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FINANCIAL LIQUIDITY AND PROFITABILITY OF FAMILY FARMS – INTERDEPENDENCE DILEMMA

Summary: The study was to analyse correlations between liquidity according to the dynamic and static approach and profitability. Liquidity has been evaluated using the financial liquidity ratio and quick liquidity ratio. Profitability has been measured with the use of return on assets ratio. The study covered 679 farms which in the period between 2004 and 2011 gathered accounting data for FADN PL purposes. The study has shown a statistically significant correlation between the liquidity ratio in the dynamic approach and ROA. However, it was not possible to confirm explicitly if such a correlation has been positive (low correlation coefficients).

Keywords: financial liquidity, profitability, family farms.

1. Introduction

A condition necessary to maintain the continuity of operation and development of an enterprise in each phase of its organization is to ensure financial liquidity [Skoczylas 2013, p. 28]. The basic area of enterprise performance evaluation, apart from profitability, is financial liquidity. The existence of each economic entity depends on liquidity, understood as ability to pay current liabilities. Czekaj and Dresler indicate [1998, p. 21-31] that economic entities may function and incur periodic losses, but such functioning is impossible when they cannot pay their debts. This means that even when an entity reports a loss, it can still exist, however, not for a long time. Hence, in a way there should be some correlation between the achievement of a positive result in the form of profit, income (basis for calculating profitability ratios) and liquidity. In family farming, farmers-owners put less pressure on achieving proper rates of return on factors of production employed, and consider the sense of security more important, therefore, maintenance of financial liquidity is in their opinions the most important aspect of

farm operations. In such entities, the level of financial liquidity depends on different factors which also affect the profitability of each and every enterprise. Nevertheless, Zawadzka [2011, p. 195] advocates that the reduction of financial liquidity usually leads to the increase in profitability. Similar opinion is expressed by Raheman, Nasr [2007, p. 279-300].

2. Enterprise liquidity and profitability

– review of reference literature

Issues of financial liquidity often appear in the literature [Nasruddin, Zainudin 2006, p. 107-118; Vishnani, Bhupesh Kr. Shah 2007, p. 267-281] as, in market economy, the maintenance of ability to pay debts on a timely basis is the most important objective of each and every enterprise [Sierpińska, Wędzki 1999, p. 58; Franc-Dąbrowska 2008, p. 43-59]. Although the authors agree that this area of entity's operations is important, they often define financial liquidity in similar but different ways. The problem is the understanding of current liabilities. According to Sierpińska and Wędzki, these are not only liabilities which appear on the balance sheet, but also the ones included in the cash flow statement (the broad view). Bień [1997, p. 178] sees them as short-term liabilities, and Gołębiowski and Tłaczała [2005, p. 56] point to “own liabilities”. It seems that financial liquidity should concern the ability to pay all liabilities that fall due in a given year, regardless of whether they relate to suppliers, budget, payroll or banks. Lack of available cash is a direct threat for an economic entity's existence. Comparing an economic entity to a live organism Micherda [2004, p. 47] states that “[...] profit corresponds to food, and solvency to air, without which an organism cannot exist even for a moment”. Such an approach indicates that liquidity is treated as necessity to hold enough cash to function without any problems. In the most common approach, an enterprise has proper liquidity if its current assets – mainly cash – are in harmony with payable liabilities [Bieniasz, Gołaś 2008, p. 24-25]. Measurement of financial liquidity based on resource figures presented in the balance sheet – liquidity according to the static approach – may in practice prove to be insufficient as it shows the ratio of liabilities coverage with liquid assets as at the date of financial statements. However, the value of assets often relates to assets which can be cashed easily only in theory, as these include inventory and receivables. Given that, static approach of liquidity in family farms may raise doubts, considering a quite significant share of inventory and the value of non-breeding livestock in relation to current liabilities. Due to specific needs of the farming industry, farms are required to undertake certain actions that call for maintaining high values of these current assets that are most difficult to cash. Conversion of such assets into cash could hold up the annual production cycle. On the other hand, long animal production cycle results in the increase of the inventory value [Goraj, Mańko 2009, p. 179; Mańko, Sobczyński,

Sass 2008, p. 7-8] which in theory also raises liquidity. This in turn may be viewed as an adverse event – problem of excess liquidity – due to the occurrence of opportunity costs.

To a smaller extent, interpretation problems arise with the lack of profitability which indicates the results achieved from the factors of production employed. Profitability is a general measure which allows to isolate different areas of enterprise's operations with the use of one or more ratios. Such ratios should be analysed in comparison to the profitability of other enterprises of the same industry, as only then they may constitute a basis for a reliable evaluation and appropriate decisions. The level of profitability achieved by an entity should also be compared with respect to time. The increasing trend in the profitability ratio will be evaluated in a positive manner [Zuba 2007, p. 34-35].

The issue which still remains without a clear resolution are mutual relations between liquidity and profitability. Research presented in the reference literature and concerned with this issue does not provide any definite solutions. These discrepancies result mainly from the liquidity ratio which was assumed for analysis purposes [Zawadzka et al. 2011, p. 196]. Research conducted by Wasilewski and Gałecka [2010, p. 236] shows that there is no material correlation between the return on equity and the current financial liquidity, although earlier research by Wasilewski [2007, p. 444-450] indicated an increase in quick financial liquidity of farm enterprises with the increased efficiency of use of assets and equity. Taking the above into account, a question may be asked if during the evaluation of such correlations the researchers applied the principle of comparability. Doubts relate to the possibility of comparing ratios calculated as a ratio of balances of current resources to liabilities – liquidity ratios – and as a ratio of streams to balances – profitability ratios.

3. Aim and methodology of the paper

This paper was to evaluate the correlations between profitability and financial liquidity in family farms taking into account different measurement methods of the latter one, i.e. the static and dynamic approaches. Profitability has been evaluated based on return on assets ratio which should reflect the result of employing the entire property. Assets participate (with various intensity) in generating profit, income and cash streams. It has been noted that the ability to pay is not a feature which can be observed based on the closing or opening balances, but is dynamic in nature. What is then the ability to pay liabilities which is shaped by inventory or receivables? High values of such assets are rather a sign of problems with liquidating inventory (predominantly products or goods), or inability to collect receivables. Knowledge of the period in which particular assets, within a normal cycle, can be converted into cash provide information rather on the amount and availability of the possible cash, and not on the ability to pay liabilities [Skoczylas 2013, p. 28].

Taking the above into consideration, in this paper the following formulas have been applied:

– for return on assets (ROA):

$$ROA = \frac{IFF}{\bar{A}},$$

where: IFF – income from family farm,

\bar{A} – average balance of assets¹

– for the financial liquidity ratio (FLR):

$$FLR = \frac{CFOA}{\bar{CL}},$$

where: $CFOA$ – cash flows from operating activity,

\bar{CL} – average balance of current liabilities.

Average balance of current liabilities in family farms comprised the arithmetic mean of opening and closing balances of short-term liabilities disclosed in the balance sheet, the amount of interest (Int) disclosed in the profit and loss account and instalments of long-term credits (Ins) disclosed in the statement of cash flows from financial activity, and has been calculated using the following formula:

$$\bar{CL} = \frac{OB - STL + OB - LTL}{2} + Int + Ins$$

$OB - STL$ – opening balance of short-term liabilities,

$OB - LTL$ – closing balance of short-term liabilities.

For comparability purposes, the static measure of liquidity will also be presented; due to specific needs of farming and necessity to build up inventory [cf. Zawadzka et al., 2011, p. 195] quick ratio of liquidity (QRL) was used; it has been calculated according to the following formula²:

$$QRL = \frac{CA - I - NBL}{CL},$$

where: CA – current assets,

I – inventory,

NBL – non-breeding livestock.

¹ It seems that not only the closing balance of assets, but also all components employed during the year contributed to the achievement of a certain result. A substitute for disclosure of the property employed is the average value of such a property.

² In the reference literature [e.g. Sierpińska, Jachna 2004, p. 147] quick ratio of liquidity is a ratio of (current assets less inventory and prepayments) to current liabilities; in the paper it has been modified to a small extent, i.e. assets have been further adjusted by non-breeding livestock.

For the purposes of evaluating the correlation between liquidity and profitability, and the static and dynamic approach of liquidity, Spearman's rank correlation analysis has been conducted. Such a solution has been applied as variables used have not shown any normal distribution which is one of conditions precedent for the use of Pearson's correlation.

The study covered the period between 2004 and 2011 and 679 farms which in the given period constantly gathered data for FADN (Farm Accountancy Data Network) purposes. This approach allowed to track changes in the evaluation of liquidity and profitability in family farms.

4. Description of entities studied

Table 1 shows figures which allow to characterize family farms in terms of factors of production held by such farms: land and funds (assets) in the successive years and the level of inventory. Amounts of result categories which are necessary from the point of view of the issues under study have also been presented.

Table 1. Farms' holdings of assets and areas of agricultural land, and level of income and cash flows from operating activity between 2004-2011

Description	2004	2005	2006	2007	2008	2009	2010	2011	Average
Total assets [thousand PLN]	399	3957	421	451	477	501	514	555	464
Area of agricultural land [ha]	29.6	30.7	31.0	32.3	33.0	33.5	34.0	34.4	32.3
Current assets [thousand PLN]	84	79	91	104	107	111	122	141	105
including inventory [thousand PLN]	32	26	28	41	42	38	46	54	38
Income from family farm [thousand PLN]	46	42	58	69	61	58	83	96	64
Cash flows from operating activity [thousand PLN]	54	62	71	77	85	85	100	105	80

Source: own calculations based on FADN PL.

The studied farms held mainly fixed assets, which was evidenced by the share of current assets which accounted for only 20%. Such a situation is typical for production-related units which use buildings in their operations. In agriculture, the value of equity is to a large extent determined by this group of assets.

In 2005, family farms experienced a decrease in value of assets, despite their annual revaluation. The most significant positive changes took place in 2006, which could indicate intensive investments. At the same time, however, this period evidenced the biggest increase in the value of current assets which accounted for 14%. It has been decided that this resulted from an increase in the values of non-breeding livestock and other current assets, as at the same time the value of inventory changed by 3%. In 2006, inventory's share in current assets was at the lowest level and amounted to a little less than 30%, whereas in the other years under study this share was by 2-9 pp higher. Figures in Table 1 show a stable situation in inventory management, which results from the specifics of farms,

especially animal farms³. However, considering that family farms do not include in data related to current assets any information on the balance of cash (private property of the farmer and his family), current assets will rather be difficult to liquidate, i.e. convert into cash, and consequently it will be harder to pay the liabilities. It should be remembered that such information is taken into account while determining the level of static financial liquidity.

The studied farms reported slightly higher (on average by PLN 16 thousand) cash flows from operating activity⁴ than income throughout the entire studied period. In particular years, such differences ranged from PLN 8 thousand (2004) to PLN 20 thousand (2005), but given the significant share of depreciated fixed assets, they were not so high. This shows that farmers use on farms property which is depreciated or the initial value of which is so low that depreciation reduces income from the family farm only to a small extent. On the other hand, however, such small differences in the categories under review indicate that the executed transactions were of cash nature (no trade credit), and this in consequence should be reflected in the levels of profitability and liquidity. Spearman's rank correlation analysis (Table 2) shows that in all the years there was a statistically relevant correlation between the level of income of a family farm and the level of current assets and cash flows from operating activity. It should be noted that there was a stronger correlation⁵ between the streams (income – flows), and not between the balance and stream (assets – income). This can affect the relations between the profitability and liquidity ratios.

Table 2. Spearman's correlation coefficient between income of a family farm and the level of current assets and cash flows from operating activity.

Description	2004	2005	2006	2007	2008	2009	2010	2011	Average
Current assets	0.66	0.54	0.62	0.70	0.64	0.63	0.71	0.74	0.67
Cash flows from operating activity	0.83	0.80	0.86	0.84	0.77	0.80	0.85	0.85	0.82

All correlation coefficients significant at $p > 0.05$.

Source: own calculations based on FADN PL.

Funding for the available assets came from different sources. This is material from the point of view of the issue under study. Information on such assets is shown in Figure 1.

³ Goraj and Mańko advocate that farms, in order to ensure continuity of their production processes, need to have high levels of inventory.

⁴ Cash flows from operating activity have been calculated according to the direct method as a difference between cash inflows and expenses.

⁵ In Aczel's opinion [2000, p. 480] correlation coefficient r of 0.7 reflects a weaker relationship, and r of about 0.9 indicates strong correlation relationships.

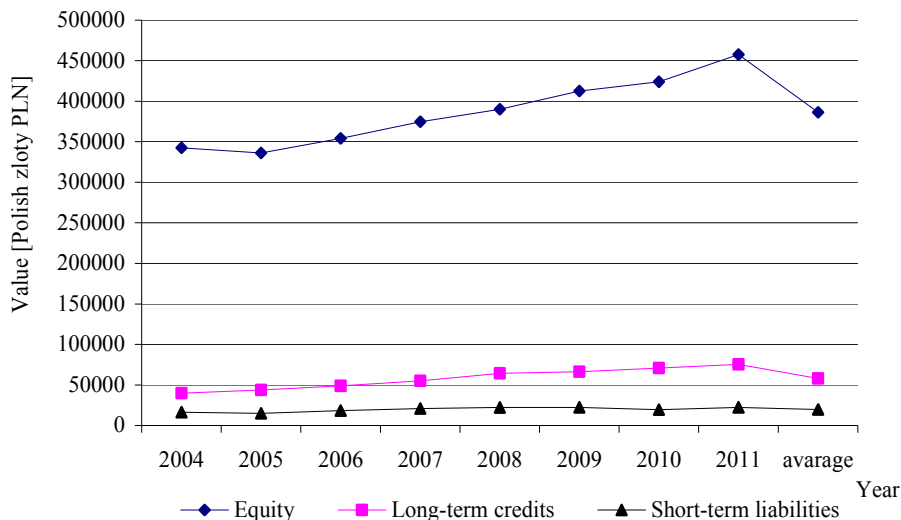


Figure 1. Average value of equity and long- and short-term borrowings in the studied period

Source: own study.

The study has confirmed that in Polish family farms the main source of funding is still equity, and its share accounted for over 80%. This determines high ratios of financial liquidity in the static, and perhaps dynamic, approach. In the debt structure, however, long-term capital was more important. Its value was found to increase over time, while short-term liabilities remained on a similar level (around PLN 20 thousand). In such a situation it may be concluded that farmers exhibited extreme caution with respect to incurring any indebtedness and chose rather long-term debt, as in the period of one year it was connected with lower financial burdens. Usually it was in the form of a preferential credit⁶, and when such funding was insufficient, farmers used short-term credits. On just a few occasions, farmers used only short-term credits. Based on the available data it is difficult to say if trade liabilities were also incurred, or if they were included in short-term liabilities.

5. Results of the study

Table 3 shows figures reflecting levels of liquidity ratios according to dynamic and static approach and the return on assets ratio.

⁶ Research conducted by Bereźnicka [2011, p. 88-101] based on FADN data for 2004-2008 indicated that interest rates of credits were so low (c.a. 2-4%) that it would confirm the thesis of preferential crediting conditions for farmers.

Table 3. Average level of quick liquidity ratio, financial liquidity ratio and return on assets ratio in the period 2004-2011

Ratio	2004	2005	2006	2007	2008	2009	2010	2011	Average
FLR (multiplication)	4.00	4.57	4.73	4.52	4.65	4.22	4.46	5.50	4.56
QLR (multiplication)	2.25	2.31	2.65	2.11	2.06	2.26	2.25	2.71	2.32
ROA [%]	11.33	11.24	14.75	16.32	14.09	12.89	18.54	19.39	14.82

Source: own calculations.

The lowest values (around 2) can be seen with respect to the quick liquidity ratio, which indicate that the value of other current assets (excluding inventory and non-breeding livestock) is twice as high as current liabilities. This ratio was two times higher than the one considered in the reference literature as the proper value, i.e. around 1 [Sierpińska, Jachna 2004, p. 147]. The level of financial liquidity ratio was four times higher, which means that farm assets generated significantly higher value of cash from operating activity than total liabilities payable within the period of 1 year. These results confirm that farmers are extremely cautious as regards incurring debts. It seems to be a reasonable behaviour of entities which usually derive income from basic activity. For self-employed families this activity is also the main source of income. The ratios have not been evaluated with respect to the existence or excess liquidity, as this was not the aim of this study.

Return on assets (ROA) remained at the average level of 14.8% throughout the entire studied period. Such amounts in all years present a rather optimistic view of family farms, however, it should be remembered that FADN data relate to farms with a rather good financial standing as they cover only those farms the economic size of which is greater than 2 ESU⁷. In general, there can be seen an increasing trend from c.a. 11% with minor fluctuations in 2005 and 2008-2009. Considering the increasing value of assets, faster dynamic of growth can be observed in the farm's income. In the same period liquidity ratios according to both the static and dynamic approach gave somewhat different results, which may indicate that there is in fact no correlation between profitability and liquidity. In order to verify if there is any correlation between the variables under study, rank correlation analysis has been conducted. Relevant figures are presented in Table 4.

Table 4. Spearman's rank correlation of ROA ratio and financial liquidity ratio and quick liquidity ratio

Description	2004	2005	2006	2007	2008	2009	2010	2011	Average
FLR	0.198	0.182	0.174	0.187	0.118	0.206	0.142	0.097	0.150
QLR	0.057	0.025	-0.007	0.054	0.045	0.064	0.011	0.006	0.029

Coefficients in bold significant at $p > 0.05$.

Source: own calculations based on FADN PL.

⁷ ESU is a measure of economic size of a farm and corresponds to EUR 1200. It is calculated as the difference between the volume of production and direct expenses.

Calculations show that the studied farms exhibited a statistically significant relationship between the return on assets ratio and the financial liquidity ratio throughout the entire analysed period. The direction of variables was the same, which can indicate that in the case of increase of assets' profitability, there will be a positive change in the financial liquidity ratio. However, ranks correlation coefficients remained very low, and this in turn allows to draw the conclusion that the problem of relationships is still not resolved. Based on the fact that the revenues are in cash, it may be assumed that this relationship is positive. For this reason (cash transactions) it seems justified that family farms should calculate liquidity ratios according to the dynamic approach. Such a relationship was not statistically significant in the case of static approach to liquidity. This probably resulted from the fact that cash (result on sale) was not disclosed in the balance sheet and did not increase the value of the most liquid assets.

6. Conclusions

The study conducted confirmed that in family farms the financial liquidity measurement method is not only significant from the point of view of the liquidity ratios according to the static and dynamic approach, but also in the context of relationships between the liquidity and profitability. The analysis suggests that there was a statistically significant correlation between the liquidity ratio (in the dynamic approach) and ROA ratio, which resulted from a very strong correlation between the amount of income and cash flows. This may confirm that family farms should conduct liquidity analysis according to the dynamic approach. Nevertheless, considering that correlation coefficients remained very low, the existence of a positive correlation between the studied ratios was not possible to be confirmed explicitly.

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PŁYNNOŚĆ FINANSOWA I RENTOWNOŚĆ W RODZINNYCH GOSPODARSTWACH ROLNYCH – DYLEMAT WSPÓLZALEŻNOŚCI

Streszczenie: Celem badań była analiza zależności między płynnością w ujęciu dynamicznym i statycznym a rentownością. Do oceny płynności wykorzystano wskaźnik płynności finansowej oraz wskaźnik szybki płynności. Rentowność zmierzono za pomocą wskaźnika rentowności aktywów. Badania przeprowadzono w 679 gospodarstwach rodzinnych, które w okresie 2004-2011 gromadziły dane rachunkowe na potrzeby FADN PL. Badania wykazały statystycznie istotną zależność między płynnością w ujęciu dynamicznym a ROA. Nie udało się jednak potwierdzić jednoznacznie, czy zależność ta była dodatnia (niskie współczynniki korelacji).

Słowa kluczowe: płynność finansowa, rentowność, gospodarstwa rodzinne.