

**ACCUMULATION AND DEPRECIATION
IN THE CASE OF INDIVIDUAL FARMS OF THE POLISH FADN**

MONIKA JUCHNIEWICZ
MARIAN PODSTAWKA

Abstract

The aim of the paper is to identify and evaluate the development opportunities for farms in Poland in terms of area groups. The analysis covered the 2015-2019 period and was based on the results of individual farms keeping agricultural accounts under the Polish FADN. The paper determined the level and rate of accumulation, as well as the level of depreciation, taxes and fees, operating subsidies, and the ratio of operating subsidies to public accumulation and support that the farms receive under the Common Agricultural Policy (CAP).

The results indicate the financial and organizational diversity of the group of farms. Very small, medium-large, large, and very large farms had a positive accumulation rate. In this group of farms, the accumulation in terms of value covered the depreciation, and even in the case of large and very large farms it exceeded the depreciation. By contrast, small and medium-small farms were characterized by negative accumulation rates, which was associated with the lack of reproduction of fixed assets. These farms have no development opportunities.

In conclusion, the ratio of subsidies to public accumulation is the most beneficial in the case of medium-large farms, where the ratio of subsidies to fiscal burden was over 20:1. Very small farms receive the least benefits under the CAP in terms of public accumulation. In this case, the ratio of subsidies to public accumulation is approximately 2:1 throughout the entire research period.

Keywords: depreciation, accumulation, farm.

Kody JEL: Q12, Q14, D25.

Introduction

Currently, Poland is working on the strategic plan for the Common Agricultural Policy (CAP) for 2023-2027. It seems to be a good time to introduce a new strategy for the development of Polish agriculture, and propose funds for its implementation. The new approach to the development of agriculture in Poland should result from the experience gained so far and assumptions for the future. As for the assumptions of the first pillar of the CAP implemented in Polish agriculture so far, they concern the income support for farmers through single payments per hectare and through payments for various types of production and activities related to environmental protection. The policy pursued this way towards Polish agriculture is highly conservative and has not contributed to changes in the agrarian structure. In addition, these changes are not catalyzed by the regulations adopted before 1990 concerning the social insurance system for farmers. It seems that there is no will to take bolder decisions with regard to changes in the existing agricultural policy. However, changes are needed, especially when comparing the competitiveness of our agriculture with the agriculture of France, Germany, Denmark, or the Netherlands. Currently, according to the estimates of the Institute of Agricultural and Food Economics – National Research Institute (IAFE-NRI), there are about 200 thousand farms in Poland which can meet the competition (Ziętara, Adamski, Mirkowska, Sobierajewska, and Zieliński, 2020).

The aim of the study is to determine which area groups include competitive farms. The evaluation is based on consumption and accumulation in respective area groups of individual farms of the Polish FADN.

The following hypotheses were made:

1. Farms capable to develop and compete are those where accumulation is higher than depreciation.
2. Such farms are found among the group of very small farms, of up to 5 ha of utilized agricultural area, and among those of over 50 ha of utilized agricultural area.

Materials and methods

In order to achieve the aims and verify the hypotheses, the results of individual farms keeping agricultural accounting under the Polish FADN from 2015-2019 were used.

The share of consumption in the income structure of the examined farms was evaluated according to the minimum subsistence, calculated for the farmer and farmer's family (Kryszak and Czyżewski, 2020). For comparison, a similar study was made of the share of consumption in the income of farms, determined according to the estimated cost of family labor, taking into account the average annual net salary in the national economy and the number of family work units.

The study assesses farms, dividing them according to classes of utilized agricultural area into six area groups (UAA6): very small ($UAA \leq 5$), small ($5 < UAA \leq 10$), medium-small ($10 < UAA \leq 20$), medium-large ($20 < UAA \leq 30$), large ($30 < UAA \leq 50$), and very large ($UAA > 50$).

In order to achieve the set aim and examine the hypothesis, the level and rate of accumulation, as well as the level of depreciation, taxes and fees, and operational subsidies were characterized, and the ratio of operating subsidies to public accumulation was determined (Kryszak and Czyżewski, 2020). The values of individual parameters are arithmetic means from the sample of analyzed farms.

Consumption was analyzed from the point of view of the consumption rate index, which is the ratio of the estimated consumption value to the income from the family farm. Accumulation was considered through the prism of the accumulation rate index, which is the quotient of the possible accumulation value and the income from the family farm.

The research allowed for the formulation of conclusions and proposals for changes in the agricultural policy.

Consumption and accumulation as determinants of the functioning and development of farms

Nowadays, attention is increasingly being paid to the multi-criteria approach to the goals of a farm (Sielska, 2012), but it is agricultural income that remains a fundamental analytical category in agricultural economics (Kryszak and Czyżewski, 2020), and this income is the means to achieve various goals of a farm.

Consumption and accumulation are derivatives of farm income, and at the same time determinants of the survival and development of a holding. In the short term, they seem to be antonyms, but in the long term, both accumulation and consumption are complementary (Grzelak, 2019).

Accumulation is that part of the farm income which ensures its development in the future. It allows for investment (Woś and Tomczak, eds. 1979) in fixed assets, in new environmentally-friendly technologies, and in the human factor. All this is to ensure that the farm will be able to function and develop in the future. This development is expressed by the growth of competitiveness and increased income, and consequently an increase in consumption.

To sum up, accumulation can guarantee the survival and development of the rural economy. Ultimately, it influences the increase in production, and thus contributes to the increase in consumption, and this in turn determines the conditions for the functioning of the farmer's family (Wiatrak, 1978). The level of consumption also affects the attractiveness of the farming profession and determines whether generational renewal will occur in agriculture or whether the population working on farms will be aging (Podstawka, Chlebicka, Gołasa, and Litwiniuk, 2017).

The study of accumulation and consumption processes on farms is important from the point of view of their further development. An important factor is also the competitiveness of Polish farms compared to others, which ultimately translates into the balance of foreign trade in agricultural products, and the food industry. These phenomena are also important from the point of view of changes in the agrarian structure which should be supported by other measures, including the social and business insurance system.

There was a discussion in the past about whether the fact that farmers spend part of their income on accumulation should be taken into account in determining parity income, or only the part that is intended for consumption. There is no reason to share this point of view. Entrepreneurs who also spend some of their profits on the development and modernization of the company are in a similar situation. Full-time employees are also in a similar situation. They also spend part of their income on accumulation. In this case, it is related to receiving education, improving qualifications, or purchasing means of interpersonal communication.

It is also worth mentioning public social accumulation (Woś and Tomczak, eds., 1979). This is the financial burden borne by farms for the benefit of the whole society. Currently, in terms of social accumulation, farm owners pay agricultural tax, forest tax, real estate tax, VAT, and fees, which have the nature of quasi-fiscal charges due to the equivalence between the amount of the fee paid and the provision of services by a tax-collecting body, such as the state or local government body. Since 2004, farmers in Poland have been receiving a refund of payments for social accumulation in the form of various types of payments under the Common Agricultural Policy. The study evaluates the balance between social accumulation and its return in the form of operating subsidies.

Accumulation and depreciation in the case of individual farms of the Polish FADN from 2015-2019

The information presented indicates that the accumulation rate, determined assuming that consumption is at the level of minimum subsistence, is over 50% in the case of very small, large, and very large farms (Table 1). However, among farms of up to 5 ha of utilized agricultural area, this “developmental” accumulation can be observed in 2015 and 2016. In the following years (2017-2019), it decreased to 33.9%. Nevertheless, in all analyzed years the accumulation rate among very small farms was positive. As regards large and very large farms, the accumulation rate exceeded 50% in all analyzed years. Its systematic growth has been observed over the years.

The presented accumulation rates, determined assuming that consumption is at the level of costs of family labor, are less favorable than the accumulation rates occurring among the examined farms, measured by the minimum subsistence. This is due to the fact that farmers define consumption at a level higher than the minimum subsistence. Accumulation at the level of over 50% of income, in this case, is observed only among very large farms. A slightly lower level of accumulation occurs in the case of large farms. Very small farms are doing quite well in this respect. The situation seems to be the worst among small and medium-small farms, in which there is no accumulation. Its rates are negative. Therefore, consumption on these farms exceeds income and there is no basis for their functioning.

Table 1

Accumulation rate in separate area classes of utilized agricultural area in the case of the examined farms from 2015-2019 (on average per one farm in %)

Year	Very small (UR ≤ 5)	Small (5 < UR ≤ 10)	Medium small (10 < UR ≤ 20)	Medium large (20 < UR ≤ 30)	Large (30 < UR ≤ 50)	Very large (UR > 50)
Accumulation rate measured by the minimum subsistence						
2015	61.0	-47.2	-8.5	31.1	50.6	75.9
2016	49.9	-45.9	-3.3	37.2	56.2	76.9
2017	41.9	-51.0	14.7	47.6	65.1	81.3
2018	33.9	-79.0	-1.4	43.0	59.3	78.8
2019	42.1	-37.9	6.7	45.4	63.4	80.0
Average level during the period considered	47.5	-51.1	2.5	41.5	59.6	78.8
Accumulation rate measured at the cost of family labor						
2015	45.2	-83.8	-51.4	-1.4	26.0	61.2
2016	28.2	-88.5	-46.1	6.7	32.7	62.7
2017	17.3	-98.1	-21.6	21.7	46.6	69.7
2018	4.2	-145.5	-48.8	11.2	36.1	64.8
2019	14.1	-93.6	-39.9	13.0	40.9	66.0
Average level during the period considered	24.5	-101.0	-40.5	11.1	37.4	65.2

Source: own study based on data from FADN.

Table 2

Depreciation in separate area classes of utilized agricultural area from 2015-2019 (on average per one farm in PLN)

Year	Very small (UR ≤ 5)	Small (5 < UR ≤ 10)	Medium small (10 < UR ≤ 20)	Medium large (20 < UR ≤ 30)	Large (30 < UR ≤ 50)	Very large (UR > 50)
2015	34,691	15,671	19,784	28,332	41,295	76,726
2016	33,540	16,811	19,959	28,381	41,669	76,392
2017	30,337	17,330	20,496	28,239	40,810	75,025
2018	27,041	16,072	20,093	28,574	40,550	74,695
2019	25,942	15,368	20,037	28,718	40,910	74,556
Average level during the period considered	30,339	16,220	20,075	28,445	41,053	75,504

Source: own study based on data from FADN.

Table 3

Accumulation level measured by the minimum subsistence in separate area classes of utilized agricultural area from 2015-2019 (on average per one farm in PLN)

Year	Very small (UR ≤ 5)	Small (5 < UR ≤ 10)	Medium small (10 < UR ≤ 20)	Medium large (20 < UR ≤ 30)	Large (30 < UR ≤ 50)	Very large (UR > 50)
2015	57,973	-11,969	-2,992	17,725	41,158	126,662
2016	37,222	-11,901	-1,230	23,447	52,109	136,125
2017	27,372	-13,071	6,823	36,964	77,581	183,316
2018	19,849	-17,486	-551	30,920	62,125	160,123
2019	29,325	-11,228	2,922	35,138	75,199	176,699
Average level during the period considered	34,690	-13,163	1,025	28,797	61,481	156,073

Source: own study based on data from FADN.

The evaluation of the development opportunities of farms according to the accumulation rate is an indirect measure. It is important to establish its amount and link them to the depreciation amounts. Farms which are able to reproduce the used fixed assets through accumulation have a chance to continue existing, whereas all farms which accumulate more than their depreciation are able to develop (Tables 2 and 3).

In the light of the data in Tables 2 and 3, it is visible that in the group of very small farms (up to 5 ha of UAA) accumulation almost balances depreciation. Only in 2017 and 2018, accumulation is lower than depreciation. This group of farms has a chance to continue functioning. However, there are no possibilities for their development. On average, accumulation is slightly higher than depreciation in this group of farms. When it comes to small and medium-small farms (from 5 ha to 20 ha of UAA), there is no possibility of their survival and development. In almost all of the analyzed years, the accumulation rates observed are negative, which proves that it is not possible to reproduce used fixed assets subject to depreciation. The most favorable situation is observed among medium-large (20-30 ha of UAA), large (30-50 ha of UAA), and very large farms (over 50 ha of UAA). In the case of these farms, the accumulation rates are positive, which translates into positive amounts. They exceed the depreciation amounts significantly. The situation in the case of very large farms is definitely the best in this respect. Accumulation on these farms in all analyzed years is almost twice as high as depreciation. This guarantees the dynamic development of these farms, which have a chance to compete on the European market. In the case of large farms, there is also an advantage of accumulation over depreciation. However, these advantages are not as significant as in the case of very large farms. With regard to medium-large farms, accumulation balances depreciation. Thus, they are similar in this respect to very small farms. This guarantees the existence of these farms. However, there are no development prospects.

**Operating subsidies and public accumulation
in the case of individual farms of the Polish FADN
from 2015-2019**

Apart from operating accumulation, farms transfer public accumulation as a contribution to public finances. This part of the study evaluates this accumulation in relation to payments received under the CAP. Information on public accumulation is presented in Table 4.

Table 4

*Taxes and fees in separate area classes of utilized agricultural area from 2015-2019
(on average per one farm in PLN)*

Year	Very small (UR ≤ 5)	Small (5 < UR ≤ 10)	Medium small (10 < UR ≤ 20)	Medium large (20 < UR ≤ 30)	Large (30 < UR ≤ 50)	Very large (UR > 50)
2015	1,902	847	1,242	1,757	2,615	6,839
2016	2,127	824	1,210	1,712	2,499	6,453
2017	1,646	775	1,163	1,667	2,453	6,154
2018	1,300	749	1,139	1,690	2,434	6,156
2019	1,498	741	1,166	1,743	2,555	6,383
Average level during the period considered	1,697	785	1,184	1,713	2,511	6,401

Source: own study based on data from FADN.

The information presented in Table 4 indicates that the level of public accumulation is the highest among very large and large farms. This is probably due to the amount of agricultural tax, which is derived from the area and the equivalent of 2.5 quintal of rye. Small farms are relatively the least burdened with public accumulation. It is worth emphasizing that very small farms are relatively burdened with high public accumulation which is probably caused by a large quantity of assets subject to real estate taxes and vehicle taxes.

The data in Table 5 indicate that very large farms benefit from public aid to the greatest extent. This is a result of the rules for calculating payments, especially direct ones, which are correlated with the area. Medium-large and large farms use this aid to a much smaller extent. Medium-small farms receive average level of aid, and small farms even less. Very small farms are the least supported.

Table 5

Operating subsidies in separate area classes of utilized agricultural area from 2015-2019 (on average per one farm in PLN)

Year	Very small (UR ≤ 5)	Small (5 < UR ≤ 10)	Medium small (10 < UR ≤ 20)	Medium large (20 < UR ≤ 30)	Large (30 < UR ≤ 50)	Very large (UR > 50)
2015	3,149	10,836	22,117	35,796	49,983	99,151
2016	3,869	11,178	23,017	37,555	54,321	107,520
2017	3,270	11,727	23,377	38,042	55,463	110,539
2018	3,940	11,875	24,544	40,882	58,239	117,570
2019	4,037	12,146	24,669	41,114	59,349	119,195
Average level during the period considered	3,654	11,575	23,558	38,649	55,401	110,587

Source: own study based on data from FADN.

Table 6

The ratio of operating subsidies to public accumulation in separate area classes of utilized agricultural area from 2015-2019 (on average per one farm in PLN)

Year	Very small (UR ≤ 5)	Small (5 < UR ≤ 10)	Medium small (10 < UR ≤ 20)	Medium large (20 < UR ≤ 30)	Large (30 < UR ≤ 50)	Very large (UR > 50)
2015	1.65	12.79	17.81	20.37	19.11	14.50
2016	1.82	13.57	19.02	21.94	21.74	16.66
2017	1.99	15.13	20.10	32.71	22.61	17.96
2018	3.03	15.85	21.55	35.89	23.93	19.10
2019	2.69	16.39	21.16	23.59	23.23	18.67
Average level during the period considered	2.15	14.75	19.90	22.56	22.06	17.28

Source: own calculations based on data from FADN.

The data demonstrated in Table 6 show individual area groups of farms in the light of the national policy and the CAP. A considerable diversity can be observed, even though the principles of subsidies and fiscal burden are the same for all farms. The ratio of subsidies to public accumulation is the most favorable among medium-large farms. On average, here the subsidies are almost 23 times higher than the fiscal burden. The data indicate that over the years this indicator has risen in all area groups. Large and medium-small farms derive similar, although slightly smaller, benefits from the CAP in relation to the fiscal burden. In this case, on average for the analyzed years, the ratio of subsidies to public accumulation ranges from almost 20:1 in the group of medium-small farms to over 22:1 in the case of large farms. Table 6 shows that very large farms are not particularly rewarded by the national policy and the CAP. In this case, the ratio of subsidies to fiscal burden is over 17:1 during the five years considered.

The situation is definitely the worst in this respect among very small farms. Here, the ratio of subsidies to fiscal burden, the average for the period of 5 years considered, is over 2:1. The results presented in Table 6 may be helpful in shaping the CAP Strategic Plan for 2023-2027. It seems that it would be right to provide relatively more support to both very small and very large farms.

Conclusions

The research indicates the financial and organizational diversity of the farms under the Polish FADN. There is a clear bipolarity when it comes to the area groups. On one hand, there are very small farms (up to 5 ha of UAA) and medium-large farms (20-30 ha of UAA), as well as large farms and very large farms (over 30 ha of UAA). On the other hand, there are small farms (5-10 ha of UAA) and medium-small farms (10-20 ha of UAA). Among the farms of the first group, positive accumulation rates can be observed, measured as the difference between their income and consumption. At the same time, positive accumulation rates occur regardless of whether the consumption was measured according to the minimum subsistence or work input. However, farmers declare consumption according to their work, at a higher level than the estimated consumption according to the minimum subsistence. Thus, the level of accumulation taking into account consumption according to work input is lower. It seems that a more objective measure of consumption is its assessment according to the minimum subsistence. Small and medium-small farms had negative accumulation rates, no matter what method of measuring consumption was used. These farms have no chance of survival, let alone development.

The paper evaluates the levels of depreciation and accumulation amounts among the examined farms. The research indicates that among small farms accumulation almost balances depreciation. This group has a chance to continue functioning. When it comes to small and medium-small farms, they have no chance of survival and development. Negative accumulation rates can be observed here in all the analyzed years. The situation is the most favorable among medium-large, large, and very large farms. In this group of farms, accumulation exceeds depreciation. These farms have a chance to develop and compete on the European market.

The paper also determines the ratio of public accumulation to EU support in individual area groups of farms, resulting from the CAP. It turns out that the ratio of subsidies to public accumulation is the most favorable among medium-large farms (20-30 ha of UAA). On average, the ratio of subsidies to fiscal burden is over 20:1 here. Smaller benefits from the CAP in relation to public accumulation are derived by large farms (30-50 ha of UAA) and medium-small farms (20-30 ha of UAA). In this case, the ratio of subsidies to public accumulation is approximately 20:1. Very large farms (over 50 ha of UAA) are not particularly rewarded by national and EU policies, as here the ratio of subsidies to fiscal burden is over 17:1. The situation is definitely the worst in this respect among very small farms. Their ratio of subsidies to fiscal burden is approximately 2:1 throughout the entire research period.

References

- Grzelak, A. (2019). Akumulacja majątku w gospodarstwach rolnych w Polsce ze względu na typy produkcyjne i kontekst paradygmatu rozwoju zrównoważonego. *Zagadnienia Ekonomiki Rolnej / Problems of Agricultural Economics*, No. 3(360), pp. 89-106.
- Kryszak, Ł., Czyżewski, B. (2020). *Determinanty dochodów rolniczych*. Warszawa: CeDeWu.
- Podstawka, M., Chlebicka, A., Gołasa, P., Litwiniuk, P. (2017). *Dochody gospodarstw rolnych*. Warszawa: Wydawnictwo SGGW.
- Sielska, A. (2012). *Decyzje producentów rolnych w ujęciu wielokryterialnym: zarys problemu*. Warszawa: IERiGŻ-PIB.
- Wiatrak, A.P. (1978). Czynniki kształtujące akumulację i jej współzależność ze spożyciem w gospodarstwach chłopskich. *Wieś i Rolnictwo*, No. 4(21).
- Woś, A., Tomczak, F. (eds.). (1979). *Ekonomika rolnictwa. Zarys teorii*. Warszawa: PWRiL.
- Ziętara, W., Adamski, M., Mirkowska, Z., Sobierajewska, J., Zieliński, M. (2020). *Konkurencyjność polskich gospodarstw rolnych na tle gospodarstw wybranych krajów Unii Europejskiej*. Paper delivered at the scientific seminar at the IAFE-NRI on 23 September 2020. Retrieved from: www.ierigz.waw.pl.

AKUMULACJA I AMORTYZACJA W INDYWIDUALNYCH GOSPODARSTWACH ROLNYCH POLSKIEGO FADN

Abstrakt

Celem artykułu jest rozpoznanie i ocena zdolności rozwojowych gospodarstw rolnych w Polsce ze względu na grupy obszarowe. Zakres czasowy analiz odnosi się do okresu 2015-2019 i opiera na wynikach indywidualnych gospodarstw rolnych prowadzących rachunkowość rolną w ramach Polskiego FADN. Scharakteryzowano poziom i stopę akumulacji, jak również poziom amortyzacji, podatków i opłat, dopłat do działalności operacyjnej oraz określono relację dopłat do działalności operacyjnej względem akumulacji publicznej i wsparcia, które otrzymują badane gospodarstwa w ramach wspólnej polityki rolnej (WPR).

Wyniki badań wskazują na różnorodność finansowo-organizacyjną ocenianej grupy gospodarstw rolnych. W gospodarstwach bardzo małych, średnio dużych, dużych i bardzo dużych wystąpiła dodatnia stopa akumulacji. W grupie tych gospodarstw akumulacja w ujęciu wartościowym pokrywa amortyzację, a nawet w przypadku gospodarstw dużych i bardzo dużych przekracza wartość odpisów amortyzacyjnych. Natomiast gospodarstwa małe i średnio małe charakteryzowały się ujemnymi stopami akumulacji, co wiąże się z brakiem reprodukcji majątku trwałego. Gospodarstwa te nie mają szans rozwoju.

W konkluzji stwierdzono, że relacja dopłat do akumulacji publicznej jest najkorzystniejsza wśród gospodarstw średnio dużych, gdzie relacja dopłat do obciążeń fiskalnych wyniosła ponad 20-krotność. Najmniejsze korzyści z WPR względem akumulacji publicznej odnoszą gospodarstwa bardzo małe, tu relacje dopłat do akumulacji publicznej wynosi około dwukrotność w całym okresie badań.

Słowa kluczowe: amortyzacja, akumulacja, gospodarstwo rolne.

Submission date: 01.03.2021.

Final review date: 12.03.2021.

Acceptance date: 26.03.2021.

Unless stated otherwise all the materials on the website are available under the Creative Commons Attribution 4.0 International license.

Some rights reserved to the Institute of Agricultural and Food Economics – National Research Institute.

