УДК 330.3:64.01

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Динамічне і статичне вимірювання фінансової ліквідності у сімейних господарствах

У статті розкрито можливості оцінки ліквідності в сімейних господарствах. Мета дослідження – перевірити, чи дають динамічний і класичний (статичний) підхід до вимірювання ліквідності схожі результати при оцінці ліквідності сімейних господарств, а також відповісти на питання, чи є динамічний підхід достатнім для оцінки ліквідності сімейного господарства. Об'єктом дослідження обрано сімейні господарства, які протягом 2004-2011 років безперервно вели бухгалтерський облік сільськогосподарських операцій та відображали в балансі короткострокову кредиторську заборгованість, а також негативні грошові потоки від фінансової діяльності. При динамічному підході для розрахунку коефіцієнта ліквідності використано інформацію про кошти отримані від операційної діяльності, а також про кошти, що класифікуються фермерами як заощадження. Здійснено порівняння коефіцієнтів поточної та швидкої ліквідності. Встановлено, що існує дуже сильна кореляція між показниками отриманими за динамічним і статичним підходом, однак більш високі коефіцієнти відзначаються у випадку використання показника поточної ліквідності. На думку автора, у зв'язку зі специфікою сімейного господарства, а саме проблемою запасів, призначених для забезпечення внутрішніх потреб господарства, для оцінки ліквідності слід використовувати динамічний підхід.

Ключові слова: *сімейні господарства, оцінка ліквідності, динамічний підхід, статичний підхід, коефіцієнти ліквідності, грошові потоки.*

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Динамическое и статическое измерение финансовой ликвидности в семейных хозяйствах

В статье раскрыты возможности оценки ликвидности в семейных хозяйствах. Цель исследования – проверить, дают ли динамичный и классический (статический) подходы к измерению ликвидности схожие результаты при оценке ликвидности семейных хозяйств, а также ответить на вопрос, достаточно ли применять лишь динамический подход для оценки ликвидности семейных хозяйств. Объектом исследования избраны семейные хозяйства, которые в течение 2004-2011 годов непрерывно вели бухгалтерский учет сельскохозяйственных операций и отражали в балансе краткосрочную кредиторскую задолженность, а также негативные денежные потоки от финансовой деятельности. При динамическом подходе для расчета коэффициента ликвидности использована информация о средствах, полученных от операционной деятельности, а также о средствах, которые фермеры классифицируют как сбережения. Проведено сравнение коэффициентов текущей и быстрой ликвидности. Установлено, что существует очень сильная корреляция между показателями, полученными за динамическим и статическим подходом, однако более высокие коэффициенты отмечаются в случае использования показателя текущей ликвидности. По мнению автора, в связи со спецификой семейных хозяйств, а именно проблемой запасов, которые предназначены для обеспечения внутренних потребностей хозяйств, для оценки ликвидности следует использовать динамический подход.

Ключевые слова: *семейные хозяйства, оценка ликвидности, динамический подход, статический подход, коэффициенты ликвидности, денежные потоки.*

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Dynamic and Static Evaluation of Financial Liquidity in Family Farms

The research exposes the possibility of assessing liquidity in family farms. The purpose of the research is to check whether dynamic and classic (static) approaches to measuring liquidity give similar results in assessing the liquidity of households, and also to answer a question whether it is sufficient to apply only dynamic approach in assessing the liquidity of households. As the object of the research some family farms were chosen which had maintained continuous accounting records of agricultural transactions for the period of 2004-2011 and reflected in the balance sheet all short-term accounts payable and negative cash flows from financing activity. With the dynamic approach to calculation of the liquidity ratio the information was used about the funds received from operating activity, and about the funds which farmers classified as savings. A comparison of current and quick ratio has been done. It has been established that there is a very strong correlation between the figures obtained with the dynamic and static approach, though higher rates are observed in case of current liquidity indicator use. According to the author, due to the family farm specifics, namely, inventories problem intended for domestic needs, a measure of liquidity should use the dynamic approach.

Keywords: *family farms, liquidity valuation, dynamic approach, static approach, liquidity ratios, cash flows.*

Introduction. Maintaining financial liquidity is a key element of running a business in the market economy. Polish family farms, despite being mainly financed by their own capital, also make use of external financial sources. The process of farm owners running into debt farm has intensified since Poland joined the European Union's structures. The financial support offered by Structural Funds within the scope of investments, created an opportunity to improve the conditions of farm management; however it required considerably higher involvement of financial sources to those which were possible for farmers. Those farmers taking out loans (most frequently bank loans) must take into consideration the possibility of encountering problems with paying them off. Thus, the problem of measuring financial liquidity comes into the equation. Does the standard indication of a firm's market liquidity, current ratio (a firm's current assets to its current liabilities), run true with regard to farms? Due to the necessity of stockpiling in order to maintain production and livestock continuity, alongside a lack of information concerning financial means transferred to the household farm, it seems that the above mentioned measurement may be incorrect. The aim of this paper is to verify whether the dynamic measurement of liquidity (according to the paper's presented proposal) and its classical (static)[*] concept give a similar result with regard to assessing family farm liquidity and to answer the question of whether the dynamic concept suffices in the assessment of family farm liquidity.

Financial liquidity – concept in academic literature. Since the XX century the issue of financial liquidity was widely examined in theories concerning money demand in the works of Keynes and Tobin or optimal cash balance in the works of Miller-Orr and Baumol [Franc-Dąbrowska 2008, p. 46]. Investigating financial liquidity encompasses an analysis of the indicator widely used in economic life and an assessment based on the balance of cash flows. The topic of financial liquidity is often touched upon in academic literature due to the fact that in a market economy, the ability of meeting current liability payment deadlines is most important for enterprises. [Sierpińska,Wędzki 1999, p. 58; Franc-Dąbrowska 2008, p. 43;] Financial liquidity however, is defined in similar albeit various ways. The definition of financial liquidity is understood differently and is sometimes considered as the ability to change different types of assets into cash [Gabrusewicz 2005, p. 253]. In the estate-capital perspective, liquidity is treated as the ability to pay off current liabilities [Cicirko 2010, p. 12] and in this concept the determinant of financial liquidity is the level of asset liquidity and demand of liabilities [Gabrusewicz 2005, p. 253].

The most frequently encountered approach of enterprises concerning suitable liquidity depends on the harmonization of current assets – mainly cash – with due liabilities. [Bieniasz, Gołaś 2008, p. 24-25]. The measurement of financial liquidity on the basis of the amount of financial reserves remaining in the balance – static liquidity – may not be sufficient in practice. The problem concerns how currently liabilities are understood. According to Sierpińska and Wędzki, they not only encompass those liabilities occurring in the balance sheet but also those included in the cash flow statement. According to Bienia [1997, p. 178] these liabilities are treated as short-term whilst Gołębiewski and Tłaczała [2005, p. 56] mention 'their liabilities'. It seems that financial liquidity should concern the possibility of paying off all liabilities which occur in a given year irrespective of whether they concern suppliers, the budget or bank. Liquidity is also treated as solvency in a lot of economic literature [Michalski 2004, p. 40].

[*] The classical concept of financial liquidity will be understood as the estate-capital approach whereby financial liquidity is measured as the ratio of current assets to current liabilities in the form of an indicator of current, quick and immediate liquidity.

Financial liquidity may be examined in the following two ways:

a) static – referring to a specific moment – using the basic parts of a balance sheet: the profit and loss balance, supported by traditional indicators of financial liquidity,

b) dynamic – referring to a specific period, based on the cash flow statement.

The traditional measurement of financial liquidity is based on data received directly from the balance statement. A characteristic feature of these indicators is their structure which is irrespective of the enterprise's size and is designed for comparisons between various types of economic entities. At the same time such a structure of indicators enables the observation of changes over time in the level of financial liquidity of a given enterprise even if their sizes considerably change. A range of traditional indicators, which vary in their scope of application, serve to measure financial liquidity. The most popular of these indicators are: current ratio, quick ratio and cash ratio. Each of these indicators embraces various ranges of financial means: from all current assets, to the most liquid financial means. These indicators are compared with data from previous periods, indicators of other enterprise and so called standards – normative values, of which there is no concurrence in economic literature [Kurtys 1998, Urbańczyk 2001, Bartley 2001, Waśniewski, Skoczylas 2002].

Static methods of measuring liquidity do not carry enough information in today's world of finances for the efficient management of this area in the enterprise. One should therefore evolve towards a greater use of dynamic methods of measuring financial liquidity of firms [Nesterak, Żmuda, 2005, p. 79-80].

Moreover, the static concept of liquidity may cause problems in the assessment of farms which frequently gather reserves of products for internal use (needs of animal production), for which there is no active market. In such a situation their encashment could be a problem, which may result in a loss of liquidity (in the static perspective).

Research methodology. The empirical research concerned farms which between the years 2004-2011 participated in the gathering of data for the needs of the FADN (Farm Accounting Data Network). There were 5350 such farms, but due to the target set, those which showed negative financial cash flow were chosen, which meant that they were paying off long-term loans and possessed short term liabilities. Due to the fact that the use of foreign capital is characterized by considerable variability each year was analyzed separately. The following formula was used to measure financial liquidity:

$$WPF = \frac{OCF + SP_p}{ZB_n} \qquad (1)$$

where:

OCF – cash flow from operating activity[**];

SP_p – financial means at the beginning of the year;

ZB_n - current liabilities to pay off in year n.

Alongside which current liabilities established according to the formula:

$$ZB_n = ZK_{n-1} + [(-)FinCF] \qquad (2)$$

ZK – short-term liabilities in year n-1;

(-) FinCF – negative cash flow from financial activity.

The presented formula (1) shows that the main source of financial means necessary to pay off liabilities should be a basic farm activity calculated directly by way of comparing the flow of financial means into the farm and costs incurred by the operating activity. This approach is the only one which ensures proper information about the actual level of financial means possessed by the farm. Due to the fact that a situation in which costs surpass income may be proof of a lack of financial liquidity and due to the feature of the family farm ('one till' for the family and farm) the flow of money - in the presented formula - was increased by the value of financial means gathered in previous periods (savings), which may be used to settle current liabilities. Thanks to these savings farmers may survive difficult periods resulting from unfavourable relations between the price of products and means of production.

As far as current liabilities are concerned an approach was applied according to which the value of short-term debts shown in the balance sheet at the end of the year would be paid off the following year[***]. This is different to commonly used solutions by which to calculate indicators of liquidity the value of short-term debts were accepted according to their average or level at the end of the year. It seems that the solution proposed is justified on account of the fact that the situation in the market of farming products and price of means of production change from year to year, which influences the financial means of the operating activity, whose debts (at the end of the year) will be paid off not in the same but in the following year. As a consequence, such an approach can enable a more precise assessment of the capacity of family farms to pay off their liabilities.

For comparative purposes the current and quick liquidity indicator were used. The last one is void of reserves and value of non-breeding livestock which could artificially raise the value of the indicator. The quick ratio indicator (WSP) was calculated according to the following formula:

$$WSP = \frac{AO - Z - SO}{ZB_n} \qquad (3)$$

where:

AO – current assets;

Z – product reserves;

SO – non-breeding livestock.

The cash liquidity indicator cannot be calculated due to the fact that there is a lack of information about financial means of the family farm.

[**] The flow of money is calculated according to the direct method which constitutes the difference between income and expenses.

[***] Such a solution may be appropriate in the case of ex post analyses, in which balance sheets from several accounting periods are at one's disposal. However, a cash budget should be worked out in the case of ex ante analyses.

An analysis of the correlation was conducted to examine the dependency between indicators from the static perspective and proposed indicators of liquidity.

Research results. In table 1 data was compared concerning the level of debt: short-term, long-term and current assets in the investigated family farms.

Table 1

Descriptive statistics of debt and current assets of family farms

Year	Group number	Average [thousands.PLN]	Median [thousands.PLN]	Minimum [thousands.PLN]	Maximum [thousands.PLN]	Standard deviation	Coefficient of variation [%]
Current assets							
2004	2823	95.4	61.4	0.0	2013.5	118.6	124.0
2005	3969	91.3	61.2	0.0	2042.0	110.3	120.0
2006	2927	112.6	76.9	0.0	2267.0	136.8	121.0
2007	3442	124.5	83.1	0.0	2654.5	156,0	125.0
2008	3610	129.7	87.5	0.0	2806.7	160.9	124.0
2009	3396	138.8	93.2	0.0	3249.8	174,4	125.0
2010	3304	155.3	103.8	0.0	4176.4	195.8	126.0
2011	3113	188.4	127.8	0.0	3714.4	223.5	118.0
Long-term liabilities							
2004	2823	52.3	15.8	0.0	2597.0	125.7	240.0
2005	3969	58.9	16.8	0.0	2207.8	129.9	220.0
2006	2927	75.7	26.1	0.0	3277.2	156.6	207.0
2007	3442	80.9	24.5	0.0	2841.0	163.4	201.0
2008	3610	88.8	27.1	0.0	2693.1	175.7	197.0
2009	3396	35.4	31.7	0.0	3379.8	191.6	200.0
2010	3304	103.5	31.1	0.0	6837.3	239.1	231.0
2011	3113	114.0	35.6	0.0	4116.2	242.5	212.0
Short-term liabilities							
2004	2823	21.1	10.1	0.0	1626.7	52.1	246.0
2005	3969	21.8	9.3	0.0	1083.6	47.4	216
2006	2927	28.9	13.0	0.0	1037.7	59.8	207.0
2007	3442	29.9	14.0	0.0	1033.5	56.2	187.0
2008	3610	30.5	130.0	0.0	1609.6	62.0	205.0
2009	3396	33.9	14.2	0.0	1439.9	64.5	190.0
2010	3304	34.2	14.9	0.0	1882.5	68.8	201.0
2011	3113	37.5	15.6	0.0	1470.2	72.5	193.0

Source: own calculations based on FADN PL.

According to the figures in table 1, most farmers were paying off long-term and short-term debts in 2005 and 2008. In the first year Poland featured in the structures of the European Union. This fact may have influenced the farmers' investment decisions. Funds appeared supporting the modernization of Polish family farms. Due to the fact that farmers did not possess enough reserves of own capital to take advantage of the support, they more frequently took out long-term loans. On the other hand an increased interest in loans may have resulted from changes in the farming conditions (a fall in product prices) and the necessity to take out short-term loans for the immediate needs of the farm.

In 2008 the increase in the number of farmers interested in loans continued to be the result of programs directed towards the development of rural areas, as well as favourable market conditions for farming produce in 2007. Moreover farmers had the possibility to make use of preferential loans. From 2009 the number of farmers with loans decreased. This was on one hand caused by the paying off of long-term debts as well as the use of means designated towards co-financing investment activities, which resulted in a reduction of interest of investment support and external sources of financing to complement own capital.

As far as current assets are concerned, it is worth noticing that the average value oscillated between 91 thousand PLN and 188 thousand PLN. However, there were farms which did not possess current assets. Though they were few and far between, one must take such a possibility into consideration. This in the static perspective of liquidity would mean a lack of liquidity the farm, which would not be in line with the truth. This may constitute an argument favouring the necessity to calculate financial liquidity of farms differently to that used in the classical model. The group investigated was not differentiated and possessed assets of a large degree of liquidity. The standard deviation showing similar values to that of the average shows that the farms disposed of current assets of similar value, which is confirmed by the median. One must however take the

significant difference between minimum and maximum sizes into consideration.

The average long term debt oscillated between 52 and 114 thousand PLN which shows a consecutively higher level of debt for each farm. It seems that this situation was caused by the fact that farmers achieving measurable benefits from direct financing (especially larger farms) improved their financial situation, which however was not good enough for them to fulfill their investment goals. Complementing a lack of financial means from long-term loans enabled the purchase of modern equipment with financing from EU funds. Moreover, the conditions of the loan – preferential interest rates – acted as an incentive for this type of financing. One must notice however, that the family farm differed on account of the size of the debt (large values of standard deviation and variation coefficient).

Similar tendencies to those above can be observed in short-term loans. Unfortunately, according to FADN data it is difficult to unequivocally state whether these were short term bank loans or purchasing loans. However, one can notice that the value of the loans remaining to be paid off within a year was decisively lower than those of long-term ones and they oscillated between 21-38 thousand PLN. A likely reason for this was a lower interest of farmers in short-term loans, because their cost was relatively high due to a lack of preferential interest rates and immediate needs did not require such a large involvement of external financing. Amongst polish farmers a conservative approach concerning finance management can be observed, especially with regard to purchasing loans. Despite this it is worth noticing that also in this case there was a huge variation in this variable which can be confirmed by the individual approach of farmers in this scope.

Table 2 compares values of pay-offs in a given year and income obtained from operating activities.

Table 2

Amount of current liabilities and balance of cash flow from operating activities in the farms investigated in the years 2004-2011

Year	Group number	Average [thousands.PLN]	Median thousands.PLN]	Minimum [thousands.PLN]	Maximum [thousands.PLN]	Standard deviation	Coefficient of Variation[%]
Current liabilities							
2004	2823	14.8	7.8	0.1	527.8	25.2	169.0
2005	3969	36.6	18.1	0.3	1952.2	71.6	195.0
2006	2927	36.4	16.9	0.4	1337.3	68.2	187.0
2007	3442	44.1	20.7	0.01	1443.8	84.5	191.0
2008	3610	45.9	23.6	0.4	1219.0	75.3	164.0
2009	3396	51.2	24.4	0.2	1839.3	91.1	177.0
2010	3304	57.1	27.5	0.3	1625.7	93.1	163.0
2011	3113	59.6	27.0	0.03	2905.4	106.1	177.0
Cash flow from operating activities							
2004	2823	63.5	41.6	-106.3	1168.5	78.0	122.0
2005	3969	77.5	53.6	-66.4	2536.4	97.6	125.0
2006	2927	89.2	60.0	-235.8	1395.1	100.5	112.0
2007	3442	100.2	67.0	-22.8	1781.9	122.1	121.0
2008	3610	100.4	67.3	-175.6	2362.2	119.0	118.0
2009	3396	109.0	71.7	-42.6	2773.0	141.7	130.0
2010	3304	131.1	87.2	-266.0	2208.1	153.0	116.0
2011	3113	144.4	95.0	-227.2	2246.6	179.9	124.0

Source: own calculations on the basis of FADN PL.

Current liabilities in the investigated period showed a consecutively high value from 15 thousand PLN in 2004 to almost 60 thousand PLN in 2011. This was a consequence of the change in the level of short-term and long-term debt. One can observe a big difference between minimum and maximum sizes of up to 2.9 million PLN in the final year analyzed. In all the years investigated, the average value of financial means obtained from operating activities was almost double to that of the average value of current liabilities which indicates a lack of risk in failing to meet payment deadlines. However, by analyzing the minimum values it can be stated that there were cases in which even paying off 100 or 300 PLN could be difficult. Farmers showed a negative balance from the operating activity which means that in their basic farming activity they incurred expenses which were higher than the income they obtained. This situation means that it was necessary to use savings or obtain income from the sale of dispensable fixed assets to cover the shortcomings. A single case of negative cash flow from the farming activity is not proof of a lack of financial liquidity but may result in a lack of liquidity in the following years. 2011 is worth noting due to that that that the maximum value of positive cash flow from farming activities was lower than the maximum value of current liabilities to be paid off that year. This difference amounted to around 700 thousand PLN. Such a situation may be a result of the unfavourable relation of product

prices and means of production which occurred that year. However, it seems that if a farm achieved a high surplus level of income over expenses it was able to accumulate enough savings which could be used to cover the shortcomings.

Table 3 compares the size of indicators of liquidity in the dynamic perspective according to the proposed methodological formula and traditional perspective – indicators of current and quick liquidity.

Table 3

Level financial liquidity indicator in the proposed perspective and current and quick liquidity indicator

Year	Financial liquidity indicato (WPF)		Current liquidity indicato (WBP)		Quick liquidity indicato (WSP)	
	average	median	average	median	average	median
2004	10.6	6.5	12.9	8.1	4.1	2.2
2005	5.4	3.5	5.2	3.3	1.9	1.0
2006	6.8	4.2	7.2	4.5	3.0	1.5
2007	6.6	3.9	7.2	3.9	2.6	1.2
2008	5.7	3.4	6.1	3.6	2.0	1.0
2009	7.1	3.5	7.7	3.7	3.3	1.2
2010	6.4	3.7	6.7	3.8	2.5	1.2
2011	8.4	4.0	10.2	4.5	4.3	1.4

Source: Own calculations on the basis of FADN PL.

All the indicators of liquidity irrespective of the accepted calculation method showed a higher level than zero and the average size higher than that recommended in academic literature [Sierpińska, Jachna 2005, p. 135], only the median indicator showed a level that was acknowledged as optimal in academic literature [Sierpińska, Jachna 2005, p. 135]. An assessment will not be made as to whether these indicators were at an appropriate or inappropriate level because this was not the aim of the paper. Initially it may have seemed that the indicator responsible for financial liquidity should be the quick liquidity indicator, however from the research it resulted that these sizes varied significantly. However, similar values were achieved in the case of the financial liquidity indicator and current liquidity indicator. This is a surprising result due to the fact that the size of financial means was compared, not the whole working capital. Higher differences were observed in this case in 2004. In the other years the financial liquidity and current liquidity indicators were almost at the same level. The indicator of quick liquidity showed half the size of the value. It was stated that the value of the most liquid of assets, liabilities and financial means was twice as low as the amount of financial means obtained from the basic activity. This is amongst others the effect of methodological assumptions used by FADN, according to which financial means are treated as a private asset of the farmer and do not increase the assets of the farm for which a balance sheet is drawn up. Moreover, the balance of financial means at the end of the year is a size which takes into consideration the financial and investment activity and means from the beginning of the year. It is worth noticing that decisions in the scope of investment are undertaken by farmers after the assessment of their financing. Moreover, it is worth emphasizing that in family farms similarly to the case of the enterprises of individual entities, there is a so called "till" from which financial means are used for private purposes as well as those of the farm including its liabilities.

To investigate mutual dependencies between the calculated indicators the Pearson correlation coefficient was compared in table 4.

Table 4

Correlation coefficient of financial liquidity and current and quick liquidity

Wyszczególnienie	Year							
	2004	2005	2006	2007	2008	2009	2010	2011
WPB	**0,78**	**0,76**	**0,81**	**0,39**	**0,83**	**0,94**	**0,81**	**0,95**
WSP	**0,68**	**0,65**	**0,70**	**0,35**	**0,70**	**0,92**	**0,73**	**0,94**

Correlation coefficient is significant at significance levels of $p<0.05$
Source: own calculations.

In all the years analyzed a positive dependency was observed amongst examined indicators of liquidity. The liquidity indicators calculated according to the proposed formula, t. counted as a relation of cash flow from the operating activity to current liabilities apart from 2003 showed a very high correlation coefficient (between 0.7-0.9) with indicators used in the traditional static way. This is proof of significant relations between the examined variables. This may indicate the possibility of measuring liquidity in family farms using this method. It is interesting that slightly stronger dependencies concerned the current liquidity indicator and the financial liquidity indicator despite the fact that the first one does not take all the elements of current assets into consideration. This was probably caused by a strong correlation (0.6-0.7) between reserves and cash flow. These strong correlations occurring between liquidity indicators in the static and dynamic perspective may indicate that the financial liquidity indicator is sufficient in the assessment of family farm liquidity.

Conclusion. The conducted assessment enabled the following summarizing statements:

1. In the investigated period, the family farms increased their level of debt which was mainly caused by the opportunities arising from using European funds associated with co-financing, investment goals and preferential loan conditions.
2. The financial liquidity indicator showed similar sizes to the current liquidity indicator and may indicate actual possibilities of farms in the scope of paying off debts.
3. The high level of correlation coefficients of liquidity indicators in the static and proposed perspective confirm that the assessment of financial liquidity on the basis of cash flow from the operating activity is a solution which can be used in family farms and enables the elimination of product reserves for which there is no active market as well as a lack of information about financial means remaining at the family's disposal.

Summing up, the proposed solutions in the scope of measuring financial liquidity may constitute a basis for defining the liquidity of the family farm and define the actual possibility of farms to pay off their debts. Such a solution can be used by farmers in their farms due to the fact that cash flows reflect the amount of financial means which remain after payments associated with agricultural activity. Such a balance should not cause any great problems for farmer because the result – the amount of financial means in the till or bank account – is controlled by the family on an ongoing basis.

4 References

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