

Can we really talk about structural change? The issue of small-scale farms in rural Poland

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Abstract

From the beginning of transition to the market economy, Polish agriculture has undergone substantial structural changes. However, most of the macro-indicators characterizing the agricultural structure in Poland still point to profound socio-economic problems. According to the Central Statistical Office, in 2007 there were approximately 900,000 agricultural households, or 38% of all farms in Poland, that consumed more than 50% of the value of their agricultural production. Given this situation, the question arises whether we can truly talk about structural change in Polish agriculture or whether Poland merely faces two distinct groups of farm structures, small and large?

Key words: structural change, small-scale farms, agriculture, Poland

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1 Introduction

Five years have passed since the accession of Poland to the European Union (EU) and the introduction of the Common Agricultural Policy (CAP) measures in Polish agriculture. Despite billions of Euros being allocated to measures of both Pillars (Pillar 1: market policy and Pillar 2: rural development policy) most of the macro-indicators characterizing the Polish agricultural sector still point to profound structural problems.

The first part of the contribution is focused on the general structural problems of the Polish agricultural sector. The next portion concerns the theoretical aspects of the term ‘structural change’ and some controversies over understanding this process in Poland. The analysis in the third section refutes the myth of average farm size being a measure of structural changes in Polish agriculture. The last portion presents various dimensions of structural changes that have occurred in Poland since EU accession. This analysis is based on the latest available data from the Farm Structure Surveys of 2005 and 2007.

2 Structural problems of Polish agriculture

Poland, due to its historical heritage of an abundance of small and highly fragmented private farms¹, began the transition process with an unfavorable agrarian structure. Since 1989 the total number of private farms has been constantly decreasing, in 2007 reaching slightly more than 2.5 million. Considering private farms, between 1990 and 2007, more than 330,000 of them possessing over 1 ha, and about 900,000 smaller than 1ha have disappeared. Since 1996 the acreage of total agricultural land utilized in private farms has dropped by 800,000 ha. A significant decrease of employment in agriculture, from over 25% in 1996 to less than 15% in 2007, has been also observed. The share of agriculture in gross value added has decreased twice between 1996 and 2007, to 4.3% (Table 1).

¹ Private farms are understood as an agricultural holding from 0.1 ha of agricultural land, being exclusive property or used by natural person or group of persons as well as an agricultural holding of person having no agricultural land or with agricultural land less than 0.1 ha who has at least: 1 head of cattle or (and) 5 heads of pigs or 1 sow or (and) 3 heads of sheep or goats or (and) 1 horse or (and) 30 heads of poultry or (and) 1 ostrich or (and) 5 females of fur animals (rabbits included) or (and) 3 heads of animals kept for slaughter or (and) 1 beehive.

Table 1 Agricultural structure in Poland (1990-2007)

	1990	1996	2000	2004	2006	2007
Private farms	3 829 000	3 066 535	2 854 374	2 839 664	2 594 579	2 575 113
<i>including:</i>						
< 1 ha	1 691 000	1 025 155	973 492	987 887	788 184	771 050
≥1 ha	2 138 000	2 041 380	1 880 882	1 851 777	1 806 395	1 804 065
Agricultural land (mln ha) in private farms	18.5 ^a	15.2	15.5	14.3	14.1	14.4
Average area of agricultural land in private farm (ha)	-	4.96	5.43	5.04	5.43	5.59
Employment in agriculture (% of total employed persons – annual average) ^b	-	25.5 ^c	25.8	15.6	15.3	14.8
Share in gross value added (current prices) of agriculture, hunting and forestry (%)	-	8.0 ^c	4.9	5.1	4.2	4.3
“price gap” ^e	100	93.4 ^c	74.0	65.7	64.4	69.0

Source: Statistical Yearbooks of Central Statistical Office, Statistical Yearbook of Agriculture and Rural Areas, Agricultural Census 1996 and 2002.

Notes: a) In agricultural holdings;
b) Data regarding employed persons on private farms in agriculture for 2002/2006 are not strictly comparable to those for previous years;
c) data for 1995;
d) Data are compiled Population and Housing Census 2002 as well as the Agricultural Census 2002, in the denominator — of the Agricultural Census 1996;
e) Index of price relations of sold agricultural products to goods and services purchased by private farms in agriculture – 1990=100

Structural adjustments in agriculture are in most cases analyzed in reference to agricultural employment and farm size. These two structural aspects may be joined in one simple measure – average utilized area (Rosner, 2001). Despite considerable changes, the average area of agricultural land utilized by private farms has exhibited surprising stability and increased by only 0.63 ha between 1996 and 2007. This is mainly due to a dual structural arrangement that has distinguished Polish agriculture during transition. Its elements consist of viable farms (estimated at 600-800,000) and the social agricultural sector (1.3-1.5 million). The latter group plays two roles: they contribute to the family’s well-being, assuring the economic existence of its members; they absorb and keep hundreds of thousands persons who otherwise would be unemployed (Woś, 2003).

As a result of structural problems, Polish agriculture still has unfavorable relations between the share of agriculture in gross domestic product (GDP) and its share of total employment. Another interrelated problem refers to the excessive production capacities of the Polish agricultural sector compared to market demand (besides the possibility of exporting to EU markets, agricultural producers encounter difficulties in selling their products).

3 Ambiguity of structural changes in Polish agriculture

Traditionally, with regard to farming, the term ‘structure’ is understood as the allocation of land, and thus concerns mainly farm size. However, as a result of technological progress in agriculture, the importance of land resources has significantly diminished. Nowadays, a much broader approach prevails, encompassing economical factors of production², production trends, sales figures and types of connections with the market (Szemberg, 1998). Therefore, the main aspects of structural transformation in agriculture should refer to the optimal allocation of production factors, which are adequate to the specificity of the given farm. Moreover, besides changes inside the farm, structural transformation concerns the evolution of closer and further socio-economic environments within rural areas (Woś, 2003). Structural change in agriculture is a complex phenomenon, under which we should understand the whole picture of changing variables describing the agro-food sector and its wider role in the economy of rural areas.

During the debates over what is the most desirable structural change in Polish agriculture, the answer is generally accepted, and states that concentration is one of the main processes leading to an improvement in the structure of ‘peasant farming’ (Frenkel and Rosner, 1999).

Concentration of production is very often viewed as a simple function of land consolidation, but this is an unjustified simplification. Of course, concentration of land is a very important aspect of structural change, but it is neither the only nor always the main. Concentration of production may sometimes be achieved without enlarging the utilized area, e.g., it may be achieved by intensifying production in some farms and by various forms of formal and informal

² These are natural resources, physical capital, financial capital, human capital and social capital.

cooperation between agrarian producers, suppliers of inputs and the agricultural processing industry. Another simplification concerns the problem of land concentration, and the opinion that it can be solely achieved by increasing the average farm size. However, concentration should be interpreted more carefully. It is possible to achieve concentration through polarizing the area's structure: increasing the area of the smallest and the largest farms and reducing the area of the medium-sized farms. In this situation, concentration can take place without increasing the average farm size. One more simplification appears when the concept of agrarian structure transformation is reduced merely to change of utilized area. Meanwhile, structural change should include the evolution of farm functions with regard to the importance of farming as a main or supplementary source of family income (Frenkel and Rosner, 1999). This process particularly determines the emergence of different farm structures across the country, which is adjusted to specific local conditions.

4 The 'myth' of average farm size³

There is no such thing as average for Polish agriculture! This is true for many different indicators describing features of the Polish agricultural sector, but especially concerning the average acreage owned by farms. Data from the Agricultural Census conducted in 2002 reveal the spatial diversity of average farm size by Poviats (NTS-4⁴) (Figure 1). The north and west parts of Poland are characterized by much larger farms than the country's average (from 11.5 to 32 ha), due to the presence of bigger state-owned farms mostly privatized and taken over by private farms during transition. In the central and southwest regions, the size of farms is mostly close to the country average. In the southeast Poviats the majority of farms represent 'weak' agrarian structures with an area below the country's average.

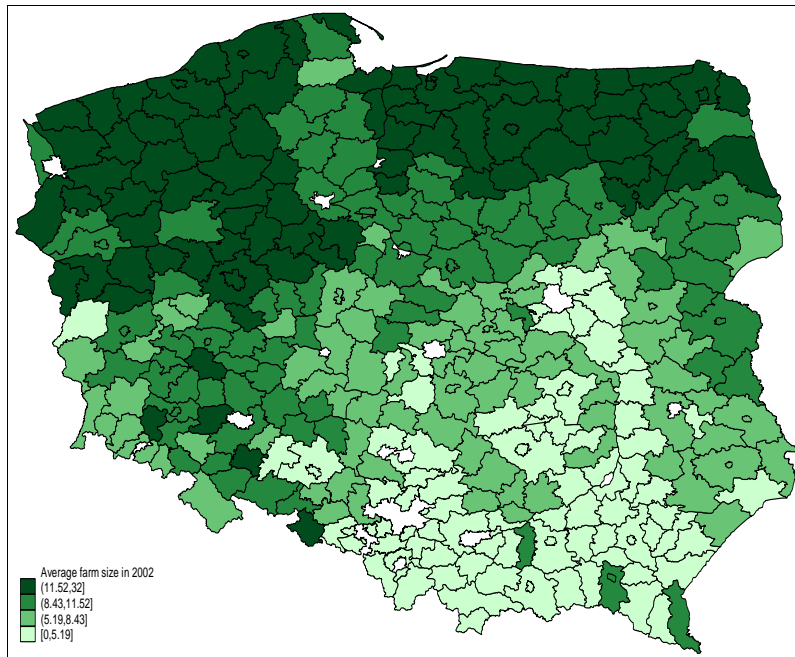
Comparison of the data from both Agricultural Censuses 1996 and 2002 reveal another interesting fact on the average farm size. Table 2 presents the relative changes of this measure (AFS_{year} – Average Farm Size in the given year) that have occurred between surveys. In 16% of Poviats, a decrease in average farm size was recorded. Subsequently, in 74% of Poviats, AFS increased by 0 – 20%,

³ Average farm size in Poviats is calculated as a quotient of total acreage of agricultural land and total number of holdings.

⁴ NUTS = Nomenclature des unités territoriales statistiques.

while in only 9% of Poviats it increased by more than 20%. At the same time, average farm acreage in the country increased by 6% (CSO, 2003).

Figure 1 Average farm size in Poviats (NTS-4) in 2002



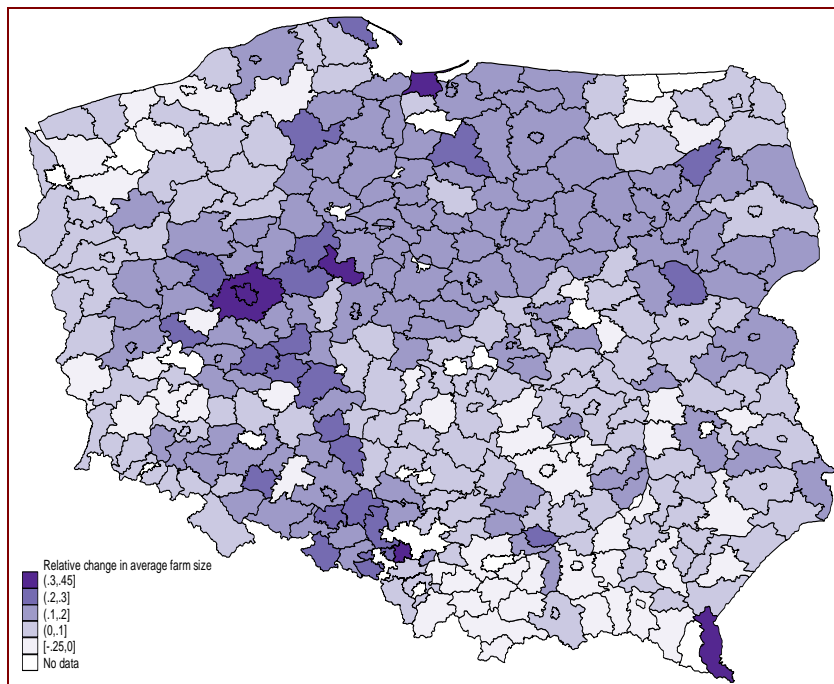
Source: Own depiction based on data from the Agricultural Census 2002.

Table 2 Relative changes in average farm size (1996-2002)

$(AFS_{2002} - AFS_{1996})/AFS_{1996}$	No./share of Poviats
[-0.25, 0]	50 / 16%
[0, 0.1]	117 / 38%
[0.1, 0.2]	112 / 36%
[0.2, 0.3]	23 / 7%
[0.3, 0.45]	5 / 2%

Source: Own calculation based on data from the Agricultural Census 1996 and 2002.

Figure 2 confirms that the most significant changes in average farm size occurred in those parts of the country where the land from state farms was accessible. Unfortunately, in Poviats where the farm structure was already highly fragmented (in the southeast regions), a decrease of average size was recorded.

Figure 2 Relative changes in average farm size (1996-2002)

Source: Own depiction based on data from the Agricultural Census 2002.

Obviously, changes of average farm size are dependent on the changes in total number of farms belonging to the specific area groups. However, it is more complicated to indicate the area groups which have a significant influence on average farm size. This problem is tested by the following linear regression model:

$$(1) \quad Y = \sum_i^4 \beta_i \times \text{change_area_group}_i$$

$$(2) \quad Y = \sum_i^7 \beta_i \times \text{change_area_group}_i$$

Y = relative change in average farm size (AFS) in particular Poviats (AFS2002 - AFS1996) / AFS1996)

β_i = coefficient for the i th change_area_group

$\text{change_area_group}_i$ = change in share of private farms belonging to respective area group in total number of private farms in particular Poviats (number of farms_area_group₂₀₀₂ / total number of Farms₂₀₀₂ - number of farms_area_group₁₉₉₆ / total number of Farms₁₉₉₆)

Due to the existence of collinearity⁵, one independent variable is removed in each model: change_15-50ha from model (1) and change_20_50ha from model (2). Both models are significant and explain: (1) – 43% and (2) – 48% of the variance of the relative change in average farm size (Table 3). The results of model (1) indicate that all variables influence significantly changes in ‘AFS’, but in the case of changes in number of farms from area groups 1-5 ha and 5-15 ha, dependency is negative and from the group over 50 ha, dependency is positive. In model (2), variables ‘change_1-5ha’, ‘change_5-10ha’ and ‘10-15ha’ are significant and negatively influence changes in ‘AFS’, and variable ‘change_50-100ha’ is significant and positively influences ‘AFS’ (Table 3).

Both models give very similar results, and prove that between 1996 and 2002 only changes in the number of the smallest farms (negatively) and in the number of the largest farms (positively) significantly influenced relative changes in average farm size. This result also proves that in case of a simultaneous increase in the number of small and large farms (polarization of agrarian structure) in proper proportions, both effects can cancel each other out and the average farm area in Poland may remain relatively stable.

In fact, according to data presented in Table 4, between 1996 and 2002, the polarization of agrarian structure was observed: there was almost a 12% increase in the number of private farms possessing 1-2 ha, 27.7% of 20-50 ha farms, and 92% for farms larger than 50ha. Meanwhile, a decrease in the number of farms possessing 2-20 ha was noted.

However, since 2002, a tendency other than the polarization of acreage structure can be noticed. Positive changes in the number of private farms occurred in the medium area group (10-15 ha) and those above 20 ha. Calculation of dynamics based on data from the latest Farm Structure Survey 2007 clearly reveals the new trend in the structural arrangement in Polish agriculture. Between 2005 and 2007, there was a significant increase in the number of medium farms and a high increase in number of large farms (≥ 50 ha).

⁵ High values of Variance Inflation Factor (VIF) indicate collinearity between independent variables. Elimination of selected variables reduced R^2 and adjusted R^2 only marginally.

Table 3 Determinants of changes in average farm size (AFS) in Poland (1996-2002)

Independent variable (t-Statistics) [p-value] (n=307)	Model (1)	Model (1) (no collinearity)	Model (2)	Model (2) (no collinearity)
Change_1-5ha	-4.052088 (-3.60) [0.000]	-1.956463 (-13.22) [0.000]	-2.533633 (-2.08) [0.038]	-2.636722 (-9.60) [0.000]
change_5-10ha	- - -	- - -	-1.204524 (-1.00) [0.316]	-1.304884 (-4.00) [0.000]
change_5-15ha	-3.270636 (-2.95) [0.003]	-1.214523 (-6.51) [0.000]	- - -	- - -
change_10-15ha	- - -	- - -	-2.177446 (-1.63) [0.105]	-2.289104 (-6.11) [0.000]
change_15-20ha	- - -	- - -	-1.25419 (-1.09) [0.275]	-1.330764 (-1.82) [0.070]
change_15-50ha	-2.084029 (-1.88) [0.061]	- - -	- - -	- - -
change_20-50ha	- - -	- - -	0.1140962 (0.09) [0.931]	- - -
change_50-100ha	- - -	- - -	2.978105 (1.88) [0.062]	2.887577 (2.42) [0.016]
change_>50ha	1.701256 (1.55) [0.122]	3.554282 (7.38) [0.000]	- - -	- - -
change_>100ha	- - -	- - -	-2.381359 (-1.23) [0.220]	-2.437566 (-1.34) [0.182]
_constant	0.0621931 (7.91) [0.000]	0.0629599 (7.99) [0.000]	0.0690331 (8.43) [0.000]	0.0690573 (8.45) [0.000]
R ²	0.4401	0.4336	0.4799	0.4799
Adjusted R ²	0.4327	0.4280	0.4677	0.4695
F-statistics (p-value)	59.35 (0.000)	77.31 (0.000)	39.41 (0.000)	46.13 (0.000)

Source: Own calculation based on data from Central Statistical Office.

Note: Dependent variable = $(AFS_{2002} - AFS_{1996})/AFS_{1996}$

Table 4 Number of private farms (1996 – 2007)

	Total numbers (in thousands)				1996 = 100			2002 = 100		2005 = 100
	1996	2002	2005	2007	2002	2005	2007	2005	2007	2007
0-1 ha	-	976.9	946.6	771.05	-	-	-	96.9	78.9	81.5
1-2 ha	462.2	516.8	446.8	422.6	111.8	96.7	91.4	86.5	81.8	94.6
2-5 ha	667.6	629.5	585.1	614.3	94.3	87.6	92.0	93.0	97.6	105.0
5-10 ha	520.8	426.5	388.2	400.1	81.9	74.5	76.8	91.0	93.8	103.1
10-15 ha	217.2	152.5	167.6	166.6	70.2	77.2	76.7	109.9	109.2	99.4
15-20 ha	89.4	83.8	77.1	77.6	93.7	86.2	86.8	92.0	92.6	100.6
20-50 ha	75.2	96	98.7	102.8	127.7	131.3	136.7	102.8	107.1	104.1
≥ 50 ha	8.9	17.1	18.8	24.1	192.1	210.8	270.8	109.7	140.9	128.5
Total >1 ha	2041.3	1922.2	1782.3	1808.1	94.2	87.3	88.6	92.7	94.1	101.4

Source: Own calculations based on the data from Central Statistical Office.

As a result, during the considered period, average area of agricultural land in private farms grew by 9% (in comparison with 2.6% for period 1996-2002 and 0.8% for period 2002-2005) (Table 1). This effect is consistent with the results of econometric models presented above, and confirms that average farm size in Poland increases along with the growth in number of big farms only.

As it was argued, average farm size can be a misleading measure of structural change in Polish agriculture; however, it is very often used for making assessments of the level of agricultural sector performance. Especially confusing can be claims that, without in-depth study, accuse small (in terms of acreage) farming units of being responsible for the unfavorable agrarian structure. The mistake of such statements has a dual nature: first, it is hard to decide which farm should be called small; second, it is questionable if low productivity and efficiency can be attributed mostly to small, in term of acreage, farms⁶.

5 Different dimensions of structural changes in Polish agriculture (2005-2007)

As ‘the myth’ of average farm size is refuted, another question arises about ‘smallness’ and ‘largeness’ of farms. Currently, there is a lack of precise criterion for placing farms in the given group. This is a crucial problem in the

⁶ See discussion in Gorton and Davidova (2004).

discussion on structural changes in agriculture due to the fact that small structures do not necessarily react to the same policy signals as large farms. In this context, the efficacy of governmental measures aimed at structural transformation in agriculture or wider, at development of rural areas, can be questioned.

The general problem refers to the selection of criteria which could separate farms into different size groups. Two basic ones come to mind: production potential and incomes of private farm conducting agricultural activity. It seems that European Size Unit (ESU)⁷ is a proper measure because it embraces production potential as well as incomes (Chlebicka et al., 2009).

Table 5 Holdings (in %) conducting agricultural activity by area groups and economic size

	0-4 ESU		4-12 ESU		≥ 12 ESU		Total
	2005	2007	2005	2007	2005	2007	
0 - 1 ha	98.9	99.1	0.7	0.5	0.4	0.4	100
1 - 5 ha	96.7	97.1	2.7	2.2	0.6	0.7	100
5 - 20 ha	50.6	51.7	41.5	40.2	7.9	8.1	100
5 - 10 ha	67.9	69.5	30.0	28.4	2.1	2.1	100
10 - 20 ha	23.2	22.7	59.6	59.4	17.1	17.9	100
20 - 50 ha	3.3	2.3	33.5	33.6	63.2	64.2	100
≥ 50 ha	1.6	0.7	4.8	3.3	93.6	96.0	100
Total	81.2	80.5	13.1	13.3	5.7	6.3	100

Source: Farm Structure Survey 2005 and 2007, CSO.

Farms between 2-4 ESU in Poland are officially called semi-subsistence farms⁸. In order to encompass the whole spectrum of features related to small-scale farms, it is reasonable to expand this definition by adding holdings generating 0-2 ESU. This is a very numerous group represented by more than 1.6 million farms. Holdings between 4-12 ESU can be classified as medium units in terms of economic size. According to various analysis, the threshold of 8 or 12 ESU

⁷ European Size Unit (ESU) represents 1,200 EUR standard gross margin (SGM): http://ec.europa.eu/agriculture/rca/methodology1_en.cfm.

⁸ Such definition is accepted in Rural Development Plan 2004-2006 and Rural Development Program 2007-2013.

enables farms to achieve income at the parity level⁹, thus these units can be categorized as large (Józwiak, 2009).

In 2007, there were over 1.9 million small-scale farms (80.5% of the total number of farming holdings), 317,000 medium-scale farms (13%) and roughly 150,000 large-scale farms (6%). Table 5 presents the relation between area size and economic size of Polish farms. In the first group (0-4 ESU), 'area smallness' denotes 'economic smallness', however it must be stressed that some special production types generate large incomes from a small area (in group of farms possessing 0-10 ha, 3.2% constitute farms generating more than 12 ESU). Between 2005 and 2007, noticeable changes have occurred regarding economic size structure: the share of small farms (0-4 ESU) increased within the group of holdings possessing 0-10 ha, but dropped significantly within the group of medium and large farms in terms of acreage. This situation can be interpreted as a strengthening of the economic position of medium and large farms but a weakening of the position of small farms (0-10 ha). During the same period, within all acreage groups except 20-50 ha, the share of farms with medium economic size (4-12 ESU) has decreased. The share of the largest, in terms of ESU farms (≥ 12 ESU), has increased considerably in the group of farms possessing more than 10 ha, which can be interpreted as a tendency towards the commercialization of farms with medium and large area potential.

One more interesting fact can be noticed regarding trends in structural changes in Polish agriculture. Similar to the acreage criterion, between 2005-2007 slow growth of the share of medium and large farms (in terms of ESU) and a decline in the group of small units was observed (last row in Table 5). If the group of 0-4 ESU is divided into two more detailed categories (0-2 and 2-4 ESU) opposing tendencies are revealed: a decrease in the first group (69.4% to 67.9%) and increase in second group (11.8% to 12.5%). The growing number of semi-subsistence farms (2-4 ESU) may be related to the introduction of Rural Development Policy (Pillar 2 of the CAP) measure addressed to this specific category. From 2005-2007, the total value of support for semi-subsistence farms reached over 1 billion Zlotys.

In fact, land is still the most important factor of production in agriculture which determines farms' economic sizes; however its role constantly diminishes in favor of innovative solutions in the process of production (technical and product innovations). The measure of economic size (ESU) is more appropriate than area size to present diversity among various farming units, unfortunately the further analysis of structural changes will be based on acreage criterion due to the lack of data categorizing holdings according to ESU in 2005.

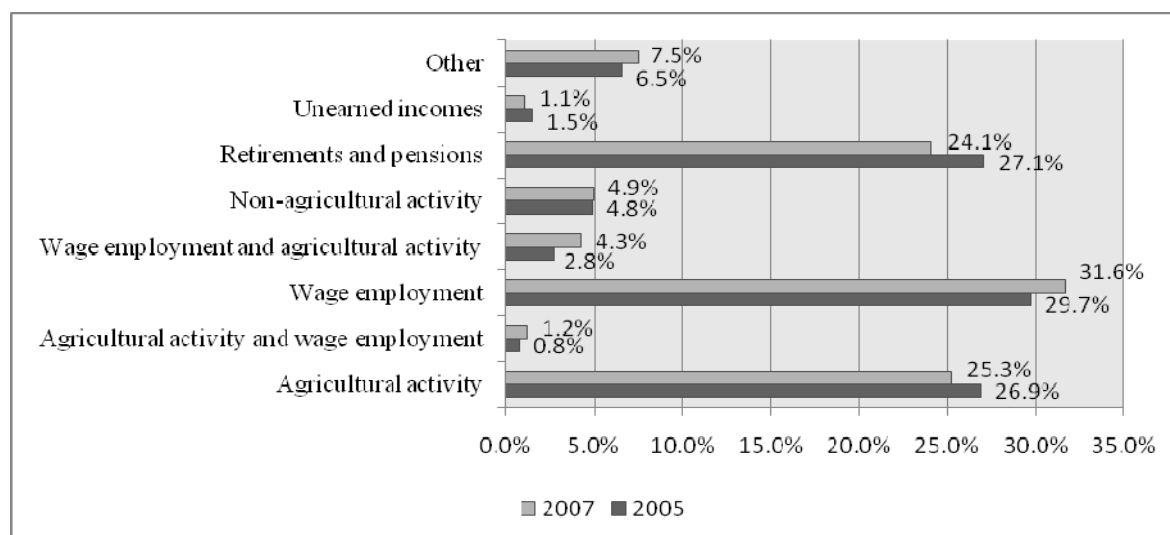
⁹ Income achieved from farming at the level comparable to the country average net income achieved in other economic sectors (Goraj, 2005).

5.1 Sources of incomes

The whole picture of structural changes in the Polish agricultural sector would be incomplete without an analysis of the evolution of farm functions with regard to the importance of farming as a main or supplementary source of income for the family. This issue is crucial for understanding the role of agriculture in the wider context of economic changes in rural areas and even nationwide.

In general, the total number of farming households can be divided into three groups according to the importance of agriculture for income generation: (1) about 25% of farms oriented towards agricultural activity as a main source of income; (2) those with combined sources – 5.5%; (3) farms treating agriculture as additional source of incomes or as a ‘hobby’ or ‘lifestyle’ – roughly 70% (Figure 3).

Figure 3 Structure of households conducting agricultural activity by the main source of income



Source: Own depiction based on the data from Central Statistical Office.

The role of agriculture as a source of income diminished between 2005 and 2007 (Figure 3). Combined sources of incomes, agricultural and wage employment, and only wage employment increased in importance. The share of non-agricultural activity stayed at an almost unchanged level. A significant decline of importance of retirements and pensions and unearned incomes can be noticed.

As progress of diversification of income sources and marginalization of agriculture is visible, the question arises how this process is distributed among different farm structures. First, it is worth stressing that the total number of holdings conducting agricultural activity decreased by 3.5% for the period 2005-

2007 (last row in Table 6). Second, the greatest number of holdings that ceased farming is belonging to the category of the smallest farms (0-1ha). Meantime, the total number of farms from medium acreage categories increased slightly and from the group of the largest units increased by roughly 15%.

An analysis of the dynamics of changes in income strategies (Table 6) delivers very interesting information about the pace and directions of structural transformation in Polish agriculture. The total number of farming holdings existing due to agricultural activity diminished in all area groups up to 20 ha, but tiny farms gave up agricultural activity most often.

Table 6 Households conducting agricultural activity and achieving over 50% of their total income from the following sources

Source of income	2007 (2005=100)						
	Total	0 - 1	1 - 5	5 - 10	10 - 20	20 - 50	≥ 50
Agricultural activity	90.8	36.4	87.1	93.9	96.6	101.5	113.7
Agricultural activity and wage employment	157.1	148.7	155.3	157.2	146.7	242.3	132.6
Wage employment	102.8	88.4	111.7	118.2	111.9	102.1	113.0
Wage employment and agricultural activity	149.0	137.3	152.3	149.2	145.5	178.0	131.0
Non-agricultural activity	98.0	89.6	99.3	104.7	104.2	130.7	115.7
Retirements and pensions	85.8	82.6	89.9	89.4	75.1	47.8	79.4
Unearned incomes	72.0	75.6	71.3	61.9	67.0	39.5	43.6
Other	111.4	116.9	107.0	113.2	115.9	133.6	145.3
Total	96.5	84.0	101.9	103.3	99.9	103.9	114.7

Source: Own calculation based on data from Central Statistical Office.

In the same timeframe, the increased role of diversified sources of incomes, especially amongst farms possessing 20-50 ha, as well as in all acreage groups, the total number of farms achieving incomes from combined sources increased significantly. This proves that improving macroeconomic conditions in Poland and better job opportunities encouraged farmers to seek additional sources of income outside agriculture. In fact, non-farm employment did not bring about significant structural change (bottom row in Table 6). This leads to the conclusion that wage employment may help smaller farms survive and in this way small-scale, part-time farming structures persist.

It is somewhat interesting that in the case of wage employment as a category of dominating source of income, a decrease of the number of farms in the smallest acreage group (0-1 ha) is noted. Persons running these farms are not officially

classified as farmers according to the national insurance law¹⁰ in Poland, and additionally they do not receive direct support from Pillar 1 of the CAP. The lack of financial incentives can be recognized as a reason to get rid of tiny farms. It is characteristic that the number of holdings achieving incomes mainly from retirements and pensions decreased considerably. It is very likely that this situation is related to ongoing demographic changes among farmers (see Table 10).

Table 7 Agricultural households consuming more than 50% of the value of their agricultural production

	Total	0 - 1	1 - 5	5 - 10	10 - 20	20 - 50	≥ 50
2005	1014951	496473	409056	72685	28999	7056	681
2007	908171	407802	394207	71786	25874	7668	835
	2007 (2005=100)						
	89.5	82.1	96.4	98.8	89.2	108.7	122.6

Source: Own calculation based on data from Central Statistical Office.

Another dimension of structural changes in Polish agriculture is related to the purpose of agricultural production. According to Table 5 there were, in 2005, over 1 million households with people running a private farm, in which the majority of the value of production was consumed. Bearing in mind that in medium area groups insignificant growth in the total number of private farms is noted, a diminishing number of farms producing mainly for the household's consumption indicates a moderate increase of the level of commercialization.

5.2 Changes in the acreage of private farms

As land is one of the most important production factors in agriculture, structural transformation should be demonstrated by changes in land allocation between different area groups. Figure 4 depicts the relative stability in land distribution for the medium acreage groups and a slight increase for the largest groups. The group of 50-100 ha constitutes an exemption and the share of land owned by farms from this category increased considerably.

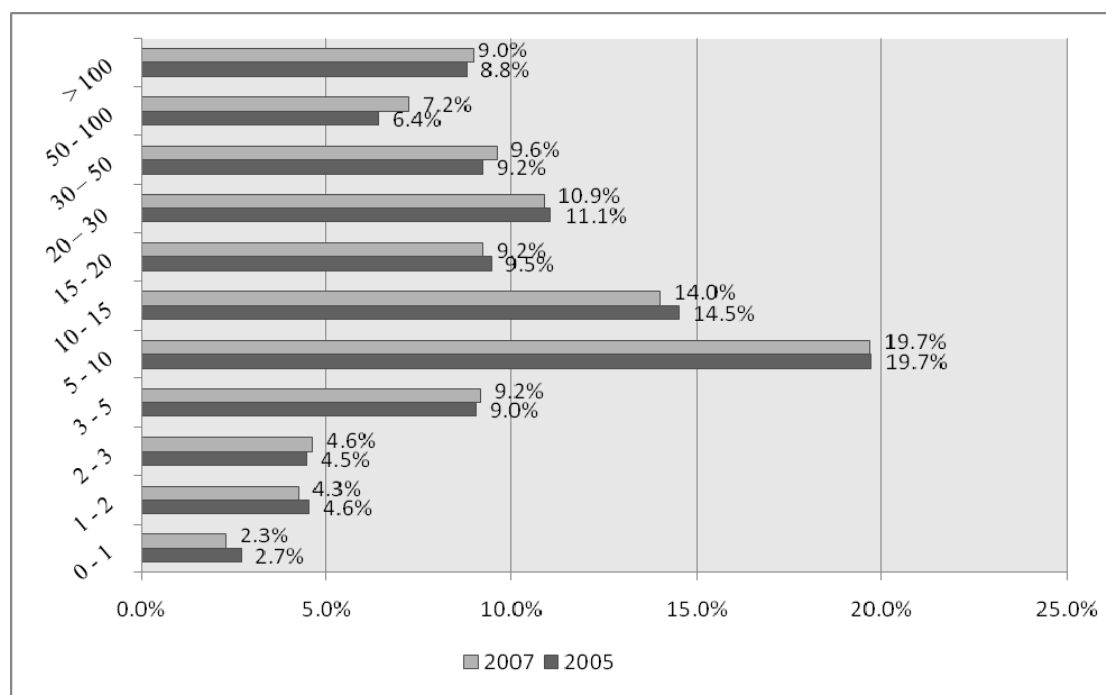
Between 2005 and 2007, the acreage of set-aside and fallow land decreased substantially, especially for the smallest and the largest area groups. Due to the entitlements of fallow land to be supported by direct payments¹¹ at the basic

¹⁰ The national insurance law for farmers is more preferential than for other professional groups in Poland.

¹¹ It involves the payment of uniform amounts per eligible hectare of agricultural land: http://ec.europa.eu/agriculture/markets/sfp/index_en.htm.

rate, a great number of farmers decided to utilize their set-aside and fallow land for production in order to receive so-called Complementary National Direct Payments¹².

Figure 4 Acreage (ha) of private farms by area groups of agricultural land in 2005 and 2007



Source: Own depiction based on data from Central Statistical Office.

Table 8 Set-aside and fallow land area

	Year	Total	0 - 1	1 - 5	5 - 10	10 - 20	20 - 50	≥ 50
Set-aside and fallow land area (ha)	2005	1028568	82186	307029	132296	86643	49380	371034
	2007 ^a	440938	23436	146684	77335	52494	30818	110172
----- 2007 (2005=100) -----								
Set-aside and fallow land area (ha)		42.87	28.52	47.78	58.46	60.59	62.41	29.69

Source: Own calculation based on data from Central Statistical Office.

Notes: ^a Fallow land only - includes arable land not used for production purposes, but maintained in good agricultural and environmental condition.

¹² On top of the EU funded direct payments, the new Member States may pay complementary national direct payments during a transitional period.

5.3 Manpower transformation

Structural change in agriculture is also characterized by constant changes in the deployment of labor. In 2007 there were roughly five million persons, including family labor force and employees, engaged in work on private farms (a decrease of 1.5% in comparison to 2005). A different picture emerges when a full-time employment measure (Annual Work Units¹³) is used – data in Table 9 indicates that in 2007 there were over 2.2 million full-time workers. This number stayed almost unchanged since 2005; however different tendencies can be noticed for various area groups.

Table 9 Full-time employment in private farms by area groups of agricultural land

	Year	Total	0 - 1	1 - 5	5 - 10	10-20	20 - 50	≥ 50
Full-time employment in thousands of AWU ^{a)}	2005	2246.9	219.8	783.4	551.8	433.3	207.2	51.4
	2007	2245.8	198.2	796.8	556.9	426.2	209.3	58.6
AWU / private farm	2005	0.91	0.29	0.81	1.44	1.78	2.11	2.75
	2007	0.94	0.31	0.81	1.41	1.75	2.05	2.73
----- 2007 (2005=100) -----								
Full-time employment in thousands of AWU ^{a)}		99.95	90.17	101.71	100.92	98.36	101.01	114.01

Source: Own calculations based on data from Central Statistical Office.

Note: ^a Including employees and neighbors' help.

A decrease of full-time employment can be observed in the group of the smallest farms (nearly 10%) and medium ones (10-20 ha) (~1.6%) and significant increase is noticeable in the group of the largest farms (14%). All these changes are closely related to changes in the total number of private farms (Table 4). Considering the number of fully-employed per one private farm, small changes are visible (Table 9). It is worth stressing that the rate of 'AWU/farm' is disproportionately distributed among acreage groups. Indeed, larger farms employ absolutely more labor force per holding, however smaller farms, especially from the groups of 1-5 ha and 5-10 ha, engage much more workforce in relation to the acreage of utilized land. This relationship did not change considerably between 2005 and 2007.

¹³ Annual work unit (AWU) means the equivalent of full-time employment. It is calculated by dividing the total annual number of hours worked by the average annual number of hours worked in full-time jobs. The annual work unit used in Poland equals 2120 working hours per a year, i.e., 265 working days per 8 working hours a day. To calculate the labor input expressed in AWU (in accordance with the Eurostat methodology) the assumption was applied that more than 1 AWU cannot be attributed to 1 person, even if the actual amount of work was higher.

A very important aspect influencing the pace of structural transformation in agriculture is the demographic structure of persons running farms. According to Table 10, over 35% of persons were, in 2007, aged 55 or older. In the same timeframe, only 1.2% of farmers were younger than 24 years old. More than 60% of people running farms were aged 25 to 54 years old.

Table 10 Persons running (%) private farms conducting agricultural activity by age groups in 2005 and 2007

a – 2005 b – 2007	Total = 100	0 - 1	1 - 5	5 - 10	10 – 20	20 – 50	≥ 50	
to 24 years old	a	1.4	11.0	35.7	24.3	20.6	7.5	0.6
	b	1.2	7.7	34.0	28.4	20.7	8.1	1.1
25 – 34 years old	a	11.3	18.7	37.6	21.1	14.8	6.6	1.2
	b	11.1	13.4	39.7	22.7	15.6	7.0	1.6
35 – 44 years old	a	22.2	23.0	39.2	18.4	12.7	5.7	1.0
	b	21.5	19.7	40.7	19.6	13.0	5.9	1.2
45 – 54 years old	a	30.9	27.5	37.5	17.9	11.6	4.6	0.9
	b	30.9	22.1	40.3	19.1	12.3	5.1	1.1
55 – 64 years old	a	17.2	37.8	40.9	11.9	6.7	2.2	0.5
	b	19.2	34.9	42.7	12.8	6.6	2.5	0.6
65 and above	a	17.1	51.1	39.9	6.6	1.9	0.4	0.1
	b	16.1	47.2	42.6	7.4	2.1	0.6	0.1

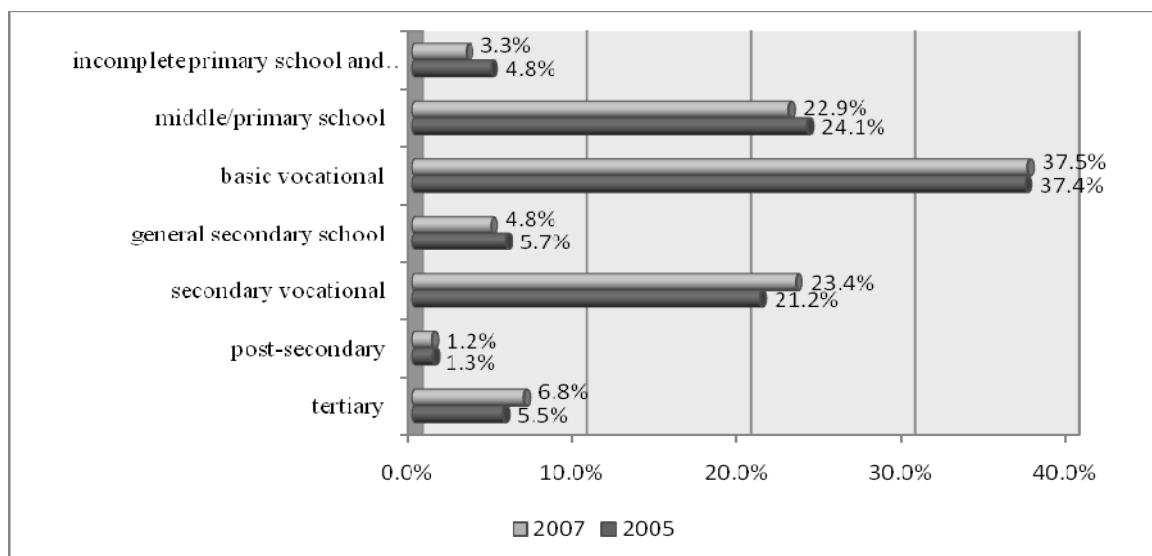
Source: Own calculation based on data from Central Statistical Office.

It is very often argued that the interest of young people in farming will be diminishing in the coming years mainly due to better job opportunities offered by other sectors, mostly in bigger cities. However, the profession of farmer gained prominence and attractiveness among graduates of agricultural schools between 2000 and 2007 (Bujak, 2009). In fact, demographic factor can become the main one responsible for structural changes in agricultural employment in Poland.

The last important aspect of manpower transformation is related to the managerial capabilities of persons running farms. Managerial capability is crucial for adaptive reactions to increasing dynamics in any economic sector, including agriculture. It can be assumed that the higher the level of education is, the better managerial capabilities characterize the given person. In Poland, more than 26% of farmers (627,000) in 2007 were educated at the basic level (incomplete primary, primary or middle school) and a further 37.5% (897,000) were educated at the basic vocational level (Figure 5). Less than 7% of all farmers had tertiary education. The dynamics of changes in educational level is quite slow, though some positive tendencies can be noticed. Between 2005 and

2007, the number of farmers with the lowest education decreased and the number of farmers having secondary vocational and tertiary education increased.

Figure 5 Structure of holdings conducting agricultural activity by education level of person running



Source: Own calculation based on data from Central Statistical Office.

In all acreage groups above 1ha, an increase in the number of farms run by persons with the highest education levels (secondary, post-secondary and tertiary) was observed (Table 11). There was a significant decrease in the number of small farms, with the lowest education of the managing farmer, but positive changes affected mostly medium and large farms.

Observed dynamics of growth in farmers' education level is very important for an increase in labor productivity, and simultaneously with increasing non-farm employment opportunities due to overall economic growth can accelerate employment shifts. Education is also crucial for the absorption of innovative solutions by farmers, which leads to improvements in the process of food production.

Table 11 Holdings conducting agricultural activity by education level of person running and area groups of agricultural land

Level of education	2007 (2005 = 100)						
	Total	0 - 1 ha	1 - 5 ha	5 - 10 ha	10 - 20 ha	20 - 50 ha	≥ 50 ha
Tertiary	118.5	96.4	128.1	126.8	152.2	140.4	124.9
Post-secondary	91.5	71.1	102.2	107.9	109.1	151.3	110.1
Secondary vocational	106.5	89.0	113.5	118.3	110.5	112.5	117.0
General secondary school	81.4	65.2	86.6	111.8	105.5	127.7	112.6
Basic vocational	97.0	84.9	101.7	102.6	99.3	99.3	106.6
Middle/primary school	92.0	86.7	95.4	94.5	89.2	93.6	103.3
Incomplete primary school, no education	66.6	68.7	72.9	57.0	41.0	45.7	28.9
Total	96.5	84.0	101.9	103.3	99.9	103.9	113.1

Source: Own calculation based on data from Central Statistical Office.

6 Conclusions

When assessing structural changes in the Polish agricultural sector, one must be very careful in interpreting the basic and generally accepted measure of average farm size. The results of analysis indicates that in the case of Poland, average farm size increases only along with the growth in number of the largest farms (≥ 50 ha). Meanwhile, during the 1990s, the polarization of agrarian structure was observed, with an increase in total area occupied by the smallest and the largest farms, and a reduction in medium-sized farms. In this situation, the concentration of land took place without increasing the average farm area. Since 2002, different tendencies have been noticed - average farm size has increased substantially due to the growing number of medium-sized and large farms.

It is generally accepted that structural change in Polish agriculture can be achieved through production concentration, which is very often understood solely as land consolidation. Despite agricultural land being the most important factor of production in agriculture, acreage criterion constantly loses its importance in favor of innovative solutions applied in production. As a result, small-scale in terms of acreage does not necessarily mean small-scale in terms of economic size. However, analysis reveals the fact that the economic position of small farms (0-10 ha) weakened between 2005 and 2007, and the medium-sized and large farms exhibited moderate tendencies to commercialization.

Analysis of structural changes should include the evolution of farm functions with regard to the role of farming being a main or supplementary source of income for the family. From 2005-2007 progress with the diversification of income sources was significant within all acreage groups and the

marginalization of agriculture was noticeable within the small and medium-sized groups.

The main symptom of structural transformation in agriculture refers to the constant changes in the deployment of labor. Only for the group of the smallest farms can the decrease of full-time employment be noticed. Larger farms employ more labor in absolute values, whereas smaller farms engage much more labor in relation to utilized area.

Demographic changes will likely be of key importance for the pace of structural transformation in Polish agriculture. The age structure of persons running farms indicates that over 35% of them were aged 55 or older in 2007.

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