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ECONOMIC VIABILITY BY FARM SIZE OF ESTONIAN FAMILY FARMS

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Abstract

Small farms are subject to a wide range of influences on their viability including economic, policy and regulatory drivers as well as internal farm household drivers of change. Small farms have experienced a decline in numbers compared to large farms. The main task of the paper is to determine the share of viable farms of different size groups in Estonia, exploring the factors that are associated with economically viable farms. For determination of the share of viable farms of different size groups the opportunity-cost-based approach is used. Farm viability is estimated by using the data from the Estonian Farm Accounting Data Network. The results indicate that the economic viability of Estonian farms has slightly increased, but the share of viable farms has decreased. Smaller farms' economic viability is declining, many of them are economically vulnerable. Smaller farms' capability to survive and develop by using the available resources is lower compared to larger farms.

Keywords: agricultural holdings, FADN, family farm income, EU small farms.

JEL codes: Q01, Q12, O13.

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Introduction

The concerns about sustainable agricultural and food systems and balanced territorial development have facilitated the need for maintenance of viability of agricultural entities, the main promoters of the rural life. It has been recognised that farms make up an important share of total employment in rural areas and play an important role in rural economies. Farm viability as a concept refers to farm economic viability, which is the indicator of farm economic performance under the approach of farm level economic sustainability. Farm level economic sustainability indicators such as viability enables to identify which farms are succeeding or vulnerable (Lynch, Donnellan, Finn, Dillon and Ryan, 2019). Farm-level viability is an indicator determining whether a farm will remain active in the near future, frequently focuses on measurable economic factors (Hooks, Macken-Walsh, McCarth and Power, 2017). Economically viable farms generate enough income and help strengthen the economy and contribute to balanced territorial development. Within the EU framework for rural development programmes, the EU Member States have drawn up their rural development programmes based on the needs of their territories and addressing the common EU priorities: enhancing the viability and competitiveness of all types of agriculture, and promoting innovative farm technologies (European Commission. Agriculture and rural development, 2014-2020).

Economic viability is a necessary condition for sustainable agricultural and food systems. In economic terms, a food system is considered sustainable if the activities conducted by each food system actor are profitable from commercial or fiscal point of view. The activities should generate benefits, or economic value-added, for all categories of stakeholders: wages for workers, taxes for governments, profits for enterprises, and food supply improvements for consumers (FAO, 2018). Viability of farms involves, in economic terms, the profitability and efficiency of the production system, securing the sources of income of the farming production system in the face of market swings and uncertainties surrounding direct payments (Landais, 1998). Taking into account opportunity costs, long-term viability of the farm, refers to economic sustainability at the farm level (Slavickiene and Savickiene, 2014).

The structure of agriculture is diverse. It varies from small family farms with a high degree of own consumption to large industrialised farms organised as legal entities with hired workers (Agricultural and farm income, 2018). Large farms use the majority of the total agricultural area, but the number of large farms is much smaller than the number of small farms. In the European Union, great part of family farms are small farms. More than two thirds of all farms in Europe have less than 5 hectares of agricultural land, and more than a half have a standard output of less than 333 euros per month. Farms smaller than 8 ESU represent approximately 80% of all agricultural holdings in Europe, but cover only 25% of the total agricultural area (Eurostat, 2015; Tudor, 2014; Unay-Gailhard and Bojnec, 2015). More precisely, approximately 10% of the largest farms occupy approximately 80% of the agricultural land in Bulgaria, the Czech Republic and Hungary, and

approximately 10% of the largest farms cover approximately 40% of the agricultural area in Slovenia, Poland, Romania and Estonia (Blacksell, 2010). In Estonia, the average percentage of small farms in terms of economic size is high, and the mean size of the farms with less than 5 ha of utilized agricultural area is below 2 ha (Guiomar et al., 2018).

The number of agricultural holdings has been decreasing since 2001, with a consolidation process, taking place in all segments of traditional agriculture. According to the Statistics of Estonia, in the period from 2010 to 2013 the number of agricultural holdings declined by 2%. The decline accelerated from 2013 to 2016, reaching to 13% (SOE 2017). However, in horticulture and subsectors such as livestock, organic and other high value added production there are still farms of smaller size. The decline of the number of small farms takes place all over the EU. While in 2005 still more than 70% of all farms in the EU-27 worked on less than 5 hectares, by 2013 this number had fallen to just over 65% (EU Farms and Farmers in 2013: an update, 2015). There are mixed views as to whether the consolidation process in agriculture and the size and number of farms contribute to the viability. According to Vrolijk, De Bont, Blokland and Soboh (2010), farms which are too small may not be viable, lacking self-sufficiency in the terms of efficiency and profitability, being not able to supply a large and homogeneous volume of agricultural production, thus generate not enough profit (Vrolijk et al., 2010). Nonetheless, some argue that small farms survival must be supported, as they play an important role of rural viability, as the health of the local economy is one of the key factors for maintaining the viability of a territory, to succeed by using available physical and human resources of this territory (Rivza and Kruzmetra, 2017; Veveri, Šapolaitė, Giedrė Raišienė and Bilan, 2019).

This paper contributes to the task of improving the understanding of economic viability of different sizes of family farms. The study examines farms' economic viability, and compares small family farms to larger family farms. This paper will provide an insight to the economic viability of Estonian farms with special reference to farm size using data from the national FADN database. The study aims to determine the share of viable farms of different size groups in Estonia. The purpose is to explore the factors that are associated with economically viable farms, identifying viability in Estonian farms, according to their size.

The structure of the paper is the following: the first part introduces a relevant theoretical framework with a primary focus on farm size and viability indicators and the methodological approach. Then, the economic viability of Estonian farms is analysed and the results of the analysis are discussed. Conclusions, followed by a statement of a need for further research, sum up the research.

Change in size structure of farms

An overview of the previous studies on farm size and economic viability is briefly provided in this section, with emphasis on motivations, initiatives, theoretical framework, and method. This gives a basis for the analysis of farm economic viability.

Agricultural holdings are operating both technically and economically independently, producing agricultural products and maintain land in good agricultural and environmental condition. In general, there are three clearly distinguished groups of farms in the EU: subsistence farms which produce a large proportion of the food for the farmers and their families; small and medium-sized farms which are generally family-run; and large farms which are organised as legal entities or cooperatives (Eurostat, 2018). Large farms are of higher prevalence year by year. Large-scale and corporate farm structures, with an intensified agriculture, focus mainly on economic efficiency. Increasing output is a strategy that farmers adopt to capture benefits from economies of scale. Previous studies have indicated that farm size is a very common factor associated with farm profitability (Moran, Drysdale, Shambrook and Markham, 2000; Gloy, Hyde and LaDue, 2002). The differences in profitability may be due to the organisational structure of agriculture: small family farms with a high degree of own consumption on one side, and large farms organised as legal entities with hired workers on the other (Agricultural and farm income, 2018). Income discrepancies between farms can originate from different degrees of productivity, labour use, different levels of economies of scale, or different access to credit markets and to extension services (Baležentis et al., 2019). However, compared to large farms, small farms might appear inefficient for modern agriculture, although they constitute an important share of total agricultural employment and play an important economic role in rural areas. The importance of small farms for rural sustainability in Europe, and their central role in the survival and development of rural communities has been demonstrated in numerous studies (Shucksmith and Rønningen, 2011; Grubbström and Sooväli-Sepping, 2012; McDonagh, Farrell and Conway, 2017). The positive aspect is that smaller farms tend to be more flexible and resilient in adaptation to market crises (McDonagh et al., 2017); and can be more efficient in mobilizing resources beyond those pertaining to farm commercialization through market exchange, such as social capital, local knowledge and cultural heritage (Šūmane et al., 2017). Small farms also maintain biodiversity more efficiently and promote ecological resilience (Babai et al., 2015). These factors are associated with sustainable farms. Still, there is a positive relationship between farm incomes and farm size, and the difference between small and large farms exists.

The Estonian agriculture is characterised by large share of small farms, despite the continuous decrease in their number (Table 1). Farms with economic size of less than euros 4,000 constitute 54% of the total number of farms, but they yield less than 2% of total standard output of agricultural holdings all together (SOE, 2017).

Table 1

Number of farms in Estonia by size (2007-2016)

Year	EUR 0- -2000	EUR 2000- -4000	EUR 4000- -8000	EUR 8000- -15 000	EUR 15 000- -25 000	EUR 25 000- -50 000	EUR 50 000- -100 000	EUR 100 000- -250 000	EUR 250 000- -500 000	>= EUR 500 000	Total
2007	10 175	4 633	3 472	1 857	951	947	582	381	153	187	23 336
2010	8 597	2 942	2 754	1 754	1 016	937	720	498	170	225	19 613
2013	9 137	2 466	2 189	1 648	1 016	976	756	571	186	241	19 186
2016	6 818	2 269	1 931	1 513	1 033	1 004	804	742	302	281	16 696

Source: authors' compilation, Statistics of Estonia PMS418.

Similar to many other Central and Eastern European countries, Estonian farming has a dual nature. The share of output of large farms has grown. Even though the amount of small holdings is very large, the production concentrates in larger holdings.

Farms' economic viability: method of analysis and data

Here it is important to distinguish between sustainability and economic viability. A farm can be sustainable even if it is not economically viable. Thus, the off-farm income may make the farm sustainable, but it does not need to be viable. In order to be economically viable, the performance of the family farm must ensure sustainability. Farm viability has a direct impact on land use and an indirect impact on the socio-economic status of rural areas. Farm viability is determined by the level of incomes but also by the fluctuations of incomes and the level of leverage. According to this, farms may be classified as viable, vulnerable or non-viable (Vrolijk et al., 2010). A farm is economically viable if it can remunerate family labour at the average agricultural wage, and provide a sufficient return on non-land assets (Frawley and Commins, 1996). The concept of viability is related to the contribution of the farm to the achievement of a particular standard of living (O'Donoghue et al., 2016). The key priority of a viable farm is to make a living after keeping the land productive in long-term perspective. Economic viability of the farm as a business depends not only on the economic success of the farm, but also on other aspects such as off-farm income. Farms may be non-viable but farmer and/or spouse may work off-farm and, therefore, this off-farm income may make the household sustainable (Frawley and Commins, 1996; Ryan et al., 2014). Farm economic viability is included in term of economic sustainability, and is measured in terms of the achievement of a specific income objective.

The opportunity-cost-based approach will be used in order to determine the share of viable farms of different size groups. A viable farm is resilient to income fluctuations, measured as difference between family farm income and cost of capital to the hours worked on-farm. This should be higher than the threshold wage (O'Donoghue et al., 2016). The issue of viability threshold is one of

the central elements of further discussion as the choice of threshold influences the viability of farms significantly. Using industrial wage as reference may prove problematic as it depends on the structure of production. The national minimum wage on the other hand is the result of a political decision and may not reflect the minimum subsistence level that would be acceptable for farmers. The analysis is based on the average income of paid labour of the farms in the sample. The relation can be expressed as follows:

(Family farm income – Cost of capital)/The hours worked on the farm > Threshold wage (1)

According to the Farm Accountancy Data Network, family farm income is defined as total output less intermediate consumption, less depreciation, less payments to external factors, plus balance of subsidies, less taxes. Data on family farm income and the hours of on-farm work are collected in the FADN survey. The cost of own capital is an imputed estimate calculated as an opportunity cost of assets as an estimate of investing the same amount of capital elsewhere in the economy. Calculations are based on euro zone (19 countries) long-term interest rates (OECD Data, 2019). The euro area long-term interest rates have been used as a benchmark because Estonia has no comparable long-term interest rate instruments. The hours of on-farm work are based on annual work unit (AWU) that is fixed at 2200 working hours per year.

Threshold wage as an income target is a subjective element, depending on current standard of living in the country. This can be measured by the average wage in the economy, usually at least 80% of average labour cost per year, or paid wages as observed in the FADN. In the study presented herein, threshold wage is calculated on the basis of paid wages from Estonian FADN data.

The raw data was obtained from the FADN databases (Farm Accountancy Data Network, FADN). The sample consists of economic indicators of Estonian farms during the period of 2006-2015, including 4341 observations over 10 years. Family farms are characterised by a high proportion of unpaid labour input. In order to eliminate commercial farms, all farms with less than 20% unpaid labour input are excluded from the sample. Specialist farms such as orchards – fruit, and the large commercial dairy farms are not included in the sample. The current data does not provide sufficient information on the total income of agricultural households earned both on farm and off farm. Therefore, opportunity-cost-based approach is adapted to the estimated cost of capital and viability threshold.

Farms were grouped into four groups by size. Size groups are based on standard output calculations from FADN data. There has been no considerable changes in the share of unpaid labour input on Estonian farms in a sample of farms as a whole or in specific size groups in the period of estimation from 2006 to 2015. The average share of unpaid labour input of the farms in a sample has increased from 82% in 2006 to 86% in 2015. Among the group of the smallest farms with standard output from EUR 4000 to EUR 8000, the share of unpaid labour input

was close to 100% in 2015. The second size group of farms had standard output of EUR 8000 to EUR 25 000 and the share of unpaid labour input was 94% in the last year of estimation period. The share of unpaid labour input was 86% in the third size group with standard output of EUR 25 000 to EUR 100 000; and only the largest farms in the sample had relatively lower share of unpaid labour input: 63% in 2015. The share of unpaid labour input is higher on small farms, and it declines as the farm size grows.

Empirical Results and Discussion

The results below present briefly some background information on the farms in the sample, a summary of the average values of the components of viability, analysis of the change of average viability of farms of different size groups, and presents the share of viable farms according to the farm size.

The average values of the factors of viability are presented in Table 2. Family farm income or entrepreneurial income, paid and unpaid labour input, and cost of own capital have decreased during the observed period. Annual hourly paid wage and own capital have increased.

Table 2

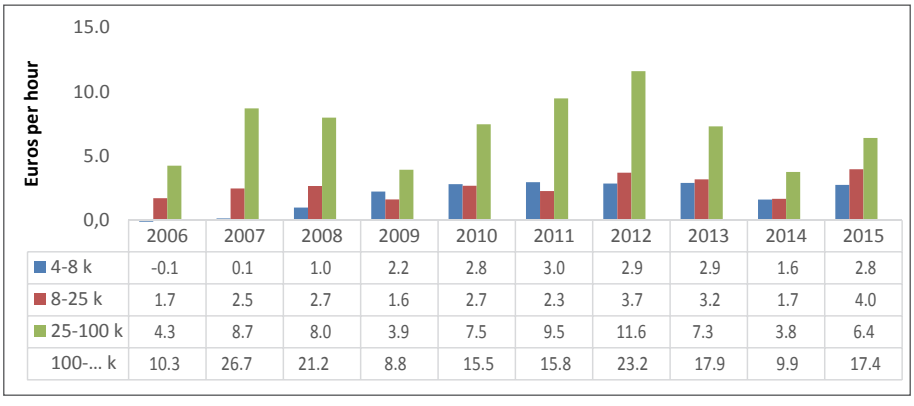
The average values of the parameters of viability, sample of FADN farms in 2006-2015

Factor of viability	2006	2010	2015	Change
Number of farms	412	485	437	6%
Unpaid labour input – FWU	1.61	1.25	1.01	-37%
Paid labour input – AWU	0.49	0.34	0.31	-37%
Family farm income – c.u.	19 731	22 248	15 617	-21%
Annual hourly paid wage	1.67	3.19	5.37	222%
Own capital (excl. land)	124 948	130 831	139 252	11%
Cost of own capital	4 822	4 947	1 770	-63%

Source: authors' calculations.

The viability of Estonian farms has slightly increased (Fig. 1). On average, larger farms are more viable than small farms. Large farms are in better financial position, and have better possibilities to intensify the production and gain from the economies of scale compared to the small- and medium-sized farms (Viira et al., 2015). It should be mentioned that even the largest farms do not perform on high level of viability permanently. Although viability is rather a long-term concept, based on the applied definition of economic viability, the values of the respective indicator can also be expressed in the short-term. Keeping track of such short--term fluctuations in economic viability is also important as these fluctuations can lead to exits from farming (Viira, Pöder and Värnik, 2013). During the period from 2006 to 2015, there were two years with considerably low level of average

viability: 2009 and 2014. Decrease of average viability in 2009 can be explained by two factors. Firstly, the impact of global economic crisis, which started already a year earlier and had a major influence on Estonian agriculture in 2009; and secondly, due to the crisis the government reduced top-up payments considerably and consequently, the average subsidy level decreased. The second shock came in 2014. There are two important considerations behind the downturn in 2014 when once again the decline in agricultural prices and the reduction of subsidies were both in effect. Another reason for the decline in average viability comes from the impact from Russian import ban on agriculture announced in August of 2014. Estonian farms' viability is apparently related to output and input prices for agricultural production, and changes in the international trade.

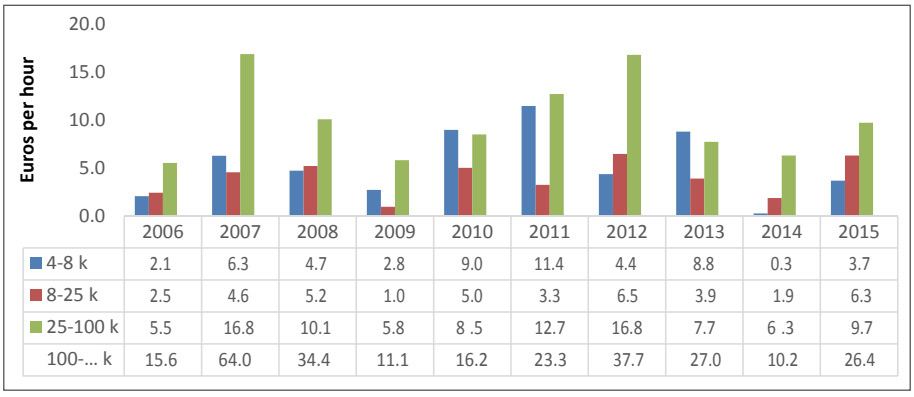


	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
4-8 k	-0.1	0.1	1.0	2.2	2.8	3.0	2.9	2.9	1.6	2.8
8-25 k	1.7	2.5	2.7	1.6	2.7	2.3	3.7	3.2	1.7	4.0
25-100 k	4.3	8.7	8.0	3.9	7.5	9.5	11.6	7.3	3.8	6.4
100-... k	10.3	26.7	21.2	8.8	15.5	15.8	23.2	17.9	9.9	17.4

Fig. 1. Average viability by size of the farm (standard output in thousands of euros), 2006-2015, all farms.

Source: authors' calculations, sample of FADN farms 2006-2015.

The average viability of field crops' farms has shown a slight increase during the period of investigation (Fig. 2). The average viability of field crop farms was increasing until the economic crisis in 2008. Average viability decreased in 2009, for all size groups of field crops' farms. Next downturn in average viability was in 2014 and the average viability recovered for all size groups of field crops' farms in the last year of investigation.

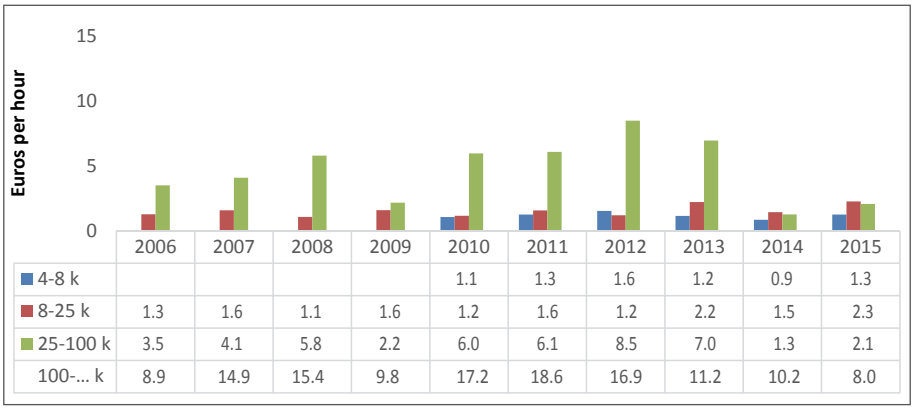


	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
4-8 k	2.1	6.3	4.7	2.8	9.0	11.4	4.4	8.8	0.3	3.7
8-25 k	2.5	4.6	5.2	1.0	5.0	3.3	6.5	3.9	1.9	6.3
25-100 k	5.5	16.8	10.1	5.8	8 .5	12.7	16.8	7.7	6 .3	9.7
100-... k	15.6	64.0	34.4	11.1	16.2	23.3	37.7	27.0	10.2	26.4

Fig. 2. Average viability by size of the farm (standard output in thousands of euros), 2006-2015, field crops.

Source: authors' calculations, sample of FADN farms 2006-2015.

The average viability of dairy farms has slightly decreased (Fig. 3). Impact of subsidy reduction in 2009 and 2014 and Russian import bans in 2014 have had a major impact on average viability of dairy farms. Compared to field crops' farms, Estonian dairy farms have lower levels of viability. While large commercial farms dominate in milk production, the small and medium scale farms have lost their competetiveness and many of them were forced to quit farming. In terms of livestock units the dairy cattle livestock farming increased until 2013. After that, it decreased mainly because of the reduction of dairy herds. The number of farms engaged in dairy cattle farming decreased in the past decade: the number of farms with animals has decreased twice (SOE, 2017). Small farms with a small number of animals have terminated their livestock farming activities. In the years 2014-2016, one third of dairy farms finished keeping dairy herds.



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
4-8 k					1.1	1.3	1.6	1.2	0.9	1.3
8-25 k	1.3	1.6	1.1	1.6	1.2	1.6	1.2	2.2	1.5	2.3
25-100 k	3.5	4.1	5.8	2.2	6.0	6.1	8.5	7.0	1.3	2.1
100-... k	8.9	14.9	15.4	9.8	17.2	18.6	16.9	11.2	10.2	8.0

Fig. 3. Average viability by size of the farm (standard output in thousands of euros), 2006-2015, dairy.

Source: authors' calculations, sample of FADN farms 2006-2015.

These outcomes enable to determine a share of viable farms in Estonia. In general, a share of viable farms has decreased (Table 3). The share of viable farms is higher among large farms. Smaller farms, compared to larger farms, are economically more vulnerable as their developing capabilities by using the available resources are limited.

Table 3

A share of viable farms according to farm size (standard output in thousands of euros)

Standard output in thousand euro	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
4-8 k	11%	15%	24%	29%	19%	11%	18%	15%	11%	17%
8-25 k	39%	35%	24%	20%	21%	15%	19%	16%	10%	26%
25-100 k	66%	71%	64%	42%	58%	64%	62%	46%	27%	36%
100-… k	81%	88%	87%	65%	77%	83%	81%	78%	61%	70%
All farms	59%	61%	54%	39%	45%	45%	45%	39%	26%	37%

Source: authors' calculations, sample of FADN farms 2007-2016.

Although the average viability of Estonian farms has slightly increased, the share of viable farms has decreased. The share of viable farms has declined during 2006--2015 from 59% to 37%. The share of viable farms depends on farm size and is positively related to farm size. Among the largest farms, the percentage of viable farms is considerably higher, compared to small farms. Even though the share of viable farms has declined in all size groups, the share of viable farms rises by the size of farm.

Conclusions

The study examined farms' economic viability according to farm size, paying special attention to family farming. The insight to the economic viability of Estonian family farms with special reference to farm size using data from the national FADN database was provided. The share of viable farms of different size groups were determined. The study explored the factors that are associated with economically viable farms, identifying viability in Estonian farms according to their size. The study concludes that the viability of Estonian farms has slightly increased, but the share of viable farms has decreased. According to the indicators, smaller farms on average do not perform on higher levels, their economic viability is diverse, and declining. Smaller farms are economically more vulnerable as their capability to survive, live and develop by using the available resources is lower compared to larger farms.

Because of the intrinsic values associated with small farms, it is necessary to decide if implementation of the measures of income transfers is necessary in order to improve the survival of small farms through their increasing viability. The future studies would be necessary to explore the small farms or specialised farm groups with an objective to consider ways in which small or specialised farmers might improve their performance and viability, and to identify possibilities in which policies might be adjusted to increase the viability of small or specialised farming.

References

Agricultural and farm income (2018). *DG Agriculture and Rural Development, Unit Farm Economics*. European Union. Retrieved from: https://ec.europa.eu/ agriculture/sites/agriculture/files/statistics/facts-figures/agricultural-farm-income.pdf.

Babai, D., Tóth, A., Szentirmai, I., Biró, M., Máté, A., Demeter, L., Szépligeti, M., Varga, A., Molnár, Á., Kun, R., Molnár, Z. (2015). Do conservation and agri-environmental regulations effectively support traditional small-scale farming in East-Central European cultural landscapes? *Biodiversity and Conservation*, 24, pp. 3305-3327.

Baležentis, T., Galnaitytė, A., Kriščiukaitienė, I., Namiotko, V., Novickytė, L., Streimikiene, D., Melnikiene, R. (2019). Decomposing Dynamics in the Farm Profitability: An Application of Index Decomposition Analysis to Lithuanian FADN Sample. *Sustainability, MDPI, 11*(10), pp. 1-15.

Blacksell, M. (2010). Agriculture and landscape in the 21st century Europe: the post-communist transition. European Countryside. *Sciendo, 2*(1), pp. 13-24.

Doćekalovà, M.P., Kocmanova, A. (2016). Composite indicator for measuring corporate sustainability. *Ecological Indicators*, 61, pp. 612-623.

EU Farms and Farmers in 2013: an update (2015). EU Agricultural and Farm Economics Briefs, 9, November 2015. Retrieved from: http://ec.europa.eu/ agriculture/sites/agriculture/files/rural-areaeconomics/briefs/pdf/009_en.pdf.

Eurostat (2015). Farm structure statistics. December 2015. Retrieved from: https://ec.europa.eu/eurostat/statistics-explained/index.php/Farm_structure_statistics.

Eurostat (2018). Farms and farmland in the European Union – statistics. November 2018. Retrieved from: https://ec.europa.eu/eurostat/statistics-explained/index.php/Farms_and_farmland_in_the_European_Union_-_statistics.

European Commission. Agriculture and rural development. Rural development 2014-2020. Retrieved from: https://ec.europa.eu/agriculture/rural-development-2014-2020_en.

FAO (2018). Sustainable food systems. Concept and framework. Retrieved from: http://www.fao.org/3/ca2079en/CA2079EN.pdf

Farm Accountancy Data Network – FADN, Põllumajandusliku raamatupidamise andmebaas. Põllumajandusuuringute keskus. Retrieved from: https://maainfo.ee/index.php?page=7 (access date: 26.09.2018).

Figge, F., Hahn, T. (2004). Sustainable value added – measuring corporate contributions to sustainability beyond eco-efficiency. *Ecological Economics*, 48, pp. 173-187.

Frawley, J.P., Commins, P. (1996). The Changing Structure of Irish Farming: Trends and Prospects. *Rural Economy Research Series 1*. Dublin: Teagasc.

Gloy, B.A., Hyde, J., LaDue, E.L. (2002). Dairy farm management and long-term farm financial performance. *Agricultural and Resource Economic Review*, 31, pp. 233-247.

Grubbström, A., Sooväli-Sepping, H. (2012). Estonian family farms in transition: a study of intangible assets and gender issues in generational succession. *Journal of Historical Geography, 38*(3), pp. 329-339.

Guiomar, N., Godinho, S., Pinto-Correia, T., Almeida, M., Bartolini, F., Bezak, P., Biro, M., Bjorkhaug, H., Bojnec, S., Brunori, G., Corazzin, M., Czekaj, M., Davidova, S., Kania, J., Kristensen, S., Marraccini, E., Molnar, Z., Niedermayr, J., O'Rourke, E., Ortiz-Miranda, D., Redman, M., Sipiläinen, T., Sooväli-Sepping, H., Sumane, S., Surova, D., Sutherland, L.A., Tcherkezova, E., Tisenkopfs, T., Tsiligiridis, T., Tudor, M.M., Wagner, K., Wästfelt, A. (2018). Typology and distribution of small farms in Europe: Towards a better picture. *Land Use Policy*, 75, pp. 784-798.

Hooks, T., Macken-Walsh, A., McCarthy, O., Power, C. (2017). Farm level viability, sustainability and resilience: a focus on co-operative action and values-based supply chains. *Studies in Agricultural Economics*, 119, pp. 123-129.

Landais, E. (1998). Agriculture durable: les fondements d'un nouveau contrat social. *Courrier de l'Environnement de l'INRA*, 33, pp. 5-22.

Liesen, A., Müller, F., Figge, F., Hahn, T. (2009). *Sustainable Value Creation by Chemical Companies*. Belfast: Sustainable Value Research.

Lebacq, T., Baret, P.V., Stilmant, D. (2012). Sustainability indicators for livestock farming. A review. Agronomy for Sustainable Development, 33, pp. 311-327.

Lynch, J., Donnellan, T., Finn, J.A., Dillon, E., Ryan, M. (2019). Potential development of Irish agricultural sustainability indicators for current and future policy evaluation needs. *Journal of Environmental Management*, 230, pp. 434-445.

Marsden, T., Lee, R., Flynn, A., Thankappan, S. (2010). *The New Regulation and Governance of Food*. Routledge: New York, NY, USA.

McDonagh, J., Farrell, M., Conway, S. (2017). The role of small-scale farms and food security. In: Bhat, R. (ed.), *Sustainability Challenges in the Agrofood Sector* (pp. 33-47). Chichester: John Wiley & Sons.

Moran, J.B., Drysdale, G.R., Shambrook, D.A., Markham, N.K. (2000). A study of key profit drivers in the Victorian dairy industry. *Asian-Australian Journal of Animal Sciences*, 13, pp. 54-57.

O'Donoghue, C., Devisme, S., Ryan, M., Conneely, R., Gillespie, P., Vrolijk, H. (2016). Farm economic sustainability in the European Union: A pilot study. *Studies in Agricultural Economics, 118*(3), pp. 63-171.

OECD Data (2019). Long term interest rates. Retrieved from: https://data.oecd.org/interest/long-term-interest-rates.htm.

Rivza, B., Kruzmetra, M. (2017). Through economic growth to the viability of rural space. Entrepreneurship and Sustainability Issues. *Entrepreneurship and Sustainability Center*, 5(2), pp. 283-296.

Ryan, M., Buckley, C., Dillon, E.J., Donnellann, T., Hanrahan, K., Hennessy, T., Moran, B. (2014). *The development of farm-level sustainability indicators for Ireland using the Teagasc National Farm Survey*. Contributed paper at the 88th Annual conference of the Agricultural Economics Society, AgroParisTech, 9-11.04.2014 Paris, France. Retrieved from: http://ageconsearch.umn.edu/ bitstream/170501/2/Mary_Ryan_The_development_of_farm_level_sustainability_indicators_for_Ireland.pdf (access date: 26.09.2016).

Sustainable Agriculture. European Parliament (2012). Retrieved from: https://epthinktank.eu/2012/09/04/sustainable-agriculture/.

Shucksmith, M., Rønningen, K. (2011). The uplands after neoliberalism? The role of the small farm in rural sustainability. *Journal of Rural Studies*, 27, pp. 275-287.

Slavickiene, A., Slavickiene, J. (2014). The evaluation of small and medium farms' economic viability in the new EU cantries. *Economy & Business* I, 8I, pp. 843-855.

SOE – Statistics of Estonia (2017). The number of agricultural holdings continues to decrease. Retrieved from: https://www.stat.ee/news-release-2017-031.

Šūmane, S., Kunda, I., Knickel, K., Strauss, A., Tisenkopfs, T., des los Rios, I., Rivera, M., Chebach, T., Ashkenazy, A. (2017). Local and farmers' knowledge matters! How integrating informal and formal knowledge enhances sustainable and resilient agriculture. *Journal of Rural Studies*, 59, pp. 232-41.

Tudor, M.M. (2014). Utilization of land resources in agriculture – opportunity or risk for Romanian agri-food sector competitiveness. *Procedia Economics and Finance*, 8, pp. 720-728.

Unay-Gailhard, I., Bojnec, Š. (2015). Farm size and participation in agri-environmental measures: Farm-level evidence from Slovenia. *Land Use Policy*, 46, pp. 273-282.

Veveris, A., Šapolaitė, V., Giedrė Raišienė, A., Bilan, Y. (2019). How Rural Development Programmes Serve for Viability of Small farms? Case of Latvia and Lithuania. AGRIS on-line Papers in Economics and Informatics, *Czech University of Life Sciences Prague, Faculty of Economics and Management, 11*(2), pp. 103-113.

Viira, A., Omel, R., Värnik, R., Luik, H., Maasing, B., Põldaru, R. (2015). Competitiveness of Estonian dairy sector from 1994-2014. *Journal of Agricultural Science, 26*(2), pp. 84-105.

Viira, A., Pöder, A., Värnik, R. (2013). The determinants of farm growth, decline andexit in Estonia. *German Journal of Agricultural Economics, 62*(1), pp. 52-64.

Vrolijk, H.C.J., De Bont, C., Blokland, P., Soboh, R. (2010). *Farm viability in the European Union: Assessment of the impact of changes in farm payments*. The Hague: LEI Wageningen UR.

RENTOWNOŚĆ EKONOMICZNA WEDŁUG WIELKOŚCI GOSPODARSTWA W ESTOŃSKICH GOSPODARSTWACH RODZINNYCH

Abstrakt

Na rentowność małych gospodarstw ma wpływ wiele czynników, włączając w to czynniki gospodarcze, polityczne i regulacyjne, a także czynniki wewnętrzne powodujące zmiany w gospodarstwie rolnym. Małe gospodarstwa odnotowały spadek liczby w porównaniu z dużymi gospodarstwami. Głównym zadaniem niniejszego opracowania jest określenie udziału rentownych gospodarstw różnej wielkości w Estonii, badając czynniki związane z rentownymi ekonomicznie gospodarstwami. Do określenia udziału rentownych gospodarstw różnej wielkości stosuje się podejście oparte na kosztach alternatywnych. Rentowność gospodarstw szacowana jest na podstawie danych z estońskiego Systemu Zbierania i Wykorzystywania Danych Rachunkowych z Gospodarstw Rolnych. Wyniki wskazują, że rentowność ekonomiczna estońskich gospodarstw nieznacznie wzrosła, ale zmalał udział rentownych gospodarstw rolnych. Rentowność ekonomiczna mniejszych gospodarstw maleje, wiele z nich jest zagrożonych gospodarczo. Zdolność mniejszych gospodarstw do przetrwania i rozwoju dzięki wykorzystaniu dostępnych zasobów jest niższa w porównaniu z większymi gospodarstwami.

Słowa kluczowe: gospodarstwa rolne, FADN, dochód gospodarstw rodzinnych, małe gospodarstwa w UE.

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