20val.pdf.
2. Almendarez L., (2010), *Human Capital Theory: Implications for Educational Development*, Belize Country Conference, November, 2010.
3. Baumol W., Litan R., Schramm C., (2007), *Good Capitalism, Bad Capitalism, and the Economics Growth and Prosperity*, Yale University Press.
4. Jung T., Ejermo O., (2014), *Demographic patterns and trends in patenting: Gender, age, and education of inventors*. Technological Forecasting and Social Change 86, pp. 110-124.
5. Lafuente E., Driga O., (2007), *1st Report on Entrepreneurial Activities in Romania*. Centre for Entrepreneurship & Business Research, CEBR working paper series, WP 01/2007.
6. Psacharopoulos G., Woodhall M., (1997), *Education for Development: An Analysis of Investment Choice*. New York: Oxford University Press.
7. Sandu, D. (coord.) (2006), *Locuirea temporară în străinătate. Migraţia economică a românilor: 1990-2006*, Soros Foundation Romania.
8. Steriu V., Otiman P.I. (coord.) (2013), *Cadrul naţional strategic pentru dezvoltarea durabilă a sectorului agroalimentar şi a spaţiului rural în perioada 2014-2020-2030. Cadrul naţional strategic rural*, Romanian Academy Publishing House, Bucharest.

9. Naude W., (2008), *Entrepreneurship in Economic Development*, Research paper no. 20/2008. United Nations University: UNU-WIDER.

10. Tudor M.M., (2014*), Small scale agriculture – an resilient answer to the transition's shocks in rural Romania*, paper presented at the 2nd International Conference 'Economic Scientific Research – Theoretical, Empirical and Practical Approaches', ESPERA 2014, 13-14 November 2014, Bucharest, Romania.

11. National Institute of Statistics (NIS), (2014), Statistical Leaflets – *International migration of Romania*.

12. NIS, (2013), *General Census of Population and Housing 2011*.

13. NIS, TEMPO on-line data base, www.insse.ro.

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17. Human capital in structural transformations
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17.1. Introduction

In numerous research papers on Polish food economy, the shape of agricultural structures[71] is listed as one of the most important reasons for non-optimal usage of land resources, the lack of possibilities to improve the competitive position on international markets as well as unfavourable living conditions of a significant part of rural population [Sikorska 2013a].

First of all, the faultiness of the systems is related to land fragmentation. More than three-fourths of all individual farms (the number of which exceeds 1.1 million) are small units with a total UAA of less than 10 ha. Except for the case of a small group of specialized entities, limited land resources do not allow a profitable agricultural production. That causes farmers[72] to focus on deriving income from gainful employment, benefits and pensions, while productive assets serve as insurance, have a social function or provide means of self-supply in food. The marginalisation of production orientation as well as a difficult economic situation result sometimes in a decline in number of such units.

As for medium-sized farms (10-30 ha of UAA), which constitute almost one-fifth of the total number of farms, the main challenge is to withstand the competition. Their land area is usually insufficient for them to maintain an advantageous position on agricultural markets or to provide the farmers with proper living conditions. Therefore, the majority of them is focused on survival, which often requires financial support from sources other than agriculture. Only an arable land of 30 ha or more allows profitable production and a standard of living comparable to that of other social and professional groups, as well

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[71] The term "agricultural structures", in a broad sense, is related both to the distribution of farms according to their UAA (in ha) and to other economic characteristics, including production, capital, labour resources [Szemberg 1998]. In this context, a structural transformation means a change in the number of farms with a specified characteristic.

[72] The terms "farmers" and "farm managers" are used interchangeably. So are the terms "farm", "agricultural holding", "unit" and "entity".

as capital accumulation and further development. However, even within this relatively small category[73] of entities it is not always possible to fulfil both the commercial function and asset reproduction.

The reality of Polish agriculture is such that the distribution of agricultural land resources significantly determines and is strongly related to other economic characteristics of farms [Szemberg 1998]. It concerns most of all the quantity and quality of other elements of production facilities, including livestock, buildings, machines, equipment and other fixed assets, but also the nature of ties with the agro-industry structures. For this reason the supply level of other production resources is often the highest for commercial farms with a huge arable land area. In small and medium-sized units, which are diversified in terms of technical infrastructure, some parts of the assets remain unused and their progressive depreciation can be noticed.

Regardless of the size of the accumulated production potential, in order to adjust to the market requirements by bringing about changes in organisation and production, the managers are required to take an active stance and to have factual knowledge. A set of characteristics of a person, also known as the human capital[74], comprises a certain attitude towards changes, as well as knowledge and skills. The main goal of this research was to determine the level of human capital among Polish farmers and to verify whether – and to what extent – this factor is related to the process of production resources accumulation in farms. Analysing this problem will lead to determining whether human capital has indirectly influenced structural transformations within the national agricultural sector (Fig. 17.1.). These problems will be addressed in the *Results* section of this chapter. The data sources used in the research, methods of measuring the human capital in farmers and of accumulating the physical capital will be characterised in the *Research Methodology* section. Selected agricultural policy instruments oriented towards the development of human capital in Polish agriculture will be listed and assessed in the *Discussion* section.

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[73] According to the Agricultural Census 2010, those entities constituted only 4% of all agricultural holdings.

[74] In the most general terms, human capital comprises a number of characteristics which favour maintaining or improving a person's position within an economic system [Ziółkowski 2012]. It may consist of abilities and personality traits; knowledge and skills; the state of health and social competence of the person. Human capital affects the effectiveness of work as well as the amount of remuneration. A high level of this resource protects against unemployment. The most popular methods of increasing it are: education, participation in professional training and investing in health.

Figure 17.1. Human capital and structural changes in agriculture

| knowledge and skills of farmers (human capital) | | | changes within farms | | | structural change within the sector |
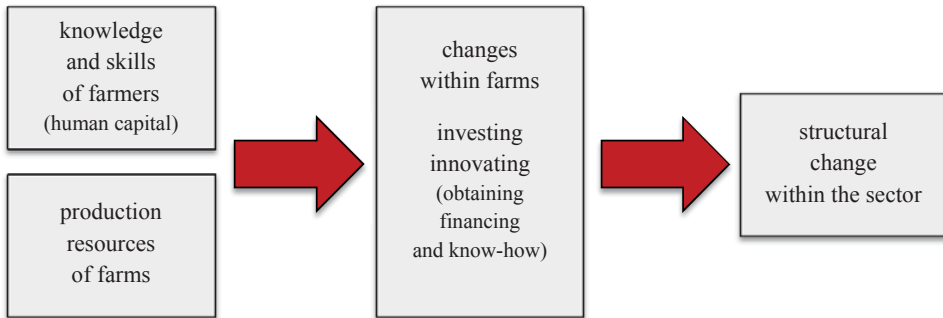
17.2. Research Methodology

The level of human capital among farmers and the importance of this factor in terms of structural transformation was determined basing on selected data, which had been collected during panel surveys conducted by the Department of Social and Regional Policy of IAFE-NRI in 76 Polish villages in 2005 and 2011. The villages were selected purposefully, taking into account the diversity of socio-economic structures in the Polish agriculture. The sample data contains 3,310 households, all of which use farmlands of more than 1 ha of UAA[75].

As it has been mentioned before, the conclusions regarding structural transformation were drawn indirectly. Factors which are regarded as favourable for this process include changes that were taking place within the respondent farms between 2005 and 2011. Those changes include modernization and augmentation of production resources[76] (making investments) as well as obtaining financial support from the second pillar of the Common Agricultural Policy. Among the factors which could have influenced the process within the examined sample, there is the level of production potential at the starting point (that is, in 2005) and the level of human capital among the managing cadres. The first group of aforementioned determinants is comprised of the following economic characteristics of farms: UAA (measured in ha), stocking density (SD), level of

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[75] These were all families who owned farmland and inhabited the surveyed villages.

[76] Investments in fixed production assets included: the purchase of farmland, livestock, machines and appliances, equipment for the livestock housing, as well as the construction, renovation and modernization of buildings and other agricultural investments.

equipment in machines and agricultural appliances[77], state of buildings and facilities[78]. The level of human capital among farmers and its characteristics were determined in relation to the entire group of respondents in 2011 (n=3310). It was diagnosed basing on the following six characteristics of persons in charge of managing the farms: age, state of health, level of general and vocational education, using counselling services as well as using computers and the Internet in their work related to agriculture. Those attributes were then used in constructing a synthetic indicator of human capital[79]. Models of economic change within farms were estimated only for a part of the examined sample, that is – for units which were included in both surveys, in 2005 and in 2011 (n=2690). They are binomial qualitative variable logit models [Long 1997, Gruszczyński 2002] and they can be formulated in the following way:

$$P(z_t = 1) = F(\beta_0 + \beta_1 M_{t-1} + \beta_2 UR_{t-1} + \beta_3 SD_{t-1} + \beta_4 B_{t-1} + \beta_5 KL_t)$$

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[77] The level of equipment of farms concerned the following types of machines and appliances: means of transportation and machines for fertilizing, plant protection, sowing, planting and harvesting. The variable had three variants: high, average or low level of equipment.

[78] Including livestock housing, barns, garages, carports and specialized buildings. The variable characterising their condition had three variants: good, average and bad condition of the buildings.

[79] The synthetic indicator of human capital was drafted using the zero unitarization method [Kukuła 2000]. The diagnostic variable – the farmer's age – was measured on an interval scale and considered as the neutral variable. It was normalized according to the following formula:

$$z_{ij} = \begin{cases} \dfrac{x_{ij-\min x_{ij}}}{c_{oj-m_{ij}}} & for \ x_{ij} < o_{ij} \\ 1 \ for \ x_{ij} = o_{ij}, & X_j \in N \\ \dfrac{\max x_{ij} - x_{i_{ij}}}{\max x_{ij} - c_{oj}} & for \ x_{ij} > o_{ij} \end{cases}$$

where: c_{oj} is the nominal value of j – this diagnostic characteristic belonging to the N set of nominants.

The nominal value of this variable was determined to equal 44 years. Other variables were considered as stimulants and were measured on an ordinal scale. They were normalized according to the following formula:

$$z_{ij} = \frac{l_{ij}-1}{k_j-1},$$

$(l_j = 1, \dots, k_j), (j = m + 1, \dots),$

where: l_{ij} – the assessment of i – this object within the range of j – this qualitative variable, k_j – the number of states (assessments) of j – this qualitative variable [Kukuła 2012].

where: z_t – economic changes within the farm (investments, using the Common Agricultural Policy instruments between 2005 and 2011); M_{t-1} – high level of equipment in machines and appliances in 2005; UR_{t-1} – UAA in 2005; SD_{t-1} – stocking density in 2005; B_{t-1} – bad condition of buildings in 2005; KL_t – high level of human capital of the farmer between 2005 and 2011[80].

17.3. Results

When characterising individual indicators of human capital among farmers, as well as trying to describe it as a whole, it is necessary to highlight the fact that apart from diverse attitudes and various characteristic traits within the group, also a diversity of production and economic functions of their farms has to be taken into account [Sikorska 2004]. As the research conducted by IAFE-NRI shows, in the case of small and medium-sized units (constituting the majority of the group), which were weakly tied to the market and unable to fulfil their social tasks to the full extent, the managers lacked professional skills related to agriculture and did not show interest in developing their farms. A different attitude could be noticed in economically strong commercial farms, the managers of which were properly qualified and significantly involved in operating the farm.

The diversity of economic functions of farms was reflected in the diversity of farmers in terms of levels of human capital (Table 17.1.). A large part of the respondents showed low levels of human capital[81]. This was determined mostly by the fact that low values of diagnostic variables were used for constructing the synthetic indicator (Fig. 17.2.).

Table 17.1. Levels of human capital among farmers – descriptive statistics

| N	Mean	Median	Min.	Max.	Mode	Coefficient of variation	Standard deviation	Variance	Skewness	Kurtosis
3310	2.76	2.72	0.00	6.00	2.77	0.39	1.07	1.14	0.38	-0.05

Source: survey by IAFE-NRI, 2011.

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[80] Only persons who were in charge of managing farms both in 2005 and 2011 were taken into account.

[81] The maximum value of the synthetic variable equalled 6. Its distribution showed a right--sided asymmetry, what indicates that a large part of observations was concentrated around lower and average values.

However, this situation did not affect the age and state of health of the respondents to the same extent (Fig. 17.2.). As a whole, the population was relatively young. That fact, in turn, was related to good health. According to the collected data, the age of half of the respondents did not exceed 49 years. Only one in ten managers were aged 65 or more. Almost half of the respondents declared to have a "good" health, and only one in ten persons described their health as "bad" or "very bad". The latter concerned mostly the elderly respondents.

Figure 17.2. Selected characteristics of farm managers*
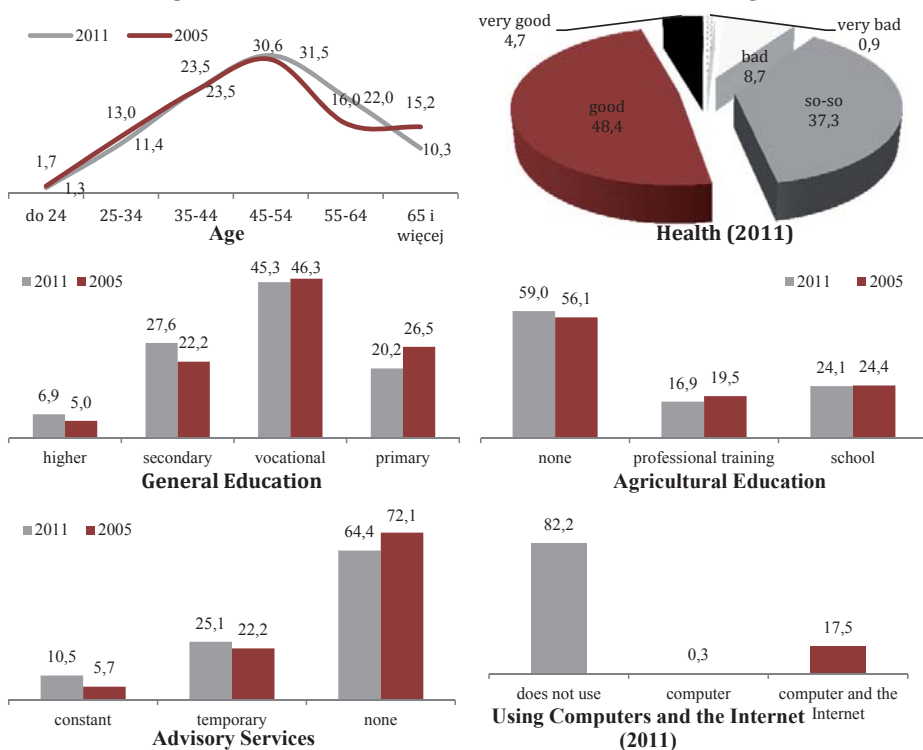
*The results are based on the entire population of respondents (n=3310).
Source: survey by IAFE-NRI, 2005, 2011.

Within the Polish reality, the relatively young age of the respondents and their subjectively perceived good state of health that is associated with it was conditioned by a group of demographic, social and institutional factors. The aforementioned structures were being formed by favourable and intense generational changes which were taking place in previous years, especially at the end of the 1980s and the beginning of the 1990s, as well as in the first decade of the 21st century. During those periods numerous farms were passed from their owners to

their children, and the younger generation showed an increased interest in taking over their parents' land. This situation was conditioned by several negative economic phenomena related to, among other factors, job market imbalances and changes in regulations concerning the operation of farms [Sikorska 2013a].

The results of the survey conducted by IAFE-NRI in 2011 show that the low levels of human capital among most of the respondent farms' managers were linked to low levels of general and agricultural education. Among all farmers, the relatively most numerous group included persons with a basic vocational education and no formal agricultural schooling[82]. It is noteworthy that the levels of general education of the managers were not strongly correlated with the economic characteristics of the farms. Both small units with no ties to the market and entities of larger areas, carrying out commodity production on an average scale, were being managed by persons with low education levels[83]. Many of them left school at a relatively early stage, during the period which preceded the socio-economic transformation. A higher level of education was typical mostly for relatively younger persons who joined the agricultural sector in the following years. In many cases they did not focus on developing the agricultural holdings they were taking over, but chose to find employment in sectors other than agriculture, combining their job with working on the farms. Those tendencies were reflected by a general decline in the popularity of agricultural schooling, while the interest in education in other fields increased. Nevertheless, considering the entire examined population as a whole, a professional background was most common among the farmers who owned large areas of agricultural land and who had an established position within the agribusiness structures.

Apart from the low popularity of agricultural schooling, similar patterns could be noticed in relation to other indicators of human capital among the respondent farmers, linked with the acquisition of knowledge useful in operating a farm. The collected data shows that the majority of managers did not use any agricultural advisory services. It concerns especially the managers of small, non--commercial farms, who declared no need for such services. This was also the case with the usage of computers and the Internet for agricultural purposes. A significant majority of the respondents did not undertake such activities. Usage of the aforementioned technologies was typical for managers of farms

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[82] One in three farm managers had at least secondary education. Less than one in four had professional qualifications obtained at different kinds of schools.
[83] Only among the managers of the largest entities, selling commodities on a larger scale, the number of persons who have completed secondary education was significantly higher.

with a relatively large land area, as well as for persons who were active in the markets. The most common topics of their research were related to agricultural policies and support instruments for agricultural activity.

Documented by the results of surveys, the divergence of human capital levels among farmers, followed by a diversity of farms' characteristics and designated functions, was related to the importance of this factor within the process of structural transformation. The inclusion of measures in the areas of increasing, recreating and innovating individual elements of the production assets was an indicator of the pro-market orientation of the farms, regardless of their initial production potential. Making investments as well as obtaining financial support for agricultural activity development was conditioned not only by the amount and state of resources, but also by the attitude, knowledge and skills of the managers. The results of the conducted analysis show that between 2005 and 2011 there was a visible correlation between the human capital levels among farmers and the changes taking place within agricultural holdings[84]. More than four-fifths of the managers with high levels of human capital and two-thirds of those with average values of this index have undertaken investments in fixed production assets in agriculture. The population of respondents showing average or high human capital levels included also the highest percentage of managers whose farms benefited from the Common Agricultural Policy support instruments[85].

Logit models were used in order to determine the direction and intensity of human capital's influence on economic changes within farms. The results show that the human factor has a positive and statistically significant effect on these transformations (Table 17.2.). High levels of human capital among farmers, *ceteris paribus*, significantly increased the probability of undertaking agricultural investments within their farms (by 168%) as well as the probability of obtaining financial support for agricultural activity development (by 183%). It is important to highlight the fact that among all examined factors that lead to transformations within farms, the characteristics of managers were of crucial importance[86]. Nevertheless, an abundant supply base itself also increased the

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[84] It is worth noting that pro-development actions were undertaken not only by those farmers who showed high levels of human capital. Such activities were also widespread in farms which previously had abundant production assets.

[85] Persons with high and average levels of human capital who benefited from the EU support instruments, constituted 28% and 13% of all beneficiaries respectively.

[86] The relatively greatest role of the human factor became apparent in relation to obtaining support from the EU funds.

chances of undertaking investments and benefiting from the Common Agricultural Policy support instruments. Other factors, like a large arable land area, high stocking density or a high level of equipment in machines and agricultural appliances also favoured[87] the occurrence of these events[88].

Table 17.2. An assessment of the logit model parameters* for the following variables: investments and benefiting from the Common Agricultural Policy support instruments between 2005 and 2011

z_t : investments	β	Standard error	z	p	Ψ
β_0	-0.364	0.068	-5.377	***	-0.31
UR_{t-1}	0.032	0.008	4.164	***	0.03
SD_{t-1}	0.054	0.010	5.479	***	0.06
B_{t-1}	-0.568	0.108	-5.275	***	-0.43
M_{t-1}	0.548	0.147	3.724	***	0.73
KL_t	0.984	0.131	7.500	***	1.68
Model summary: McFadden R-squared = 0.129; Corrected R-squared = 0126; Number of cases of correct prediction = 1842 (68.5%); f(beta'x) to mean independent variables = 0.496 The likelihood ratio test: Chi-squared (5) = 475.014					
z_t : benefiting from CAP	β	Standard error	z	p	Ψ
β_0	-2.887	0.107	-26.993	***	-0.94
UR_{t-1}	0.009	0.004	2.115	**	0.01
SD_{t-1}	0.042	0.006	6.870	***	0.04
B_{t-1}	-1.173	0.297	-3.946	***	-0.69
M_{t-1}	0.628	0.157	4.009	***	0.87
KL_t	1.038	0.144	7.219	***	1.83
Model summary: McFadden R- squared = 0.185; Corrected R-squared = 0.178; Number of cases of correct prediction = 2380 (88.5%); f(beta'x) to mean independent variables = 0.317; The likelihood ratio test: Chi-squared (5) = 351.113.					

* The results take into account only a part of the entire sample of farms (n=2690).
Source: survey by IAFE-NRI, 2005, 2011.

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[87] Increasing the farmland area by 1 ha resulted in an increase of the probability of agricultural investments and using the CAP funds, *ceteris paribus*, by 3% and 1% respectively. Similar indicators for increasing the livestock by one head resulted in an increase by 6, 4 and 3%. A high level of equipment in machines and agricultural equipment, *ceteris paribus*, increased the probability of investment by 73% and the probability of benefiting from CAP support by 69%.

[88] All of the aforementioned processes were hindered by the bad condition of the farms' technical equipment (both buildings and facilities were taken into account), which was a sign of the marginalization of the economic functions of those entities. *Ceteris paribus* it reduced the probability of investments by 43% and the probability of using the CAP funds by 69%.

17.4. Discussion

The initiation and intensification of structural transformations is often presented in the literature on the subject and in the strategies for the development of the agricultural sector as related to the collective of farms' managers and to the implementation of particular agricultural policy instruments addressed directly to them. Basing on the presented research results, it can be noticed that undertaking actions aimed at increasing the human capital is justified, as it leads to an increase in production resources and to an expansion of the public intervention programmes' influence range[89]. Nevertheless, a lot depends on the form of these instruments and on a broader economic and institutional context. Under favourable macroeconomic conditions, when agricultural production is profitable, the commercial farms segment gets reinforced, while the marginalised units close down. These processes are followed by a release of labour, land and financial resources, which had been previously assigned to the now wound-up units[90].

As the general level of human capital among Polish farmers is relatively low and the farms are diversified in terms of their production and economic functions, the agricultural policy instruments aimed at developing competence and professional skills should take into account the diversity of unit types regarding their functions (as seen from the farmers' point of view) and the position of the units within the agribusiness structures. It would be justified to address such initiatives to two groups of farm managers. The first group is constituted by persons who operate stagnating agricultural holdings and who wish to develop their agricultural activity. In their case, the informative offer or training offer should present various ways of increasing the viability of their ventures or reorienting the production profile in order to improve their competitive position. The second group in constituted by owners of small farms, which have little chance of fulfilling a commercial function. This category should be covered by instruments helping them to quit the agricultural sector, retrain or find alter-

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[89] It is worth highlighting that apart from the instruments which are addressed directly to the employees of the agricultural sector, other sector policies as well as various institutions play an important role in improving the qualifications, skills and health of farmers. The quality of human capital in the agricultural sector is a derivative of the system of forming and developing this factor, which comprises of many entities and is rooted in political, social and economic structures [O'Riain 2011].

[90] The indicated flow tendencies influence proper solutions within the broadly defined agricultural legislation (tax law, social security, public support, land trade). The shape of these regulations may either hinder or favour the mobility of production factors in agriculture. According to the dominating point of view in the literature concerning the agricultural economy and law, Polish regulations seem to petrify the unfavourable structural arrangements in agriculture.

native uses for the production resources owned by them. The existing advisory, training and educational institutions in Poland seem to be developed enough to enable the implementation of this type of programmes.

Among the policy instruments supporting the human capital which have been implemented thus far, early retirement occupying an important place, even though its goals were never fully achieved, in spite of significant expenditure that it caused. The means of supporting the human capital by the Common Agricultural Policy are going to change between 2014 and 2020. Within the planned regulations more emphasis is going to be laid on the necessity of transferring knowledge and innovations into the field of agriculture[91]. The intervention range and logic are also going to be modified[92]. Nevertheless, it can be expected that the direction and pace of structural transformations within the Polish agricultural sector will be determined mostly by the macroeconomic situation and, in relation, by the job market situation in sectors other than agriculture.

17.5. Summary

According to numerous analyses, in Poland farmers constitute one of the socio-professional groups with the lowest human capital levels. This situation has been significantly conditioned by historic and spatial disparities between the urban and rural populations, which until this day influence their access to technical and social infrastructure, as well as education, professional training and health care services. Nevertheless, a considerable improvement of the human capital index has been taking place among farm managers for the last few years. These processes concern mostly the group of persons who operate units which have abundant production assets and show a pro-market orientation.

One of the most significant obstacles that many agricultural households have to face while attempting to improve their economic situation is the lack of financial resources, which could be invested in enlarging the arable land area, modernization of owned resources, reorienting the production profile or adapting new organisational solutions. In some cases an alternative solution could

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[91] The transfer of knowledge and innovations became one of six horizontal priorities in the development of rural areas.

[92] The planned amount of human capital support for Polish agriculture through the Rural Development Programme 2014-2020 may be even three times higher than between 2007 and 2013. The instruments involved include: professional training, advisory services and cooperation programmes for the research-and-development sector and the agricultural practice. Other instruments aimed at improving the human capital involve support for young farmers as well as payments for farmers who hand over their farms. A new instrument, part of the first CAP pillar, provides additional payments for young farmers.

consist in winding up the unprofitable agricultural activity or obtaining income supplements from other sources (e.g. business activities other than agriculture, agritourism, etc.). That would result in a process which would be favourable in terms of intensification of structural transformation – a flow of released production resources towards other units, which have a greater chance of successful development. The continuity of transformations within the groups of farms is also related to the implementation of proper agricultural policy programmes, addressed to designated beneficiaries' categories. Another important factor is the increase of activity among agricultural producers in terms of undertaking new ventures (high quality ecological production, food processing, direct selling), as well as joint economic initiatives.

References

1. Gruszczyński M., *Modele i prognozy zmiennych jakościowych w finansach i bankowości*, Monografie i opracowania, no. 490, SGH, Warszawa 2002.
2. Kukuła K., *Propozycja budowy rankingu obiektów z wykorzystaniem cech ilościowych oraz jakościowych*, Metody Ilościowe w Badaniach Ekonomicznych tom XIII/I, SGGW, Warszawa 2012, pp. 9, 11.
3. Kukuła K., Metoda unitaryzacji zerowanej, Wyd. Nauk. PWN, Warszawa 2000.
4. Long J.S., *Regression models for categorical and limited dependent variables*, Sage Publications, Thousand Oaks, London, New Dehli 1997.
5. O'Riain S., *Human capital formation regimes. States, markets, and human capital in an area of globalization*, [in:] Burton-Jones A., Spender J.-C., *The Oxford handbook of human capital*, Oxford University Press, New York 2011, p. 590.
6. Sikorska A., *Uwarunkowania ekonomiczne w obrocie ziemią rolniczą w Polsce*, [in:] *Realizacja ustawy o kształtowaniu ustroju rolnego* (joint work), Materiały pokonferencyjne, FAPA, Warszawa 2005, pp. 81-85.
7. Sikorska A., *Obrót ziemią a przemiany agrarne w indywidualnym rolnictwie*, Zagadnienia Ekonomiki Rolnej, no. 1/334, IERiGŻ-PIB, Warszawa 2013a.
8. Sikorska A., *Procesy przekształceń strukturalnych w wiejskiej społeczności i chłopskim rolnictwie*, Synteza, research project no. 0021/B/H03/2011/40, IERiGŻ-PIB, Warszawa 2013b.
9. Szemberg A., *Struktura agrarna i polityka strukturalna*, [in:] Woś A. (ed.), *Encyklopedia agrobiznesu*, Fundacja Innowacja, Wyższa Szkoła Społeczno-Ekonomiczna, Warszawa 1998, pp. 867-872.
10. Ziółkowski M., *Kapitał społeczny, kulturowy i materialny i ich wzajemne konwersje w społeczeństwie polskim*, Studia Edukacyjne 22/2012, Wydawnictwo Naukowe UAM, Poznań 2012, p. 8.

Final conclusions

The competitiveness of the food sector is a very complex issue involving a number of different aspects, including economic, social and environmental issues. Moreover, there are many definitions and approaches to this problem. This publication presents the problem of competitiveness of the food sector from different perspectives covering all elements of sustainable agriculture which is a basis of competitiveness of the food sector.

At the same time analysing the competitiveness of the food sector we should take into account all the different elements forming the system of competitiveness, which also was tackled in this publication. The competitiveness system includes: the external surrounding, competitive potential, competition strategies, competition instruments and competitive position. In the case of the food sector external environment includes a number of factors, ranging from natural and climatic conditions for conducting agricultural production, affecting the type of conducted production and crop yields, to the regulations concerning, for example: animal welfare, phytosanitary regulations and trade policy. Trade policy is especially important for the food industry and it determines the export opportunities of each country.

The competitive potential refers to resources. These are not only the classic three factors of production, namely land, labour and capital, but also the used production techniques and technologies. Here the key and gaining more and more popularity problem is innovation. It is related both to the ability of the economy to generate innovative solutions and to their implementation. In agriculture, these issues are also becoming increasingly important. This is due to a number of factors, including the need to increase the efficient use of natural resources, especially water. In the case of European agriculture it is also very important due to a growing pressure from other countries with their substantially greater resources of land and cheap labour.

The problems of innovation in the agricultural sector are also inextricably linked to issues of human capital, which are or may become available for this sector. In the era of increasing efforts being undertaken to transform the EU economy into a knowledge-based economy, the skills, knowledge and abilities of employees in various sectors of the economy, including agriculture are becoming crucial for further development.

Faced with the challenges arising from the external environment and taking into account its competitive potential we have to choose a competitive strategy. In the literature there are four strategies distinguished, based on competitive advantages held by a given entity. These are:

1. Strategy based on efficiency/productivity;

2. Strategy based on innovation and entrepreneurship;

3. Strategy which refers to corporate social responsibility (CSR);

4. Strategy that uses the concept of creating shared values, economic and social (Creating Shared Value).

There is some place in the European agriculture for each of these strategies. However, strategy to be followed must be selected based on the identified competitive potential of a given entity if it is to have real chances of success.

The strategy must also be empowered with appropriate choice of competition instruments. It should be noted that the state agricultural policy can promote or hinder the implementation of the strategy chosen to achieve or keep one's competitiveness. Analysis of the CAP instruments presented in this publication indicates that the EU agricultural policy can most effectively promote the implementation of the strategy relating to corporate social responsibility. It should however be noted that in general, the potential positive impact of the CAP on implementation of the chosen strategy is small, because the CAP instrument set is based on direct payments that are not related to the need to meet certain requirements. Therefore, the beneficiaries of this support themselves have to develop an effective way to use this support to implement their strategy to compete.

Finally, the competitive position is determined by an interplay of external impact and effectiveness of the use of the possessed potential in realisation of appropriately chosen strategy to compete.

An important point of reference in the study of competitiveness of agriculture and the entire food sector in Europe is the functioning of the Common Agricultural Policy and its impact on agriculture, rural development and food economy. Changes in the EU agricultural policy and ever increasing challenges facing agriculture, agri-food industry and rural areas forces all the stakeholders to undertake systematic and comprehensive analysis of the impact of these factors on the competitiveness of the food sector and making predictions for future developments, as well as to develop proposals for changes in EU and national policy towards this sector.

Competitiveness in the economic dimension in the food sector is measured by the results of farms and scale of exports of agri-food products. In the case of performance of farms it is clearly visible that there are significant differences depending on the type of production. Generally, however, it can be concluded that farms involved in crop production have better results than those specializing in animal production. This is in part related also to the specificity of the Common

Agricultural Policy, whose main instrument – direct payments is linked to size of the agricultural land owned by a given farmer, which directly translates into a preference for agricultural holdings engaged in field crop production.

Despite a significant share of support from the CAP in agricultural income, economic performance of agricultural holdings is subject to large fluctuations associated with the volatility of prices of agricultural products. Among the German agricultural holdings nearly a half is only able to partially compensate for making use of their factors of production. At the same time the remaining 40% to 50% may fully compensate the opportunity costs and thereby to finance investments in the development of their farms.

As the results of studies on the Bulgarian agriculture show, diversification of the economic condition of farms depending on the type of production is not limited to Germany. Also, in Bulgaria there are some differences between the farms specialized in field crops, livestock and permanent crops when it comes to return on investment in relation to production.

In addition to direct payments, the measures implemented under the rural development programmes also exert their impact on the situation in agriculture. As the results of the research study presented in this publication show, the impact of these measures is varied, among others, depending on the policy instrument. For example, the support for semi-subsistence farms implemented in Bulgaria was not sufficient to transform these entities into viable farms. The analysis of implementation of measures "Modernisation of agricultural holdings" and "Adding value to agricultural products" implemented within the framework of the Czech Rural Development Programme for 2007-2013 showed that the economic results of supported farms have improved.

However, the study of Czech agricultural holdings showed that economic indicators improved compared to the counterfactual situation, vary depending on which support measure was implemented, the evaluated period and the test methods used. This means that the evaluation is not sufficient to show the effects of investment support based on only one or a few economic indicators. It is also necessary to use several methods for the selection of test sample to improve the reliability of the results.

As already mentioned, a common way to assess the competitiveness of the food sector is the export performance. However, in today's world scale of export does not depend only on the price of the products offered. An important role is also played by membership in the World Trade Organization. This is shown on the example of Lithuania and Poland, which began to increase their agri-food

exports after achieving the membership in this organisation. However, only after becoming a member of the European Union allowed for a rapid export growth both in Poland and Lithuania. Thus, the efforts of Serbia for membership in the WTO and the EU are not surprising.

As the analysis of the Lithuanian export of agri-food products, exporting companies are at the same time trying to find a balance between product diversification and diversification of markets. Lithuanian agricultural products which receive higher support from the EU (i.e. via direct payments) dominate the foreign markets (e.g. dairy products, cereals, wheat with gluten). What is more, after the accession to the EU, Lithuania has become a gateway for exporters from other EU countries which opens the way to conquer the markets of the East. The volume of exports of agri-food products originating in Lithuania in total Lithuanian exports of agri-food products decreased from 89.2% in 2003 to 64.3% in 2013.

However, as shown by the results of analysis of the Polish exports of agri-food product, changes in the volume of exports cannot be equated with changes in the level of competitiveness of the food sector. Decomposition of changes in the Polish agri-food exports in 2004-2013 indicates that nearly 60% of the cumulative in that period of export growth was a result of increasing global demand for food. While more than 40% of this export's increase was due to the effect of competitiveness. Among the groups of products with the greatest value of the competitive effect in trade was generated by such products as meat and meat products, tobacco and tobacco products, dairy products, cereals and cereal preparations.

As already mentioned, in assessing competitiveness environmental and social issues also must be taken into account. Competition in the market for agricultural products is associated with competition for resources and markets with the applicable regulations with respect to these resources. Management of natural resources becomes more important with increasing rarity of the natural resources, which translates into a need for taking them into account in the process of agricultural production.

These issues are also very important from the point of view of the production capacity of agriculture and vitality of rural areas. In this context, a special attention must be drawn to human capital. The problem of the quality of this capital is increasingly important in today's economy. As shown by research concerning Poland and Romania in both of these countries human capital in rural areas appears to be a factor limiting the potential for smart growth of the rural economy. This situation is combined significantly with historically and spatially

shaped and still persisting disparities between the rural population and urban dwellers in their access to technical infrastructure, social services and various services related to education, training and health.

Analysing the competitiveness and prospects of development of the food sector we must also take into account the demand side, i.e. consumer needs and preferences. They depend on many factors and they are influenced by, among others, marketing activities, which, as shown in this publication, are for many agricultural commodities very limited due to the homogeneity of these products and their mass scale of production and consumption. However, many manufacturers are trying to create their own brand products. Often this done by highlighting their specific characteristics making them beneficial for health or their traditional production methods. No less important factor shaping the demand for food is the macro-economic situation, particularly the level of wages and unemployment in a given country. These factors strongly influence the changes in global demand for food.

In summary, the competitiveness of the food sector is a problem of multi--faceted nature and characterised by dynamic changes over time, among others, depending on the national and global macroeconomic conditions. As the results of the research presented in this publication show Common Agricultural Policy affects the development of individual components of the food sector, which is reflected in their competitiveness. Undoubtedly this varies depending on the instrument of this policy, and analysed food sector element. However, there remains much room for continuing to improve the instruments of the CAP in order to increase the efficiency and effectiveness of this policy in improving the competitiveness of the food sector, taking into account the diversity and specificity of needs of the individual elements of the food supply chain.

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