ASSESSMENT OF ECONOMIC VIABILITY IN AGRICULTURE

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Abstract. *Research studies have given little credit to assessment of farm economic viability. Thus, the following scientific problem has been put forward: which methodology is the most appropriate for assessment of farm economic viability? Research findings by the researchers have shown that the concept of farm economic viability is a complex variable, not yet definitive and still fairly difficult to be explained in a single comprehensive way. Therefore, the definition of farm economic viability has been developed for the purposes of local research in order to design a methodology for assessment of farm economic viability. Absolute and relative financial or economic indicators are usually used for assessment of farm economic viability. As a result, the indicators characterising economic viability in agriculture have been sampled at the stage of the empirical assessment of farm economic viability. Following identification of the indicators and their components, the methodology for assessment of farm economic viability has been designed. The designed methodology has suggested that the mentioned indicators provide comprehensive characteristics of the situation that the farm operates in, i.e. are indicative of the current stage (survival, life, or development) of the farm. Empirical research on the model for assessment of economic viability of farms in Lithuania and EU-27, using the analogical results, has revealed that a majority of farms were viable and in the stage of development. The designed methodology will help farmers estimate the current stage of farm economic viability, as well as the period of their survival, life, and developed under the current condition.*

Keywords*: economic viability; assessment of economic viability; farmer's farm; the EU countries; financial indicators.*

Introduction

Economic viability is important for all agricultural entities and has become an increasingly relevant and widely discussed research subject. The relevance of the subject is based on the EU agricultural policy for the period of 2014-2020 that views growth of the economic viability of the small- and mid-sized farms as one of its priority aims. The objective to increase farm economic viability is sought by promoting entrepreneurship among farms, creating new working places and taking measures against reduction in rural population rather than making the farms larger.

Researchers (Adelaja, Sullivan & Lake, 2005; Popelier, 2005; Scott, 2001; Scott & Colman, 2008) typically use financial indicators and statistical methods to measure the economic viability of agricultural holdings. There are scientists (Offermann, Nieberg & Zander, 2009; Scott, 2005; Whitaker, 2010) who focus on the effect of support in assessing farm economic viability. Others (Adelaja, Garcia, Gibson & Lake, 2007; Cain, Anwar & Rowlinson, 2006; Popelier, 2005; Savickienė & Slavickienė, 2012) analyse the internal and external factors of economic viability. Assessment of the relative financial indicators of the farms alone does not provide clear insight into general condition of the farm or

tendencies of economic viability. It is, therefore, necessary to develop the methodology for evaluation of farms economic viability in the short or long period by using a common indicator in an integrative way. Thus, the following scientific problem has been put forward: which methodology is the most appropriate for evaluation of farm economic viability? This problem is relevant both in the theoretical and practical aspects. The novelty of the research is based on the innovative method of development of integrated indicator expressing the economic viability that will allow evaluate farms by forming the agriculture policy and farm perspectives.

Research object: assessment of farm economic viability.

Research aim: to develop the methodology for assessment of economic viability in agriculture.

Research objectives:
1) to provide the definition of farm economic viability within the research context;
2) to assess the methodologies for assessment of economic viability suggested by researchers and identify the most significant indicators for assessment of economic viability of farms;
3) to develop the methodology for assessment of economic viability in agriculture.
4) to perform the empirical research on the model of economic viability assessment based on the analogical findings on farms in Lithuania and the EU.

The following methodology has been applied to solution of the scientific problem:
- The concept of farm economic viability has been developed under the methods of scientific literature analysis, summarization, and comparison.
- The common scientific research methods have been used in analysis of the methodologies for evaluation of economic viability and identification of the most significant indicators used in assessment of farm economic viability, including the common scientific methods of research: literature analysis and synthesis, induction and deduction, comparative methods and the graphic visualization.
- The model for assessment of economic viability in agriculture has been developed under the common scientific research methods of monographic research, synthesis, summarization, and comparative analysis.
- The methods of grouping, comparison, connection, and graphical representation have been used for processing and systematization of statistical information.

The research is based on the research data on performance results by farmers' farms entered into the Farm Accountancy Data Network (FADN). Data on performance of the Lithuanian farms from the FADN, period 2010-2012, have been used for the research. EU-27 farm data for the year 2011 have been used due to absence of later consolidated statistics on the EU level. The data on the EU countries have been published in the *EU farm economics overview FADN 2013*.

Authors' further research focus is identification of major factors of assessment of farm economic viability.

Concept of farm economic viability

Farm economic viability is a rather ambiguous concept that is difficult to define in a universally appropriate way. Farm economic viability is defined in a variety of different ways in scientific literature (Bossel, 2001; Koleda & Lace, 2009; Scott & Colman, 2008). Interpretation of the concepts of farm economic viability depends largely on certain aims of assessment, as researchers have employed financial, economic, social, ecological, and environmental dimensions of viability for assessment of farm economic viability. Farm economic viability is the most usual term used in the research literature. Nonetheless, its meaning has become less definitive in economic terminology. As a result, findings are often interpreted differently due to absence of a precisely defined concept of farm economic viability.

Farm market activity is subject to constant change of farm economic viability. This is caused by indefinite nature of the farm activity, volatility of the expected results, risky decisions in light of the changing

context. The need for assessment of farm economic viability has become even more urgent due to rapid change of market conditions. If not assessed, farm economic activity may affect performance results of a farm on the market.
According to researchers (Bossel, 2001; Scotti, Bergmann, Henke & Hovorka, 2011), despite the large number of various approaches towards farm economic viability, all of them may be essentially merged into two main groups that characterise farm economic viability: first group – capability of a farm to survive, second - farm economic viability viewed as development of a farm (Table 1).

Table 1. Analysis of notions of economic viability

Author	Notion/approach	Approaches towards farm economic viability
Singh, Bhullar and Joshi, 2009	Economic viability – profitable activity by a farm.	Survival
Lin, 2002	Economic viability – an expected profit margin.	
Morehart, 2000	Economic viability in the short term – farm value added covering variable costs only.	
Scott, 2005	Economic viability – positive net value added result of a farm.	
Popelier, 2005	Economic viability – optimum use of available funds.	
Koleda & Lace, 2009	Economic viability in the long term – farm total output at basic prices covering total farm costs and household costs.	
Adelaja & Sullivan, 1998	Economic viability – positive cash flows ensuring liquidity and solvency of a farm.	
Dillon, Hennessy, Hynes & Commins, 2010	Economic viability – profitable and prospective activity.	Development
Adelaja et al., 2007	Economic viability – profitable and stable activity of a farm.	
Koleda & Lace, 2009	Economic viability – capability of a farm to grow and develop as a result of optimum allocation and effective use of resources.	

The aforementioned groups enable differentiation of the concept of farm economic viability that represents general scientific approach towards dichotomy of farm economic viability. In the first case, farm survival is in the focus, while in the second case, economic viability is perceived as development of a farm.

When the concept of farm economic viability is analysed within the context of farm survival, certain attributes that determine the farm survival factors acting on farm economic viability must be considered:
- negative net value added of a farm;
- misbalanced payments of a farm;
- climate fluctuations (loss of assets);
- seasonality of activity.

The above factors affect agricultural activity, organization of production, performance efficiency, financial result of the activity, and, in turn, farm economic viability.

The analysed factors are suggestive of the concept of farm survival, based on the researchers' ideas, namely: farm survival is the condition, when farm sustains on the reserve rather than net value added (Scotti et al., 2011).

When the concept of farm economic viability is analysed within the context of farm development, certain attributes that determine the farm development factors acting on farm economic viability must be considered:
- positive net value added of a farm;
- balanced payments of a farm;
- stable farm growth;
- investment into new technologies; knowledge; innovations, etc.

The aforementioned factors are more focused on qualitative and quantitative changes, i.e. on farm growth and development. Qualitative changes cover progress, modernization, technologies, consistent improvement of processes at a farm. Quantitative changes cover growth of farm activity.

The analysed factors are suggestive of the following concept of **farm development**, namely, that farm development is the farm condition, when the farmer leverages farm resources for further development (Koleda & Lace, 2009).

Certain researchers (Bossel, 2001; Scotti et al., 2011) combine the concepts of survival and development to define viability and suggest viewing viability systematically. Scott (2005) and Park and Allaby (2013) extend the systematic assessment of the viability concept by introducing the concept of farm life.

When the concept of farm economic viability is analysed within the context of farm life, certain attributes that determine the farm life factors acting on farm economic viability must be considered:
- output at basic prices;
- intermediate consumption;
- depreciation;
- external factors.

The aforementioned factors have effect on the financial performance result and, in turn, farm economic viability. The analysed factors are suggestive of the concept of **farm life**, which, pursuant to the researchers' insights, is the condition, when net value added is sufficient for the farm to live (Scott, 2005). According to Bossel (2001), a farmer satisfies a majority of his/her physiological, safety, social and other needs by developing his/her activity. *The theory of needs* focuses on what the farmer needs to live his/her life to the fullest. Persons working at the farms develop their needs as well as sequence of steps towards satisfaction of such needs. This means that they will not necessarily direct their activity towards growth or development of the positive result.

In order to identify the functional importance of components comprising the concept of farm economic viability at all stages of farm lifecycle, the systematic approach towards viability must be employed. Such approach enables a wide variety of studies that may be performed. The starting point for the direction of studies is the definition of viability.

In general, the concept of farm economic viability has a number of different definitions: from the capability to survive to farm development. The concept of farm economic viability has been developed taking into account the concepts used by researchers in other countries (Bossel, 2001; Park & Allaby, 2013; Scotti et al., 2011). Economic viability of a farm is its capability to survive, live, and develop by using the available resources.

Theoretical reasoning of assessment of farm economic viability

A number of various relative indicators, methods of their grouping, calculation as well as employment for analysis have been provided in scientific literature. Although grouping of indicators facilitates their analysis, different authors group same indicators under different principles, which means that the groups differ not only by the indicators, but also by the number of indicators. Opinions of both Lithuanian and foreign authors differ in this respect.

Indicators that must always be assessed for consistent analysis of changing situation of a farm are highly important, as they allow explaining the key aspects, identify benefits and shortcomings of the farm activity. Interpretation of indicators empowers the researchers in assessment and development of possible solutions. It is, therefore, important to perform systematic analysis of farm economic viability by combining the components of concept (survival, life, and development).

Analysis of studies on assessment of farm economic viability performed by researchers (Argiles, 2001; Koleda & Lace, 2009; Popelier, 2005; Scott, 2008; Tillack & Epstein, 2000; and others) has suggested

that there is no single opinion on which indicators in the methodology provide the best assessment of farm economic viability. Differences in opinions are usually determined by researchers' individual approaches towards economic issues, and the diversity of opinions demonstrates the necessity to establish a methodology for assessment of farm economic viability.

Researchers (Scott, 2001; Singh et al., 2009) claim that significant differences between farm economic viability may be observed, if viewed individually in different countries. This is determined by natural differences, different support policies, return on investment, labour productivity, land productivity, etc. It is, therefore, important to analyse and assess methodologies for assessment of economic viability and their applicability to determination of farm economic viability in Lithuania.

Absolute and relative indicators are usually used for assessment of farm economic viability. Indicators that must always be assessed for consistent analysis of changing situation of a farm are highly important, as they allow identifying the stage of economic viability of a farm activity.

Main information used in assessment of farm economic viability is drawn from financial statements. Statements provide evidence of assessment of internal indicators of farms. Relative financial indicators would probably provide the simplest way for assessment of farm economic viability. Indicators are grouped by two research directions. One group of researchers presents indicators for assessment of farm economic viability and provide evidence for their limits by empirical research, while other researchers confine to presentation of the indicators only.

Scientific literature analysis has shown that 20 relative indicators have been usually used by the researchers. Relative indicators included by the researchers into their final models for assessment of farm economic viability are presented in Table 2. Table 2 presents only the indicators that have been used more than once. The total of eleven indicators satisfying this condition have been identified.

Based on the studies employing regression analysis performed by researchers (Doye, 2009; Scott & Colman, 2008; and others), indicators identified as the most significant are equity and return on assets, debt ratio, operating expense ratio, current ratio, gross margin, as they have been used most often in the researchers' methodologies.

Table 2. Comparative analysis of methodologies on assessment of farm economic viability

Indicators	Frequency of use, number of occurrences
Return on equity: farm net value added / equity	******** - 8
Return on Assets: farm net value added / assets	******* - 7
Operating expense ratio: expense / total output at basic prices	******* - 7
Current ratio: current farm assets / current farm liabilities	***** - 5
Debt to assets: total farm liability / total farm assets	**** - 4
Gross margin: farm gross value added / total output at basic prices	**** - 4
Asset turnover ratio: total output at basic prices / total assets	*** - 3
Labour productivity: Farm net value added / annual work unit (AWU)	*** - 3
Land productivity: Farm net value added / hectare of UAA	*** - 3
Debt to total output ratio:: debt / total output at basic prices	** - 2
Depreciation expense ratio: expense / total output at basic prices	** - 2

The set of identified indicators fails to comprehensively define the situation that the farm operates in, i.e. does not reflect the current stage of farm activity (survival, life or development stages).

Analysis of methods for assessment of economic viability has suggested that the choice of specific farm economic viability indicators should be guided by the goals of farm economic viability, such as:
- growth of agricultural output;
- assurance of normal standard of living for farmers;
- market stabilization;
- assurance of foodstuff and other agricultural product supply and storage conditions;

- assurance of consumers' access to foodstuff at prices acceptable to the consumers (European Commission, 2010).

Given that key goals of farm economic viability are related to farm life and development, the aforementioned combination is usually targeted towards assessment of indicators. However, Bossel (2001) has noted that certain shortcomings of farm economic viability become evident, when assessment of farm economic viability is interpreted by focusing on the sets of indicators. On the other hand, calculation of individual indicators fails to provide comprehensive information and makes interpretation more difficult. Yet, no attempts have been made to develop a single integrated indicator consisting of the existing sampled indicators under the systematic approach. The integrated indicator would enable faster determination of the farm activity stage and the measures that must be undertaken to improve farm economic viability (Bossel, 2001).

Studies by Koleda & Lace (2009), J.M. Argiles (2001) have shown that financial factors and the indicators defining them are the most significant. The question is which financial indicators should be applied, and which of the indicators are more important. Financial indicators found most often in scientific literature for assessment of farm economic viability is presented in Table 3. Koleda & Lace (2009) have developed factor analysis models for indicators sampled under the method of regression analysis and have performed the study to analyse the components of each specific indicator.

Following the analysis of indicators used in the methodologies for assessment of farm economic viability (Table 3), comprehensive analysis of eleven indicators has been performed.

Information in Table 3 is suggestive of the importance to include not only the relative financial indicators (grouped by stability, solvency, profitability, turnover, and performance efficiency), but also other non-financial indicators into assessment of farm economic viability. Four main components may be identified in the methodology for description of financial indicators (Table 3) based on their more than two occurrences: total output at basic prices, costs, assets, liabilities. Nonetheless, other indicators presented reflect the components of the main indicators (current debt, current assets, depreciation, intermediate consumption, etc.).

Table 3. Indicators defining assessment of farm economic viability (Koleda & Lace, 2009)

Indicators	Calculated for agriculture	Description of indicators
Return on Equity	$ROE = \frac{TO_{BP} - (INT_{CONS} + T + D + EXT_{FAC} + UNP_{LAB})}{E}$	TO_{BP} – total output at basic prices INT_{CONS} – intermediate consumption T – taxes D – depreciation EXT_{FAC} – external factors UNP_{LAB} – value of unpaid labour (farmer and family members) A_{CURR} – current farm assets A_{FIXED} - fixed assets D_{CURR} –current debt D_{FIXED} – fixed debt L – liabilities A – assets E – equity AWU – annual work unit HA - hectare of the utilizable agricultural area (UAA)
Return on Assets	$ROA = \frac{TO_{BP} - (INT_{CONS} + T + D + EXT_{FAC} + UNP_{LAB})}{A}$	
Operating expense ratio	$OPER_{EXP} = \frac{(INT_{CONS} + T + D + EXT_{FAC} + UNP_{LAB})}{TO_{BP}}$	
Current ratio	$CURRENT = \frac{A_{CURR}}{D_{CURR}}$	
Debt to Assets	$D = \frac{L}{A}$	
Gross margin	$GROSS_{MARGIN} = \frac{TO_{BP} - (INT_{CONS} + T)}{TO_{BP}}$	
Asset turnover ratio	$A_{TURN} = \frac{TO_{BP}}{A}$	
Labour productivity	$LABOUR_{PROD} = \frac{TO_{BP} - (INT_{CONS} + T + D + EXT_{FAC} + UNP_{LAB})}{AWU}$	
Land productivity	$LAND_{PROD} = \frac{TO_{BP} - (INT_{CONS} + T + D + EXT_{FAC} + UNP_{LAB})}{HA}$	
Debt to total output ratio	$D\_TO = \frac{L}{TO_{BP} - (INT_{CONS} + T + D + EXT_{FAC} + UNP_{LAB})}$	
Depreciation expense ratio	$D_{EXPEN} = \frac{D}{TO_{BP}}$	

Debt to total output ratio	$D\_TO = \frac{L}{TO_{BP} - (INT_{CONS} + T + D + EXT_{FAC} + UNP_{LAB})}$	*HA* - hectare of the utilizable agricultural area (UAA)
Depreciation expense ratio	$D_{EXPEN} = \frac{D}{TO_{BP}}$	

The integrated indicator is offered to be developed from the components (Figure 1) of the most frequently occurring indicators (Table 3) with reference to the conducted analysis and for the purpose of development of the model for assessment of farm economic viability, as these components define the stages of survival, life, and development and may be attributed with specific characteristics of the respective area.

According to researchers (Scotti et al., 2011), debt indicator is very important in assessment of farm economic viability during the survival stage of farm activity, as the indicator reflects the capabilities of the farm to comply with its liabilities and find sources to cover the emerging losses. It demonstrates the possibilities for restoration and preservation of the farm activity.

Worsening financial condition of farmers' farms could hardly be avoided at the life stage of farm activity in the modern business environment. Therefore, the size of available assets is highly important in business development of farm activity, as the size of available assets points at the solvency level, possibilities for the farm to draw funds from internal resources, financial risk, threat of non-viability threat.

According to certain researchers (Morehart, 2000; Zeddies, 1991), the development stage of farm activity reflects the farmer's possibility to combine the capital, labour and natural resources for organization of business, implementation of innovations for the purpose of generating profit and taking risk with own assets. Farm economic viability is determined by the capability to produce better and at lower cost than others. Development stage of farm activity reflects the total output at basic prices and costs that are viewed as positive performance result of farming activity by a farmer's farm for the certain period.

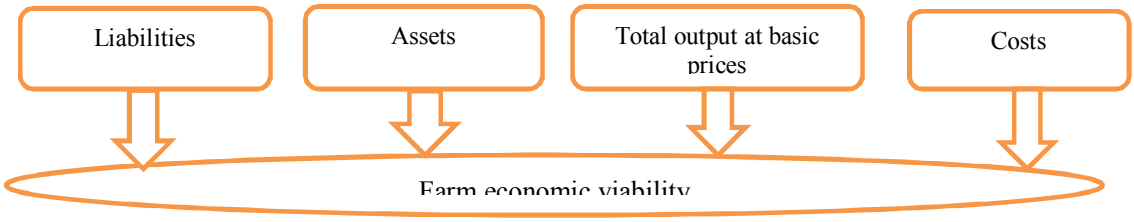

Figure 1. Components of the model for assessment of farm economic viability

The proposed components of the model for assessment of farm economic viability would reflect all the main analysed activity areas of farmers' farms, as the insufficient representation of the activity areas is one of the main shortcomings of the models applied by the aforementioned authors.

In general, indicators comprising survival, life, and development stages of farm activity could be claimed to be economic, as they combine production factors (capital, labour and natural resources) and point at the capability to organize business, develop and introduce innovations, taking risk with own assets and welfare for the purpose of profit generation. Interpretation of the survival, life, and development indicators depends on certain goals of the assessment, as researchers have attempted to assess not only the economic, but also entrepreneurial, technology, strategic, human, and other factors.

The paper further deals with development of model for assessment of farm economic viability that would enable not only forecast any impairments of the financial condition of farm in advance, but also assess the development potential of the farm.

Methodology for assessment of farm economic viability in agriculture

In view of the discussed theoretical methodologies for assessment of farm economic viability and the most significant indicators for assessment of farm economic viability, two key integrated components of the model for assessment of farmers' farm activity may be put forward:
1) indicator reflecting the farm condition;
2) indicator assessing farm economic viability.

Methodology for assessment of economic viability in agriculture is formed of two indicators. The first indicator reflecting the farm condition is an intermediate indicator pointing at farm performance, earnings for the reporting period, and current stage (survival, life, or development) of the cycle. If positive, the indicator shows the share of farm gross value added at basic prices, left for the farm development potential, while negative result signals the level of risk at the farm (1). The indicator of farm condition ensures the fastest and most accurate identification of disturbances in farm activity.

(1) $$FARM_{CONDITION} = \frac{TO_{BP}}{(INT_{CONS} + T + D + EXT_{FAC} + UNP_{LAB})}$$

The indicator of farm condition assesses the share of total output at basic prices that may be generated by the farm from its main activity. This indicator also points at the possibilities for the farm to change the nature of its activity. Farm condition is in the stage of survival, if the indicator of farm condition is above 1. In case of stable farm activity, the indicator usually ranges between 1 and 12, which means that the farm is in the stage of life. If the farm is in the stage of development, this indicator defines profitability of activity and must be higher than ratio 1.2 (Doye, 2009).

For integrated assessment of farm economic viability, two types of indicators are used in the research defining the farm condition and solvency (ratio of farm total assets to total liabilities). Application of different indicator groups helps make proper assessment of different aspects of farmer activity.

Following assessment of the farm condition, the integrated indicator assessing the farm economic viability (2) is calculated and covers the farm assets, liabilities, total output at basic prices, and costs (Figure 1). Several indicators have been used for assessment of farm economic viability. A single integrated indicator is formed of the components of those indicators to identify the current stage of farm (2).

(2) $$ECONOMIC\_VIABILITY_{FARM} = \frac{TO_{BP} + (A_{CURR+}A_{FIXED})}{(INT_{CONS} + T + D + EXT_{FAC} + UNP_{LAB}) + (D_{CURR+}D_{FIXED})}$$

The composed integrated indicator assessing farm economic viability will help not only better forecast any impairments of the financial condition of farm, but also assess the yet unemployed potential for development, as well as the extent to which this potential would support life and development of the farm. If below 1, the indicator is indicative of the period left for the farm to sustain on the available potential. If above 1, the indicator is indicative of the potential for farm development.

Empirical research on assessment of economic viability at farmers' farms in Lithuania and the EU

For empirical verification of the research methodology, the research has covered farmers' farms in Lithuania in 2010-2012 and the EU, according to the year 2011 data stored in the FADN.

The model for assessment of farm economic viability is developed by employing the three-year data of farmers' farms engaged in agricultural activity that performed accounting and provided information on their operation and financial activity. N.K. Malhotra (2007) equation has been used to validate representativeness of the sample and has shown that in 2010 – 108.0 thousand, in 2011 – 110.2 thousand, while in 2012 – 113.8 thousand of farmers' farms were registered in Lithuania, according to farmers'

farm registry data. This means that for the data to be reliable in terms of the number of farms, about 900 farms must be taken for each year. The authors have used the data of over 1300 farmers' farms for each year analysed in the research. The estimated indicator of farm condition has shown the earnings of the farm and presence/absence of any loss during the reporting year (Table 4).

Table 4. Empirical study of the indicator reflecting the farm condition

Meaning of the indicator	Y 2010		Y 2011		Y 2012	
	Number of farms, units	%	Number of farms, units	%	Number of farms, units	%
< 1.0	284	21.7	293	22.4	226	17.3
1-1.2	256	19.6	266	20.4	234	17.9
1.2-1.4	277	21.2	321	24.6	301	23.1
1.4-1.6	220	16.8	189	14.5	235	18.0
1.6-1.8	136	10.4	120	9.2	151	11.6
1.8-2.0	57	4.4	59	4.5	71	5.4
2.0-3.0	64	4.9	53	4.1	74	5.7
> 3.0	14	1.1	5	0.4	12	0.9
Total	1308	100	1306	100	1304	100

Data in Table 4 suggest that the majority of farms incurred loss in 2010–2011, as the indicator was below 1, i.e. was about 22 % (farm activity in the survival state). It is, therefore, important that a farm becomes aware of the necessity to renovate promptly. The indicator grew by 5 % points in 2012. A considerable share of farms was in the life stage, ranging from 17.9 % to 20.4 % in the analysed period. In case a farm is in the life stage, it may either continue to grow or, having overestimated its capabilities, be subject to reducing production rates. Activity of the remaining share of farms is in the development stage, which has accounted for the 60 % of all the analysed farms. This stage of development is characterized by further growth of farms. This stage involves growth of physical capital (buildings, equipment, etc.), improvement of the products and the scope of production. Growth occurs at varying rates regardless of the stage, as it depends on seasonality of the activity, climate fluctuations, market conditions, inflation, etc.

Indicator of assessment of farm economic viability is integrated, as it is comprised of two indicators defining the farm condition and level of general solvency (Table 5).

Table 5. Empirical study of the indicator assessing farm economic viability

Meaning of the indicator	Y 2010		Y 2011		Y 2012	
	Number of farms, units	%	Number of farms, units	%	Number of farms, units	%
< 1.0	6	0,5	4	0,3	4	0.3
1.0-2.0	153	11.7	168	12.9	158	12.1
2.0-3.0	346	26.5	372	28.5	400	30.7
3.0-4.0	312	23.8	353	27.0	369	28.3
4.0-5.0	235	18.0	205	15.7	194	14.9
5.0-6.0	133	10.2	116	8.9	90	6.9
6.0-7.0	68	5.2	44	3.4	38	2.9
> 7.0	55	4.2	44	3.4	51	3.9
Total	1308	100	1306	100	1304	100

The estimated indicator assessing farm economic viability and the data in Table 5 suggest that only 0.5 % of farmers' farms are in the survival stage. On the other hand, the indicator of farm condition provided the result of 20 % of such farms. Hence, assessment of farm economic viability must follow calculation of the indicator of farm condition, as positive results of the indicator assessing farm economic viability is largely affected by the size of assets of the farmers' farm. Non-current and current liabilities included into the methodology are indicative not only of the financial risk of farmers' farm, but also should be one of the key indicators reducing farm economic viability. On the other hand, the level of liabilities in the indicator of farm economic viability shows low debt of farmers. About 16 % of the analysed farms

were debt-free. The level of debt is low both in Lithuania, and in the EU-27. Assets exceed debt by 4–6 times (European Commission, 2013).

Table 6. Empirical study of indicators of farm condition and assessment of farm economic viability (FEV) in Lithuanian farms, 2011

Stages of farm activity								
Survival			Life			Development		
Farm code	Indicator of the farm condition	FEV indicator	Farm code	Indicator of the farm condition	FEV indicator	Farm code	Indicator of the farm condition	FEV indicator
Trak 50	0.437305	3.66195	Kaun117	1.03062	0.9891	Trak 307	1.73074	16.3391
Mari 53	0.468429	3.62646	Kelm501	1.00239	0.9511	Roki 302	1.14580	15.8709
Plun 14	0.476617	4.37242	Akme 25	1.02444	0.7147	Roki 134	1.98337	15.4941
Mari 132	0,486769	5.52345				Skuo 80	1.05756	14.8637
Jurb 146	0.494198	2.95172				Pakr 26	2.26899	14.0852
Siau 39	0.501783	1.86531				Mari 43	2.80635	13.9529
Akme 76	0.534778	1.56108				Skuo127	1.49060	13.6454
Akme 55	0.544593	1.87271				Jurb 138	3.73271	13.1428
Zara 47	0.549081	2.13377				Tels 131	1.53627	12.8126

Data in Table 6 suggest that while the indicator of farm condition is negative for farms in the survival stage, the estimated integrated results of the indicator assessing farm economic viability are good and imply that, under the current condition, a farm in Akme 55 would be subject to the shortest period of survival, i.e. 1.6 years, while a farm in Mari 132 would have the longest time to survive, i.e. 5.5 years. This is influenced by the size of available farmers' assets used in the farm activity.

Estimation of the indicators of farm condition and assessment of economic viability of farms in the life stage has suggested that the indicators are very similar and equal to 1 (Table 6). This is due to worsening financial condition that can hardly be avoided at the beginning of farm activity, as well as rapidly changing environment that the farmers become subject to.

The indicators (Table 7) are good for the farms in the development stage and show that, if as long as the farm maintains the current condition, the farmer is capable of accumulating the reserve, investing into assets, new technologies, etc. Main goal of any farmers' farm is not only production of the amount of agricultural and food products to satisfy the family needs, but also generation of sufficient income to ensure normal standard of living for the family and further development of the anticipated activity.

Table 7. Empirical study of indicator of assessment farm economic viability (FEV) in the EU farms, 2011

Country	FEV assessment indicator	Indicator of the farm condition
(DAN) Denmark	1.54	0.99
(SVK) Slovakia	1.75	0.77
(FRA) France	1.80	1.09
(LVA) Latvia	1.82	0.88
(EST) Estonia	1.87	0.91
(CZE) Czech Republic	2.08	0.88
(BEL) Belgium	2.13	1.12
(NED) Netherlands	2.14	1.04
(SUO) Finland	2.19	0.86
(SVE) Sweden	2.22	0.89
(HUN) Hungary	2.27	1.03
(BGR) Bulgaria	2.33	0.95
(DEU) Germany	2.69	1.00
(LTU) Lithuania	2.89	1.03

(LUX) Luxembourg	3.00	0.92
(ROU) Romania	3.81	1.07
(POR) Portugal	4.38	1.16
(OST) Austria	4.41	1.13
(UKI) United Kingdom	4.54	1.07
(POL) Poland	4.85	1.05
(MLT) Malta	5.18	1.01
(SVN) Slovenia	6.54	0.93
(ELL) Greece	6.58	1.17
(CYP) Cyprus	6.63	1.17
(ESP) Spain	7.56	1.25
(ITA) Italy	10.56	1.39
(IRE) Ireland	12.35	1.08

The integrated indicator assessing farm economic viability in the EU-27 calculated under the developed methodology for assessment of farm economic viability on the basis of the FADN data on farmers' farms has shown that all farmers' farms were viable, as the integrated indicator assessing farm economic viability was above 1.

The indicator of farm condition in ten countries (Denmark, Slovakia, Latvia, Estonia, Czech Republic, Finland, Sweden, Bulgaria, Luxembourg, Slovenia) was negative (Table 7). Nonetheless, the indicator assessing farm economic viability was good and showed the potential of farms to grow both in terms of physical and human capital. The integrated indicator is largely determined by the assets and liabilities, which means that the value of this indicator points at higher level of solvency and lower financial risk.

Conclusions and implications

Research findings by researchers who have analysed farm economic viability have shown that the concept of farm economic viability is a complex variable, not yet definitive and still difficult to be explained in a single comprehensive way. The notion of farm economic viability has been developed taking into account the concepts employed by researchers in other countries and emphasizing the stages of farm lifecycle. Economic viability of a farm is its capability of survival, life, and development using the available resources.

Assessment of the methodologies for assessment of economic viability proposed by the researchers and identification of the most significant indicators assessing farm economic viability have suggested that the researchers tend to emphasize different indicators assessing farm economic viability and classify them under different principles. As a result, the indicators characterising economic viability in agriculture have been sampled at the first stage of the empirical assessment of farm economic viability.

After the indicators and their components have been identified, the methodology for assessment of farm economic viability has been formed of two indicators. The first indicator reflecting the farm condition is an intermediate indicator pointing at farm performance, earnings for the reporting period, and current stage (survival, life, or development) of the cycle. Following assessment of the farm condition, the integrated indicator assessing the farm economic viability has been calculated and has covered the farm assets, liabilities, total output at basic prices, and costs. Such combination provides comprehensive characteristics of the situation that the farm operates in. The advantage offered by the methodology is identification of the limits of viability that may be used to assess farm economic viability. The integrated assessment indicator developed in the methodology may be used not only as the indicator assessing short-term viability, but also as an important tool for assessment and forecasting of economic viability of farms in the long run.

Empirical research on the model for assessment of economic viability of farms in Lithuania and EU-27, using the analogical results, has revealed that as many as 22 % of Lithuanian farms and farms in ten of the analysed EU countries incurred loss according to the intermediate indicator, i.e. condition of farm.

On the other hand, the integrated indicator assessing farm economic viability has shown that a large share of the farms were viable and in the stage of development. This was determined by the farmers' assets exceeding debts by 4–6 times.

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