COMPARISON OF COMPETITIVENESS BETWEEN BULGARIA, EU, USA, AND NEW ZEALAND DAIRY SECTORS

Vassil Stoychev, doctoral candidate[1]; **Bozhidar Ivanov**, PhD, Associate Professor[2]

Department Economics and Management of Agriculture, Food and Agricultural Policy, Institute of Agricultural Economics

ABSTRACT

Defining the state of competitiveness for a particular agricultural sector is of great importance. By retaining a competitive market position sustainable economic development of the specific agricultural production is supported. Continuation of its multiple economic functions like providing raw materials for the processing industry, securing rural employment, and utilization of scarce agricultural resources is the focus of competitiveness goals. In the economic theory, there is no unified definition for competitiveness, while there are a variety of approaches to measure it, which is reflected in different applied theoretical frameworks. The research aims to compare the competitiveness of the Bulgarian dairy sector versus the EU, the USA, and New Zealand dairy sectors on the world market for the period after the accession of Bulgaria in the EU. Therefore, a conceptual framework has been chosen developed by Canada's Task Force for Competitiveness. The framework is based on the ability to gain and sustainably maintain market share. For the chosen period the results show a trend of decline in the competitiveness of the Bulgarian dairy sector and improvement in the competitiveness of the EU dairy sector. For the EU comparison, indexes of competitiveness have been calculated for the USA and New Zealand. The USA's index slightly decreased at the end of the explored period reflecting the increased competition on the world markets while New Zealand's high index values reveal its position as a leading dairy products exporter.

Key words: dairy, index of competitiveness
JEL codes: F19, Q17

INTRODUCTION

Retaining a competitive market position supports the sustainable economic development of the specific agricultural production and continuation of multiple economic functions like providing raw materials for the processing industry, securing rural employment, and utilization of scarce agricultural resources. Because of this, defining the state of competitive-

ness for a particular agricultural sector is of great importance.

From that perspective, exploring the competitive performance of the Bulgarian dairy sector aims to show how the state of competitiveness has been affected by changes in economic conditions after the country accedes to the EU in 2007. Up to 2018 there was a decline in milk production (–21.7%) and the number of specialised farms decreased significantly

---

[1] Corresponding author: Tzarigradsko Shosse Blvd. 125, Bl. 1, Sofia 1113, Bulgaria, v.stoyhev@iae-bg.com, +359 876184144

[2] Corresponding author: Tzarigradsko Shosse Blvd. 125, Bl. 1, Sofia 1113, Bulgaria, bozidar_ivanov@yahoo.co.uk

(−84%), but the average number of dairy cows per specialised farm increased to 12 due to the concentration of production in a smaller number of farms. Demand for cheaper raw materials from the processing industry led to an increase in imports of milk powders and condensates from the EU.

It is important to explore the trends of competitive performance of the European dairy sector on the international market. After the abolition of milk quotas in 2015, there is increased price volatility in the EU caused by milk overproduction and price fluctuations transferred from external markets by pressure on export prices from the competition.

The USA and New Zealand are substantial producers and although the natural conditions and size of farms are different, it is important to apply the chosen framework to have a common base for comparison with the EU and Bulgaria.

MATERIALS AND METHODS

Synopsis studies on approaches measuring international competitiveness by Hatzichronoglu (1996) and competitiveness in agriculture by Frohberg and Hartmann (1997), and Latruffe (2010), represent a fragmented theoretical field regarding applicable methods. Frohberg and Hartmann separate approaches into two categories – measuring competitiveness potential and ex-post competitive performance. Latruffe divides them into three groups: trade measures, strategic management measures, and determinants of competitiveness. The incoherence in theory reveals itself in a variety of competitiveness concepts and as many incompatible definitions. Bris and Caballero (2015) list 13 published competitiveness definitions and add their own. The divergence, in theory, is to some extent due to the economic level of the research that is carried out, whether it is for a particular product, for sets of business units, or on the national economy level. Established theoretical frameworks like Michael Porter's National 'diamond' framework focusing on the performance of companies and Heckscher-Olin's model evaluating abundance and cost of national factors of production may be associated

with competitiveness revealed on different levels. From the review, a conclusion can be made – some concepts and frameworks are more suitable than others for the evaluation of agricultural competitiveness according to specific research purposes. According to Ivanov and Stoychev (2017), which followed the evaluation algorithm proposed by Ivanov (2016), that the competitiveness is a stationary state connected to the capability of a dairy livestock in Bulgaria to uphold and expand its market share, to maintain and enhance the added value in national and international stage.

Generally, speaking on the competitiveness, it is viewed from the one hand as a market performance of the industry or the sector, which is a narrow understanding of the concept whereas on the other hand as factors or prepositions standing behind that performance. The state of competitiveness for Bulgarian dairy products has been explored by Slavova et al. (2006). The Bulgarian net foreign trade balance for dairy products is accepted as an indicator for relative product competitiveness. Due to its positive values for the four years after 2000, a conclusion is drawn that production and trade with dairy products on international markets are highly competitive. In a comparative study of dairy chain competitiveness in new member states and candidate countries, van Berkum (2009) emphasizes the significant number of small farms which are not competitive on local markets and have problems with the quality of milk. The exit of these farmers from the sector is just a matter of time and opportunities. Such a development indeed happened, triggered by the implementation of the EU regulation for the quality of raw milk[1].

Our approach for measuring competitiveness is different because it combines and quantifies the dairy sector's performance on national and international markets at the same time. We have chosen a theoretical framework developed by Canada's Task Force for Competitiveness in Agri-Food Sector: 'The sustained ability to profitably gain and maintain market share' (Martin, Westgren and van Duren, 1991). It was developed for the evaluation of a bilateral trade agreement between the USA and Canada. The definition

---

[1] After Bulgaria accession to the EU for eight years there were a derogation for implementation of milk quality regulations.

carries in itself two components that can be used to measure and monitor competitiveness on agricultural product markets: expressed by sustainable creation of value and change in market share.

The study is made on the macroeconomic level. We believe the applicable level of abstraction is admissible given our goal to depict competitiveness at the sectoral level and to quantify its performance. The approach also presents an opportunity to compare economies different in size. Modelling competitive performance is a process of simplification helping to better delineate trends over time, but also to omit determinants influencing production at a lower level, specific for each country, like natural and climatic conditions, the average scale of production, dominant dairy cattle breeds, integration of dairy chain, etc.

To attain uniformity of data, all dairy products are presented in protein equivalent[2]. Production and consumption are weighted by several country populations allowing results to be comparable. It is very difficult to determine the size of world stocks of dairy products and the assumption is made that they tend to zero and therefore world production of dairy products is identical to human consumption.

Following this framework, the index of competitiveness is composed of two components – market performance component and value component. We assume they are equally important; therefore, they can be expressed as:

$$index\ of\ competitiveness = \frac{(PICmpc + PICvc)}{2}. \tag{1}$$

The index takes values between 0 and 1. The value becomes zero when there is no local production. A value of 1 can be reached when national production is solely the world. When the local and world production equalizes, the index takes the value of 0.5.

The market performance component (*PICmpc*) is expressed as follows:

$$PICmpc = \frac{MPctr}{MCctr + MCwd + (MEnctr)}, \tag{2}$$

where:
MPctr – country milk production per capita,
MCctr – country milk consumption per capita,
MCwd – world milk consumption per capita,
MEnctr – net export of milk products per capita.

In the denominator of expression (2) double counting is avoided through exclusion of local consumption per capita out of world consumption per capita (*MCwd*). The net export of dairy products (*MEnctr*) from the country is calculated lessening the total country export of dairy products minus import. It is applicable only if the country is a net exporter of dairy products in order to keep the country milk production indicator (*MPctr*) at least equal to the sum of domestic milk consumption (*MCctr*) and the country export of milk equivalent:

$$MEnctr = MEctr - MIctr, \tag{3}$$

where:
MEctr – country dairy export per capita,
MIctr – country dairy imports per capita.

The value component (*PICvc*) presents the change in the value of dairy products and is expressed by the following equation:

$$PICvc = \frac{MVctr}{MVctr + MVwd}, \tag{4}$$

where:
MVctr – share of the gross value of local dairy production per capita,
MVwd – share of the gross value of world dairy production per capita.

While the value *MVwd* is calculated, the value of local dairy *MVctr* production is excluded. The greater the difference between the gross value of domestic

---

[2] The amount of protein and fats in a tonne of milk are almost the same. It is enough to work with one of these components for calculations.

production and the world value of the cow's milk produced, the greater the significance of *PICvc*. The calculation is made based on export prices of dairy products from the country and the world, which reflects the added value along the value chain.

RESEARCH RESULTS AND DISCUSSION

On Figure 1 are presented developments of the *PICmpc* in dynamics. For Bulgaria is observed sustainable decline (–25%) for the period examined due to a decline in the volume of milk production. The EU28 position is stable and does not change over time. The USA's development is positive, resulting in a constant increase in market performance surpassing the EU index level in 2008. New Zealand has the highest values for market performance because of the highest share of export from local milk production. It has little improvement over the period.
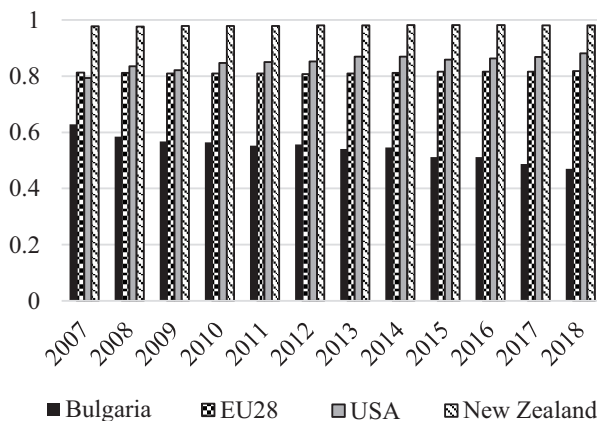

Figure 1. Production component dynamics

Source: United Nations (2018), International Trade Centre (2019), Eurostat (2021), own calculation.

Development of *PICvc* for different countries are is presented in Figure 2. There is a decline in component value for Bulgaria after the Global financial crisis in 2009. In the next years a recovery begins until 2016 and after that again starts to decrease in value. The EU development decreases until 2012 but it recovers and at the end of the period it has a higher value than in the beginning. For the USA the value component varies, reaching a peak in 2015 and mini-

mum in 2018, below the 2007 level. The New Zealand performance shows some volatility up to 2011 and after that, it is moving around 0.975.
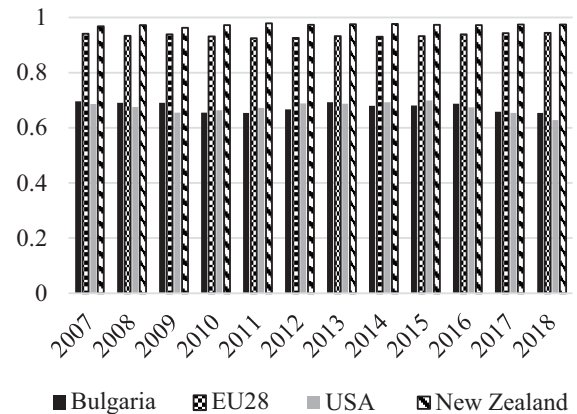

Figure 2. Value component dynamics

Source: United Nations (2018), International Trade Centre (2019), Eurostat (2021), own calculations.

Composite indexes of competitiveness are presented in Figure 3. The Bulgarian index is the only one steadily declining. The performance of the index for the EU decreased slightly until 2012, has a positive trend after that, and at the end of the period shows improvement in competitiveness. The main reason for that development is variation in the value component. For the USA the index shows significant
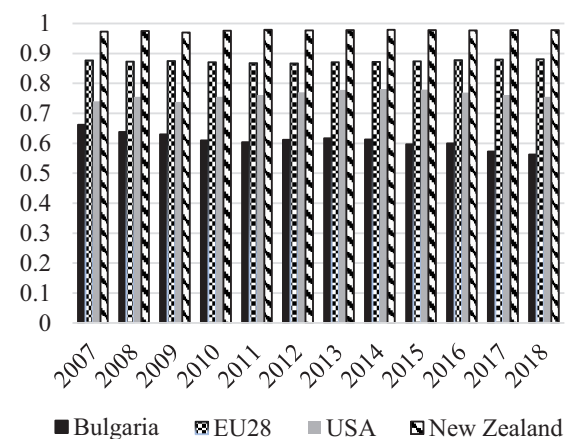

Figure 3. Index of competitiveness dynamics

Source: United Nations (2018), International Trade Centre (2019), Eurostat (2021), own calculations.

improvement but it decreases for the last three years due to a decrease in value component. For New Zealand, the index takes a minimum in 2009 and steadily increased up to 2014 and flattened after that.

CONCLUSIONS

Competitiveness is a widespread research topic in agricultural economic studies and it is commonly viewed through the prism of performance or as factors driving this accomplishment. The analysis tries to reveal the comparative dairy industry performance of Bulgaria, the EU, the USA, and New Zealand over 10 years. Adopting a methodology for estimating the index of competitiveness is envisaged to trace up the differences and evolution in terms of production and value forming of dairy industries in selected countries and to review the feasibility of the estimation method.

The competitive performance of the EU decreases up to 2012 with a positive trend at the end of the period. Dairy products with higher margins as cheeses, infant formula, and others, help to maintain the EU's competitive performance. The positive development of the USA index of competitiveness shows the growth of dairy products export is increasing steadily resulting in constant improvement in market performance. A decrease in the value of the index of competitiveness after 2015 is due to a decrease in the value of export, reflecting the increased competition in the world markets.

New Zealand has the highest competitiveness index due to the huge production of milk and dairy products for export compared to local consumption and therefore takes the leading position as a dairy exporter. Its production per capita significantly surpasses the EU and the US production, but the index of competitiveness shows retention of the level achieved after 2014.

The Bulgarian index of competitiveness steadily decreases over the period after accession to the EU. That result reflects the decrease in milk production due to the diminishing number of dairy cows, farms' adaptation to common market conditions, and increased competition from imported raw materials for processing. Another reason is Bulgarian dairy products export specificity, targeted at niche markets, therefore they are not able to take advantage of world dairy markets growth. As a result of our analysis, Bulgarian authorities have to support investments in dairy farms, targeting an increase in milk production, to improve the competitiveness of the dairy sector.

Acknowledgements

REFERENCES

1. Berkum, S. van (2009). Dairy chain competitiveness in EU's new member states, candidate and potential candidate countries. Agrarwirtschaft, 58 (7). Retrieved from: https://research.wur.nl/en/publications/dairy-chain-competitiveness-in-eus-new-member-states-candidate-an [accessed 05.2021].
2. Bris, A., Caballero, J. (2015). Revisiting the Fundamentals of Competitiveness: A Proposal. IMD World Competitiveness Yearbook, pp. 492-503.
3. Eurostat (2021). Population on 1 January by age and sex [demo_pjan]. Retrieved from: https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=demo_pjan&lang=en [accessed 05.2021].
4. Frohberg, K., Hartmann, M. (1997). Comparing measures of competitiveness. Discussion Paper, 2. Institute of Agricultural Development in Central and Eastern Europe, Halle. Retrieved from: http://nbn-resolving.de/urn:nbn:de:gbv:3:2-22616 [accessed 05.2021].
5. Hatzichronoglu, T. (1996). Globalization and Competitiveness: Relevant Indicators. OECD, STI Working Paper, 1996/05, Paris, pp. 19-23.
6. International Trade Centre (2019). ITC Trade Map. Retrieved from: https://www.trademap.org/Index.aspx [accessed 05.2021].
7. Ivanov, B. (2016). Dairy model and projections. Centre for Agri-policy Analysis – CAPA, Institute of Agricultural Economics, Sofia.
8. Ivanov, B., Stoychev, V. (2017). Index of competitiveness in dairy cattle sector. In: Proceedings of conference: Agricultural development and commodity market projections. Agricultural Academy. Avangard Prima, Sofia, pp. 151-161.

9. Latruffe, L. (2010). Competitiveness, Productivity and Efficiency in the Agricultural and Agri-food Sectors. OECD Food, Agriculture and Fisheries Papers, 30. OECD Publishing, Paris.

10. Martin, L., Westgren, R., Duren, E. van (1991). **Agri**business Competitiveness across National Boundaries. American Journal of Agricultural Economics, 73 (5), pp. 1456-1646.

11. Slavova, Y., Kovacheva, Tz., Ivanova, N., Atanasova, M., Draganov, M., Terzijska, K. (2006). Competitiveness of agricultural products on the domestic and international market. Avangard Prima, Sofia.

12. United Nations (2018). Population Division. World Urbanization Prospects 2018. Data Query. Retrieved from: https://population.un.org/wup/DataQuery [accessed 05.2021].