

The agriculture development in market oriented agricultural holdings in European union /Bulgarian case study/

Ivan Byanov

department of Economic theory and
international economic relations,
Faculty of economics
University of Veliko Tarnovo "St.
Cyril and St. Methodius"
Veliko Tarnovo, Bulgaria
iv.bianov@ts.uni-vt.bg

Abstract. *This article explores the development of market-oriented agricultural holdings in the European Union (EU), with a specific focus on the Bulgarian agricultural sector. By analyzing agricultural holdings within the Farm Accountancy Data Network (FADN), the study aims to focus the challenges and opportunities faced by farmers in a market-driven agricultural landscape.*

The EU's Common Agricultural Policy (CAP) has been instrumental in shaping the agriculture sector across member states. As the EU transitions towards a more market-oriented approach, agricultural holdings are required to adapt to changing market dynamics, technological advancements, and environmental sustainability. Hence these are the holdings which could deploy in practice the Agriculture 4.0 techniques. Through a comprehensive analysis of the FADN data, this article aims to identify the factors that contribute to the success or failure of market-oriented agricultural holdings in Bulgaria.

The Bulgarian case study provides insights into the challenges faced by market-oriented agricultural holdings. The country's unique socio-economic characteristics, including a rural population and a history of agricultural production, make it an interesting case for analysis. The study examines key indicators such as farm size, land use, production diversity, and income levels within the FADN database. Furthermore, it explores the impact of EU policies, market integration, and access to financial resources on the development of these holdings.

Keywords: *Agriculture 4.0, European union, Bulgaria, FADN*

I. INTRODUCTION

Agriculture remains a cornerstone of the European Union's economy, with market-oriented agricultural holdings playing a crucial role in ensuring food security, economic stability, and social welfare especially in rural areas. The transition towards market-oriented agricultural

holdings has been a key aspect of Common Agricultural Policy (CAP) reforms within the EU. This shift aims to enhance competitiveness, efficiency, and sustainability within the agricultural sector. The market-oriented agricultural holdings are divided into different stages according to their standard output. The standard output (SO) of an agricultural product (crop or livestock) is the average monetary value of the agricultural output at farm-gate price, in euro per hectare or per head of livestock [1]. The standard output is used to classify agricultural holdings by type of farming and by economic size [2]. This article delves into the development of such holdings in Bulgaria, providing a case study that reflects the broader EU context. The analysis covered the period 2007 - the year of Bulgarian accession in the EU till 2022. Because of the specific of the statistical information and observations of these market oriented agricultural holdings the analysis is focused on data as: average economic size, numbers of represented farms, total utilized agricultural area, total livestock units, total output, farm net value added, as well draw conclusions through samples of equity standing years, i.e. 2007, 2010, 2013, 2016, 2019, 2022.

II. MATERIALS AND METHODS

The farm accountancy data network (FADN) will be the primary data source for this study, which provides comprehensive and detailed data on farm economics within the EU. The FADN monitors farms' income and business activities and is a reliable informative source for analysis of market-oriented agricultural holdings. This database of microeconomic variables is based on harmonized bookkeeping principles, i.e. covers only EU

Print ISSN 1691-5402

Online ISSN 2256-070X

<https://doi.org/10.17770/etr2024vol1.7953>

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agricultural holdings which, due to their size, can be considered commercial.

The literature review method involves systematically searching for, appraising, and synthesizing research evidence from existing studies, reports, and academic papers relevant to this study. This is good method to known and identify gaps in the current knowledge.

The secondary data analysis is quantitative method which involves analysing existing data sets, such as agricultural productivity statistics, economic indicators, and demographic data. This data for agricultural holdings is from FADN EU databases, research institutions, and international organizations.

The comparative analysis as method is used to compare the situation in different types of agricultural holdings within Bulgaria. It helps to contextualize the findings and understand the relative performance or characteristics of the subject of study.

III. RESULTS AND DISCUSSION

The market-oriented agricultural holdings are the main driver for development and diversification of agricultural activities in rural areas. These holdings could apply new technologies leading to Agriculture 4.0 concept. Digital transformation (DT) is necessary to improve efficiency, productivity, and market access in the context of Green Deal and increasing competition. In the agri-food sector, DT is required to address the challenges of food safety, food waste, and sustainability [3]. All the recent challenges that both rural areas and agriculture in general had faced raised concerns that moving forward, the higher productivity should not be the only driving force. Sustainable practices must be followed to ensure that agriculture is responsible towards the natural resources, biodiversity, climate and the society itself [4]. The economic uncertainty since COVID-19 and different interventions in European countries are the most relevant difficulties with which the market-oriented holdings must resolve. The EU managed to react timely to the new market developments and responded fast to the COVID-19 crisis by applying new rules and procedures, not only in sectoral policies, but also in the more general competition and competitiveness stimulating policy directions [5].

According to the SO classification the market-oriented agricultural holdings are divided in 6 economic sizes /in levels 1 to 6/ as follow:

- (1) 2 000 - < 8 000 EUR
- (2) 8 000 - < 25 000 EUR
- (3) 25 000 - < 50 000 EUR
- (4) 50 000 - < 100 000 EUR
- (5) 100 000 - < 500 000 EUR
- (6) \geq 500 000 EUR

Fig. 1 indicates the dynamic of average economic size of the market-oriented agricultural holdings within every level of economic sizes through the analyzed period. The farms from the first four levels are without any change in economic size for the period of fifteen years. There is a

change only in the biggest agricultural holdings at levels 5 and 6 but it is not sustainable and fluctuates up and down. The increase of average economic size of farms in level 5 is 7 per cent in 2022 compared to 2007, respectively in state 6 the increase is 15 per cent.

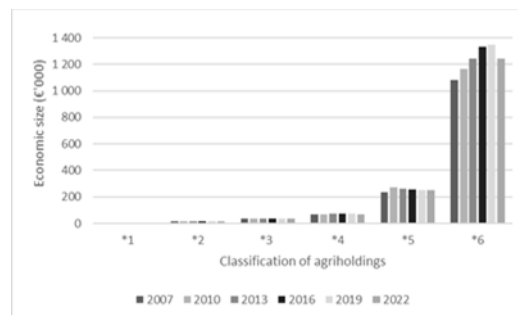


Fig. 1. Average economic size of the agricultural holdings.

Fig. 2 observes the numbers of market-oriented farms. During the period there are tremendous changes in this indicator. The smallest farms are on the verge of existence, i.e. their number drop by 7.5 times in 2022 compared to 2007 year.

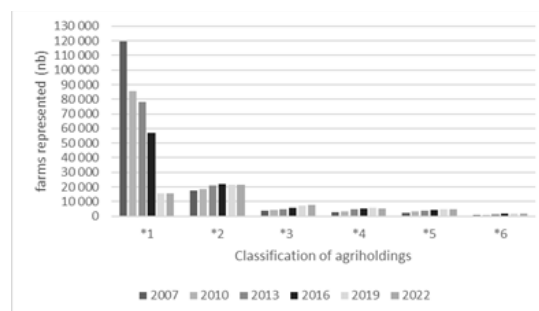


Fig. 2. Number of the agricultural holdings.

In contrast the number of market-oriented agricultural holdings in all other levels, is increasing considerably. In level (2) 8 000 - < 25 000 EUR the number of holdings is increased in 20 per cents, (3) 25 000 - < 50 000 EUR – increasing is 2 times, as well as the other levels above the increasing is between 1.5 and 2 times. All this turbulence as result in numbers of market-oriented farms in Bulgaria in 2022 – 56 987 compared to 146 769 in 2007 year.

The bigger farms in terms of economic point of view means better economic sustainability and more options of adoption of new Agriculture 4.0 related cut edge technologies. The application of smart village's concept is a forefront example of social innovation in rural areas [6]. However, tremendous decreasing of the smallest farms could indicate severe depopulation of the rural areas. Thus, will undeniably reflected in national security possible threats. The topic of career attitudes is rooted in human resource management, provoking academics, practitioners, psychologists, labor market analysts and others to seek solutions to real and potential challenges. The subject is dynamic due to changing generations, living environment, and career opportunities [7]. The lack

of infrastructure and job opportunity add more negative effect of rural development areas in Bulgaria.

Fig. 3 analysis is focused on the average size of each of the 6 levels of market-oriented agricultural holdings. There is a clear trend among the farms, i.e. these from the first level ((1) 2 000 - < 8 000 EUR) are growing bigger – from 3.1 ha to 5.4 ha, as well as at the level (2) 8 000 - < 25 000 EUR – 14.3 ha to 16.5 ha respectively 2007 to 2022 year.

In contrast the size of farms – in terms of utilized agricultural area in the upper levels (3 to 6) is decreasing between 5 to 55 percent. This leads to the conclusion that the restructuring of the holdings and their activities which relate to land will be further developed. Must be said that maybe one of main drivers for decreasing the average size of farms, in levels 3, 4 and 5 is additional national funding for smaller holdings – this will be topic of discussion for further papers.

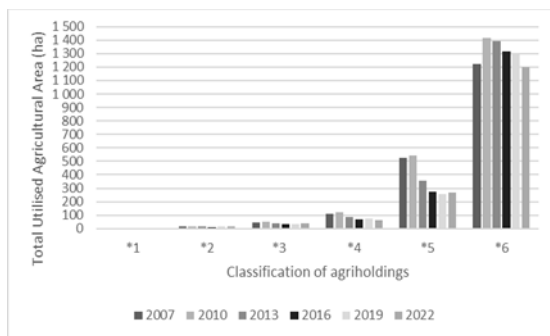


Fig. 3. Total utilised agricultural area (ha).

Fig. 4 is representative of Livestock units (LSU) [8] which are within the market-oriented agricultural holdings. Unfortunately, in all the farms in each level of classification (1-6) there is a decrease in this indicator.

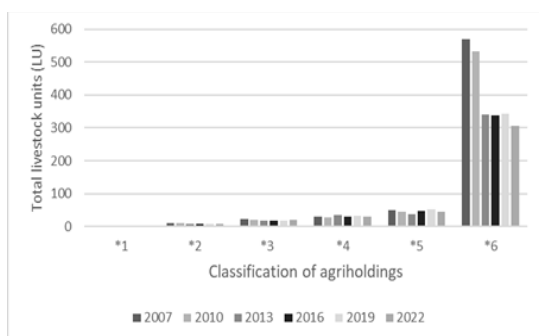


Fig. 4. Total livestock units (LU).

The animal breeding in Bulgaria was always suffer lack of support from the government as well as farm to fork strategy and was exposed in the goodwill of the free market. This could be changed if innovation and the concept of Agriculture 4.0 are applied in the future. This sub-sector of the agriculture could benefit in terms of added value, sustainability, innovation, and digitalization in rural area in Bulgaria. The digital social and economic

transformation is the key for achievement of the digital future of Europe [9].

Till now the average number of LSU per farm indicates critical condition of the sector and even the biggest agricultural holdings decreased numbers of LSU with almost 35 percent. Must be mentioned that through the analyzed period there were few animal diseases in the poultry and pigs which led to their extermination in the biggest agricultural holdings in the country. We should consider that food security, where animal breeding plays a vital role, is crucial for national security in terms of the possibility of feeding your own population. Besides the animal breeding is the key for added value in the sector and export opportunities.

Fig. 5 is focused on total output (€/farm) which is crucial for farms' survival and future development. This indicator is total value of output of crops and crop products, livestock, and livestock products and of other output, including that of other gainful activities (OGA) of the farms. In other words - sales and use of (crop and livestock) products and livestock + change in stocks of products (crop and livestock). Here clearly is indicated the increase of the indicator which is corresponding to improved market efficiency within the small number of agricultural households.

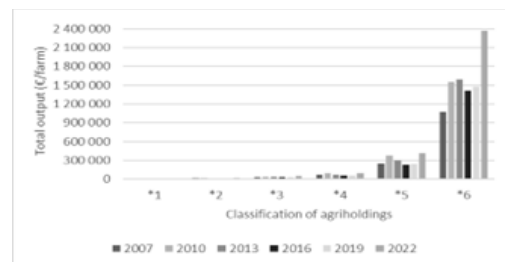


Fig. 5. Total output (€/farm).

However, it must be noted that the prices of agricultural products soared last 5 years. This is provoked from COVID-19 pandemic as well as the war Russia-Ukraine. This is one more evidence that sustainability in rural area could not be underestimate so intensification of production within EU rural development is crucial for further innovation. The increase of the indicator is between 15 and 55 percent respectively 2007 and 2022 year and the biggest share is in the biggest market-oriented farms (level 6 >= 500 000 EUR).

On the one hand, advances in science and technology have had an impact on how the results of human labour are presented, accessed, used, and disseminated. On the other hand, demand, market niches and sales have undergone revision and reorganization. Changes in supply, demand and affordability have become an opportunity and/or a threat [10].

Fig. 6 is the last analysed indicator which is Farm net value added (in €). This is remuneration to the fixed factors of production (work, land, and capital), whether they be external or family factors. This last indicator reveals that every market-oriented farm in all the levels of classification has significantly increase between 2 and 3

times during the period. This could be as proof that the successful market-oriented farm is more sustainable during market turmoil within the period. Consequently, there has been a shift in societal expectations, putting emphasis on the role of business in protecting and preserving the environment, with companies becoming increasingly sensitive to, and committed to, social and environmental issues [11]. The digitalization and innovations in market-oriented agriculture will be in great beneficent for the society and Bulgarian's economy. In recent years the interest in innovation and implementation of digital solutions in the public sector is growing at a rapid pace, both at global and regional level. [12]

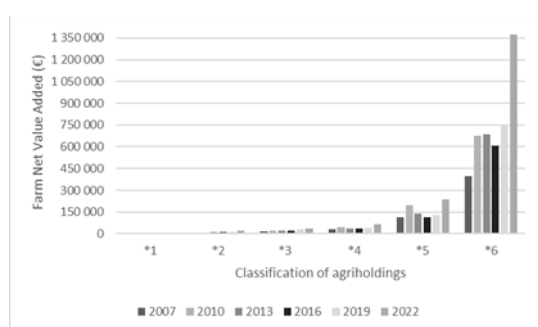


Fig. 6. Farm net value added (€).

IV. CONCLUSIONS

The development of market-oriented agricultural holdings in Bulgaria is not unique trends in the EU's agricultural sector. The competitiveness, restructuring, and social impact of these holdings are connected with the country's socio-economic context. Smallholder farms lack behind their development in Bulgaria's agriculture, emphasizing the need for a balanced approach that integrates technological innovation with ecological and social considerations. The competitiveness of these holdings should be shaped by effective management, innovation, and the integration into sustainable food supply chains. Smallholder market-oriented farms, despite facing challenges, remain integral to Bulgaria's food security and the well-being of rural communities. Policy initiatives and the goal of sustainability impact the future of agriculture. The central role of agriculture in environmental and climate challenges are aware in recent policy, such as the EU's farm to fork strategy, biodiversity

strategy, and the common agricultural policy (CAP) for 2023-2027. The CAP Strategic Plan for 2023-2027 sets a strategic direction for the sector, focusing on sustainability, competitiveness, so it's essential for Bulgaria evolve its agricultural practices. This case study is attempted to serves as an understanding the broader trends and policies shaping agriculture in the European Union as well as in Bulgaria.

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