

AGNIESZKA POCZTA-WAJDA

Poznan University of Economics and Business, Poland

ECONOMIC VIABILITY OF FAMILY FARMS IN EUROPE – A LITERATURE REVIEW¹

Key words: economic viability, income, opportunity costs, family farm, FADN

ABSTRACT. As family farms are the dominant form of agricultural activity in Europe, their economic viability is a prerequisite for the sustainable development of agriculture and rural areas. The aim of this research is to review the latest publications on the economic viability of family farms in Europe. Based on a systematic literature review of studies related to European agriculture published in 2010-2020, this paper presents various concepts of family farm economic viability and assesses the methodologies used. The paper also presents the results of selected empirical research from the last 10 years on family farm economic viability in Europe, broken down into international and national comparisons. Results suggest that the most common approach to measuring economic viability is to use the opportunity cost concept of own factors of production. An important observation is also that, although most studies are based on the FADN database, the results of the analyses are sensitive to the selection of the threshold wage and own capital costs. What contemporary literature lacks is a long-term comparative analysis for all EU countries, as well as studies of drivers of family farm economic viability.

INTRODUCTION

The economic viability of family farms is the basic condition for their long-term survival. It influences farm succession decisions and land management, determines the possibilities of development as well as the quality of life of household members. As family farms are the dominant form of agricultural activity in Europe, their economic viability is a prerequisite for the sustainable development of agriculture and rural areas. A high share of non-viable family farms may result in a substantial negative impact on the rural economy in Europe. Understanding the concept, measures and drivers of economic viability of family farms, especially in the long-term, is crucial for formulating policy instruments that could improve viability levels and the sustainability of rural areas.

The concept of economic viability is defined and measured in different ways. In the short term, economic viability is understood as the ability to survive, and, in the long term, also as the ability to develop. The measurement of the economic viability of family

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farms differs from the measurement of enterprise viability, mainly due to the fact that farms use their own production factors, their own labour in particular. Hence, the most common approach to measuring economic viability is to use the opportunity cost concept and family farm income is the fundamental reference category.

One of the problems with measuring economic viability is also a lack of globally comparable (standardized) data to assess economic viability and its drivers. That is why the analysis of economic viability in an international dimension is difficult and sensitive to the variables included in its measurement [Lynch et al. 2019].

The main aim of this research is to review the latest publications on the economic viability of family farms in Europe and find the best way to measure this phenomenon and its determinant, as well as indicate the direction for further research. Hence, this paper reviews the concept of farm economic viability and assesses the methodologies used based on a systematic literature review. While searching for relevant literature, the following keywords were used in the databases' search-machines: farm economic viability and farm viability. As an additional source of literature, the list of references included in the literature found was also used. The time of publication of the article – from 2010, and the spatial scope – Europe, were adopted as additional selection criteria. Due to editorial limitations, only selected publications considered as contributing by the author are presented in this article. However, the final conclusions refer to the entire database of collected publications.

DEFINITION AND MEASURE OF FAMILY FARM ECONOMIC VIABILITY

There is no single universally recognized definition of the economic viability of a family farm. In general, most definitions refer to economic viability as the ability to earn for a living, with some also underlining returns from on-farm investment. Hence, various definitions of farm economic viability refer to remuneration of labour and/or own capital engaged in farming. According to Astrida Slavickiene and Jurate Savickiene [2014a]: “the economic viability of a farm is its capability to survive, live and develop by using available resources”. Michael Vassalos et al. [2015] define farm economic viability as “the ability of a farm operating to earn enough income to meet its financial obligations and continue to operate and expand”.

The concept of farm economic viability differs from the household economic viability concept. The former contributes to the standard of living in the farm household, but may be supplemented by non-farm income. The concept of economic viability should not be confused with economic sustainability, because a farm can be sustainable even if it is not economically viable due to off-farm income.

In European studies, various measures of farm economic viability focus more on opportunity cost, while in North American studies concentrate more on household welfare measures. This difference may be due to data availability in Europe, the USA and Canada [O'Donoghue et al. 2016]. The most common approach to assessing family farm economic viability in Europe is to use Farm Accountancy Data Network (FADN) data. The problem is that FADN data are not sufficient to calculate farm household income as a whole. Besides

FADN data does not include social data such as education, gender, marital status, number of household members, number of children, successor and off-farm employment. An alternative approach is to use European Union Statistics on Income and Living Conditions (EU-SILC), which focus on household income and living conditions [Boncinelli, Casini 2014]. This data, in turn, lacks detailed information on business operation.

The basic criterion for the division of farm economic viability measures is the division into short- and long-term viability. Economic viability in the short-term means that family work engaged in farming activity receives an income level that is at least equal to alternative jobs. Hence, in the analysis of short-term economic viability, a chosen measure of farm income is compared to the opportunity cost of unpaid labour. The broad formula of farm economic viability in the short term can be presented as follows:

$$\frac{\text{Farm income}}{\text{Hours of unpaid labour}} > \text{Threshold wage}$$

The challenge is both to select an appropriate measure of farm income and choose a reference income measuring the opportunity cost of labour. Since most studies in Europe are based on FADN, they use an income definition similar to the Family Farm Income (FFI)² included in FADN [O'Donoghue et al. 2016]. The alternative ways of measuring farm income include or exclude depreciation, taxes, inventory changes and off-farm income. Family farm income is not an appropriate measure for a farm with a substantial share of paid labour, for which Farm Net Value Added (FNVA) would be more suitable [Spicka et al. 2019]. Cash flow can be an alternative for both FFI and FNVA. Labour input in the denominator is most often measured using the Annual Work Unit (AWU) expressed in hours or by Family Work Unit (FWU) available in FADN.

Choosing a reference income (threshold wage) is one of the key problems in analysing economic viability and can significantly influence the results of analyses, especially in the case of international comparisons. The most frequently used approaches include: the minimum wage, the minimum [Hennessy, Moran 2015] or average wage in agriculture [Ryan et al. 2016, Nurmet, Omel 2020] or the average wage in the national economy [Goraj 2010, Vrolijk et al. 2010, Coppola et al. 2020, Kołoszycz 2020].

Choosing the minimum wage as the reference income can lead to an overestimation of the viable farm number, especially in countries with a very low minimum wage, and can only be used to estimate the economic viability of farms in the very short term, because minimum wage is not a real alternative for labour on-farm engagement [Spicka et al. 2019]. Besides, it has not been defined in every country. A similar problem, even more frequent, relates to the minimum and average wage in agriculture. In turn, average wage in the total economy can be quite high and lead to underestimation. Cathal O'Donoghue et al. [2016] solved this problem by employing wages paid by the farm, which were close to minimum national wages. The most common approach is, however, to use an average wage

² FFI = Total output – Total intermediate consumption + Balance current subsidies and taxes – Depreciation + Balance subsidies and taxes on investment – Total external factors.

in the national economy or region as this presents the value of the real alternative while making the decision of whether to engage own labour in on-farm or off-farm activities.

Economic viability in the long term is understood as the ability to develop which assumes suitable remuneration for all family factors including own land and capital. Hence, in the analyses of long-term economic viability, apart from the opportunity cost of the labour factor, the cost of own capital [O'Donoghue et al. 2016, Kołoszycz 2020] and sometimes the cost of land [Coppola et al. 2020] are also taken into account. The broad formula of farm economic viability in the short term can be presented as follows:

$$\frac{\text{Farm income} - \text{Cost of own capital}}{\text{Hours of unpaid labour}} > \text{Threshold wage}$$

The opportunity cost of own capital is usually estimated with the use of long-term bond interest rates [Vrolijk et al. 2010] or long-term interest rates provided by the European Central Bank [O'Donoghue et al. 2016, Nurmet, Omel 2020]. Given the strong decline in interest rates in EU countries in recent years, or even negative rates, this approach might also be problematic. Jindrich Spicka et al. [2019] suggest that due to the risky nature of agriculture, the opportunity cost of own capital should be higher than the risk of investments in bonds. So, another common approach is to adopt a 5% return to non-land assets [Barnes et al. 2015, Goraj 2010]. In the long-term analysis of economic viability some authors [Coppola et al. 2020] also include the opportunity cost of own land usually measured as regional land rent.

Ewa Kołoszycz [2020] defines short-term and long-term viability somewhat differently. She assumes that short-term declines in income may be compensated for by their increases in subsequent periods. Therefore, she relates short-term profitability to a period of one year, while long-term profitability is determined on the basis of a 3-year moving average. Andrew Barnes et al. [2015] also propose an alternative distinction between short- and long-term viability. They use cash income to assess short-term viability, and net farm income to assess long-term viability.

There is also an alternative approach to measuring economic viability in the literature that departs from the use of agricultural income as the basis for comparison. This alternative approach is to measure farm economic viability with the use of financial ratios such as a return on assets, investment or sales, assets turnover, debt to net income or equity. Such an approach was used i.a. in the works of Astrida Slavickiene and Jurate Savickiene [2014b], Astrida Miceikienė and Laura Girdžiute [2016] or Erika Besusparienė and Astrida Miceikienė [2020]. Jindrich Spicka et al. [2019] claim, however, that these measures are purely accounting indicators and do not consider the opportunity cost of own production factors. Especially indicators based on assets, which only include own assets but not hired are not suitable for farms with a high share of hired land.

FARM ECONOMIC VIABILITY AND ITS DRIVERS IN EMPIRICAL RESEARCH

In addition to measuring the economic viability of farms, the identification of factors influencing it is also of key importance. The latter issue is much less recognized and the results of the studies conducted so far do not give a clear answer about what makes a farm economically viable. The literature review shows that the economic viability of family farms is influenced by various exo- (political, regulatory, cyclical) and endogenous (changes in production factors) drivers. The most commonly analysed factors are farm size, productivity of production factors, specialization and policy support. However, some studies show that these factors are not always decisive [Veveris et al. 2019]. For example Andrew Barnes et al. [2015] prove that farm economic viability is favoured by diversification, not specialization; Teresa Hooks et al. [2017] suggest that viability is not wholly determined by size and productivity but also by improvements to market orientation; also Victor Moroz et al. [2014] claim that small farms can be economically viable if they are planned well. And, in principle, there is hardly any research at an international level that shows the impact of socio-demographic variables on economic viability, as there is a serious problem in this regard with a lack of comparable data.

The examples of empirical research on the economic viability of family farms presented in the article (see Table 1) can be divided into two groups: studies comparing economic viability from an international perspective and studies analysing this phenomenon in a national context.

The most comprehensive study, so far, is one by Hans Vrolijk et al. [2010]. It refers to 25 EU countries, however, the data is from 2004-2006, which makes this study quite outdated. Nevertheless, this study analyses the importance of EU support in the economic viability of family farms. The authors point out that farms in Denmark, Ireland, Sweden, the UK, France, Germany and Hungary would be particularly sensitive to the possible reduction of subsidies, while in Spain, Poland, Lithuania, Latvia, Belgium and Austria this effect would not be so strong.

Another study based on data from the first decade of the 21st century is that of Astrida Slavickiene and Jurate Savickiene [2014b], who use an alternative set of four farm viability measures, i.e. return on equity, the liabilities to gross profit ratio, the expense to income ratio and production subsidies to gross profit ratio. This survey only looks at EU-10 countries. The first three measures indicate that, in the analysed period 2004-2009, family farms were, on average, economically viable. The last of the indicators, however, proved that it was only thanks to the support of direct payments.

The results of pilot studies done by Cathal O'Donoghue et al. [2016] was based on more contemporary data from 2014-2015 and concerned 8 European countries. It shows that the farm viability rate is sensitive to the threshold or benchmark wage of those employed. Hungary has the highest farm viability rate, while Spain has one of the lowest viability rates. In general, poorer countries with a lower minimum agricultural and average wage rate, such as Greece, Hungary and Poland, have the highest farm viability rates, while countries with higher threshold, such as Germany, Finland, the Netherlands and Spain, have lower viability rates.

Table 1. Family farm economic viability in European countries – selected study examples

Author	Country/sector	Years of analysis	Viable Farms	Non-viable farms	Drivers of viability differences
International comparison					
Andrew Barnes et al. [2015]	Scotland, Sweden	2000-2012	Higher proportion of Scottish farms	Higher proportion of Swedish farms	Diversification of agricultural activity
Ewa Kofoszyc [2020]	Dairy farms in DE, FR, GB, IT, NL, PL	2008-2017	Polish, Italian > EUR 100,000 German > EUR 500,000	British, French, Dutch	Size
Cathal O'Donoghue et al. [2016]	Small number of pilot farms in DE, EL, ES, FI, HU, IE, NL, PL	2014-2015	In the short-term the highest percentage in Hungary and Greece; in the long-term the highest percentage in Hungary and Ireland	In the short-term the highest percentage in Finland and the Netherlands; in the long-term the highest percentage in Spain, Finland and the Netherlands.	Threshold wage
Astrida Slavickiene and Jurate Savickiene [2014b]	EU-10	2004-2009	All EU-10 on average with direct payments	All EU-10 on average without direct payments	Support
Hans Vrolijk et al. [2010]	EU-25	2004-2006	Highest share in Austria, Belgium, Estonia, Lithuania, Latvia, Poland	Highest share in Denmark, Sweden, Slovakia, the UK	Economic size, productivity of production factors, share of paid labour

Table 1. Cont.

Author	Country/sector	Years of analysis	Viable Farms	Non-viable farms	Drivers of viability differences
National comparison					
Adele Coppola et al. [2020]	Italy	2015-2017	37.7% in both the short and long-term, highest percentage in granivores farms, over 40 ha, run by a male, run by a farmer up to 40 years old and with a higher education	51.2% in both the short and long-term, highest percentage in mixed farms, less than 5 ha, run by a female, run by a farmer over 66 years old and with a low education	Size, capital intensity, age, gender, location, EU support
Lech Goraj [2010]	Poland	2008	17.1% of family farms within the field of observation of Polish FADN	74.7% of family farms within the field of observation of Polish FADN	Economic size, proportion of own factors of production and their productivity
Nurmet Maitre and Raul Omel [2020]	Estonia	2006-2015	59% in 2006 and 37% in 2015	83% of farms with an economic size of EUR 4-8 thousand of the standard surplus	Economic size
Michael Vassalos et al. [2015]	Greece	2001-2010	Over 50% viable or potentially viable	Less than 50% declining or marginal	CAP payment, age, type of production, location

Source: own elaboration

In a Scottish-Swedish comparative study, Andrew Barnes et al. [2015] estimate that Scottish farms (73-80%) are generally more economically viable than Swedish farms (43-46%). Findings indicate that farms running diversified agricultural activity are more viable compared to specialized agricultural units. The authors further conclude that it may arise from rural development plans, under which farm viability is supported more strongly in Scotland, and productivity and environmental enhancement in Sweden.

One of the few studies on economic viability in a single production type, is the research presented by Ewa Kołoszycz [2020]. She indicates that, in the case of dairy farms, economic viability was related to farm size. The coverage of opportunity labour costs was possible on Polish (over EUR 50 thousand), Italian and German (over EUR 100 thousand) and Dutch farms (over EUR 500 thousand). However, only Polish and Italian farms (over EUR 100,000) and German farms (over EUR 500,000) had opportunities for development, understood as also covering the opportunity cost of own capital. British, French and Dutch farms did not have this possibility in any of the size classes.

Of the four studies based on national analyses, two have a longer i.e. 10-year time range. Michael Vassalos et al. [2015] studied economic viability of Greek farms in the period 2001-2010. They found that decoupled payments increase the probability of farms being classified as economically viable. Their study also proves that the transition towards horticulture and livestock production increases the probability of being classified as viable, but age is negatively related to economic viability.

According to a study by Maire Nurmet and Raul Omel [2020], based on Estonian FADN data from the years 2006-2015, although the viability of Estonian farms has slightly increased, the share of viable farms has decreased from 59 to 37%, on average. A particularly strong decline was observed in the periods of global economic downturn in 2009 and 2014. This suggests that family farms in Estonia are more sensitive to economic fluctuations than other entities in the economy. Another important conclusion from these studies is that economic viability is positively related to economic farm size, which is consistent with the results of studies conducted in other European countries.

Lech Goraj [2010] provided an analysis of economic viability among family farms within the field of observation of Polish FADN. Results of his study show that, in 2008, only 17.1% of farms were classified as economically viable, with over 50% of them being large farms. 74.7% of farms were classified as non-viable. Over 70% of these farms were two-occupational farms, which made it possible to compensate for the lack of current economic viability with off-farm activities. This means that the long term future of these farms is uncertain.

The latest study presented by Adele Coppola et al. [2020] indicates that almost 38% of Italian farms is economically viable in both the short and long term but over 50% lack viability in both approaches. However, when EU aids are deducted from the Farm Net Income, these shares change: 27 and 63%. Authors also tested drivers of economic viability and proved that both socio-demographic (age, gender, location, share of non-farm revenues) as well as structural farm characteristics (size, type of production, marketization, capital intensity, share of family work) significantly influence farm economic viability. The contributing observation is that CAP payments do not change the list of factors affecting farm viability but change their weight.

In recent years, several studies on the economic viability of niche groups of farms have also been published. Such alternative forms of agricultural activity are often characterized by a higher economic viability than the average for agriculture. These studies concerned, inter alia, micro farms in France [Morel et al. 2017], urban agriculture in Germany [Krikser et al. 2019] and in London [Chang, Morel 2018], social farming in Spain [Tulla et al. 2018], farms in areas facing natural constraints in the Czech Republic [Hlavsa et al. 2020] and Scotland [Barnes et al. 2020].

CONCLUSIONS

1. The aim of this research was to review the latest publications on the economic viability of family farms in Europe. Various definitions and measures of economic viability are discussed in relation to the short and long term. The results of empirical research on the economic viability of farms in Europe, published in the last 10 years, were also presented.
2. The results of the review indicate that there is no unified methodology for studying the economic viability of family farms. The method of estimating farm income is the most unified, which is due to the fact that most studies use FADN data. On the other hand, the choice of the threshold weight and cost of equity is subjective, which makes the research results very sensitive to the selection of variables. This suggests that sensitivity analysis is needed in case of international research.
3. If one understands the economic viability of a farm as its ability to survive and develop, then, in the author's opinion, the best approach to measure it is to compare agricultural activity to its real alternatives. Therefore, the author suggests measuring economic viability using the opportunity cost concept of average wage in the economy, 5% return on equity and regional land rent. Valuing return on equity with bonds and considering land as part of capital is not a real alternative and can lead to an overestimation of results.
4. The least amount of research definitely presents the problem of economic viability in a comparative dynamic perspective in the long-term. To the best of the author's knowledge, since the publication of the article by Hans Vrolijk et al. [2010], no one has conducted a long-term comparative analysis for all EU countries. Such research would be highly recommended, as it would allow for an analysis of trends in economic viability and the influence of the evolution of agricultural policy and economic fluctuations on this phenomenon.
5. More research analysing drivers of economic viability would also be useful. In addition to research on the impact of structural farm characteristics such as size, type of production, marketization, capital intensity and share of family work, socio-demographic variables such as age, gender, education and share of off-farm revenues would also be useful. This means, however, that primary research is necessary or that the FADN database should be supplemented with more socio-demographic variables.

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ŻYWOTNOŚĆ EKONOMICZNA RODZINNYCH GOSPODARSTW ROLNYCH W EUROPIE – PRZEGLĄD LITERATURY

Słowa kluczowe: żywotność ekonomiczna, dochód, koszt alternatywny,
gospodarstwo rodzinne, FADN

ABSTRAKT

Gospodarstwa rodzinne są dominującą formą działalności rolniczej w Europie, a ich żywotność ekonomiczna jest warunkiem zrównoważonego rozwoju rolnictwa i obszarów wiejskich. W artykule dokonano przeglądu koncepcji żywotności ekonomicznej rodzinnych gospodarstw rolnych oraz oceniono stosowane metody pomiaru tego zjawiska na podstawie wybranych artykułów z okresu 2010-2020, a dotyczących europejskiego rolnictwa. Najpowszechniejszym podejściem do pomiaru żywotności ekonomicznej jest wykorzystanie koncepcji kosztu alternatywnego własnych czynników produkcji. W artykule przedstawiono także wyniki wybranych badań empirycznych z ostatnich 10 lat nad żywotnością ekonomiczną gospodarstw rodzinnych w Europie, w podziale na porównania międzynarodowe i krajowe. Ważnym spostrzeżeniem jest również to, że chociaż większość badań opiera się na bazie danych FADN, to wyniki analiz są wrażliwe na to, jaką płacę odniesienia i miarę kosztu kapitału własnego wykorzystuje się do porównania. We współczesnej literaturze brakuje długoterminowej analizy porównawczej dla wszystkich krajów UE, a także badań czynników warunkujących żywotność rodzinnych gospodarstw rolnych.

AUTHOR

AGNIESZKA POCZTA-WAJDA, DR HAB. PROF. PUEB

ORCID: 0000-0001-5618-1590

Poznan University of Economics and Business

Institute of Economics

Department of Macroeconomics and Agricultural Economics

10 Niepodległości Av., 61-875 Poznan, Poland