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PARITY INCOME AND DEVELOPMENT POSSIBILITIES OF FARMS IN POLAND

Key words: farm income, labour income, types of farming, competitiveness

ABSTRACT. The article presents the importance of farm income, taking the farm's ability to develop into account. It has been demonstrated that achieving farm income at a parity level is insufficient to determine the farm's ability to develop. These requirements are also not met by labour income. What informs about a farm's development ability is the ratio of farm income to conventional costs of own production factors: labour, land and capital in the form of the competitiveness index (*Wk*). Its value from 1 to 1.9 points to a competitive capacity and when it reaches 2 and more, it points to full competitiveness. Based on the data from farms covered by FADN monitoring in 2017, it was found that the farm area specialising in field crops and the cultivation of cereals, oilseeds and protein crops for seeds and being able to compete (to develop) was about 40 ha of utilised agricultural area (UAA), while in the case of fully competitive farms it was 106 ha. The size of farms specialising in vegetable and permanent (fruit-growing) crops and able to compete was 7 and 13 ha of UAA, respectively. The size of dairy farms able to compete was about 25 ha of UAA and 21 cows, while the size of fully competitive farms – 75 ha and 54 cows. The size of pig farms able to compete was about 25 ha of UAA and 26 sows, while the size of fully competitive farms – 40 ha of UAA and 37 sows. The size of "mixed" farms able to compete was 39 ha of UAA and, on average, 4 cows and 7 sows, while the size of fully competitive farms – 79 ha of UAA, 8 cows and 11 sows.

INTRODUCTION

Basic entities responsible for the level of agricultural production, and thus for food security[1] of the country are farms and agricultural enterprises[2]. The fundamental condition for their operation is to achieve positive farm income or profit (in enterprises of legal persons). For this reason, the issue of farm income has been included in the Treaty of Rome of 1957, which adopted the principles of common agricultural policy pursued by countries of the European Economic Community [Majewski, Wąs 2015]. Its objective

[1] Food security. "Refers to a situation where all households have actual access to food necessary for all persons and are not at risk of losing this access" [Mikuła 2012, p. 40]. On the other hand "(…) food safety covers two aspects with its area of interest: a) risks resulting from the presence of so-called foreign substances in food (impurities, residue of pesticides and veterinary medicinal products, radioactive contamination), thus health safety and b) food fraud, including, in particular, food adulteration and its implications i.e. economic food safety [Kowalczyk 2019, p. 17].

[2] According to the scientific discipline – "economics and farm organisation" – two terms are...

was to provide "(…) the appropriate living standard of the rural population, in particular by increasing the individual income of those working in agriculture" [Wąs et al. 2019, p. 4]. The issue of farmer income was reflected in subsequent reforms of the Common Agricultural Policy. It was the result of the correct assumption that conducting agricultural production on farms is not only a "lifestyle" but a professional commercial activity, the basis of which is to achieve income. Existing practice and study results point to differences between the level of income achieved by farmers per FWU and the salary of paid workers in the national economy. Those differences were conditioned historically. Primitive societies, from before the new era until the mid-19th century, were of agricultural nature. Agricultural activity was a way of life [Tomczak 2004]. The lower level of farmer income, regardless of historical conditions, also results from a definitely higher growth rate of labour productivity in non-agricultural sections, caused by technological progress and growing production scale[3]. These processes are illustrated by trends in the evolution of labour costs in the national economy (mainly salaries), prices of inputs purchased by farmers and selling prices of agricultural products, presented in Figure 1.

The level of labour costs in the national economy influences labour costs in agriculture, both paid and unpaid labour, and the evaluation of farmer income. Minimum farm income, satisfactory to farmers, should equal the parity level[4]. In countries with a market economy, including Poland, the following principles exist: the growth rate of labour costs in the national economy (mainly salaries) exceeds prices of agricultural inputs and this exceeds prices of agricultural products sold by farmers.

Over the analysed period – 2006-2018, labour costs in the national economy increased more than six times (6.51), prices of inputs purchased by farmers – more than three times (3.31), while the selling prices of agricultural products – more than twice (2.47). The result of those trends was a decrease in the unit profitability of agricultural production. In this situation, the farmer, wishing to achieve a satisfactory farm income, at least at a parity level, must increase the economic productivity of own labour[5], which entails an increased production scale. The basic method to increase the agricultural production scale is to increase the farm area. It is believed that a factor hindering the increase in farm size is a specific feature of land, i.e. its "non-relocatability". This statement is not right in

[2] cd. ... distinguished: the farm and enterprise. The farm is a set of three production factors: land, labour and capital geared towards the production of agricultural products, while the enterprise is a set of the same production factors geared towards the production of agricultural products for the purpose of their sale. For this reason, so-called individual or family farms conducting commodity production are enterprises whose legal form is an "enterprise of a natural person".

[3] The production scale is determined by the value or volume of production manufactured in an economic entity (enterprise). An increase in the production scale results from processes of concentration processes and production specialisation. These processes result in a reduction in unit production costs.

[4] Farm income is the difference between revenue adjusted for the difference between the inventory and animal herd value and actual costs of running the farm. It is remuneration for the farmer and his family for their work on the farm and for the use of own remaining production factors: land and capital. Parity income is farm income per FWU equivalent to the average net salary in the national economy.

[5] Economic labour productivity – value or volume of production per FWU.

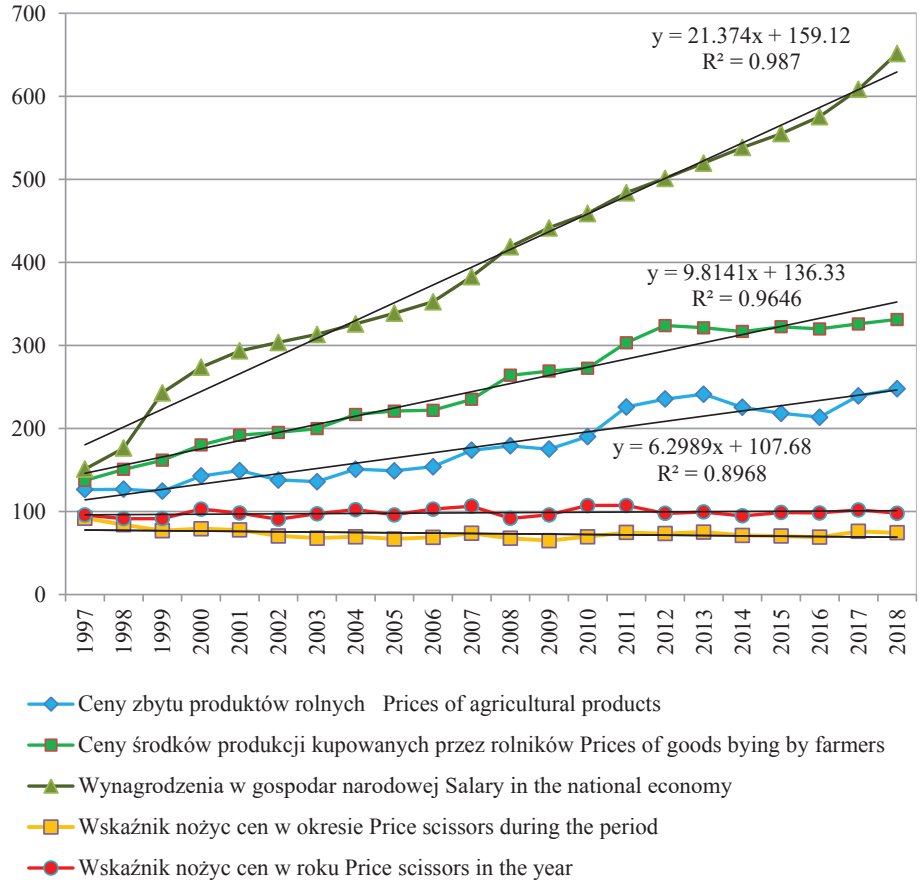

Figure 1. Trends in the evolution of labour costs in the national economy, prices of agricultural inputs and selling prices of agricultural products in the years 1996-2018
Source: [GUS 1998-2019]

organisational and economic terms. The land may change its owner and user (by means of lease). Owing to this, the "flow" of land from one farm to another may take place. However, the social factor is an obstacle. The condition of enlarging farms by some farmers consists of resigning from running farms by others. They will show the willingness to lease or sell their own land, when they have the possibility of achieving labour income in rural areas outside agriculture. The use of this method is, however, conditional upon the level of economic development of the country [Sikorska, 2013], which determines the creation of jobs for farmers resigning from running the farm.

The following question arises: is the fact of achieving farm income at a parity level a sufficient criterion to evaluate farm operation and does it form the basis for its development? Existing experience shows that such an evaluation would be incomplete. Parity income shows that the farmer received remuneration for his and his family's labour input.

In addition to own labour, the farmer also contributes his own land and capital. For this reason, he should also receive decent remuneration. Therefore, to evaluate income from a farmer's own labour, the category of "labour income" is proposed [Wąs et al. 2019]. It is calculated as the difference between farm income and the costs of use of own land and capital per FWU. Without negating the usefulness of this income category, we must state that it is insufficient to evaluate the farm's ability to develop. In this situation, there is a need to analyse the income situation of farms and their development ability depending on their production potential[6] and implemented production types[7].

MATERIAL AND STUDY METHODS

The objective of the study is to determine the level of parity income on farms, taking account of their area and implemented types of production and development ability. The primary source of study materials is the data from farms covered by of Polish FADN monitoring[8] in the years 2008-2017. The adopted study period resulted from the availability of aggregate data taking the types of farming into account[9]. The farms' ability to develop has been determined using the competitiveness index (*Wk*-times), which is a quotient of farm income (*Dzgr*) and the total of approximate costs of the use of own production factors[10]: labour, land and capital and is calculated according to formula (1). The *Wk* classification has been adopted after Werner Kleinhanss, by distinguishing the following classes: *Wk*(-) – in the case of negative Dzgr (*Wk*1), $0 < Wk < 1$ – the partial coverage of costs of own production factors (*Wk*2), $1 = Wk < 2$ – full coverage of costs of own production factors (*Wk*3), $Wk \geq 2$ – two-fold and higher coverage of costs of own production factors (*Wk*4). The *Wk*3 index points to the competitive capacity of farms, while *Wk*4 points to their full competitiveness [Kleinhanss 2015]. This statement is in line with the opinion of Hans C. Binswanger, who claims than an enterprise able to develop should achieve a profit rate twice higher than the loan interest rate [Binswanger 2011].

$$Wk = \frac{Dzgr}{Kwz + Kwp + Kwk} \tag{1}$$

where: *Wk* – competitiveness index, *Dzgr* – farm income, *Kwz* – alternative cost of own land, *Kwp* – alternative cost of own labour, *Kwk* – alternative cost of own capital (exclusive of own land).

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6 The production potential of the farm is determined by resources owned: land, capital and labour.

7 Type of production is determined by the structure of final or commodity production.

8 FADN – the Farm Accountancy Data Network.

9 Types of farming have been determined based on the structure of standard output (SO). They reflect the production orientation of farms. For research purposes, eight basic types of farming (TF8) of farms were identified specialising in: 1) field crops, 2) horticultural crops.

10 The cost of own labour of the farmer and his family has been determined at the level of the cost of paid labour in the same economic size classes. The cost of using own land has been determined at the level of lease rent in given economic size classes. The costs of own capital have been adopted at the level of the interest rate on multiannual government bonds.

PARITY INCOME ON FARMS DEPENDING ON THE AREA AND TYPE OF FARMING

Table 1 presents the figures regarding the area of farms achieving farm income at a parity level and their competitiveness indices in the years 2008, 2012 and 2017 in the selected types of farming. The average area of farms specialising in field crops in those years was about 24.5 ha of UAA. They achieved income at a parity level in 2008 and in the remaining years – at a much higher level. Despite this fact, they had no competitive capacity. Their *Wk* was lower than "1", ranging from 0.70 to 0.98. Similar relations took place on farms specialising in the cultivation of cereals, oilseeds and protein crops for seeds. The area of those farms was similar and the competitiveness index was lower than in the previous type and ranged from 0.68 to 0.80, thus clearly pointing to their inability to develop. Farms specialising in horticultural crops were in a definitely better situation. Farm income per FWU was higher there than the parity level, in 2008 and 2012 – twice and in 2017 - by 25%. Their area was about 2 ha of UAA. It can be presumed that part of the production on those farms was conducted under covers. Farms of that type showed a competitive capacity. The competitiveness index ranged from 1.14 to 1.20. The area of farms specialising in permanent crops was higher than that of horticultural farms and ranged from 7.6 to 14 ha of UAA. In the years 2008 and 2012, they showed no ability to develop, although they achieved an income higher than the parity income. Their competitiveness index was 0.54 and 0.76, respectively. On the other hand, in 2017 it was 1.09, pointing to a low competitive capacity. The area of farms specialising in rearing dairy cattle (dairy cows) in the years 2008 and 2012 was about 25 ha of UAA and those farms kept, on average, 20 dairy cows. They showed no competitive capacity. The competitiveness index was 0.84 and 0.96, respectively. In 2017, the area of a parity farm of this type was lower and stood at 15.7 ha of UAA and such a farm kept about 15 dairy cows. This resulted from higher buying-in prices of milk. In 2017, the buying-in price of milk was PLN 1.39/l and was by 16% higher than in 2012 [Seremak-Bulge, Świetlik 2015, Szajner 2020]. That year, dairy farms showed a low competitive capacity. Their *Wk* was 1.02.

The area of farms specialised in rearing pigs in the analysed years was about 15 ha of UAA and those farms kept about 15 sows. In the years 2008 and 2012, pig farms, despite achieving income at a parity level, did not show the ability to develop. Their competitiveness index was 0.60 and 0.85, respectively. In 2017, the value of the competitiveness index was 1.09, pointing to a weak ability to develop. The last analysed type of farming was "mixed farms". Their area was about 25 ha of UAA and they kept, on average, 3.5 cows and 4.3 sows. Farms of this type, despite achieving parity income, did not show the ability to develop. The competitiveness index ranged from 0.45 to 0.82. In 1996, the average area of individual farms achieving income at a parity level, covered by the farm accountancy system, was about 15 ha of UAA [Ziętara 2003]. These farms may be compared to mixed farms in the years 2008-2017. The average area of farms achieving parity income in the years 1996-2017 increased from 15 to 25 ha of UAA, i.e. by 66.7%. This resulted from a decrease in the unit profitability of agricultural production caused by the growth rate of labour costs and costs of inputs faster than that of selling prices of agricultural products.

Table 1. Parity income and the competitiveness of farms specialising in various types of farming in the years 2008, 2012 and 2017

Types of farming	Indices	Parity income and farm competitiveness		
		2008	2012	2017
Farms specialising in field crops	Income/FWU [thousand PLN]	26.70	42.73	36.37
	Area [ha of UAA]	24.80	24.58	24.70
	Competitiveness index	0.70	0.98	0.85
Farms specialising in the cultivation of cereals, oilseeds and protein crops for seeds	Income/FWU [thousand PLN]	23.36	34.38	31.17
	Area [ha of UAA]	24.89	24.68	24.83
	Competitiveness index	0.68	0.80	0.71
Farms specialising in horticultural (vegetable) crops	Income/FWU [thousand PLN]	50.23	52.44	42.76
	Area [ha of UAA]	1.83	1.96	1.99
	Competitiveness index	1.16	1.20	1.14
Farms specialising in permanent crops	Income/FWU [thousand PLN]	25.56	32.15	45.61
	Area [ha of UAA]	14.07	7.59	13.62
	Competitiveness index	0.54	0.76	1.09
Farms specialising in rearing dairy cattle (dairy cows)	Income/FWU [thousand PLN]	33.30	41.96	41.11
	Area [ha of UAA]	24.76	24.94	15.68
	Number of cows/farm	20.00	19.64	14.95
	Competitiveness index	0.84	0.96	1.02
Farms specialising in rearing pigs	Income/FWU [thousand PLN]	22.86	34.53	44.53
	Area [ha of UAA]	15.30	14.70	15.44
	Number of sows/farm	14.30	11.11	15.21
	Competitiveness index	0.60	0.85	1.09
Mixed farms	Income/FWU [thousand PLN]	20.32	34.64	34.33
	Area [ha of UAA]	24.38	24.21	24.68
	Number of cows/farm	4.49	3.36	2.77
	Number of sows/farm	4.62	3.96	4.25
	Competitiveness index	0.45	0.82	0.80
Parity income	Thousand PLN/FWU	23.63	28.20	34.22

Source: [Goraj et al. 2010, Bocian et al. 2019]

Table 2 presents the figures concerning farm area able to compete and competitive, in accordance with the above-mentioned scale of the competitiveness index. These figures refer to the analysed types of farming of farms in 2017. In that year, the area of farms specialising in field crops and able to compete was 39.21 ha of UAA, with the competitiveness index standing at 1.16, while the area of fully competitive farms of this type was 104.96 ha of UAA, with the competitiveness index of 2.08. The area of farms specialising in the cultivation of cereals, oilseeds and protein crops for seeds was similar in the identified groups of farms and amounted to 39.64 and 100.54 ha of UAA, respectively. Farms specialising in the cultivation of vegetables showed the competitive capacity in two area classes: up to 5 ha and 5-10 ha of UAA. In the former, the average area was 1.99, while in the latter – 7 ha of UAA. The value of competitiveness indices was 1.14 and 1.03, respectively. It should be presumed that, in the former class, the production of vegetables was partially conducted under covers. The area of farms specialising in permanent crops and able to compete was 13.62 and their *Wk* was 1.9. In this type, there were no competitive farms. In the type of farms specialising in rearing dairy cattle and able to compete, the area was 25 ha of UAA and such farms kept 21 dairy cows, with a *Wk* standing at 1.40. The area of fully competitive dairy farms was 75.3 ha of UAA, where about 60 dairy cows were kept and the value of *Wk* was 3.01. The area of farms specialising in rearing pigs and able to compete was 25 ha of UAA, they kept 26 sows and the *Wk* was 1.61. The area of fully competitive pig farms was about 40 ha of UAA, they kept 36.6 sows and the *Wk* amounted to 2.28. The area of mixed farms able to compete was 38.7 ha of UAA, they kept, on average 4 cows and 7 sows, while the area of fully competitive mixed farms was 78.7 ha of UAA, they kept, on average, 8 cows and 11 sows and the *Wk* was 1.92. Despite the value of the *Wk* lower than the limit value, farms in this group may be deemed fully competitive.

Table 2. Area of parity farms, able to compete and competitive

Types of farming of farms	Farms able to compete		Competitive farms	
	area [ha]	*Wk*	area [ha]	*Wk*
Farms specialising in field crops	39.21	1.16	104.96	2.08
Farms specialising in the cultivation of cereals, oilseeds and protein crops for seeds	39.64	0.99	110.54	2.02
Farms specialising in horticultural (vegetable) crops	7.00	1.03	-	-
Farms specialising in permanent crops	13.62	1.09	-	-
Farms specialising in rearing dairy cattle (dairy cows)	25.0/21.0	1.40	75.3/53.7	3.01
Farms specialising in rearing pigs	24.6/26.2	1.61	39.6/36.6	2.28
Mixed farms	38.7/4/6.8	1.20	78.7/8/11.4	1.92

Source: [Goraj et al. 2010, Bocian et al. 2019]

CONCLUSIONS

1. Achieving farm income at a parity level does not guarantee a farm's ability to develop.
2. Possibilities of development are held by farms achieving a farm income not only covering conventional costs of own labour but also costs of own land and capital and in which the competitiveness index exceeds "1".
3. The area of farms specialising in field crops and the cultivation of cereals and oilseeds and able to compete was about 40 ha and of fully competitive farms – about 106 ha of UAA.
4. The area of farms specialising in vegetable crops and able to compete was about 2 ha in the case of crops under covers and about 7 ha for outdoor crops.
5. The size of dairy farms able to compete was about 25 ha of UAA and they kept 21 cows, while the size of fully competitive farms was 75 ha and they kept 54 cows.
6. The size of pig farms able to compete was about 25 ha of UAA and they kept 26 sows, while the size of fully competitive farms was 40 ha and they kept 37 sows.
7. The size of mixed farms able to compete was 39 ha of UAA and they kept, on average, 4 cows and 7 sows, while the size of fully competitive farms was 79 ha and they kept 8 cows and 11 sows.

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DOCHÓD PARYTETOWY A MOŻLIWOŚCI ROZWOJU GOSPODARSTW ROLNICZYCH W POLSCE

Słowa kluczowe: dochód z gospodarstwa, dochód z pracy, typy rolnicze gospodarstw, konkurencyjność

ABSTRAKT

W artykule przedstawiono znaczenie dochodu z gospodarstwa z uwzględnieniem jego zdolności do rozwoju. Wykazano, że uzyskanie dochodu z gospodarstwa na poziomie parytetowym jest niewystarczające do określenia jego zdolności do rozwoju. Tych warunków nie spełnia także dochód z pracy. O zdolnościach rozwojowych gospodarstwa rolnego informuje relacja dochodu z gospodarstwa do umownych kosztów własnych czynników produkcji: pracy, ziemi i kapitału w formie wskaźnika konkurencyjności (*Wk*). Jego wartość w przedziale 1-1,9 wskazuje na zdolności konkurencyjne, a gdy osiąga wartość 2 i większą wskazuje na pełną konkurencyjność. Na podstawie danych z gospodarstw objętych monitoringiem FADN w 2017 roku, stwierdzono, że powierzchnia gospodarstw wyspecjalizowanych w uprawach polowych oraz w uprawie zbóż, oleistych i wysokobiałkowych na nasiona zdolnych do konkurencji (do rozwoju) wynosiła około 40 ha użytków rolnych (UR), natomiast w pełni konkurencyjnych 106 ha UR. Wielkość gospodarstw wyspecjalizowanych w uprawach warzywniczych i trwałych (sadowniczych) zdolnych do konkurencji wynosiła odpowiednio: 7 i 13 ha UR. Wielkość gospodarstw mlecznych zdolnych do konkurencji wynosiła około 25 ha UR i utrzymujących 21 krów, natomiast w pełni konkurencyjnych – 75 ha i utrzymujących 54 krowy. Wielkość gospodarstw trzodowych zdolnych do konkurencji wynosiła około 25 ha UR i utrzymujących 26 loch, natomiast w pełni konkurencyjnych 40 ha UR i utrzymujących 37 loch. Wielkość gospodarstw w typie „mieszane" zdolnych do konkurencji wynosiła 39 ha UR, w których utrzymywano średnio 4 krowy i 7 loch, natomiast w pełni konkurencyjnych 79 ha UR i w których utrzymywano 8 krów i 11 loch.

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