AGRICULTURAL SUPPORT INFLUENCE ON FARM FINANCIAL STABILITY

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Abstract
Strategically and socially, agriculture is an important part of European economy. It is important to work efficiently not only to large family farms or agricultural cooperatives but also to small and medium-sized family farms. Researchers showed that Lithuanian farms are financially stable. However, there is lack of studies about agricultural support influence on farms financial stability and profitability. Also farm profitability ratios depend on farm type. This paper investigates farms financial stability and profitability after elimination agricultural support according to farm type. In the investigation applied statistical analysis.

Key words: *farm, profitability, stability, agricultural support*

INTRODUCTION

Direct payments ensure financial stability for farmers in the form of a basic income support, decoupled from production, stabilising their income stemming from sales on the markets, which are subject to volatility. In order to maximise their profits, producers must respond to market signals, so that they produce goods that are demanded by consumers. Direct payments also contribute, in combination with cross-compliance, to providing basic public goods delivered through sustainable farming.

Researchers generally tried to predict the probability of organisations' bankruptcy, insolvency or financial distress by employing financial ratios. Leathers, Chavas (1988) analysed the impact of policy action on farms' insolvency and their withdrawal from farming. DeVaney (1994) analysed which financial ratios best reflect family farm insolvency. Davies (1996) examined the reasons for English and Welsh farm insolvency. Wadsworth, Bravo-Ureta (1992), Franks (1998) prognosticated financial distress among UK farms. Argiles (2001) analysed financial viability in Spanish farms, Santarossa (2003) – financial health in Scottish farms. Some of more recent studies were carried out by Cross, Buccola ir Thomann (2009) which analysed the solvency of agricultural cooperatives. Tamošaitienė et al (2010) assessed the stability of family farms by employing financial analysis ratios.

The object of the research – farm financial stability. *The aim of the research* – to evaluate agricultural support influence on farm financial stability. To achieve the aim of the paper, there are solving the following objectives: (1) to analyse and summarise the financial ratios of farms; (2) to calculate financial ratios of Lithuanian farms according to type of farming; (3) to evaluate agricultural support influence on Lithuanian farm financial stability. To achieve the aim of the paper, and dealing with the set objectives, general scientific research methods (comparative analysis and synthesis, and generalisation, quantitative content and contextual analysis, statistical research techniques) were used.

The main data source for this paper is a Farm Accountancy Data Network (FADN). The specific data used are based on Lithuanian family farm records for the calendar years 2010-2012. Selected farms cover all districts, natural zones and reflect different farming conditions.

BACKGROUND AND METHODOLOGY

Consecutive years of financial measures developed in a consistent manner provide the best information about changes in financial position of farm (Doye, 2009). Financial ratios vary

considerably among farms of different types, for instance, dairy operations and horticulture operations. What may be critical for one farm might be tolerable for another (Doye, 2009).

According to Capital Structure Theory, debt to asset ratio (D/A) is the measure of financial position. Debt to asset ratio indicates the proportion of total assets owed to creditors (Doye, 2009). The higher the ratio, the greater the risk exposure for the business and those providing loan funds for the business and the less flexibility the operator has to respond to adverse natural or market phenomenon (Doye, 2010).

Although there is no exact standard for every farm business, a debt-to-asset ratio greater than 0.50 indicates that less than 50 percent of the value of the farm's total assets is contributed by owners. Faced with this situation, the creditors are likely to be cautious in advancing additional funds (Doye, 2010).

High debt-to-asset ratios have been interpreted as an indication of farm financial distress. In 2007, Lithuania Ministry of Agriculture indicated "The Economic viability evaluation rules" where those farms with a debt-to-asset ratio above 70 percent were likely to experience very high financial distress (LR žemės…). Farms experiencing high financial distress may have to consider restructuring or refinancing debt. Farms experiencing very high financial distress may have to liquidate certain assets in order to improve their farm financial position (Doye, 2010).

It has to be noted that an opinion is found in the scientific literature that solvency ratios cannot present a reliable picture of the family farm's financial position and therefore some authors (Doye, 2009; Blonde, 2009; Becker el at, 2009) recommend also calculating profitability ratios (Net farm income from operations, Rate of return on farm assets, Rate of return on farm equity, Operating expense ratio). No one measure can indicate farm financial stability. Instead, several measures must be calculated to give a more complete picture. Solvency and profitability are areas for which financial measures are useful (Doye, 2009).

Table 1. Farm Financial Ratios and Benchmarks Calculations

Ratio	Calculation including subsidies	Calculation excluding subsidies
D/A	Total Farm Debt / Total Farm Assets + subsidies for investment	Total Farm Debt / Total Farm Assets
NFIR	(Net Farm Income From Operations + subsidies for production) / Gross Revenue	Net Farm Income From Operations / Gross Revenue
ROA	(Net farm income from operations + subsidies for production + farm interest expense – value of operator's labour & management) / Average farm assets	(Net farm income from operations + farm interest expense – value of operator's labor & management) / Average farm assets
ROE	(Net farm income from operations + subsidies for production – value of operator's labour & management) / Average farm equity	(Net farm income from operations – value of operator's labour & management) / Average farm equity
OPM	(Net Farm Income From Operations + subsidies for production + farm interest expense – value of operator's labor & management) / Gross Revenue	(Net Farm Income From Operations+ farm interest expense – value of operator's labour & management) / Gross Revenue

Net farm income from operations (NFIR) represents the return to unpaid labour, management, and owner equity. There is no single standard for farms of different sizes with different enterprises. Net cash income is adjusted for changes in inventory and depreciation. Changes in inventory (accrual adjustments) may add to income (increases in accounts receivable, prepaid expenses, cash investments

in growing crops, supplies on hand) or decrease income (increases in accounts payable, taxes due, or other liabilities) (Doye, 2009). Kohl et al (2009) suggest looking at trends in the market. According to authors this ratio varies with cyclical nature of agricultural prices and income.

Table 2. Farm financial ratios critical values

Ratio	Financial ratios critical values			Notes
	High	Fair	Low	
D/A	< 30%	30-70%	>70%	Kohl et al (2009); Economic viability evaluation rules (2007-2013)
	< 30%	30-50%	>50%	Economic viability evaluation rules (2005-2006)
	< 30%	30-60%	>60%	Doye (2009), Kohl et al (2009), Becker et al (2009)
NFIR	>20%	10-20%	<10%	Becker et al (2009)
ROA	>8%	4-8%	<4%	Becker et al (2009)
	>5%	1-5%	<1%	Doye (2009), Kohl et al (2009) (for mostly owned assets)
	>12%	3-12%	<3%	Kohl et al (2009) (for mostly rented or leased assets)
ROE	>10%	3-10%	<3%	Becker et al (2009)
	>10%	5-10%	<5%	Doye (2009)
OPM	>25%	15-25%	<15%	Becker et al (2009)

Rate of return on farm assets (ROA) serves as an index of profitability. The higher the value, the more profitable is the business. ROA is most meaningful in year-to-year comparisons if assets are valued using their cost basis. ROA for agricultural assets is typically low compared to nonfarm investments (Doye, 2009).

Rate of return on farm equity (ROE) also serves as an index of profitability. Like ROA, the higher the value, the more profitable is the business. ROE is most meaningful in year-to-year comparisons if assets are valued using their cost basis. If debt is being used advantageously, ROE will be greater than ROA. ROE can be compared to the return that could be earned in alternative investments, such as certificates' of deposits, bonds, or stock mutual funds (Doye, 2009). Kohl et al (2009) suggest looking at trends and comparing to other farm and non-farm investments.

Operating expense ratio (OPM) indicates the proportion of total income used to pay expenses. The higher the ratio, the greater the financial risk in periods of low market prices (Doye, 2009).

RESULTS

Results of the present study provide information on development of annual FADN Survey Results during the short term period 2010-2012 in Lithuania. Fig. 1 presents Lithuanian farm share of subsidies in net farm income (NFI) according to types of farming. The results have showed that share of subsidies of the net farm income according to farm type are not constant during the analysed period.

The largest share of subsidies of the net farm income had cereals, oilcrops farms in 2010, about 98 percent. In 2011-2012 the largest share of subsidies of the net farm income had mixed crops and livestock farms, respectively 98 and 90 percent.

In 2010-2011the smallest share of subsidies of the net farm income had horticulture farms, respectively 32 and 19 percent. The smallest share of subsidies of the net farm income had Specialist granivores farms in 2012, about 23 percent.

Fig.1. Share of Subsidies in Net Farm Income of Lithuanian farms %

(Source 2010, 2011, 2012 FADN Survey Results)

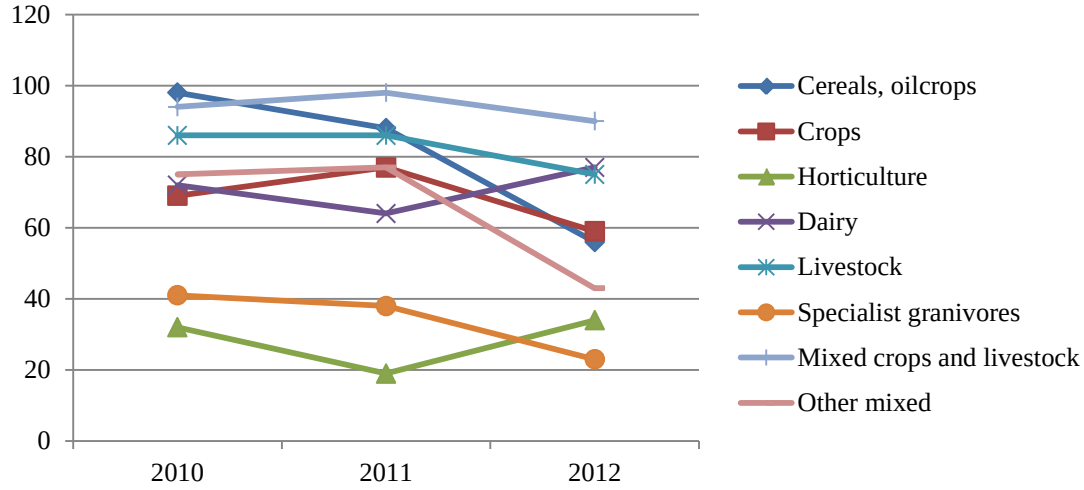


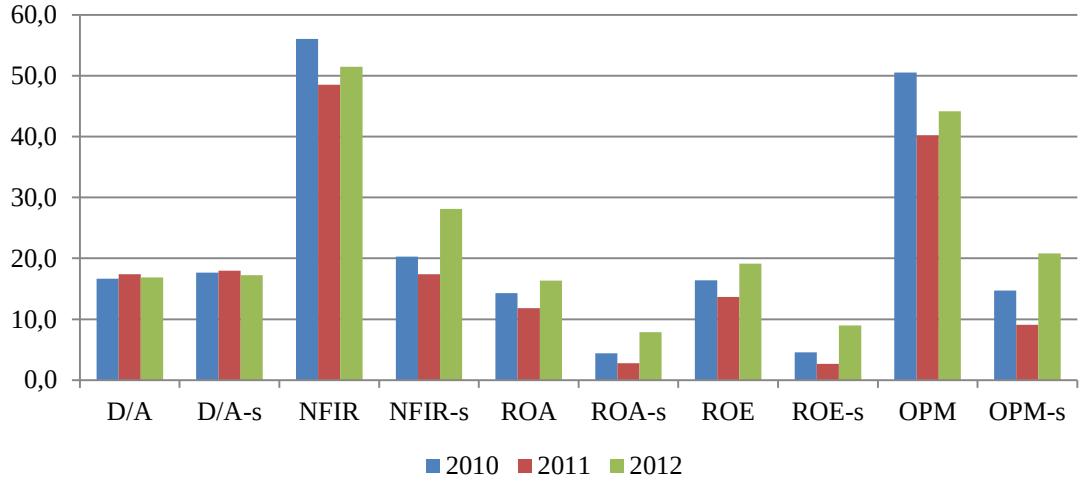
Fig. 2-9 data indicates Lithuanian Farms according to type of farming solvency (D/A) and profitability (NFIR, ROA, ROE, OPM) ratios including subsidies and solvency (D/A-s) and profitability (NFIR-s, ROA-s, ROE-s, OPM-s) ratios excluding subsidies.

Fig. 2 presents Lithuanian farms of cereals, oilcrops stability and profitability ratios (2010-2012). D/A and D/A-s ratio shows that cereals, oilcrops farms would not be risk averse even without agricultural support on investment. D/A-s are less than 1 percent point higher comparing with D/A.

Net farm income ratio shows how much is left after all farm expenses, except for unpaid labour and management are paid. NFIR-s is more than twice less comparing with NFIR. According to NFIR critical values cereals, oilcrops farms without agricultural support would be stable and profitable only in 2012.

ROA ratio shows that cereals, oilcrops farms are profitable with agricultural support; the ratio is higher than 12 percent during the analysed period. ROA-s ratio shows that cereals, oilcrops farms are low profitable without agricultural support; the ratio satisfies fair critical values during the analysed period.

Fig.2. Lithuanian Farms of Cereals, Oilcrops Stability and Profitability ratios (source 2010, 2011, 2012 FADN Survey Results)



ROE (Fig. 2) also serves as an index of profitability. Like ROA, the higher the value, the more profitable is the business. According to ROE ratio cereals, oilcrops farms are financially stable and profitable in the short-term. ROE-s ratio shows that cereals, oilcrops farms are low profitable without agricultural support; the ratio satisfies fair critical values during the 2010-2011.

The final profitability measure is the operating profit margin ratio, which measures the return to capital per euro of gross farm revenue. Cereals, oilcrops farms are profitable with agricultural support; the ratio is higher than 25 percent during the analysed period. OPM-s ratio shows that cereals, oilcrops farms are not profitable without agricultural support; the ratio satisfies low critical values during the 2010-2011. In the 2012 cereals, oilcrops farms OPM-s ratio satisfies fair critical values.

Fig.3. Lithuanian Farms of Crops Stability and Profitability ratios (source 2010, 2011, 2012 FADN Survey Results)

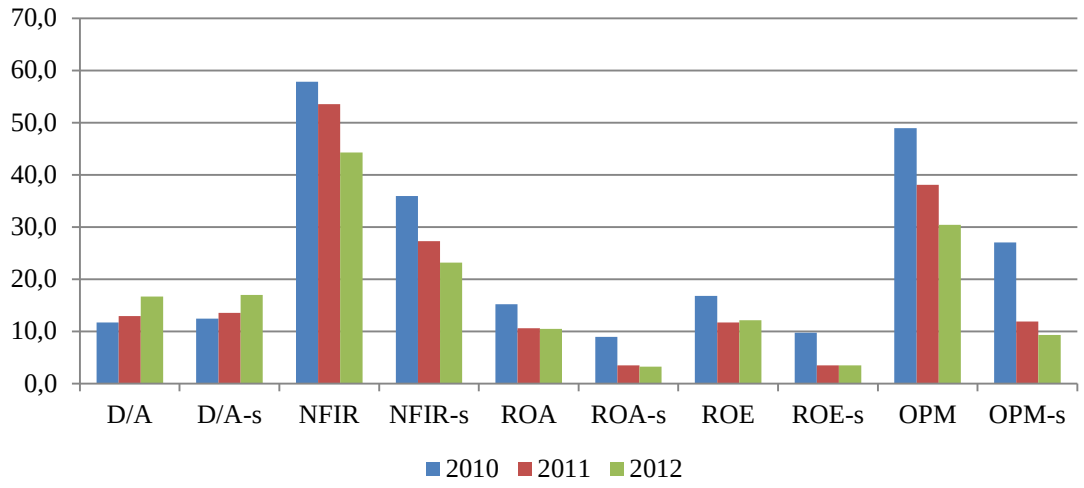


Fig. 3 presents Lithuanian farms of crops stability and profitability ratios (2010-2012). D/A and D/A-s ratio shows that crops farms would not be risk averse even without agricultural support on investment. D/A-s are less than 1 percent point higher comparing with D/A.

There are noticeable NFIR decreasing trend during the analysed period. According to NFIR critical values crops farms without agricultural support would be stable and profitable.

ROA ratio (Fig. 3) shows that crops farms are profitable with agricultural support only in 2010; the ratio is higher than 12 percent. In the 2011-2012 ROA satisfies fair critical values. ROA-s ratio shows that crops farms are low profitable without agricultural support; the ratio satisfies fair critical values during the analysed period.

According to ROE ratio crops farms are financially stable and profitable in the short-term. ROE-s ratio shows that crops farms are low profitable without agricultural support; the ratio satisfies fair critical values during the 2010-2011.

There are noticeable OPM decreasing trend during the analysed period. Crops farms are profitable with agricultural support; the ratio is higher than 25 percent during the analysed period. OPM-s ratio shows that crops farms are not profitable without agricultural support; the ratio satisfies fair critical values during the 2010-2011.

Fig. 4 presents Lithuanian farms of horticulture stability and profitability ratios (2010-2012). D/A and D/A-s ratio shows that horticulture farms would not be risk averse even without agricultural support on investment. D/A-s are less than 1 percent point higher comparing with D/A.

According to NFIR critical values horticulture farms without agricultural support would be stable and profitable.

ROA and ROA-s ratio as well as ROE and ROE-s shows that horticulture farms are profitable with or without agricultural support, the ratio is higher than respectively 12 and 10 percent (except ROA-s and ROE-s in 2012). In the 2012 ROA-s and ROE-s ratio shows that horticulture farms are low profitable without agricultural support; the ratio satisfies fair critical.

Horticulture farms are profitable with agricultural support; the ratio is higher than 25 percent during the analysed period. OPM-s ratio shows that horticulture farms are profitable without agricultural support in 2010-201; the ratio satisfies fair critical values during the 2012.

Fig.4. Lithuanian Farms of Horticulture Stability and Profitability ratios (source 2010, 2011, 2012 FADN Survey Results)

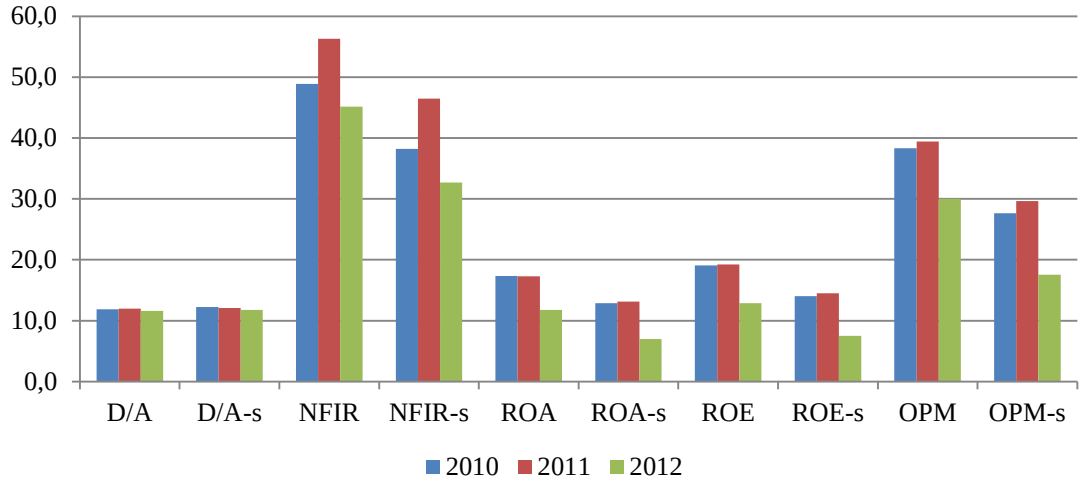


Fig. 5 presents Lithuanian dairy farms stability and profitability ratios (2010-2012). D/A and D/A-s ratio shows that dairy farms would not be risk averse even without agricultural support on investment. D/A-s are less than 1 percent point higher comparing with D/A.

There are noticeable NFIR decreasing trend during the analysed period. According to NFIR critical values dairy farms without agricultural support would be stable and profitable as well.

ROA and ROE ratio (Fig. 3) show that dairy farms are not high profitable with agricultural support, the ratio is less than respectively 12 and 10 percent and during the analysed period, both ROA and ROE satisfies fair critical values. ROA-s and ROE-s ratio shows that dairy farms are non profitable without agricultural support; the ratio satisfies low profitability critical values during the analysed period. There are noticed negative ROA-s and ROE-s in the 2012.

There are noticeable OPM decreasing trend during the analysed period. Dairy farms are profitable with agricultural support; the ratio is higher than 25 percent during the analysed period. OPM-s ratio shows that dairy farms are non profitable without agricultural support; the ratio satisfies low profitability critical values during the 2010-2011. In the 2012 OPM-s ratio is negative.

Fig.5. Lithuanian Farms of Dairy Stability and Profitability ratios (source 2010, 2011, 2012 FADN Survey Results)

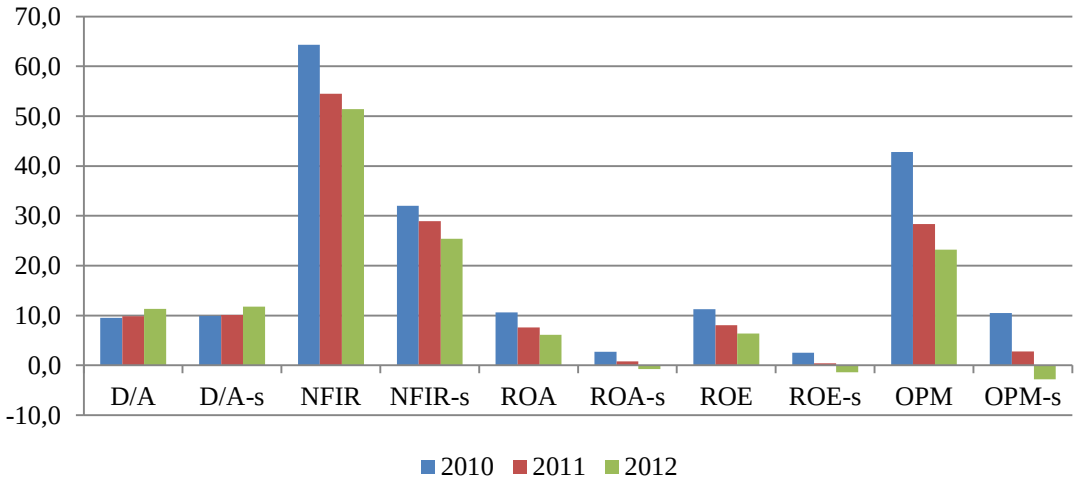
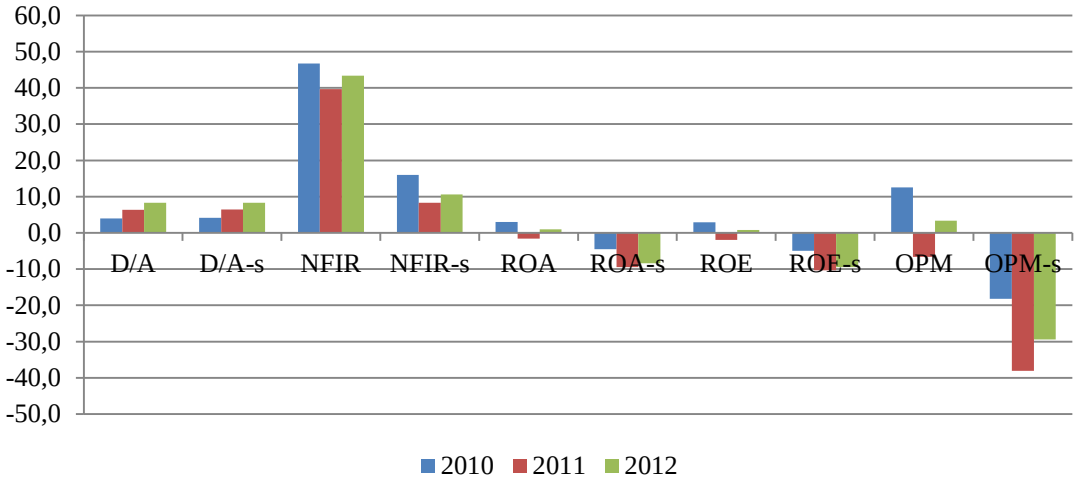


Fig. 6 presents Lithuanian farms of livestock stability and profitability ratios (2010-2012). D/A and D/A-s ratio shows that livestock farms would not be risk averse even without agricultural support on investment. D/A-s are less than 1 percent point higher comparing with D/A.

Fig.6. Lithuanian Farms of Livestock Stability and Profitability ratios (source 2010, 2011, 2012 FADN Survey Results)



According to NFIR (Fig. 6) critical values livestock farms with agricultural support are stable and profitable. NFIR-s ratio satisfies fair critical in the 2010. In the 2011-2012 livestock farms without agricultural support would be non profitable.

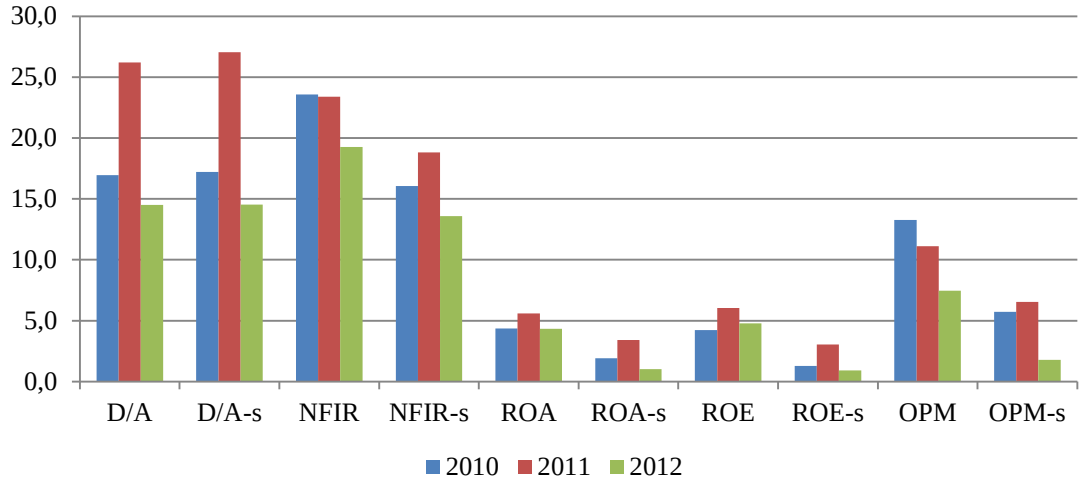
ROA and ROA-s ratio as well as ROE and ROE-s show that livestock farms are non profitable with or without agricultural support. ROA and ROE ratio are positive, but very low in 2010 and in 2012. In the 2011 ROA and ROE are negative. ROA-s and ROE-s ratio are negative during the analysed period. This shows that agricultural support is necessary to livestock farms in order to survive.

Livestock farms was low profitable with agricultural support only in 2010 and 2012. In the 2012 OPM ratio is negative. OPM-s ratio shows that livestock farms are non profitable (ratio is negative) without agricultural support during the analysed period.

Fig. 7 presents Lithuanian farms of specialist granivores stability and profitability ratios (2010-2012). D/A and D/A-s ratio shows that specialist granivores farms would not be risk averse even without agricultural support on investment. D/A-s are less than 1 percent point higher comparing with D/A.

According to NFIR critical values of specialist granivores farms with agricultural support are with fair profitability. NFIR-s ratio satisfies fair critical in the 2010-2011. In the 2012 specialist granivores farms without agricultural support would be non profitable

Fig.7. Lithuanian Farms of Specialist Granivores Stability and Profitability ratios (source 2010, 2011, 2012 FADN Survey Results)



ROA and ROA-s ratio (Fig.7) as well as ROE and ROE-s shows that specialist granivores farms are fair profitable with agricultural support, the ratio is less than respectively 12 and 10 percent but higher than 3 percent. ROA-s and ROE-s ratio shows that specialist granivores farms are non profitable without agricultural support during the analysed period; the ratios are less than 3 percent.

Specialist granivores farms are non profitable with and without agricultural support, the ratio is less than 15 percent during the analysed period.

Fig. 8 presents Lithuanian mixed crops and livestock farms stability and profitability ratios (2010-2012). D/A and D/A-s ratio shows that mixed crops and livestock farms would not be risk averse even without agricultural support on investment. D/A-s are less than 1 percent point higher comparing with D/A.

According to NFIR critical values mixed crops and livestock farms with agricultural support are stable and profitable. NFIR-s ratio satisfies fair critical in the 2010-2011. In the 2012 mixed crops and livestock farms without agricultural support would be non profitable.

ROA and ROE ratio show that mixed crops and livestock farms are fair profitable with agricultural support, the ratio is less than respectively 12 and 10 percent and during the analysed period, both ROA and ROE satisfies fair critical values. ROA-s and ROE-s ratio shows that mixed crops and livestock farms are non profitable without agricultural support; ROA-s and ROE-s ratio are negative (except ROA-s in the 2011).

Mixed crops and livestock farms are profitable with agricultural support in the 2010-2011 and fair profitable in 2012;. OPM-s ratio shows that mixed crops and livestock farms are non profitable

without agricultural support; the ratio satisfies low profitability critical values during the 2010-2011. In the 2010 and 2012 OPM-s ratio is negative.

Fig.8. Lithuanian Farms of Mixed Crops and Livestock Stability and Profitability ratios (source 2010, 2011, 2012 FADN Survey Results)

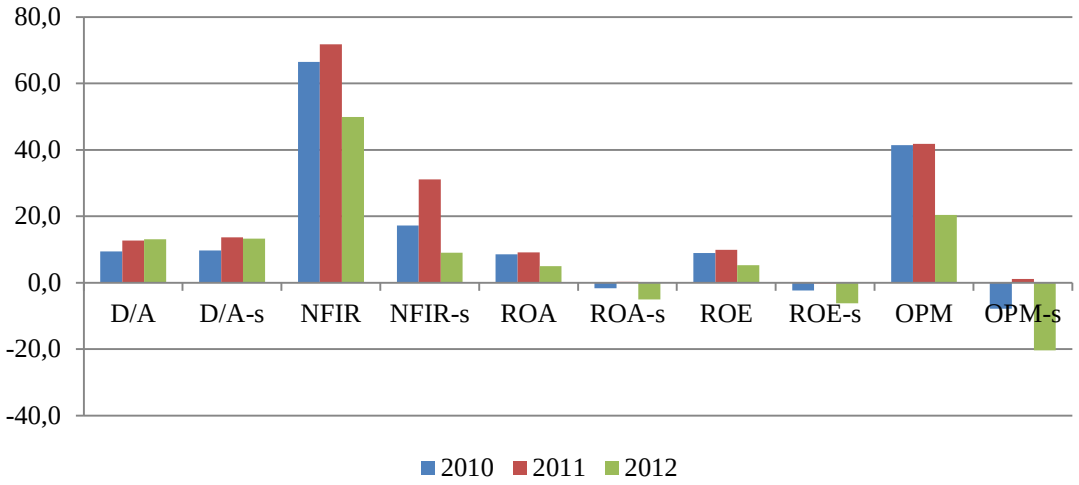
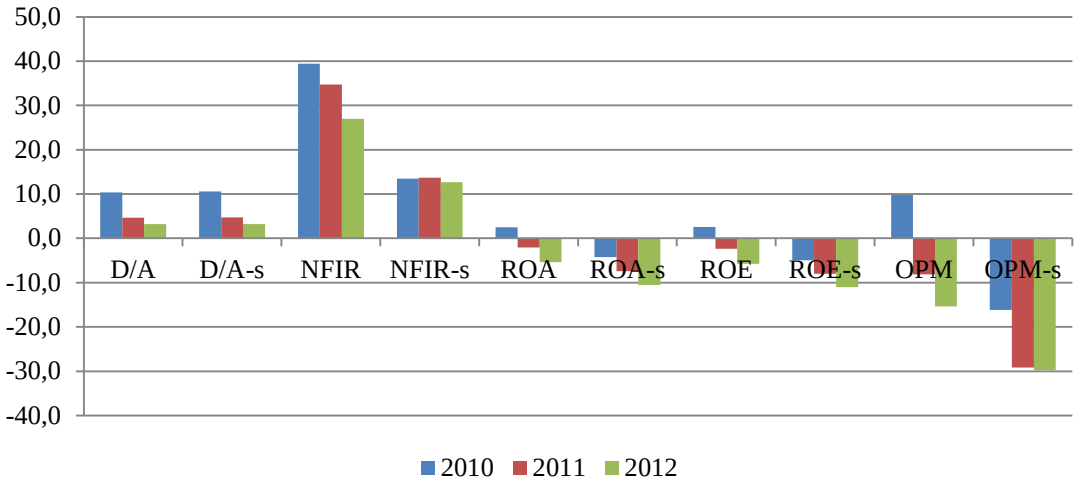


Fig. 9 presents Lithuanian other mixed farms stability and profitability ratios (2010-2012). D/A and D/A-s ratio shows that other mixed farms would not be risk averse even without agricultural support on investment. D/A-s are less than 1 percent point higher comparing with D/A.

Fig.9. Lithuanian Other Mixed Farms Stability and Profitability ratios (source 2010, 2011, 2012 FADN Survey Results)



According to NFIR (Fig. 9) critical values other mixed farms with agricultural support are stable and profitable. NFIR-s ratio satisfies fair critical values during the analysed period.

ROA and ROA-s ratio as well as ROE and ROE-s show that other mixed farms are non profitable with or without agricultural support. ROA and ROE ratio are positive, but very low in 2010. In the 2011-

2012 ROA and ROE are negative. ROA-s and ROE-s ratio are negative during the analysed period. This shows that agricultural support is necessary to other mixed farms in order to survive.

Other mixed farms was low profitable with agricultural support only in 2010. In the 2011-2012 OPM ratio is negative. OPM-s ratio shows that other mixed farms are non profitable (ratio is negative) without agricultural support during the analysed period.

CONCLUSION

There are systemised financial ratios to be calculated for farms, revealed the peculiarities of their calculation and recommended the critical values of respective ratios to be used for estimating farm's stability.

The survey showed that Lithuanian farms according to type of farming are not risk averse. D/A ratio critical values satisfied high solvency boundaries values in all cases. Subsidies on investment have minimal influence on D/A ratio.

According to NFIR critical values all Lithuanian farms with agricultural support are stable and profitable. Without agricultural support would be hard to survive for livestock, mixed crops and livestock and other mixed farms.

According to ROA, ROE and OPM ratios livestock, mixed crops and livestock, other mixed farms are non profitable with and without agricultural support. Specialist granivores, dairy, livestock and mixed livestock farm depend on natural conditions, especially on animal health and diseases. Cereals, oilcrops, crops and horticulture farms are high profitable with subsidies. For these farm types is important to get agricultural support because depend on natural conditions, especially on weather conditions.

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