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## FARM COMPETITIVENESS DETERMINANTS AND DRIVERS

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### Abstract

The aim of the current paper is to present an overview of the literature on farm competitiveness and to present several definitions of this concept. Furthermore, we discuss a body of recent surveys on productivity and efficiency and outline key determinants of competitiveness with a view to identifying important drivers for growth. On the basis of previous results from the "Innovative Models for the Increase of Farm Competitiveness in Bulgaria – AGROIN" project we conclude that the key determinants of farm competitiveness referred to above are the quality and quantity of the production capacities, the national agricultural policies, and the innovations and investments in infrastructure.

**Keywords:** productivity, efficiency, competitiveness, growth.

### INTRODUCTION

The processes of globalization and integration in world economics make the concept of competitiveness relevant and provoke a debate over key factors influencing this category. The dynamic changes generate discussion of how to allocate resources and ensure the food security and social welfare. The determinants, contributing to the competitiveness and productivity growth, are subject of interest worldwide.

The aim of the study is to highlight the main factors and determinants of farm competitiveness and based on the overview of the literature to outline the main drivers for competitiveness growth.

### MATERIALS AND METHODS

The report observes farm competitiveness and explains the main definitions and results from various studies. The survey does not claim to be detailed and exhaustive but could be a starting point for conclusions and a prerequisite for further findings and measurements. Comparative, historical, monographic and abstract-logical methods of analysis are applied in the study.

This article summarizes results from the project "AGROIN", financed by the National Fund for Scientific Research at the Ministry of Education and Research. The main objective is to identify key determinants of farm competitiveness.

### RESULTS AND DISCUSSION

The concept of competitiveness has many dimensions. There is a range of possible applications – from individual and company activity to sector and sector cluster activity, through to regional and state levels (Porter, 1990).

Competitiveness in the agricultural sector has specific features and characteristics, which require change and adaptation of research approaches. Due to the complexity of the concept in theory and practice, no consensus has been reached on competitiveness definition and measurement (Latruffe, 2014).

Competitiveness in the context of agriculture could be seen on a national and international level. Latruffe (2014) defines the competitiveness of farms as "the ability of the farm to compete and be successful". The competitive success of the agricultural holdings is determined by the competitive abilities they possess. They depend on the following factors: resources, production structure, national markets and related and supporting productions (Alexiev, 2012). The Food, Agriculture and Fisheries Department of OECD has conducted studies to determine the components of agricultural competitiveness. According to the surveys, the competitive environment for agricultural growth includes stable policies, adequate provision of public goods, good governance through laws and regulations, beneficial to economic activity of farms while coping with market failures. Kuneva and Angelova (2017) suggest using the mathematical approach as the Model of Leontief to describe links between sub-sectors and assess competitiveness.

Latruffe (2010) defines key factors and drivers of farm competitiveness. Based on Porter's model, the author outlines the specific indicators and their impact on farm performance. The survey classifies these determinants into two major groups – internal and external:

✓ **Internal factors and determinants**

• **Structural characteristics of the farm**

The relation between farm size and competitiveness is widely discussed (Cornia, 1985, Hall and LeVein, 1978). Although the debate started in developing countries, the topic became relevant for Central and Eastern Europe in the transition period. The farm structure in these countries was characterized by many small holdings and large cooperation and raised the discussion which structure will dominate after the transformation.

The farm size influence on allocative, technical efficiency and productivity is the subject of a number of studies. They use different indicators and there is no consensus which one is the most adequate for the purpose of the analysis. The applied indicators include: total output (Latruffe et al., 2004); utilised agricultural area (Nasr et al., 1998; Hadley, 2006; Carroll et al., 2009); economic size (Emvalomatis et al., 2008; Zhu et al., 2008a and 2008b); labour used or assets (Bojnec and Latruffe, 2007). Gorton and Davidova (2001) observed several studies on the international competitiveness of agriculture in Central and Eastern European counties. The results show that large farms are more competitive internationally than smaller holdings.

The organizational type of the farm is often included in the surveys for economies in transition, although the existing results do not reveal a clear advantage of the competitiveness of either family farming or cooperatives (Gorton and Davidova, 2004). The legal status is used to evaluate the technical efficiency of farms in Western Europe (Weersink et al., 1990).

The impact of factor intensity on competitiveness is applied in several studies (Weersink et al., 1990, Mathijs and Vranken, 2001, Latruffe et al., 2004, Carroll et al., 2009). The use of external factors is often considered a determinant of competitiveness. There are various results related to the share of hired labour and leased land (Weersink et al., 1990; Latruffe et al., 2004; Hadley, 2006; Zhu et al., 2008a and 2008b; Tonsor and Featherstone, 2009).

Several studies observe the impact of agricultural specialization on farm competitiveness. The process of specialization stimulates competitiveness by allowing the farmer to focus on few tasks and therefore to improve management practices (Brümmer, 2001; Mathijs and Vranken, 2001; Zhu et al., 2008a; Carroll et al., 2009). On the other hand, diversification reduces the risk (Mathijs and Vranken, 2001; Hadley, 2006).

• **Social capital**

The age of the farmer, the degree/type of education, the gender is often included as variables in the analysis of management capacity. They are important factors influencing farm competitiveness, but in most of the surveys, they are not directly discussed.

The impact of a manager's age may be negative due to the difficulties for older farmers to adapt and their inability to accept and implement innovations (Brümmer, 2001; Hadley, 2006). However, the effect of age on competitiveness could be positive, as older farmers are more experienced and could use resources more effectively (Mathijs and Vranken, 2001; Chen et al., 2009). The years of experience are also an indicator of farm competitiveness (Sharma et al., 1999). Education as a determinant has a positive impact on farm competitiveness, because better-educated farm managers may have more skills and are more effective. Mathijs and Vranken (2001) and Latruffe et al. (2004) confirm that education has a positive effect on technical efficiency in family farms in Hungary and Bulgaria in 1997, and in Polish farms in the period 1996-2000. However, Sotnikov (1998) registered opposite results in Russian farms. The author explains the findings with the specifics of agricultural education in Russia, which focuses much more on technological aspects than on management practices.

The gender is a factor that also could influence farm competitiveness and productivity. Quisumbing (1996) and Chavas et al. (2005) observed that there is no significant gender difference. In contrast, Timothy and Adeoti (2006) found that women showed better technical efficiency than male farmers but lower allocative efficiency. Mathijs and Vranken (2001) prove that the share of women in the household has a positive impact on competitiveness.

Another key factor affecting competitiveness is related to the type of employment – full-time or part-time. Brümmer (2001), Mathijs and Vranken (2001), Rezitis et al. (2003), Tonsor and Featherstone (2009) observed that full-time farmers are more efficient than part-time ones. Huffman and Evenson (2001), Mathijs and Vranken (2001), Tonsor and Featherstone (2009) register the opposite results.

✓ **External factors and determinants**

• **National resources and demand**

Farm competitiveness is determined by national resources and demand conditions (Porter, 1990).

According to Venturini and Boccaletti (1998), the strong competitive position of Italian pasta producers in the period 1988-1992 is due to the increasing consumer perception that pasta is healthy. Viaene and Gellynck (1998) explain that the problems with the competitiveness of pork meat producers in Belgium during the period 1987–1993 is partly due to a change in demand conditions: young people consume less meat. Banterle and Carraresi (2007) show that the success of EU farms is related to the growing interest of consumers in quality and origin.

- **Government interventions**

Public policies and regulations affect the decisions for resource allocation. They may also distort competition between companies (OECD, 2001). The agricultural policy plays an important role in the sector and could affect farm competitiveness. Banse et al. (1999) conclude that there is a negative correlation between competitiveness and government interventions in agriculture. Nivievskiy, von Cramon-Taubadel (2008) and Bezlepkina et al. (2005) assess the role of subsidies for Russian dairy farms in the period 1995–2001. Both studies found a positive effect of subsidies on competitiveness.

A number of surveys use the impact of agricultural policy as a determinant (Rezitis et al., 2003, Emvalomatis et al., 2008) or the share of farm income stemming from state support (Giannakas et al., 2001), or a ratio between subsidy size and production level or gross margin to avoid size effects (Hadley, 2006, Zhu et al., 2008a and 2008b; Bakucs et al., 2010). The impact on competitiveness is negative in almost all studies (Rezitis et al., 2003, Hadley, 2006, Emvalomatis et al., 2008, Zhu et al., 2008a). Only Hadley (2006) registers a positive effect on dairy and cattle farms in England and Wales between 1982 and 2002.

Sauer and Park (2009) also report the positive impact of subsidies on efficiency and technological change. In contrast, farm financial support does not have a significant effect on US total factor productivity (Yee et al., 2004; Makki et al., 1999). Several studies observe the effect of agricultural policy reform on productivity and competitiveness. This approach is applied by Morrison (2000) and Carroll et al. (2009).

In addition to income support, a number of studies survey the impact of other types of interventions on competitiveness. Rezitis et al. (2003) analyse whether the EU farm credit program achieves the goal to increase farm productivity. In both studies, there is a negative effect on competitiveness.

- **Public expenditures in research and development (R&D) and infrastructure**

Public expenditures in research and development (R&D) allow the implementation of technologies that improve farm productivity and reduce production costs, application of more efficient pesticides for the agricultural sector.

Mullen et al. (2006) investigate studies on the role of R&D expenditure. The authors demonstrate that expenditures in a certain year may have an impact on Total factor productivity for many years. Hall and Scobie (2006) find out that public investment in R&D has a positive impact on competitiveness. Alston et al. (2009) argue that the recent decline (in the early 1990s) in crop yields and productivity growth in 2008 may be related to the declining share of public expenditures in 2007.

Other studies focus on the type of research expenditures. Ahearn (1998) points out that not only the public but also private expenditure is an important factor for agricultural productivity and competitiveness. The survey shows that since 1975 in the USA private expenditures exceeded those of the public sector. Hall and Scobie (2006) use private R&D expenditure as a determinant and register that private investments have a greater impact and rate of return than public expenditures. Makki et al. (1999) highlight that both types of expenditure have a positive effect, but the rate of return on public investment is higher. Hall and Scobie (2006) include foreign knowledge as a key determinant. The positive effect of the variable allows the conclusion that an international transfer of knowledge is also a determinant of competitiveness. Public investment in infrastructure supports productivity growth (Ahearn et al., 1998). For example, public expenditure on the construction of highways has a positive effect on the productivity of US agriculture.

While recognizing that public expenditures increase productivity in the agricultural sector, the impact on competitiveness indicators other than productivity is not widely discussed. Only Harrison and Kennedy (1997) show that farm competitiveness is improved by technological innovations introduced by public programs.

- **Location and business endowment**

Farm competitiveness is associated with other important factors – location and business environment of agricultural holdings. The location is related to different climate, different soil quality, but also different physical and market infrastructure.

Several authors include the location in their regressions to analyse farm competitiveness – Weersink et al. (1990); Sharma et al. (1999),

Rezitis et al. (2003); Zhu et al. (2008b), Tonsor and Featherstone (2009), and Bakucs et al. (2010).

Zhu et al. (2008b) conclude that the location in less-favoured areas reduced the technical efficiency of Greek olive-growing farms in the period 1995-2004. The same effect is registered by Hadley (2006) on dairy farms in England and Wales in 1982–2002, but the author finds a positive impact on the grain and cattle farms. Brümmer (2001) proves that the location of the altitude above 600 meters reduces the technical efficiency of the farms. Nasr et al. (1998) explore soil productivity in order to observe technical efficiency of the Illinois grain producers during the period 1988-1994. Soil quality indices are used by Latruffe et al. (2004) for Polish farms in 1996–2000 and Bakucs et al. (2010) for Hungarian farms in 2001-2005. Climate conditions also have a significant effect on total factor productivity (Yee et al., 2004).

Sotnikov (1998) shows that road density is positively related to the technical efficiency of Russian farms in the period 1990-1995. Larue and Latruffe (2009) explore the determinant market infrastructure and find that a higher capacity of slaughterhouses increases efficiency. Tchale and Sauer (2007) use a dataset at the farm level and register that those farmers who have better market access, are more competitive.

Larue and Latruffe (2009) highlight that density of pig holdings in a given region had a positive impact on the competitiveness of producers, suggesting that the proximity of farms improved the transfer of experience and knowledge. Similar findings are made by Tvetaras and Battese (2006) for Norwegian farms in the period 1985–1995.

Based on a literature review and the analysis of different classifications of factors, key determinants for farm competitiveness growth could be systemized. Similar studies are made by Wang et al. (2015). Authors outline the factors with a positive impact on farm-level competitiveness.

Improving the competitiveness of agricultural holdings is a key objective for the development of Bulgarian agriculture. Sources of long-term growth of competitiveness are related to the increase in total factor productivity. Determinants that cause short-term fluctuations in agricultural production differ from those that affect long-term trends and generally require different policies.

Jorgenson and Griliches (1995) found that, in addition to the driver for TFP growth, it is important to analyse the determinants that influence production factors' productivity. Authors measure input quality changes in the production system and

incorporate adjusted quality ratios in TFP assessment. In this approach, changes in the contribution of individual factors include changes in the quality of work, land quality and quality in used agricultural chemicals and agricultural machinery, as well as changes in quantity.

## CONCLUSIONS

Based on the analysis, several conclusions could be drawn:

1. The concept of farm competitiveness is widely discussed in the existing literature, but the term does not have a unified definition in economic theory;
2. The studies classify the determinants and factors of farm competitiveness in two main groups – controllable by farms and factors beyond farm control;
3. The main drivers of farm competitiveness growth include quality and quantity of resources, government interventions, innovation and knowledge transfer, investments in infrastructure.

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