

**THE EVALUATION OF THE TRENDS  
OF POLISH FARMS INCOMES IN THE FADN REGIONS  
AFTER THE INTEGRATION WITH THE EU**Agnieszka Brelik<sup>1</sup>, Aleksander Grzelak<sup>2</sup><sup>1</sup>Zachodniopomorski Uniwersytet Technologiczny w Szczecinie<sup>2</sup>Uniwersytet Ekonomiczny w Poznaniu

**Abstract.** The main aim of this article was to identify trends regarding income changes in the period of 2004-2008 in Poland between the regions of FADN. In 2004-2008 we noticed the processes of convergence in range of income situation of farms among the FADN regions. It was noticed that the convergence of beta type and the sigma were in place. This situation appears for general group of farms, as well as in farms with mixed production. Although, exclusion of the subsidies would initiate the divergence processes. This means that direct payments make up a kind of catalytic situation in range of levelling incomes situation in farms among these regions. We could initially signal that instruments of the CAP favour getting differences of incomes smaller in spatial range, what would indicate some kind of strategy in the aims of the EU policy with reference to sustainable growth in spatial range.

**Key words:** agricultural income, convergence, FADN regions

**INTRODUCTION**

The inclusion of agriculture with the EU's CAP instruments in Poland significantly influenced the income situation of agricultural holdings, as it was confirmed by the study results [Sytuacja... 2009, Grzelak 2008]. There are many questions how these processes are carried out in spatial terms for the trend in agricultural incomes: have there been growth processes (divergence) or decreases (convergence) in the income diversification in the years 2004 to 2008? In fact, it is also the question whether regional

factors, as well as the instruments of the CAP, were important in shaping the economic situation. These issues are the main target of this article.

In this article division into the regions was adopted in accordance with the findings of FADN, namely: Pomorze and Mazury, Wielkopolska and Śląsk, Mazowsze and Podlasie, Małopolska and Pogórze. At this point we could rise the question whether regional comparisons can be conducted by income for regions with a relatively large level of aggregation and because each area is composed of four provinces? The most expedient evaluation of the processes would be to examine them in terms of the county. On the other hand, there is no possibility of obtaining relevant data in this regard. Their availability is possible only in terms of these four regions. To isolate the regions the results of the recognised institutions were used: Institute of Soil Science and Plant Cultivation, Institute of Agriculture and Food Economy, Institute of Animal Production and the Central Statistical Office.

Nine production-economic parameters were taken into consideration, as well as the limits set by the province. In this way there were obtained four relatively homogeneous main regions in terms of economic-productive factors [Skarżyńska et al. 2005]. The evaluation of the differences or similarities in the development of the income situation in these regions is only an initial point of reference for the importance of regional factors. The article reviews the research phenomenon investigated by comparing the average results for the farms in the region, as well as with the selected types of manufacturing. Due to the limitations of this article farms were selected in total and multilateral. The choice of the latter is related to the large number of farms representing this type of manufacturing (52% of households covered by the FADN) against the others.

#### **THE THEORETICAL IMPLICATIONS OF THE DIFFERENCES IN DEVELOPMENTAL PROCESSES**

The issue of the convergence means the tendency to reduce differences in the development between the countries, regions, whereas divergence means the opposite process. The genesis of these terms is quite clearly associated with the debate over the theory of economic systems from the 50's and 60's of XX century [Gabryjelska and Gadomski 2004]. The bone of contention was the issue between the capitalist system and socialist and whether assimilation process occurs (convergence) or divergence [Kowalik 2000, Morawski 2001]. Examples from one part of the more advanced elements of planning in France and some areas of the free market economy in the countries with command-and-distribution introduced to this discussion. Both, convergence and divergence may relate to the many socio-economic parameters. These include the GDP, the productivity of production factors, income, life expectancy and education level, the development of social and economic infrastructure in the assessments between the countries or regions. It could be venture to say that the convergence is one of the most dynamic areas of research within the broader theory of growth.

Development of research related to the processes of convergence has resulted in honors from several types of convergence. The most common is the division of the beta and sigma convergence. The first of these occurs when countries (regions) with lower levels of development have higher growth rates than countries (regions) richer than considered period. However, sigma convergence means a decrease in diversity (disper-

sion) between the countries (regions) in the considered period. In this case it means reducing the standard deviation of the characteristic in the group of countries (regions). Most frequently used in this case was analysis of the coefficient of variation, which is a relation of the standard deviation by the average characteristics of the study population. Beta convergence is a necessary although insufficient existence of sigma convergence.

The most commonly quoted factor of convergence process in the literature is the phenomenon of diminishing incomes of capital [Barro 1997] which is well known from the classical Solow growth model. This means that the differences between countries (regions), richer and poorer decrease with an increase in their wealth. This follows from the fact that the countries (regions) poorer due to the lower saturation of the capital compete to the lower prices and costs allowing them to attract investment into the area and a higher growth rate and thus to equalize the level of economic development.

Ferment in the field of this phenomenon triggered endogenous growth theory, as well as the representatives of the new economic geography [Krugman 1995]. Due to a broader understanding of the capital, taking into account human capital, income from the use of capital does not have to be decreasing [Romer 1990]. On the other hand, investments in technology and knowledge, resulting from the positive externalities may be a source of convergence. Endogenous development theories suggest that the gap between richer and poorer countries can increase the distance to the less affluent countries because they are able to quickly and efficiently implement new technologies [Gawlikowska-Hueckel 2002].

The level of convergence depends on the homogeneity of the study group [Matkowski and Próchniak 2005]. Thus, while in developed countries (regions) processes of convergence can be observed, polarization tendencies are developing in the whole world [Gierczycka-Bednarek 2010]. In this article, the operationalization of convergence was carried out using the coefficient factor of variation of agricultural income for the sigma convergence and a comparative assessment of the dynamics of agricultural income for the absolute beta convergence.

## **COMPARISON OF THE SITUATION OF AGRICULTURAL HOLDINGS INCOME ACROSS FADN REGIONS**

The data presented in Table 1 shows that the highest average incomes of the farms covered by the FADN system took place in 2004-2008 in Region 1 (Pomorze and Mazury) and 2 (Wielkopolska and Śląsk) which results from the relatively larger farms in the regions. At the same time in Region 1 took place the biggest drop of income in the considered period. This should be associated with the deterioration of the situation on the cereals market in 2008, which are dominant in the agricultural production in this region. The lowest agricultural income in the same years was recorded in the region of fragmented agriculture, i.e. Małopolska and Podgórze. However, the loss of income in this case was small. Only in Region 3 (Mazowsze and Podlasie) there was a growth in revenue, which could be associated with the processes of specialization of this region in the direction of milk production.

Interesting conclusions can be drawn comparing income and excluding subsidies. While in 2004 in Region 1 the highest level of income was recorded, it was lowest in 2008. This should be linked with the domination of the large farms specializing in field

crops, which the profitability worsened in 2008. Thus, there is a place of heavy reliance on an average economic performance of farms from direct payments. This is why in this region took place the greatest loss of revenue, excluding grants. Attention was paid to the relatively high level of this parameter in the case of households in Region 2 (Wielkopolska and Śląsk). In a way it could be related to the specialization in the production of pigs, which is somewhat less dependent on support payments.

Based on the following considerations we could say that in the years 2004-2008 the beta convergence type took place. So, regions where farms initially reached a lower level of revenue, recorded a higher growth of this parameter. Similar trends were also noticed in the case of convergence type sigma for agricultural income. There was reduction of this parameter variation between regions with 0.36 in 2004 to 0.26 in 2008. On the other hand, if the revenue are excluded, a certain increase of income disparities would occur between the regions.

Table 1. Income (PLN) for an average farm in certain FADN regions in Poland in 2004-2008

Tabela 1. Dochody (zł) dla przeciętnego gospodarstwa rolnego w poszczególnych regionach FADN w Polsce w latach 2004-2008

Specification Wyszczególnienie		2004	2005	2006	2007	2008	2008:2004
R1*	SE 420	40 189	31 278	54 670	43 315	32 386	0.81
	B	35 542	15 899	25 744	21 386	962	0.03
R2*	SE 420	35 681	26 831	32 076	38 226	31 212	0.87
	B	29 934	16 628	15 628	24 044	8 692	0.29
R3*	SE 420	20 998	19 738	24 213	25 952	21 767	1.04
	B	17 318	11 944	12 545	15 870	6 987	0.40
R4*	SE 420	18 948	15 476	22 688	24 322	18 447	0.97
	B	14 665	10 368	12 616	16 401	7 306	0.50
Sigma**	SE 420	0.36	0.30	0.44	0.28	0.26	0.72
	B	0.41	0.22	0.37	0.20	0.57	1.39

\*R – FADN regions, R1 – Pomorze and Mazury, R2 – Wielkopolska and Śląsk, R3 – Mazowsze and Podlasie, R4 – Małopolska and Pogórze.

\*\*Sigma – convergence rate = standard deviation/average.

SE 420 – farm family income, B = farm family income excluding subsidies.

Source: own calculations based on data contained on pages: <http://www.fadn.pl/mediacatalog/document...pdf> [accessed: 12.2010].

\*R – oznaczają regiony FADN, R1 – Pomorze i Mazury, R2 – Wielkopolska i Śląsk, R3 – Mazowsze i Podlasie, R4 – Małopolska i Pogórze.

\*\*Sigma – współczynnik konwergencji = odchylenie standardowe/średnia.

SE 420 – dochód rodziny rolniczej; B = dochód rodziny rolniczej z wyłączeniem subsydiów.

Źródło: opracowanie własne na podstawie danych zawartych na stronach: <http://www.fadn.pl/mediacatalog/document...pdf> [dostęp: 12.2010].

In order to compare more homogeneous groups of households multilateral farm income situation was rated in individual regions (Table 2). The data indicate that the highest income levels were recorded for Region 1 (Pomorze and Mazury) in 2004

Table 2. Income (PLN) for an average farm of multilateral production in FADN regions in Poland in 2004-2008

Tabela 2. Dochody (zł) dla przeciętnego gospodarstwa rolnego o produkcji wielostronnej w poszczególnych regionach FADN w Polsce w latach 2004-2008

Specification Wyszczególnienie		2004	2005	2006	2007	2008	2008:2004
R1*	SE 420	28 770	20 702	27 474	26 810	23 301	0.81
	B	25 858	7 250	3 396	7 429	-3 863	-0.15
R2*	SE 420	27 915	21 931	26 595	27 710	23 304	0.83
	B	23 284	12 153	11 036	14 133	1 606	0.07
R3*	SE 420	14 224	14 266	19 487	17 973	17 356	1.22
	B	11 973	6 663	7 777	8 209	2 334	0.19
R4*	SE 420	13 877	8 858	16 094	15 158	13 059	0.94
	B	10 444	4 379	6 624	7 699	2 289	0.22
Sigma**	SE 420	0.39	0.37	0.25	0.29	0.26	0.67
	B	0.44	0.43	0.44	0.34	5.05	11.48

\*R – FADN regions, R1 – Pomorze and Mazury, R2 – Wielkopolska and Śląsk, R3 – Mazowsze and Podlasie, R4 – Małopolska and Pogórze.

\*\*Sigma – convergence rate = standard deviation/average.

SE 420 – farm family income, B = farm family income excluding subsidies.

Source: own calculations based on data contained on pages: <http://www.fadn.pl/mediacatalog/document...pdf> [accessed: 12.2010].

\*R – oznaczają regiony FADN, R1 – Pomorze i Mazury, R2 – Wielkopolska i Śląsk, R3 – Mazowsze i Podlasie, R4 – Małopolska i Pogórze.

\*\*Sigma – współczynnik konwergencji = odchylenie standardowe/średnia.

SE 420 – dochód rodziny rolniczej; B = dochód rodziny rolniczej z wyłączeniem subsydiów.

Źródło: opracowanie własne na podstawie danych zawartych na stronach: <http://www.fadn.pl/mediacatalog/document...pdf> [dostęp: 12.2010].

and 2006, while in the other examined years for Region 2 (Wielkopolska i Śląsk). This is due to the relatively economically stronger farms in these regions. The lowest income in the analysed years took place in Region 4 (Małopolska and Pogórze). From 2004 to 2008 the biggest drop in earnings was in Region 1, while the growth in Region 3 (Mazowsze and Podlasie), which should be connected with a good economic situation in the milk market in 2007 and at the turn of 2007/2008.

In contrast, the level of income without subsidies, there was no clear “leader” among the regions in that case. There was noted also a significant reduction in all surveyed regions, which resulted from the downturn in agriculture in 2008. The highest occurred in the case of households in Region 1 (Pomorze and Mazury). While in the 2004 all income excluding subsidies, were highest here, it was the lowest in 2008, and were negative. This is due to the dominance of cereals in agricultural production in the region and a relatively stronger dependence in income from the direct payments.

In the case of multilateral farms there were also a beta and sigma convergence. The last one was associated with a quite marked reduction in income differences between regions. However, if the subsidies were excluded then we would talk about the divergence of the developmental processes in farms in Poland in the multilateral regional approach.

## CONCLUSIONS

1. The space factor plays an important role in shaping of the income situation of agricultural holdings [Grzelak 2008]. It is indicated by the differences observed between the levels of income in the surveyed regions. It can be assumed that the assessment of regional income at county level would show even a greater diversification.

2. In the years 2004-2007 an improvement in farm income situation in all regions of the FADN was observed, it deteriorated in 2008, despite of increase in direct payments, which was associated with a downturn in agriculture

3. In the years 2004-2008 we dealt with the processes of convergence of the income situation of agricultural holdings between FADN regions. There was a presence of both: beta and sigma convergence. It means more rapid "catch up" in terms of the stronger household income by regions with a lower income and reduction of income disparities between households in different regions. This situation occurred for both- the total group of farms, as well as multilaterally.

4. The exclusion of the subsidies from income would be a divergence processes. This means that the direct payments are a sort of catalytic processes making the compensation in income between the regions. It could be deduced that the institutional factor was the determinant of the convergence processes of the income between regions in Poland after EU integration. On the other hand, it should be noted that in 2008 took place downturn in agriculture which could further encourage the convergence process. Confirmation of these proposals requires verification in the subsequent years.

5. Diversification of income in the regions and types of farm production is related to the level of the productive resources, received operative subsidies, investment subsidies, climate on various agricultural markets, as well as the costs of production factors. We should not forget that each of the regions (despite of the considerable aggregation) has different conditions of natural, social, and infrastructural nature, as well as referring to the broad historical circumstances and the so-called "human factor" [Pondel and Słodowa-Helpa 2002, Słodowa-Helpa 1994] (qualifications, education). Thus, in regions with larger stocks of agricultural land in relation to the work factor cereal is dominant production (Pomorze and Mazury), while in the regions rich in meadows and pastures (Podlasie) the production of milk and cattle is developing.

6. It can be indicated that CAP instruments are conducive to reducing the income gap in spatial terms, which can be embedded in a range of the EU policy objectives for sustainable growth in spatial terms. In this case it could be interesting to evaluate these processes at the county level which would however, be bound up with considerable cost-consuming studies.

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## **OCENA TENDENCJI W KSZTAŁTOWANIU SIĘ DOCHODÓW GOSPODARSTW ROLNYCH W POLSCE W REGIONACH FADN PO INTEGRACJI Z UE**

**Streszczenie.** Głównym celem artykułu jest rozpoznanie tendencji odnośnie zmian dochodów w Polsce w latach 2004-2008 pomiędzy regionami FADN. W latach 2004-2008 mieliśmy do czynienia z procesami konwergencji w zakresie sytuacji dochodowej gospodarstw rolnych pomiędzy regionami FADN. Odnotowano zarówno występowanie konwergencji typu beta, jak i sigma. Sytuacja ta miała miejsce zarówno dla grupy gospodarstw ogółem, jak i wielostronnych. Gdyby wyłączono subsydia, nastąpiłyby procesy dywergencji. Oznacza to, że płatności bezpośrednie stanowią swego rodzaju katalizator w zakresie wyrównywania sytuacji dochodowej pomiędzy regionami. Można wstępnie zasygnalizować stwierdzenie, że instrumenty WPR sprzyjają zmniejszaniu się różnic dochodowych w ujęciu przestrzennym, co może wpisywać się w pewnym zakresie w cele polityki UE odnośnie wzrostu zrównoważonego w ujęciu przestrzennym.

**Słowa kluczowe:** dochody rolnicze, konwergencja, regiony FADN

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