Examination of the profitability of poultry farms

Baromfitelepek jövedelmezőségének vizsgálata

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Abstract: Based on the data of the Test Plant System (FADN) operated by the Agricultural Economics Research Institute (hereinafter AKI), the authors examined the economic, profitability and liquidity situation of poultry farms. Period under review: 2010-2020. The income statement and profitability indicators of individual and corporate farms were examined separately. We have made a comparison of farms by size and evaluated the basic data of poultry holdings in a common table. Based on the results, it can be concluded that poultry farmers in Hungary are typically individual farms, however, the production value achieved on social farms was much more favourable. Based on a comparison of farm sizes, it can be said that the variability of the profitability indicators coincided over the period under review. For large and medium-sized farms, there was no significant differentiation between the values. While we have also seen significant volume differences in terms of liquidity, collateral, and labour income ratios for small economies.

Keywords: income, liquidity, subsidies

Összefoglalás: A tanulmányban az Agrárgazdasági Kutató Intézet (továbbiakban AKI) által működtetett Tesztüzemi rendszer (FADN) adatai alapján a baromfitartó gazdaságok gazdaságossági, jövedelmezőségi, likviditási helyzetének vizsgálatát végeztük el. A vizsgált időszak: 2010-2020. Az egyéni és társas gazdaságok eredménykimutatását és a jövedelmezőségi mutatókat külön-külön vizsgáltuk. Elvégeztük a gazdaságok méret szerinti összehasonlítását, a baromfitartó gazdaságok alapadatait pedig közös táblázatban szerepeltetve értékeltünk. Az eredmények alapján megállapítható, hogy hazánkban a baromfitartók jellemzően egyéni gazdaságok, azonban a társas gazdaságokban elért termelési érték jóval kedvezőbben alakult. A gazdaság méretek összehasonlítása alapján elmondható, hogy a jövedelemezőségi mutatók változékonysága a vizsgált időintervallumban egybe esett. A nagy és közepes méretű gazdaságok esetében az értékek között jelentős differenciáltság nem mutatkozott. Míg a kicsi gazdaságok tekintetében likviditási, fedezettségi és munkajövedelmezőségi mutató tekintetében is jelentősebb volumenbeli eltérést tapasztaltunk.

*Kulcsszavak*: jövedelemezőség, likviditás, támogatások

1. Introduction

Looking at the last decade, the profitability of poultry farmers is low, reaching only about 59% of crop producers' profits, but can still be considered more stable. After all, poultry farmers are best placed to adapt to extremely rapidly changing market conditions. As a result, the number of farms has not changed significantly (Bakota, 2019).

Internationally, more developed countries typically have industrial economies, covering the entire production process with the help of vertical integration.

Poultry production in EU countries is significantly affected by high production costs, due to the regulatory and animal welfare system established within the Member States (Csorbai, 2019).

Changes in the price of energy used in the sector showed a similar trend, with electricity prices increasing by 22%, natural gas by 99% and diesel by 50%. Acquisition prices also increased (Figure 1), but the growth trend in production costs was higher and therefore did not cover them. As the buying-in prices did not offset the increase in energy and feed costs, the profitability of the sector deteriorated. Due to the increase in consumer prices, domestic consumption decreased and sales in the grey and black economy increased, the proportion of which the Poultry Product Council estimates has increased from 15-25% to 35% within the sector.
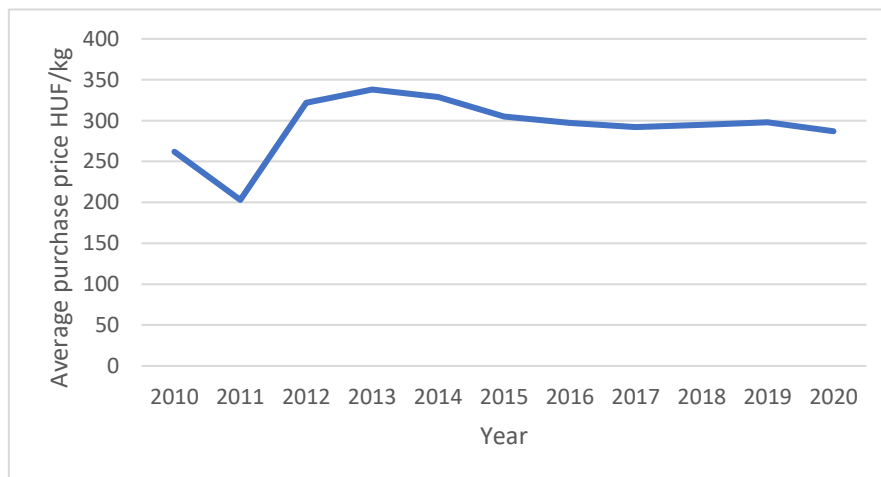
Figure 1. *Evolution of the purchase price of slaughter poultry 2010-2020.*
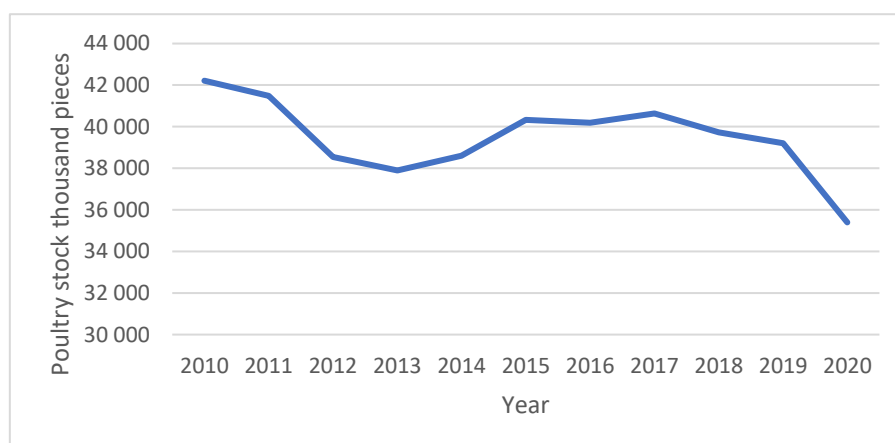
Source: KSH

Looking at direct aid for different types of economies, it can be said that their development is favourable, although there are significant differences (Table 1). In the case of poultry and dairy farms, it has a value of more than 50% of the gross farm income. In the case of pig farmers, this is less than 50%. Which is due to the specificity of the area payment system. In the case of cattle and sheep farmers, only the aid covered the income. This clearly shows the more favourable situation of poultry farmers (AKI, 2020).

Table 1. Share of gross operating income and grants in 2020

Type of economy	Operating Gross income thousand HUF/farm	Direct subsidies thousands of HUF/farm	Share of direct grants and gross operating income %
Poultry farmers	19907	10833	54
Pig farmers	25941	10312	40
Beef and sheep farmers	8675	10974	127
Dairy farms	36390	19918	55

Source: AKI Test Plant Information System Results 2020

Hungary's poultry population has been over 30,000,000 since 2014. (Figure 2) The laying flock is above 10,000,000 with smaller and larger fluctuations. Poultry stocks change rapidly during the year due to their short life cycle, producers have learned to adapt to market changes, and the size of the stock does not reliably reflect the development of annual production. The performance of slaughterhouses will also increase dynamically in 2012-2016. increased by 130 thousand tons, compared to the number of other slaughter animals, it can be considered an outstanding increase (Juhász et al., 2017). Similar growth is predicted in the coming years due to changing eating habits. In terms of consumption, it is projected to overtake pork by 2020 and to lead the world in meat consumption, which already happened in 2016 based on FAO data (Gergely, 2019).

Figure 2. Poultry stock in Hungary 2010-2020

Source: KSH

The central problem of the Hungarian poultry sector is the deterioration of international competitiveness, which leads to sectoral market losses and, through this, the cessation of uncompetitive enterprises (Bakota, 2019).

2. Materials and Methods

In our studies, we used the data of the AKI Test Plant System (FADN). The database shows data from more than 1,900 test farms, representing 107,000 farmers with a Standard Production Value more than € 4,000. The examined period is 2010-2020. The database available to us did not contain the test farm data for 2019, so we were unable to perform their analysis. Our aim was to examine the profitability and liquidity indicators of poultry farms. We used two approaches in terms of farm type and farm size to highlight the data highlighting the significant differences. During our analyses, we used the results statement and economic data collected in the test farm system, and we examined the publications prepared by AKI. We organized our data using Microsoft Office Excel and performed analyses.

Indicators used:

Production-value proportional income = Profit before tax/production value*100
Total capital profitability= Profit before tax + interest paid/Liabilities * 100
Return on equity=Profit before tax/ Equity *100
Work-profitability = Profit before tax + personal income/ Annual labour unit (AWU = unit of work output, annual working time of 1 person in full-time employment, expressed in hours worked. 1 YEAR = 2200 hours of work. number of other payments.
Cash flow= After-tax profit+ Depreciation
Investments coverage= After-tax profit+ Depreciation/ Gross investment*100
Liquidity ratio= Current assets/ Short-term liabilities
Liquidity Quick Rate= Current Assets Inventories/ Short-term Liabilities
Equity ratio= Equity/Resources*100
Capital supply= Equity/ Fixed assets*100
Dynamic indebtedness ratio= Net liabilities/ Cash flow. Net liabilities are the amount of liabilities less the number of receivables, securities, and funds.
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3. Results

Table 2. Evolution of the number of poultry farms in the test farm system 2010-2020 Source: AKI

Individual farms										
Pointer	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2020**
Number of farms in the sample, pcs	70	72	108	112	106	114	106	106	101	104
Number of farms in the observed population, pcs	6841	6843	6843	6186	5821	6793	5415	5415	5415	1924
Standard production value,1000 HUF/farms	12915.6	11948.9	8501.7	9572.6	10592.9	9055.9	13785.7	13785.7	12967.01	26887.05
Corporate farms										
Pointer	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2020**
Number of farms in the sample, pcs	48	43	44	49	51	46	52	52	46	58
Number of farms in the observed population, pcs	402	402	402	333	320	343	442	442	442	350
Standard production value 1000 HUF/farms	358485	248645.2	314950.6	486306.9	355280.2	365332.2	219690.8	228559.6	267577.9	548719.4

The listed indicators were not recalculated, we worked with the values specified by AKI. The basic data of the test operational information system are presented in Table 2. The number of individual farms increased steadily until 2012. Then it decreased in 2013-14, the growth in 2015 will almost reach the level of 2012, then by 2016-17 we will see a large decrease again. A similar trend can be observed in the case of corporate farms, but in terms of this type of economy, the increase in 2016-17 exceeded the value in 2012. However, in terms of the number of farms, the number of corporate farms lagged significantly behind that of individual farms, and between 2010 and 2012 their number barely exceeded 400. In terms of STÉ, the periods of 2010-11 and 2016-17 can be said to be favourable for individual farms, when they significantly exceeded the value of HUF 10,000 thousand / farm.

In the case of corporate farms there are some overlaps with individual farms, here the favourable periods (with STÉ over HUF 350,000 thousand) are 2010,2013-2015, however, the last two years of the examined period showed a serious decline in the case of these farms. The difference in magnitude between the data for 2018 and 2020 also results from a methodological shift. In 2018, the average size of agricultural land used by individual farms is 3.29 ha / farm, and the size of the poultry population is 8.63 animals / farm. In the case of corporate farms 13.8 ha / farm and 180 livestock / farm. In 2020, the same data for individual farms: 6.83 ha / farm and 18.55 livestock / farm; and in the case of corporate farms 11.02 ha / farm and 355.69 livestock / farm. it is therefore clear that the number of animals has doubled for both forms of company.

Table 3. Development of profitability indicators for individual holdings 2010-2020

Source: AKI

Pointer	2010	2011	2012	2013	2014	2015	2016	2017	2018	2020
Profitability in proportion to production value, %	3.15	5.33	11.6	8.21	10.57	14.08	14.81	14.81	14.13	7.93
Profitability of total capital, %	4.17	7.92	15.08	9.66	12.9	16.09	15.39	15.39	14.62	6.89
Return on equity, %	5.14	11.8	20.07	12.82	16.68	19.64	18.92	18.92	18.16	8.96
Work-profitability, tFT/ AWU	1070.1	1475	2706.2	1864.7	2509	3064.3	4248.9	4249.8	4236	4606.09
Cash flow, tFT/farm	979.4	152.7	613.4	464.4	985.8	1160.6	3622.4	3623.2	3547.04	4798.17
Investment coverage %	86.2	12.1	150.2	45.1	120.4	106	232.4	232.4	263.83	60.98
Liquidity quick rate	1.68	1.14	1.26	1.19	1.6	1.73	3.85	3.85	4.63	3.34
Liquidity ratio	2.08	1.53	1.59	1.62	2.22	2.47	5.09	5.09	5.68	4.03
Equity ratio, %	69.36	63.64	73.82	71.54	75.68	80.49	80.8	80.8	79.93	74.78
Capital supply, %	111.38	109.67	111.69	104.31	118.95	119.31	119.72	119.73	127.99	110.05
Dynamic indebtedness index, year	0.02	4.81	-0.12	1.4	-0.28	-0.36	-0.28	-0.28	-0.7	-0.14

We started our studies by analysing individual farms. During the period under review, the farms produced positive results every year. Profitability as a proportion of production value enjoys continuous and dynamic growth rates (30.2%) over the period under review until 2018, after which we can see a drastic decrease in 2020. In the case of the profitability of total capital, we were able to observe continuously alternating values, the highest value was reached in 2015 by 16,09 %, followed by stagnation and decrease. The profitability of equity showed significant variability over the period under review, its maximum was registered by 20.07% in 2012. It also recorded its lowest figure in 2010 at 5.14%. In terms of work-related productivity, we have seen a steady increase in work profits. Looking at the values of cash flow, it fell drastically from 2010 to 2011 (HUF 152.76 thousand /farm), then, apart from 2014, it showed a significant increase and in 2020 the maximum value of the period was registered with a value of HUF 4798.17 thousand/farm. We used the two indicators to examine liquidity, we got lower differentiation values in the analysis of the rapid rate, while at the general liquidity rate there were also very differences in volume and dispersion. In the last two years of the study period, both values were reduced. When examining the share of equity, we can see that it continued to increase until 2017, followed by a continuous decrease until 2020. In the case of capital supply, only values above 100% were recorded in the AKI database, which can be considered favourable. In terms of dynamic indebtedness, its highest value was registered in 2011 (4.8 years) and the lowest value in 2015 (-0.36 years).

Table 4. Development of profitability indicators of corporate farms 2010-2020

Source: AKI

Pointer	2010	2011	2012	2013	2014	2015	2016	2017	2018	2020
Profitability in proportion to production value, %	1.43	1.65	2.25	2.7	3.97	6.91	6.42	6.43	8.33	3.88
Profitability of total capital, %	4.64	5.39	5.75	6.25	7.16	11.81	4.76	4.79	8.49	4.24
Return on equity, %	4.27	6.57	7.52	9.17	12.1	21.17	8.66	8.7	14.14	6.38
Work-profitability, tFT/ AWU	2367.3	2371.6	2667.6	3130.2	3601.3	5532.1	5854.6	5893.8	7530.91	6699.16
Cash flow, tFT/farm	34070.6	21112.1	30718.3	50340.3	41955.3	50326.5	49018.3	51341.5	81617.38	95855.8
Investment coverage %	65.1	56.2	45.2	50.9	57.1	172	117.9	116.7	114.14	54.69
Liquidity quick rate	0.6	0.67	0.74	0.55	0.7	0.78	1.32	1.31	1.23	0.93
Liquidity ratio	1.13	1.06	1.15	1.2	1.21	1.53	1.97	1.98	1.86	1.4
Equity ratio, %	50.26	42.21	48.31	57.42	52.23	52.69	52.6	52.72	58.15	62.52
Capital supply, %	80.05	76.47	93.84	92.91	87.8	94.28	75.19	75.53	86.99	97.64
Dynamic indebtedness index, year	2.88	3.35	2.14	1.95	1.83	1.57	2.82	2.79	1.29	1.16

In the case of corporate farms, it can be said that in 2010-2020. there was no loss-making year between. Examining the profitability of the production value, we experience significant differences between the two examined economic forms. In the case of corporate farms, the profitability ratio proportional to the production value will remain below 3% until 2013, then it will approach 4% in 2014 and will exceed 6% in 2015-2017, reaching a maximum of 8.33% in 2018. and then dropped drastically by 2020. Return on total capital and equity peaked in 2015 (11.81%; 21.17%) and then decreased significantly by the end of the period. Analysing the profitability of work, we can see that it showed a steady increase until 2018 and by 2020 a decrease was observed. In terms of cash flow, we can see that smaller and larger decreases and increases alternate between 2010 and 2020. However, with continued volatility, it achieved slow growth by the end of the period and was well ahead of the end-period value observed for individual farms. Regarding the coverage of investments, it can also be stated that it was characterized by significant variability. It peaked at 172% in 2015 and has been steadily declining since then. The liquidity rapid rate increased with minor major fluctuations, with its maximum value recorded at 1.32 in 2016. The same trend of change can be observed for the liquidity ratio. The share of equity in 2011 and 2012 did not reach 50 %. The "corresponding

value above 30%" according to the literature was still significantly higher. Capital supply was able to increase in aggregates with continuous variability, but still did not reach the values observed for individual economies. The dynamic indebtedness indicator showed an improvement from 2010 to 2020, but still lags the performance of individual economies.

In the second part of our analysis, poultry farms are examined by size. Large farms with more than 50 livestock are considered large farms. As a result of the methodological change, the poultry population of large farms changed from the average value of 194.9 livestock / farm in 2018 to 336.2 in 2020.

Table 5. Development of profitability indicators for large farms 2010-2020

Source: AKI

Pointer	2010	2011	2012	2013	2014	2015	2016	2017	2018	2020
Profitability in proportion to production value, %	28.8	40.4	38.9	35.2	37	34.6	37.3	37.3	9.24	4.43
Profitability of total capital, %	12.3	19.4	17.4	14.3	14.8	13.3	13.7	13.7	9.7	4.82
Return on equity, %	13.7	22.1	19.4	15.7	16.4	14.8	14.9	14.9	15.51	7.06
Work-profitability, tFT/ AWU	7837.8	14124.5	14309.9	11844.7	12823.2	12030.4	14172.2	14143.1	8116.45	6050.31
Cash flow, tFT/farm	10203	18271.4	19146	17884.8	18101.3	17068.5	42674.7	42591.9	80660.1	18813.2
Investment coverage %	168.4	132.2	139	131.7	105.7	104.9	258.4	257.9	125.36	55.93
Liquidity quick rate	2.2	1.9	2.3	2.9	2.7	3.1	4.9	4.9	1.4	0.98
Liquidity ratio	3.3	3	3.6	4.4	4	4.6	7	7	2.09	1.46
Equity ratio, %	83	84.3	87.1	88.3	87.9	88.1	90.4	90.4	61.4	64.52
Capital supply, %	110.8	115.4	120.9	123	120.2	121.8	124.8	124.8	91.76	98.02
Dynamic indebtedness index, year	0	-0.1	-0.5	-0.8	-0.7	-0.9	-0.6	-0.6	0.99	1.06

In the examination of large economies, we observed continuous variability in terms of the development of proportional profitability in production value, but it is striking that the large decrease in profitability in the last two years will fluctuate between 28.8 and 40.4% in 2017 between 2018 and 9.2% in 2018 and to 4.43% in 2020 The same trends can be observed in the profitability of total capital, although the rate of decline is not so great. A similar trend was observed for labour profitability. It increased overall from 2010 to 2017 and then declined in subsequent years. Considering the composition of the indicator, there may be several reasons for the increase in after-tax profit and/or the wages paid and, conversely, the decrease in the unit of the annual workforce. In terms of cash flow and investment coverage, the trend described so far can also be observed. The change in the value of the liquidity ratio and the rapid rate also shows the same trend, which assumes that the ratio of inventories to current assets is relatively

constant over the period under review. The value of the two indicators is adequate, dropping to critical levels in the last two years. The share of equity is high, even in less favourable years (2018; 2020) it is above 60%. The financing of fixed assets with open-ended funds is also adequate, although it has fallen below 100% in the last two years. The dynamic indebtedness indicator will only take positive value in 2020 in the rest of the year the stock of receivables and funds exceeds the value of liabilities. This is unfavourable if the farm is unable to recover its claims in time and thus short-term liquidity is impaired. In the last two years, however, the value of the indicator has already become positive as liabilities have increased.

Table 6. Development of profitability indicators for medium-sized farms 2010-2020

Source: AKI

Pointer	2010	2011	2012	2013	2014	2015	2016	2017	2018	2020
Profitability in proportion to production value, %	29.6	40.6	39.4	34.7	35.5	37	36.9	37	11.44	9.02
Profitability of total capital, %	10.9	17.3	16.6	13.3	13.2	12.5	11.4	11.4	11.05	6.59
Return on equity, %	11.8	19.4	18.1	14.5	14.1	13.4	12	12.1	13.85	8.98
Work-profitability, tFT/ AWU	5620.1	9407.6	9970.8	8584.8	9265.3	10000	9968.7	10019.8	5014.53	5341.61
Cash flow, tFT/farm	3328.4	5512.6	5497	4404.2	5058.9	4558.4	12464.5	12525.8	10414.7	9281.86
Investment coverage %	231.8	222.9	214.2	145.8	183.4	94.9	316.9	318.5	159.17	49.56
Liquidity quick rate	3.7	2.8	3.4	3.7	4.6	4.8	9.1	9.1	2.63	1.98
Liquidity ratio	4.8	3.8	4.7	5	6.1	6.2	11.5	11.6	3.44	2.55
Equity ratio, %	88	87.4	89.8	90.1	91.9	91.8	93.5	93.5	79.46	71.73
Capital supply, %	126	132.5	134.9	132.9	139.2	134.8	135.6	135.7	120.23	107.36
Dynamic indebtedness index, year	-1.8	-1.4	-1.7	-2.2	-2.5	-3	-1.4	-1.4	-0.43	0.25

For medium-sized farms, in 2018 the average agricultural area was 13.3 ha / farm, and the number of poultry was 32.2 livestock / farm, the same data in 2020 were 9.5 ha / farm and 30.9 in this size category. The return on production value ratio is better, but the return on total capital ratio is worse than on large farms. However, for medium-sized farmers, the decline in 2018-2020 was smaller. Looking at profitability indicators, as in large economies, we can see that the most favourable year is 2011 and the worst is 2020. For medium economies, the profitability of work indicator is much lower than in large economies. The liquidity ratio and rapid rate are much higher (twice in 2016) than in large economies. The same can be said about the share of equity, although the difference is not so great. In the last two years of the period under review also saw a significant decrease. The equity ratio is also more favourable than medium-sized economies. Between 2013 and 2017, it will not fall below 90% and even in the most unfavourable years it will not fall below 70%. Fixed assets are covered with equity well over 100 % throughout the period. Dynamic indebtedness, on the other hand, is negative every year except 2020 for the 10-year period under review, which may raise financing problems in the short term.

Table 7. Development of profitability indicators for small farms 2010-2020

Source: AKI

Pointer	2010	2011	2012	2013	2014	2015	2016	2017	2018	2020
Profitability in proportion to production value, %	24.7	32.3	35.8	32.5	32.7	29.6	36.3	36.4	15.55	4.31
Profitability of total capital, %	7.8	11.2	11.2	9.9	8.8	8	9	9	13.85	3.34
Return on equity, %	8.4	12.1	12	10.6	9.2	8.4	9.3	9.3	17.91	4.72
Work-profitability, tFT/ AWU	2620.4	3930.5	4437.2	4141.9	4250.2	4218.3	5047.2	5053.2	2708.61	2275.44
Cash flow, tFT/farm	866.6	1126	1402.9	988.1	1025.4	751.6	2636.2	2639.3	1712.23	1129.05
Investment coverage %	173.5	205.6	295.8	193.8	237.8	83.5	655.6	656.4	390.94	108.9
Liquidity quick rate	6.5	5	5.1	6.3	9	9.9	32	32	4.56	5.61
Liquidity ratio	7.6	6	6.2	7.6	10.4	11.3	35.6	35.6	5.22	6.08
Equity ratio, %	89.4	90.6	92.7	93.1	95	94.9	97.1	97.1	77.14	68.98
Capital supply, %	135.4	138.1	137.5	142.1	150.1	146.3	156.4	156.4	134.98	1326.21
Dynamic indebtedness index, year	-3.9	-3.2	-3.2	-4.6	-6.5	-8.7	-3.1	-3.1	-0.95	-2.08

The profitability of small farms lags medium and large economies, but this lag is only small. The same trends are observed, in the last two years the value of all indicators has deteriorated. The labour income is half the value shown in medium-sized economies. However, the liquidity ratio and the value of the rapid rate are higher than those of both large and medium economies. This is a consequence of the stock of low short-term liabilities, as the dynamic indebtedness indicator has taken a negative value every year without exception for the same reason. It is true for each year of the investigation for small farms that the receivables (i.e., receivables) are larger than those of debts. In 2014, capital supply takes in values above 150 % in 2014, which is not typical for either medium and large economies. Overall, the share of equity for the whole period is higher than for the other two size sizes.

4. Conclusions

When comparing individual and corporate farms, the values of the profitability indicators change according to the same tendencies, but the values of individual farms significantly exceed those of corporate farms. The exception to this is the profitability of labour, but it is a special indicator that is distorted by the special situation of family farms and the recognition of income. In terms of liquidity indicators, there is an increase can be seen for both types with greater or lesser variability. It can also be pointed out here that the liquidity indicators of individual economies are better developed than those of corporate farms. Regarding capital structure

indicators, the same can be said for the previous one's dynamic indebtedness, the order that has characterized so far is reversed for corporate holdings throughout the period under review, while for individual farms only 5 years its value was above 0 and the maximum was 4.81 years (2011), while for corporate farms the highest was 15.19 years (2007).

Based on the comparison of economy size, we can conclude that all the profitability indicators, except the indicator of labour income, describe the same curves during the period under review, and differences in volume are negligible. It is important to mention that we have seen the lowest values in 2020. Liquidity indicators have also moved in the same direction for all three types. The difference in volume for these indicators was already significant. Small farms achieved the highest values. Thus, it can be said that small farms are more liquid than those of medium and large farms. For all three farm sizes, the capital structure indicators showed almost the same variability. The differentiation between the values did not prove to be significant here either, except for the coverage indicator. Regarding dynamic indebtedness, it can be concluded that it has developed contrary to the order established for liquidity indicators.

Acknowledgements

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