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Characteristics of Models of Farms in the European Union

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Abstract: The article describes and sets the definition of different farm models under the categories of being family, small, and large-scale commercial farms. The distinction was based on the structure of the workforce and the relationship between agricultural income and the minimum wage. Family farms were dominated by the farming family providing the labour and their income per capita exceeded the net minimum wage in the country. The larger commercial farms feature a predominance of hired labour. Based on surveys, it was found that in 2016 in the EU-28 there were 10,467,000 farms (EU-13—57.3%, EU-15—42.7%). They carried out agricultural activities on an area of 173,338,000 ha (EU-13—28.5%, EU-15—71.5%). Countries of the EU-28 generated a standard output (SO) amounting to EUR 364,118,827,100 (EU-13—17.2% and EU-15—82.8%). After the delimitation, it was shown that small farming (70.8%) was the predominant form of management in the European Union (EU-13—88.2% and EU-15—79.8%) compared to family farming (18.4%) (EU-13—10.5% and EU-15—29%). In most EU countries the largest share of land resources pertains to small farms (35.6%) and family farms (38.6%) (UAA—utilised agricultural area of farms).

Keywords: the European Union; agriculture; models of farms

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1. Introduction

Agriculture is a primary division of the economy. Thus, it is present in all economic and political systems and accompanies people in all regions and climatic zones. Regarding the economic activity of agriculture, the larger commercial farms feature a predominance of hired labour. Based on surveys, it was found that in 2016 in the EU-28 there were 10,467,000 farms even in the most developed countries of the world. The larger commercial farms feature a predominance of hired labour. Based on surveys, it was found that in 2016 in the EU-28 there were 10,467,000 farms next to human-induced factors and phenomena determine the conditions created by the forces of nature [1]. Agriculture has developed for thousands of years, evolving towards two main models of farms: family farms and large-scale farms (also known as large-area farms) [2]. It can be assumed that large-area farms are commercial units with strong market links, and family farms are both sales-oriented entities. The larger commercial farms feature a predominance of hired labour. Based on surveys, it was found that in 2016 in the EU-28 there were 10,467,000 farms where agriculture is the primary source of livelihood for the family. The larger commercial farms feature a predominance of hired labour. Based on surveys, it was found that in 2016 in the EU-28 there were 10,467,000 farms and entities performing social, self-supply, recreational and other functions. From the emergence of the European Union's Common Agricultural Policy family farms constituted the main target group [3–6]. Therefore, the United Nations Organization declared 2014 the International Year of Family Farming. As defined by the FAO, a family farm is an agricultural holding that is managed and operated by a household and where farm labour is largely supplied by that household. The family and the farm are linked, coevolve and combine economic, environmental, social and cultural functions [7–9].

Considering the size of the farm, the force of its links to the market and its functions for the owners, Klepacki [10] distinguished three groups of farms found in Polish agriculture:

- small farms that are treated by their owners as dwelling places and (or) a capital investment and not as agricultural commodity production entities,
- intensive farms featuring a growing area, developing production through investment and a high level of market integration,
- large area farms distinguished by simplified production on a large scale that can be easily mechanised.

Assuming that identical groups of farms can also be identified in economies of other European countries, a similar classification was used in this work which distinguishes between small farms (subsistence farms), family farms (intensive farms with a medium surface area) and large-scale farms (large area farms) [11,12]. Poczta et al. [7], based on available reference literature, grouped the farms (Table 1) according to the following criteria.

Table 1. Criteria for identifying farms as adopted by different authors and institutions.

Author	Family Farm Identification Criterion
Act on Agricultural System Development. [Dz.U. (Journal of Laws) No. 64, item 592 as amended] [12]	Managed by an individual farmer who is the owner or leaseholder of agricultural real property with a total utilised agricultural area not exceeding 300 hectares, runs the farm in person, and holds agricultural qualifications
Djurfeldt [13]	Link between the farm and the household and family; involvement of family labour in management and in agricultural production
Halamska [14]	Individual farm, predominance of own labour
Kołoszko-Chomentowska, Sieczko [15]	Link between the farm and the household
Lamarche [16]	Fundamental production factors owned by the family
Klepacki et al. [17]; Zegar [18]	Fundamental production factors owned by the family, predominance of own labour, classification: 1. farming as the primary source of income for the family, 2. farming as a supplemental source of income
Małecki-Tepicht [19]	Main source of livelihood for a family, the subject of management is a peasant family
The Mansholt Plan—Farm with a growth potential: Council Directive No 159/72 of 17.04.1972 on the modernisation of farms [20]	Farming (agricultural activity) is the primary (main) source of income, relevant professional qualifications, developing a farm modernisation plan, obligation to keep the accounts of the farm—from the introduction of the farm modernisation plan, farmer's income from farming work should not be lower than that determined by the member states as proper income after the period of modernisation
Michna [21]	farm as a source of labour and income, ability to recover the production potential, extended reproduction and innovation
Tomczak [22]	fundamental production factors owned by the family, link between the farm and the household, size and output sufficient to provide for a family

Source: Research based on Poczta et al. [7] and of selected bibliography.

The present-day European Union (EU) is a group of 27 countries (until 2020 the United Kingdom was one of the 28 member states of the EU) of various surface areas, distinct population and economic potential, and—what is extremely significant in the context of the discussed subject matter—different political and economic history [23–25]. Therefore, each country developed a specific agrarian structure as a result of various natural

conditions (e.g., terrain relief, climate), and economic and political factors. At the same time, it should be noted that this structure has been gradually evolving, but essentially remains considerably inactive and affected by past political decisions. Considering frequent changes of borders in Europe, this also leads to serious internal (regional) differentiation of agrarian structure in many European countries. A rudimentary division exists between the member states of the old and the new EU. Concurrently, differences in agrarian structure and agricultural productivity are not only connected with different economic history after the Second World War but also refer to earlier events. Countries making up the old European Union, situated in the west of Europe (except Greece) were definitely earlier and more deeply affected by the period of 19th and 20th century industrialisation linked to the migration of farmers to other activities (mainly to industry), which generally had a positive effect on both the agrarian structure and efficiency of agriculture "driven" by an influx of capital. In countries of Central and Eastern Europe the industrial revolution took place later and was less intense, which contributed to their decidedly more fragmented agrarian structure [24,26,27], all the more so because the controlling powers in that part of the world (including the Habsburg Monarchy) did not undertake any measures to concentrate production. Reforms in the interwar period were too superficial to bring about radical changes in the state of affairs [14]. In turn, post-war reforms were assumed to constitute the first stage of collectivisation that, in most countries of the Eastern bloc (except Poland and Yugoslavia), was implemented effectively with an impact on the then agrarian structure of many countries, and especially the Czech and Slovak Republics, where state-owned and cooperative farms were transformed into present-day entities with legal identity. In other countries transformations after the collapse of real socialism led to the distribution of most of the area of land to a numerous group of small farms, next to which large area enterprises operate [27]. Currently, the direction in which agricultural structures evolve in respective EU countries is mainly determined by the Common Agricultural Policy (CAP), and to a considerable extent by its national implementations, where the selection of the right instruments depends on the results of all-European compromises and the most important needs of a specific country, which in turn derive from the condition of national economy and the level of social development [24,25,27]. However, it should be mentioned that the impact of the Common Agricultural Policy is relatively short-lasting from a historical perspective. Its implementation has lasted for more than 30 years "only" and is limited exclusively to the founding member of the community. In other countries this period is respectively shorter and has been only 10–15 years for new member states. The contemporary variety of structures, reflected in distinct proportions of respective farm models (family farms, large scale farms and small farms) is a result of specific past events related to politics and economics as well as invariable natural conditions also affecting the image of agriculture in respective countries.

In attempting to evaluate the models of farms at least a number of criteria can be taken into account. These include:

- social aspects related to ensuring food security. The human requirement of food is a primary need that must be satisfied to enable individuals to function and cannot be postponed. Therefore, agriculture should generate product volumes adequate to the size of the population [28–30];
- environmental aspects, including maintenance of the proper quality of agricultural production space, and mainly the quality of soil [31],
- economic aspects linked to a sufficient level of income of agricultural producers to guarantee the profitability of production [27], generating public goods and reducing external costs [18].

The characteristic features of family farms are a strong relationship between the farm and the household, a predominant part of income deriving from agricultural production and the power of a private owner or user to make independent decisions [7,32,33]. These elements are drivers to achieving the best economic results, and simultaneously taking care about the quality of the environment, which results directly from the ownership of

land. Although it is not a necessary condition for a family farm to exist [34], the ownership title to land in use is a factor improving the quality of strategic management of the farm both in the economic and the environmental sense. All those characteristics of family farms suggest compliance with the above-presented assessment criteria. In their activity, despite the dominance of a microeconomic objective, the environmental and social aspect is also important, which testifies to good sustainability of such entities, especially those that are bigger, run by better educated and motivated users paying attention to keeping the negative impact of production on the environment to a minimum [27,31].

Large-scale farming relies on an external, hired workforce with microeconomic objectives predominating. The origin of such entities that emerged in European economies is very different. In the west of Europe, the drive was market forces, and in the east—state politics oriented at collectivisation. However, at present, both operate on similar terms [7]. These entities run production activities on a large scale while keeping the unit costs at a relatively low level. This is possible thanks to using concentrated capital and infrastructure and applying high technologies in manufacturing. This fosters the accomplishment of a social objective to ensure food security, however, often at the expense of microeconomic objectives (mainly due to monoculture cultivation adversely affecting the soil and the landscape, excessive use of chemicals in production, separation of crop production from animal production and, finally, considerable focus on animal production [35]. The main reason behind it can be the separation of the household from the farm. As a result, owners of large-scale farms—that are often corporate in nature—have little motivation to care about soil quality (or, more explicitly, the environment) in order to provide future generations with the necessary skills and tools. In the case of commercial law companies, this phenomenon is enhanced by separating the ownership and managerial functions and often, by the lack of ownership title to land. People working for such entities do not feel obliged to respect the environmental aspects of production either [36].

The third group of entities is small farms. Due to the small scale of their production, they are not capable of fulfilling the basic criterion for assessing the suitability of respective models of farms, namely, the food security criterion. In addition, such farms decrease the global level of food security because they use land ineffectively or do not use it at all. However, the existence of this group of farms is justified or excused. In the absence of off-farm jobs for a marginal workforce in rural areas, small farms are a social "buffer" (speaking about typical social farms). This is not a desired status, but this phenomenon can be deemed the "lesser evil".

Another reason behind the operation of such entities is the form of using the part of land being in their possession. Wealthy people often use land for hobbies and leisure, which is in line with the principle of economic freedom, but this phenomenon should not be analysed in terms of agriculture or economics. The group of small farms also comprises "economic" entities often oriented at deriving benefits from specific forms of taxation and social insurance and grants from the European Union. Small farms are often environmentally unsustainable [31,37]. This is due to the lack of adequate human capital and tangible assets and the absence of motivation to take care about their own skills and tools and meet the regulatory environmental standards. However, certain small farms produce specific, high-quality food. The demand for such food is continuously growing as a result of increasing health awareness and societies becoming wealthy in Europe. Nevertheless, it should be remembered that this refers only to some small entities (of marginal economic significance) that, following the right structural transformations, lose their marginal economic nature.

Thus, it can be concluded that only strong commercial family farms satisfy all the farm model assessment criteria proposed by the authors. This situation to some extent determines the shape of the agricultural policy being implemented. The target European model of agriculture relies on environmentally sustainable and economically effective family holdings, which does not preclude other farming models. Their occurrence stems from past events and the present function: large scale farms supply cheaper raw materials and

social farms (of marginal economic significance) are a certain social "buffer". In addition, studies carried out by Sadowski et al. [26,27] show that next to economic stimuli, factors conducive to concentration include certain regulations, especially those related to the need for investments aligning large scale farms with EU standards in environmental and health protection. They are justified in terms of microeconomics only if the scale of production is sufficiently high, which, as a consequence, leads to a deterioration of the position of family farms. An example can be the recent focus on swine production in most member states of the European Union. Of course, this is contrary to the fundamental assumptions of the European model of agriculture and the common agricultural policy where certain instruments (such as for example premium for young farmers) are especially dedicated to family entities.

The paper aims to verify the hypothesis (1) that the farming model in the European Union (small farms, family farms and large area farms) is determined by the effect of production factors: area (UAA), workforce (AWU) and share in generating national standard output (SO), and that the relationship between production factors has an influence on farm model type. Another hypothesis (2) is that the family farming model is the leading type of agriculture in the European Union.

2. Material and Methods

Farms were delimited using statistical data from Eurostat (http://ec.europa.eu/eurostat, accessed on 15 February 2021) [38,39] supplemented with results from FADN (Farm Accountancy Data Network, http://ec.europa.eu/agriculture/rica/, accessed on 15 February 2021) [39–41] to the extent of determining the level of income from farming. Farms were delimited based on methods developed by Sadowski et al. [27].

Farming models were identified and analysed with reference to economic size classes determined in mass statistics based on standard output (SO). Standard output is a 5-year mean value of specific crop or animal production per 1 ha of crops or per animal in one year under average production conditions in a specific region [41].

The first step of the analyses was to identify the group of family farms. To this end, the results from FADN were used. The farms comprised entities falling into appropriate classes of economic size that met two fundamental criteria:

- own labour of the farming family accounts for more than 50% of labour calculated as AWU (annual work unit). An AWU (annual work unit) is an annual calculation unit for labour, where 1 AWU equals 2120 h worked over the year [41];
- income from farming (calculated according to FADN methodology) per FWU (family work unit) exceeds the minimum net wage in the specific country.

These criteria follow from the adopted assumptions according to which a family farm, thanks to using mainly its own labour, should be the primary source of livelihood, which will ensure an adequate living standard for the farming family. The limit value of standard production, based on which classes of farms are included in this model, is different in respective countries due to different levels of the minimum wage. This assumption is justified by a differentiated level of earnings and prices in respective member states of the European Union which also affects the level of income from farming.

Another step was to identify the group of large-scale farms, also based on data from FADN. This group included entities falling into economic size classes featuring a predominance of hired labour over own labour (family work). At the same time, those were classes with the highest level of standard production, so they were classified as a large-scale farming model.

The last group—small farms (of marginal economic significance)—consists of farms whose income per family work unit was lower than the minimum wage in the specific country. Since FADN was also used to delimit this model, it includes all classes of economic size meeting the above-mentioned criterion for small entities and all classes from Eurostat with an identical or lower economic size. Such a procedure was adopted because FADN is not representative of the whole of agriculture in the specific member state but the field of

observation includes only farms generating in total 90% of the domestic standard output. The Eurostat database is wider in this respect as it refers to all farms, but it does not contain a lot of data used to delimit the respective models. In particular, it lacks information on income and own labour. Due to the incomplete scope of data, the economic results from FADN were used exclusively to delimit respective classes for subsequent models, while such classes were described based on results from Eurostat. In practice, the results from FADN were not inclusive of classes of the smallest economic size that did not contribute to generating 90% of the national SO, and which in this analysis in Eurostat were included in the small farming model together with classes included in FADN where income per capita was lower than the minimum wage.

For the purposes of this article, it was assumed that a criterion for classifying a farm as a family farm is that it relies mainly on family labour, hence, farms where, irrespective of their legal status, the majority of the workforce is not family are deemed large scale farms (farming enterprises).

Following the delimitation of three basic models their characteristic features were described for respective countries, taking into account their number, surface area and share in generating national standard output. The description was based on data sourced from Eurostat.

3. Results

The significance of various types of farms for respective countries can be viewed with reference to two aspects. The first aspect is social significance. This mostly refers to the share of respective types of farms in their total number. The second is the economic aspect, mainly connected with their participation in generating agricultural output, which is substantially determined by the share of land and efficiency of its use. Therefore, it should be assumed that small farms, despite their large number, are of little economic significance and their impact on the development of agriculture and agrarian transformations consisted mainly of their land being taken over by family farms and large-scale farms and their workforce by nonagricultural sectors. They have different social significance since they lack internal homogeneity. The main social function of social farms is to provide employment to a marginal workforce, which—as already mentioned—should be regarded as the lesser evil. This means that when their owners find an off-farm job, the process of taking over the land of small farms should be deemed positive. In the European Union nearly 10.5 million farms are in operation (Table 2).

Table 2. Number of farms by type in the EU.

Subgrouping	Member State	Total Farms (Number)	Which of:		
			Family Farms	Small Farms	Large Scale Commercial Farms
			Total = 100		
UE-13	Bulgaria	202,720	10.9	81	8.2
	Croatia	134,460	8.7	89.6	1.7
	Cyprus	34,940	2.3	97.2	0.5
	Czech Rep.	26,530	48.9	31.7	19.4
	Estonia	16,700	4.8	87.2	8
	Hungary	430,000	34.6	61.4	4
	Latvia	69,930	48.2	48.9	2.9
	Lithuania	150,320	21.8	75.9	2.3
	Malta	9210	7.2	92.7	0.1
	Poland	1,410,700	14.1	85.7	0.2
	Romania	3,422,030	4.9	94.6	0.5
	Slovakia	25,660	0	83.8	16.2
	Slovenia	69,900	2.1	97.8	0.1
	UE-13	6,003,100	10.5	88.2	1.2

Table 2. *Cont.*

Subgrouping	Member State	Total Farms (Number)	Which of:		
			Family Farms	Small Farms	Large Scale Commercial Farms
			Total = 100		
UE-15	Austria	132,500	27.2	72.4	0.4
	Belgium	36,890	54.4	45.6	0
	Denmark	35,050	0	84.3	15.7
	Finland	49,710	16.5	81.7	1.9
	France	456,520	0	95.7	4.3
	Germany	276,120	31.2	61.4	7.4
	Greece	684,950	31.5	67.7	0.8
	Ireland	137,560	19.9	79.5	0.6
	Italy	1,145,710	25.5	73.4	1.1
	Luxembourg	1970	54.8	44.7	0.5
	Netherlands	55,680	42.1	34.7	23.2
	Portugal	258,980	23.5	72.8	3.6
	Spain	945,020	46.1	52.7	1.2
	Sweden	62,940	12.9	83.5	3.5
	United Kingdom	185,060	42.1	51.6	6.3
	UE-15	4,464,660	29	68.5	2.5
UE-28		10,467,760	18.4	79.8	1.8

Source: own calculations based on FADN and Eurostat data.

They use nearly 173 million ha of land and employ more than 9.2 million AWU, at the same time generating standard production of more than EUR 364 billion (Tables 3–5).

Table 3. Utilised agricultural area (UAA) of farms by type in the EU.

Subgrouping	Member State	Total Utilised Agricultural Area (Hectare)	Which of:		
			Family Farms	Small Farms	Large Scale Commercial Farms
			Total = 100		
UE-13	Bulgaria	4,468,500	6.3	4.4	89.3
	Croatia	1,562,980	26.6	30.5	42.9
	Cyprus	111,930	22	67.6	10.4
	Czech Rep.	3,455,410	12.5	1.6	86
	Estonia	995,100	9.8	23.4	66.9
	Hungary	4,670,560	26.8	2.7	70.5
	Latvia	1,930,880	42.7	12.2	45.1
	Lithuania	2,924,600	39.5	19.8	40.7
	Malta	11,120	23.6	75.9	0.5
	Poland	14,405,650	47.6	44.1	8.3
	Romania	12,502,540	14.8	37.9	47.3
	Slovakia	1,889,820	0	7.4	92.6
	Slovenia	488,400	11.7	83.4	4.8
	UE-13	49,417,490	26.8	27.6	45.6

Table 3. *Cont.*

Subgrouping	Member State	Total Utilised Agricultural Area (Hectare)	Which of:		
			Family Farms	Small Farms	Large Scale Commercial Farms
			Total = 100		
UE-15	Austria	2,669,750	53.4	44.1	2.5
	Belgium	1,354,250	81.4	18.6	0
	Denmark	2,614,600	0	47.6	52.4
	Finland	2,233,080	33.8	59.8	6.4
	France	27,814,160	0	90	10
	Germany	16,715,320	41	20.7	38.2
	Greece	4,553,830	46.9	17.9	35.2
	Ireland	4,883,650	43.9	53.5	2.6
	Italy	12,598,160	62.7	25.4	12
	Luxembourg	130,650	87.3	12.7	0
	Netherlands	1,796,260	47.5	12.3	40.2
	Portugal	3,641,690	40.8	15.9	43.3
	Spain	23,229,750	82.7	10.5	6.8
	Sweden	3,012,640	38.2	39.5	22.2
	United Kingdom	16,673,270	51.4	26.9	21.8
	UE-15	123,921,060	43.3	38.8	17.9
UE-28		173,338,550	38.6	35.6	25.8

Source: own calculations based on FADN and Eurostat data.

Table 4. Annual work unit (AWU) of farms by type in the EU.

	Member State	Total Annual Work Unit (AWU)	Which of:		
			Family Farms	Small Farms	Large Scale Commercial Farms
			Total = 100		
UE-13	Bulgaria	255,520	14.1	56.3	29.5
	Croatia	160,460	14.5	78	7.5
	Cyprus	18,740	14.7	78.1	7.2
	Czech Rep.	103,270	18.6	6.9	74.4
	Estonia	19,880	6	45.3	48.6
	Hungary	394,410	40.5	31.2	28.4
	Latvia	76,860	57.1	25.4	17.6
	Lithuania	148,350	26.9	53.8	19.3
	Malta	5340	26.6	71.9	1.5
	Poland	1,649,400	27.5	69.6	2.8
	Romania	1,640,120	14.4	80.8	4.8
	Slovakia	47,190	0	26.6	73.4
	Slovenia	82,390	6	92	2
	UE-13	4,601,930	22.2	67.1	10.7
UE-15	Austria	101,730	:	:	:
	Belgium	55,350	74.8	25.2	0
	Denmark	49,480	0	47.7	52.3
	Finland	81,630	42.8	47.8	9.4
	France	708,170	0	84.9	15.1
	Germany	502,610	37.6	31.7	30.7
	Greece	457,150	59.9	36	4.1
	Ireland	160,740	27.2	71.2	1.6
	Italy	897,090	51.4	35.4	13.3
	Luxembourg	3500	77.4	22.6	0
	Netherlands	147,200	34.1	17	48.9
	Portugal	313,830	31.5	52.4	16.1
	Spain	822,370	62.3	26.5	11.1
	Sweden	55,940	28.8	52.5	18.7
	United Kingdom	284,940	40	28.6	31.4
	UE-15	4,641,730	39.6	42.1	18.3
UE-28		9,243,660	30.9	54.5	14.5

Source: own calculations based on FADN and Eurostat data; not available.

Table 5. Standard output (SO) in farms by type in the EU.

Subgrouping	Member State	Standard Output (Euro)	Which of:		
			Family Farms	Small Farms	Large Scale Commercial Farms
			Total = 100		
UE-13	Bulgaria	3,842,891,030	8.1	8.5	83.4
	Croatia	2,034,939,130	26.9	33.6	39.6
	Cyprus	616,692,170	26.3	32.3	41.4
	Czech Rep.	5,081,940,920	7.7	0.7	91.6
	Estonia	801,547,060	7.2	11.8	81
	Hungary	6,532,474,660	21.9	3	75.1
	Latvia	1,221,341,010	36.6	1.9	61.6
	Lithuania	2,226,207,560	35.5	12.6	52
	Malta	98,016,860	56.2	27.4	16.4
	Poland	25,005,635,420	54.1	27.3	18.6
	Romania	12,105,491,800	21	42.9	36.1
	Slovakia	1,931,433,530	0	5.5	94.5
	Slovenia	1,158,773,470	21.2	68.6	10.2
	UE-13	62,657,384,620	32.7	23.6	43.7
UE-15	Austria	6,141,561,460	69.4	22.6	8
	Belgium	8,037,986,420	92.2	7.8	0
	Denmark	10,062,442,040	0	20.5	79.5
	Finland	3,514,583,720	45.9	29.3	24.8
	France	61,343,138,670	0	73.6	26.4
	Germany	49,249,020,560	40.9	10.9	48.2
	Greece	7,574,803,910	64.2	17	18.8
	Ireland	6,324,900,700	61.4	24.6	14
	Italy	51,689,024,310	52.5	11.1	36.5
	Luxembourg	365,008,400	91.4	8.6	0
	Netherlands	23,087,034,100	28.7	3	68.3
	Portugal	5,144,206,850	30.6	9.5	59.9
	Spain	38,365,605,150	63.3	3.9	32.8
	Sweden	5,158,678,850	35.8	18.5	45.8
	United Kingdom	25,403,447,340	38.3	10.1	51.6
	UE-15	301,461,442,480	37.7	23.3	38.9
UE-28		364,118,827,100	36.9	23.4	39.8

Source: own calculations based on FADN and Eurostat data.

An average farm in the EU has a surface area of 17 ha and engages 0.9 AWU, and 1 AWU corresponds to, on average, 18.8 ha of UAA (Tables 6–8).

Table 6. The average size of farms by type in the EU (ha).

Subgrouping	Member State	The Average Size (ha)	Which of:		
			Family Farms	Small Farms	Large Scale Commercial Farms
			Total = 100		
UE-13	Bulgaria	22	13	1	241
	Croatia	12	35	4	298
	Cyprus	3	30	2	65
	Czech Rep.	130	33	6	578
	Estonia	60	122	16	504
	Hungary	11	8	0	192
	Latvia	28	24	7	432
	Lithuania	19	35	5	343
	Malta	1	4	1	3
	Poland	10	35	5	348
	Romania	4	11	1	354
	Slovakia	74	0	6	422
	Slovenia	7	39	6	338
	UE-13	8	21	3	311

Table 6. *Cont.*

Subgrouping	Member State	The Average Size (ha)	Which of:		
			Family Farms	Small Farms	Large Scale Commercial Farms
			Total = 100		
UE-15	Austria	20	40	12	129
	Belgium	37	55	15	0
	Denmark	75	0	42	248
	Finland	45	92	33	154
	France	61	0	57	143
	Germany	61	80	20	313
	Greece	7	10	2	292
	Ireland	36	78	24	148
	Italy	11	27	4	116
	Luxembourg	66	106	19	0
	Netherlands	32	36	11	56
	Portugal	14	24	3	167
	Spain	25	44	5	143
	Sweden	48	142	23	301
	United Kingdom	90	110	47	310
	UE-15	28	42	16	195
UE-28		17	35	7	240

Source: own calculations based on FADN and Eurostat data.

Table 7. The average labour force on farms by type in the EU (AWU/hold).

Subgrouping	Member State	Total Annual Work Unit (AWU/Hold)	Which of:		
			Family Farms	Small Farms	Large Scale Commercial Farms
			Total = 100		
UE-13	Bulgaria	1.3	1.6	0.9	4.6
	Croatia	1.2	2	1	5.3
	Cyprus	0.5	3.4	0.4	7.6
	Czech Rep.	3.9	1.5	0.8	15
	Estonia	1.2	1.5	0.6	7.3
	Hungary	0.9	1.1	0.5	6.5
	Latvia	1.1	1.3	0.6	6.7
	Lithuania	1	1.2	0.7	8.3
	Malta	0.6	2.2	0.4	4.5
	Poland	1.2	2.3	1	13.6
	Romania	0.5	1.4	0.4	4.7
	Slovakia	1.8	0	0.6	8.3
	Slovenia	1.2	3.3	1.1	23.1
	UE-13	0.8	1.6	0.6	6.8
UE-15	Austria	0.8	:	:	:
	Belgium	1.5	2.1	0.8	0
	Denmark	1.4	0	0.8	4.7
	Finland	1.6	4.3	1	8.2
	France	1.6	0	1.4	5.5
	Germany	1.8	2.2	0.9	7.6
	Greece	0.7	1.3	0.4	3.5
	Ireland	1.2	1.6	1	3
	Italy	0.8	1.6	0.4	9.1
	Luxembourg	1.8	2.5	0.9	0
	Netherlands	2.6	2.1	1.3	5.6
	Portugal	1.2	1.6	0.9	5.4
	Spain	0.9	1.2	0.4	8.3
	Sweden	0.9	2	0.6	4.7
	United Kingdom	1.5	1.5	0.9	7.7
	UE-15	1	1.4	0.6	6.6
UE-28		0.9	1.5	0.6	6.7

Source: own calculations based on FADN and Eurostat data; not available.

Table 8. The relationships between factors of land and labour on farms of different types in the EU (ha/AWU).

Subgrouping	Member State	Total Annual Work Unit (ha/AWU)	Which of:		
			Family Farms	Small Farms	Large Scale Commercial Farms
			Total = 100		
UE-13	Bulgaria	17.5	7.8	1.4	52.9
	Croatia	9.7	17.9	3.8	56
	Cyprus	6	8.9	5.2	8.6
	Czech Rep.	33.5	22.4	7.6	38.6
	Estonia	50.1	81.1	25.8	68.8
	Hungary	11.8	7.8	1	29.5
	Latvia	25.1	18.8	12.1	64.7
	Lithuania	19.7	28.9	7.2	41.6
	Malta	2.1	1.8	2.2	0.7
	Poland	8.7	15.1	5.5	25.6
	Romania	7.6	7.8	3.6	75.6
	Slovakia	40	0	11.1	50.6
	Slovenia	5.9	11.7	5.4	14.6
	UE-13	10.7	13	4.4	46
UE-15	Austria	26.2			
	Belgium	24.5	26.6	18.1	0
	Denmark	52.8	0	52.8	52.9
	Finland	27.4	21.6	34.2	18.7
	France	39.3	0	41.6	26
	Germany	33.3	36.3	21.8	41.4
	Greece	10	7.8	4.9	84.6
	Ireland	30.4	49.1	22.8	49.4
	Italy	14	17.1	10.1	12.7
	Luxembourg	37.3	42.1	21.1	0
	Netherlands	12.2	17	8.8	10
	Portugal	11.6	15	3.5	31.2
	Spain	28.2	37.5	11.2	17.3
	Sweden	53.9	71.5	40.6	64
	United Kingdom	58.5	75.2	55	40.5
	UE-15	26.7	29.2	24.6	29.6
UE-28		18.8	23.4	12.2	36.1

Source: own calculations based on FADN and Eurostat data; not available.

Family farms at all times play an essential role in the agriculture of the European Union since they account for about 18.4% of all farms, use 38.6% of utilised agricultural area (UAA) and absorb 30.9% of labour resources, while generating 36.9% of standard output (Tables 2–5). An average family farm in the EU has a surface area of 35 ha and engages 1.5 AWU, and 1 AWU corresponds to, on average, 23.4 ha of UAA (Tables 6–8). However, a clear difference in their significance can be observed between old and new member states. In EU-15, family farms account for about 29.0%, and in EU-13, 10.5%. In old member states family farms account for 43.3% of UAA and 39.6% of AWU, while in new ones these figures are 26.8% and 22.2%, respectively. However, family entities have a similar share in generating standard output in EU-13 (32.7%) and EU-15 (37.7%). An average family farm in EU-15 has a surface area of about 28 ha and is more than three times bigger than in EU-13. The mean labour force per one family farm in the new EU is about 0.8 AWU, and 1.0 AWU in EU-15, which is directly linked to the size of the farming family being the core labour force in this farming model. In EU-15 the area of land per 1 AWU is 29.2 ha, and in EU-13 it is 13 ha.

In terms of their number, family farms are a predominant model mainly in the Czech Republic (48.9%), Lithuania (48.2%), Luxembourg (54.8%), Belgium (54.4%), Spain (46.1%) and the United Kingdom (42.1%). However, in the Czech Republic these farms use only 12.5% of UAA and employ 18.6% of the workforce, which points to the fact that they are not as significant to agriculture as their number could suggest.

Family farming is predominant as regards the involvement of production factors in Luxembourg (utilised agricultural area (UAA) 87.3%, annual work unit (AWU) 77.4% and standard output (SO) 91.4%), Belgium (UAA 81.4%, AWU 74.8% and SO 92.2%) and in Spain (UAA 82.7%, AWU 62.3% and SO 63.3%). Family farms use more than half of utilised agricultural area in most countries of the old EU (except France, Finland, Germany, Ireland, the Netherlands, Sweden, Portugal, Greece and Denmark) and a little less than half in Poland (47.6%) and Lithuania (42.7%). In those countries family farms also engage the largest share of workforce. This does not apply to Poland, where small farms employ 69.6% of AWU, which results directly from the fragmentation of agricultural land. Family farms have the largest mean surface area in Sweden (142 ha), the United Kingdom (110 ha), Luxembourg (106 ha) and Finland (92 ha). Those countries also feature relatively high labour inputs per farm (from 1.5 to 2.5 AWU) and utilised agricultural area per full-time equivalent (FTE). Family farms in Poland and Lithuania are considerably smaller. Their average size is 35 and 24 ha, respectively, and the mean labour input per farm is 2.3 AWU and 1.3 AWU, respectively. In Estonia and Germany family farming is also highly significant. Although entities classified in this group account for as little as 4.8% and 31.2%, respectively, of all farms in the country, in Germany they engage significantly large workforce and land resources and contribute to generating national agricultural output to a material extent.

The significance of family farms is much smaller in a considerable number of countries that joined the EU during the recent decade. An extreme case here is Slovakia where, according to the adopted methods, the number of family farms is not identifiable. They are not very numerous in Slovenia (2.1%), Cyprus (2.3%), Estonia (4.9%), Romania (4.9%) or Malta (7.2%), either. Slovenian family farms hold 11.7% of land and engage 6.0% of the workforce, but their mean surface area is relatively large, amounting to 39 ha. On the other hand, in Cyprus family farms hold 22% of land and engage 14.7% of the workforce, but their mean surface area is relatively large, amounting to 33 ha. In Cyprus the farms feature a high unit engagement of workforce (3.4 AWU/farm), which can be due to the labour-consuming production of crops (vegetables and fruits). The situation is similar in Slovenia. In Malta family farms use 23.6% of agricultural land and 26.6% of the workforce, but their average surface area is considerably smaller, at 4 ha. In the future an increase in the share of family farms in the agriculture of EU-13 countries should be expected as a result of releasing the resources so far remaining under the control of small farms or family farms that discontinue production. As a result, family farming should gain in importance but the number of entities representing this model will most likely decrease. The problem looks different in Hungary where the significance of family farming is lower than could be inferred from their number. They constitute 1/3 of all farms, holding 26.8% of UAA and engaging 40.5% of the workforce. An average family farm in Hungary has only 8 ha of utilised agricultural area and it is not likely that this surface area can be increased in the future since small farms do not exist there and large-scale farms are the predominant model.

As mentioned before, in most EU countries small farms are of little economic significance. On the other hand, the pivotal issue is the social significance of such entities, mainly due to engagement of the workforce. In the European Union these farms account for 79.8% of all farms, but they control as much as 35.6% of utilised agricultural area and 54.5% of annual work units (Tables 2–4). These farms generate only about 23.4% of standard agricultural output in the European Union (Table 5). An average small farm has a surface area of 7 ha of UAA and employs 0.6 AWU, and 1 AWU corresponds to 12.2 ha of UAA (Tables 6–8). This means that its production potential is not sufficient to employ at least one person, which either leads to pluractivity of farming families or decreases their living

standard extremely. In the countries of EU-13 small farms are more significant than in EU-15. In new member states such farms constitute nearly 88.2% of all farms, holding 27.6% of UAA and engaging as much as 67.1% of AWU and generating 23.6% of SO. An average surface area of a small farm is 3 ha of UAA, and the average input of labour corresponds to 0.6 AWU (4.4 ha per AWU). In the old EU the number of small farms is close to 68.5% of all farms, but they hold 38.8% of UAA and engage 42.1% of AWU. At the same time, these are entities of lesser economic significance since their participation in generating standard output is 23.35%. The average surface area of a small farm in EU-15 is more than five times larger than in EU-13, but the average number of annual work units in a small farm in EU-15 and in EU-13 is identical. As a result, the surface area per full-time equivalent is considerably larger in old member states.

Small farms are the most numerous group of farms in many member states. Their highest share is recorded in Slovenia (97.8%), Cyprus (97.2%), Romania (94.6%) and Malta (92.7%). These entities also correspond to more than 80% of all farms in Croatia, Poland, Slovakia, Estonia and Bulgaria as well as in France, Denmark, Finland and Sweden. They account for more than 70% of farms in Lithuania, Austria, Ireland, Italy and Portugal. However, in Bulgaria and Slovakia the potential significance of such farms to agrarian transformations is low as they cover only 4.4% and 7.4% of utilised agricultural area, respectively. In Bulgaria these farms accumulate more than half of the workforce, and in Slovakia 26.6%. In a number of European countries small entities are also of high economic significance. They use about 92.7% of utilised agricultural area in Malta and more than 97% in Slovenia and Cyprus. In addition, they engage more than 70% of the farming workforce in Slovenia and Malta and 71% in Cyprus, and generate 68.6%, 27.4% and 32.0% of standard output, respectively, in these countries. A big role of small farms in the agriculture of the above-mentioned countries is an important economic and social issue and points to the fact that the agrarian structure does not allow a significant number of entities to achieve parity in income. In Poland, small farms hold 85.7% of UAA, engage 69.6% of AWU, and have an average surface area of 5 ha of UAA. In Romania, these figures are, respectively, 37.9% of UAA, 80.8% of AWU and 1 ha of UAA. Where small farms are highly significant in terms of engaging the workforce, an active structural policy may be required in rural areas to ensure that the workforce from farms of marginal economic importance is transferred to nonfarming sectors and land resources are released for other farming models, including mostly the family farms. Particularly intensive transformations in agrarian structure should be expected mainly in countries that acceded to the European Union in and after 2004. In the old Union small farms usually have little resources, which in itself reduces their role as a potential pool of resources for agrarian transformations. Due to the long-term operation of these farms under CAP the transformations aiming to consolidate agricultural resources have already occurred to a large extent, and the small farms now in operation constitute an additional, attractive activity for the inhabitants of rural areas who derive their income from sources other than agriculture. These transformations are only happening in the countries of EU-13, which results in an improvement of the agrarian structure and an outflow of the workforce to other divisions of the economy. It should be also noted that as a result of variation in wages, an average surface area of a small farm in the old EU is often larger than an average surface area of a family farm in EU-13.

According to the adopted assumptions, large-scale farms are farms where a hired workforce is predominant, and they also have a big surface area. On average, in the EU these entities account for less than 1.8% of farms but generate as much as 39.8% of standard output (Tables 2 and 5). These farms hold 25.8% of land and employ 14.5% of the workforce (Tables 3 and 4). An average surface area of such a farm in the EU is 240 ha of UAA, and its average employment level is 6.7 AWU (Tables 6 and 7). One FTE corresponds to, on average, 36.1 ha of UAA (Table 8). However, large differences can be observed between large scale farms in the old and in the new EU. In EU-15 such farms account for 2.5% of all farms and generate 38.9% of standard output, using 17.9% of UAA and employing 18.3% of AWU. In EU-13 large scale farms account for as little as 1.2% of all farms but produce

43.7% of standard output. However, these farms use more than 45.6% of UAA and engage less than 10.7% of AWU. An average surface area of a large-scale farm in EU-13 is 311 ha and is larger than in EU-15 (195 ha). In new EU member states one farm corresponds to 6.8 AWU (46.0 AWU/ha), whereas in EU-15 this is 6.6 AWU (29.6 ha/AWU). Such a state of affairs is due to the above-mentioned historical factors. Most of the new member states (except Cyprus and Malta) are post-Communist countries where the so-called collective (or socialised) agriculture predominated for nearly half a century. The majority of present-day large-scale farms used to be state-owned or cooperative farms which were transformed due to changes in the political system at the beginning of the 1990s. The market-driven concentration in Western Europe could not lead farms to an average size of concentration motivated by the political decisions in the real socialist countries.

Among EU countries, large scale farms feature the largest share in the total number of farms in the Netherlands (23.2%), Denmark (15.7%), Czech Republic (19.4%) and Slovakia (16.2%). In Slovakia, these farms occupy more than 90% of utilised agricultural area and engage 73.4% of annual work units, at the same time generating 94.5% of standard output. An average surface area of such a farm in Slovakia is 422 ha of UAA, and the average level of employment is 8.3 AWU. One AWU corresponds to 50.6 ha of UAA. A similar situation is observed in the Czech Republic where 86.0% of UAA and 74.4% of AWU are located in the group of large-scale farms generating 91.6% of SO. Concurrently, these are units with a very high labour input per farm—amounting to 15 AWU—and the largest average surface area in the EU—578 ha of UAA. The high significance of such farms in the Czech Republic and Slovakia is a result of the transformation path predominating in those countries after 1990, anticipating a change in the form of management, and at the same time maintaining the ownership status of former collective farms. Among the countries of EU-15, large scale farms are highly significant in the Netherlands, where they hold about 40.2% of land and workforce, and generate 68.3% of standard output. It is similar in Denmark where they have, respectively, about 52.4% of land and 52.3% of workforce at their disposal and generate 79.5% of standard output. A large-scale farm has an average surface area of 56.0 ha in the Netherlands, and 248 ha in Denmark. Farms in the analysed group have a high share in land resources in the following countries: Bulgaria, Estonia, Hungary, Croatia, Lithuania, Latvia, Germany, Greece, Portugal, Sweden and the United Kingdom. They are also among the largest farms in the EU, which is also due to their historical past. Large scale farms account for less than 0.6% of farms in the agriculture of Malta, Poland, Romania, Slovenia, Cyprus, Belgium, Austria, Luxembourg and Ireland. However, in Romania these entities are highly significant because they hold 47.3% of land, engage about 5% of the workforce, and generate 36.1% of standard output. As in most post-Communist countries, they are large units with an average surface area of 354 ha and quite a low unit engagement of workforce (4.7 AWU/farm). In Austria, agricultural land being under the control of such farms accounts for as little as 2.5% of all UAA and their standard output amounts to 8.0%. In Poland, farms from the analysed group occupy 8.3% of utilised agricultural area and absorb 2.8% of annual work units, generating 18.6% of standard output. An average large-scale farm in Poland has a surface area of 348 ha of UAA, and one farm corresponds to 13.6 AWU. It should be mentioned that Poland, as a post-Communist country, is quite peculiar in that respect. In the first place, it is one of the few countries with private ownership of land being predominant in the period of real socialism, and in which, after 1990, the transformation of collective agriculture was not unidirectional, and thus a certain part of land taken over from collective farms was transferred to family farms [27,42].

4. Discussion

Two fundamental treatments of the model of agriculture can be distinguished in the European Union. In the first—broader treatment—the basic determinants constituting the model are related to resources, structure and efficiency. Using this approach, the European

Model of Agriculture (EMA) is equivalent to a model developed on the European continent (except collective—that is socialist—farming).

This model features, among other characteristics:

- relatively favourable natural conditions (small share of land completely unsuitable for agricultural production);
- farm type with limited advancement of concentration processes, multidirectional production, high share of own workforce, and differentiation of the economic activity of farms;
- strong social and cultural links between farms and local communities;
- important place of agriculture in the economic policy of countries in the region (considerable distinctiveness of agricultural policy and its instruments from regulations of other economic sectors) [1].

Apart from the above-described model, a narrower approach can be identified referring to the model of agriculture developed due to the implementation of the Common Agricultural Policy. This is a model of agriculture on the one hand determined by a wide range of regulations and restrictions and, on the other hand, by a rich spectrum of benefits. This is a model of agriculture featuring a market-based mechanism with multiple constraints—agriculture to a large extent isolated from global markets [1].

To sum up, the European model of agriculture, and—technically—the farm model, was shaped by the natural reality and in addition man-made reality created over centuries. The developed model was based on a strong relationship with the economic and natural environment, using own workforce with a relatively limited unit concentration, on the one hand, but on the other hand running modern production without overexploiting natural resources and the environment. The model produces food mostly for local needs, that is, for the inhabitants of the region, in addition gradually increasing its export capacity. The model of agriculture maintains strict quality, environmental and food safety standards. Due to this fact, European consumers receive food of high quality and nutritive value. However, it is not a model that can effectively compete with agriculture based on commercial large-area farms typical of America, Australia, New Zealand and the Republic of South Africa (RSA). Therefore, it requires financial support using public funds, because next to its own economic functions it also fulfils a number of public functions.

According to Ziętara [43], the representative model of Polish agriculture is affected by many factors mainly related to globalisation and European integration. Irrespective of these external factors, a huge role is assigned to permanent concentration processes taking place in the immediate surroundings of agriculture, mainly in trade and agricultural processing enterprises. Such processes lead directly to increasing the production scale of farms and agricultural enterprises. They also necessitate improvement in the quality of agricultural products. Only agricultural production units of adequate scale will be able to meet the requirements of trade and agricultural processing enterprises. Two extreme organisational models of agriculture can be distinguished in our climate zone: the so-called plantation agriculture—characteristic of certain U.S. states, South America and Australia—and the Western European model of agriculture. In the plantation agriculture model, traditional farms—and in particular family farms—gradually disappear. Specialised companies—whose operations cover large areas—deal with production of agricultural commodities. These companies most often have capital links to agricultural processing enterprises. Animal production is carried out using large-scale industrial production methods. This production system most often leads to imposing a large burden on the natural environment. On the other hand, the Western European model of agriculture relies on agricultural farms that are mostly family farms running production on a smaller scale, where more and more attention is drawn to the quality of the natural environment [43].

However, considering the conditions in Poland, it should be assumed that the Western European model of agriculture based on family farms will be predominant in the nearest future. Next to this legal and organisational form other legal forms will also exist, such as limited liability companies, especially in the regions of northern and western Poland,

where state-owned farms dominated until 1990. In the group of family farms—that are and will continue to be a predominant form—increasing polarisation can be observed: on one end, commodity farms tending to increase their surface area and scale of production, and on the other end small area farms (up to 5 ha of UAA) and poor market relations. The number of these groups of farms and their share in the use of land increases at the expense of farms with 5–20 ha of UAA. Commodity farms with a surface area larger than 15 ha now use about 44% of agricultural land and their share in commodity production exceeds 60%. The level of production intensity in this group of farms is high and will continue to increase, imposing a burden on the natural environment. However, these entities will be forced to use production methods friendly to the natural environment. Supposedly, the so-called system of integrated production—employing good agricultural practice—will prevail. The second group of small-area farms is solely or mainly oriented at satisfying their own needs (subsistence farms). These farms mostly run extensive production, which is not equivalent to compliance with good agricultural practice. The majority of subsistence farms have worn out farming equipment, e.g., old sprinklers, at their disposal, and have no manure pads and adequate manure and slurry storage tanks. The polarisation of farms in terms of their surface area will also give rise to problems of social nature, particularly among farmers running 5–20 ha farms. Some of them will join the group of small-area subsistence farms and will not be capable of undertaking additional nonagricultural jobs. In general, it can be concluded that in the nearest foreseeable future a predominant model will be dual agriculture with two coexisting groups of farms: so-called social farms and commodity farms [43].

5. Summary

Generally, the surveys led to the conclusion that the farming model in the European Union—that is, small farms, family farms and large area farms—is determined by the production factors: area (UAA), workforce (AWU) and share in generating national standard output (SO) (hypothesis 1). In addition, the hypothesis (2) that the family farming model is the leading type of agriculture in the European Union was corroborated.

On the other hand, there is an equally numerous group of countries in which large scale agriculture has a large share in and significance to agricultural production and which holds a large share of land. In particular, many large-scale farms are located in EU-13: in the Czech Republic, in Slovakia, Estonia, Bulgaria, and Hungary. On the other hand, in the old EU-15 countries large scale farms are mostly found in France, Denmark and Spain. In these countries, large corporate entities, despite not being very numerous, engage a large part of agricultural resources (mainly land) and generate more than half of standard output.

However, in the scale of the whole EU family farms are the most significant as they engage the largest part of resources in most EU countries. The European model of agriculture assumes a dominant role of economically strong family farms. Surveys show that they have a clear advantage, in particular in terms of the share of the occupied land, absorption of workforce and high participation in generating agricultural output. For each of the above-mentioned measures the respective shares of family farms are relatively or absolutely (more than 50%) the largest, and this refers to both the European Union as a whole and its two subgroups identified here. Nevertheless, considerable differences occur between respective countries and the main borderline passes between EU-13 and EU-15. In some new member states family farming is considered less significant than in Western countries, which is considerably affected by their history and economic situation. On the one hand, the fragmented structure, often originating in the 19th century, increases the significance of small farms, while on the other hand, transformed collective farming has become a significant element of large-scale farming. In an extreme case, such as in Slovakia, family farming as defined by the adopted assumptions is generally nonexistent, and in some other countries (Bulgaria, Cyprus, and Czech Republic) its significance is very low. Thus, it can be noted that in new member states (EU-13) small farms are usually of a social nature, which makes the rural cohesion policy oriented at creating off-farm

jobs especially important. Apart from the reduction of poverty, this can contribute to "releasing" land resources as needed to boost the economic significance of family farms. In the countries of EU-15 small farms and large-scale farms are normally less significant, but in countries featuring a significant role of relatively intensive directions of production (Denmark, France, and Portugal) large scale farming has a high share.

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