

Article

Effect of European Integration on the Competitiveness of the Agricultural Sector in New Member States (EU-13) on the Internal EU Market

Aneta Jarosz-Angowska , Anna Nowak , Elżbieta Kołodziej and Hanna Klikocka 

Department of Economics and Agribusiness, University of Life Sciences in Lublin, 20-950 Lublin, Poland

* Correspondence: anna.nowak@up.lublin.pl

Abstract: The 2004, 2007, and 2013 enlargement of the EU opened up free trade opportunities, increasing trade flows and demand for products of agriculture. On the one hand, the integration processes have intensified competition between countries, and on the other hand, they have created new opportunities for them. The aim of the study was to evaluate the effect of European integration on the competitiveness of the agricultural sector in countries that acceded to the EU in or after 2004. The assessment of the competitiveness of the agricultural sector was made using the following indicators: land and labour productivity in agriculture, importance of the agricultural sector in the economy of the EU countries, agricultural trade balance, importance of agricultural export in total export of the EU countries, trade coverage ratio, Grubel–Lloyd intra-industry specialization indicator, and Balassa comparative advantage indicator. The analysis was carried out from 2004 to 2020 with the Eurostat statistical database. The outcome of surveys implies that a gap still exists between the old and the new member states of the European Union (EU) in the efficient utilisation of their production factors, despite an increased dynamics of growth in labour productivity compared with the old member states, the so-called EU-15. The overall competitive position of all EU-13 countries in agricultural trade on the common EU market has improved; however, individual analysis reveals disparities between respective member states. In 2020, net exporters with comparative advantage were Hungary, Bulgaria, Lithuania, and Croatia, and net importers with comparative disadvantage included Poland, Czechia, Slovakia, Estonia, and Malta. Latvia and Romania improved their competitive position in agricultural trade.

Keywords: agricultural sector; international competitiveness; European Union; new member states



Citation: Jarosz-Angowska, A.; Nowak, A.; Kołodziej, E.; Klikocka, H. Effect of European Integration on the Competitiveness of the Agricultural Sector in New Member States (EU-13) on the Internal EU Market. *Sustainability* **2022**, *14*, 13124. <https://doi.org/10.3390/su142013124>

Academic Editors: Dario Musolino, Mariotti Ilaria, Rodrigo Kataishi, Mina Akhavan and Antonio Boggia

Received: 10 September 2022

Accepted: 10 October 2022

Published: 13 October 2022

Publisher's Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2022 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

Economic integration of the countries of central and eastern Europe with the European Union (EU) was a huge challenge to both old and new member states (NMS) from many perspectives [1]. The expansion of the EU in 2004 opened possibilities of free exchange to those countries, and increased trade flows and demand for products [2,3]. On one hand, integration processes intensified competition between countries, while on the other, they created new opportunities for them. In particular in the agricultural sector, the extension of the EU combined with the effects of the Common Agricultural Policy (CAP) reform, decrease in protection, and reduction of customs tariffs led to changes in agricultural markets and increased competition [3,4]. Moreover, technological changes and support for this sector under national policies and in the EU have had a considerable influence on the production and exchange of goods between countries. In addition, an increase in income per capita enhances intra-industry trade between countries and can affect the pattern of trade specialisation in respective countries [5]. The conditions in which the agriculture and food industry develop are thus constantly changing due to an increasing co-dependence of national economies and the opening of foreign markets [6]. All this leads to confrontation between the agri-food products of a country with analogous products in another one. These

processes accompany changes in the competitiveness of the agri-food sector of respective countries. However, special attention should be paid to changes in countries that joined the EU in or after 2004 that are called new member states.

Competitiveness can be defined as a capacity to efficiently compete with other entities in the pursuit of analogous goals. Carraresi and Banterle [3] define it as an ability to maintain one's share in the domestic and foreign markets under free-trade conditions. To keep up with the competitors and achieve a specific competitive position, understood as a result of such competition, an adequate potential should be built. This potential is deemed a source of competitive advantage [6,7]. Discussion about the competitiveness and performance of the agri-food sector to a large extent draws upon the theory of trade. Different trade measures were broadly applied to assess the trade performance and competitiveness of this sector in respective countries. These include the revealed comparative advantage and intra-industry trade [3]. In light of the output of the international trade theory, international competition is the skilful utilisation of natural comparative advantages of respective countries and proper development of the related competitive advantages [8]. The issue of international competition of the agri-food sector in the EU and in respective member states has been tackled in numerous papers. An overview of them is presented hereinafter. The significance of surveys in this area can be attributed to the special role this industry plays in the EU's economy and budget [9]. However, studies on issues related to the competitiveness of the above-mentioned sector of the economy often focused on a selected aspect of competitiveness, were limited to selected member states of the EU, or referred to selected years or relatively short time periods. Furthermore, Pawlak [10] underlines that in connection with limited access to complete data and information that can be compared on an international scale, the competitive potential and competitive capacity of the agriculture and food industry are relatively rarely analysed. Meanwhile, export and international competitiveness are significant driving forces of the sectoral and economic growth [11,12]. This is an important premise for undertaking research on the competitiveness of agriculture, and in particular on how it has changed during the European integration. Specific concerns regarding the competitive capacity are raised for the EU's new member states from central and eastern Europe that usually feature a higher number of small farms, a higher percentage of agricultural workers, and the legacy of the communist management system [13].

This paper is an attempt at filling a research gap to that extent. The research aims to evaluate the effect of European integration on the competitiveness of the agricultural sector in countries that acceded to the EU in or after 2004. The following research questions were posed: What is the competitiveness potential of agriculture in the new member states? What international competitive position of agriculture is achieved by the new member states (EU-13) compared to the old members of the EU (EU-15)? How has this position changed in 2004–2020?

2. Literature Review

In large, self-sufficient economies, economic growth depends on the ability of efficiently using and redistributing the produced resources [14–17]. Followers of the economic competitiveness concept believe that it is associated with the key issues of economic development and is founded in the reality of globalisation [18–21]. In their opinion, the development of a country and growth in its citizens' welfare can be based on the maximisation of the benefits of international trade in the long term [22,23]. When building a strong international position to achieve the objectives of economic development, the following should be taken into account: identification and promotion of "sectors of the future" in industrial policy [24], development of human resources [25], access to knowledge, technology skills [26,27], institutional conditions [28–30], availability of financing [31,32], ability of adapting to changing external conditions [33], and increased efficiency of using production factors and notably intangible resources [34–37]. Transformation within the international division of labour and progressing globalisation of the world economy

make respective countries adapt their structure. The role of external, international conditions, including global competition and financial markets, in shaping the dynamics of economic development and sustainability is growing [31]. In the environment of free flow of production factors, competitive struggle is manifested as competition for the capital, know-how, managerial and organisational skills, and specialists [36,37]. Increased efficiency of using the production factors, and notably intangible resources, leads to changes in the competitiveness of sectors of the economy.

The theory of International trade defines competitiveness as an ability of domestic businesses to efficiently exist and make profit on foreign markets, develop efficient export, at the same time maintaining and increasing the real domestic product, and the ability to maintain growth in productivity [8,38–41]. Competitiveness can be understood as an ability of facing the competition and succeeding. It is manifested through the acceptance of products from a specific country by foreign markets and a possibility of selling products meeting the demand (in terms of price, quality, and quantity), at the same time ensuring profit (income), allowing the entities to continue their operations [42]. The World Economic Forum defines competitiveness as a set of institutions, policies, and factors determining the productivity level of a specific country. In turn, productivity designates the level of welfare that an economy can achieve. It also sets the rates of return on investment in the economy being the main drivers of economic growth. A more competitive economy will develop faster [13,43]. Thus, competitiveness is a term that can be interpreted in many ways. It refers to both the citizens' welfare, usually measured as GDP per capita, and to the commercial activity of a given country [44].

Competitiveness of the whole economy or its sector is a result of complex and dynamic interaction between three elements: the competitive potential—mostly related to the availability of resources or production factors, the competitive position—that is, the outcomes of competitive activity, and the management processes—defined as the optimum operation and use of the available potential to achieve a specific competitive position [45]. Many authors [31,36,41] underline that it is essential to make a clear distinction between the international competitive capacity (competitive potential) of the economy and its competitive position (outcome competitiveness). The competitive potential of the economy is the competitive capacity and is dynamic. This is the capacity for long-term development in the conditions of an open economy resulting in the development of an economic structure, reflected in an export structure corresponding with changes in the global demand structure [8,46]. The competitive capacity depends on institutional and infrastructural conditions and factors related to enterprise and human capital. Thus, the balance point in the analysis of international competitiveness is shifted from studies on trade, service, and capital turnover towards international conditions of economic development. Relative benefits do not stem from the exchange of goods and division of labour only, but also refer to international operations, development of human capital, innovations, and enterprise [31]. A notion having a narrower meaning is the international competitive position is outcome competitiveness. This refers to the specific country's share in international turnover and indicates the position achieved in the turnover of goods and services and the flow of international production factors [36]. The competitive position is expressed both in the volume and structure of such turnover. It is an external, incomplete manifestation of the competitiveness of production factors [47]. The competitive position is reinforced by the country's membership in international organisations and integrative formations. It is also affected by the effects of synergy between domestic enterprises and international corporations and capital groups [31]. In the dynamic approach to a competitiveness survey, it is not only the ability to compete at a specific point in time that should be determined but primarily the ability to compete in the long run, that is, maintain or improve competitiveness in the future [41]. Here, the analysis of competitiveness is based on variables determining improvement in the competitive position, which can be defined as the competitive potential.

International competitiveness is associated with the concept of comparative advantage assuming that commercial flows exist due to relative differences in costs between business

partners. Competing means that respective countries skilfully use natural comparative advantages and adequately shape the related competitive advantages [39,48,49]. A review of literature on international economics and trade allowed determining the sources of comparative advantages. These include availability and efficient use of basic production factors, level of technological advancement specialisation and export of products that can be manufactured at a relatively lower cost than in other countries, taking advantage of the changing preferences of domestic and foreign businesses, and achievement of various economies of scale in the area of production and sale by domestic entities [50,51].

Agri-food products play a special role in international trade. Long-term sustainable development of the agri-food sector can be ensured only when its products are competitive on regional and global markets. Thus, analysis of the competitiveness of agri-food products, and the determinants of competitiveness, are an important object of study [52]. Latruffe [42] defined the key determinants of the competitiveness of agricultural farms/enterprises. Based on Porter's model, he assigned them to two groups: factors controlled by the farm (internal) and those beyond the farm's control (external). Factors that can be controlled by the farm include farm size (measured as the volume of production or total sales), structural characteristics (specialisation, organisational structure, legal status, and degree of commercialisation), social capital (farmer's age, sex, level of education, managerial skills, type of employment with the farm). By contrast, the external factors are availability of production factors in a specific country, demand for the products, intervention of the state in the agricultural sector, public expenditure on research and development and on infrastructure, and business location and environment. Researchers highlight difficulties in evaluating the competitiveness of agriculture. These are due to the unclear nature of competitiveness as well as the internal differentiation of agriculture and complexity of its environment [53]. Table 1 contains an overview of selected studies on the competitiveness of the agri-food sector in EU member states. It implies that the studies were conducted in a different subjective scope and using diverse measures.

Table 1. Overview of studies on the competitiveness of the agri-food sector in EU member states.

Author and Year of Publication	Years Covered by the Survey	Scope of Survey
Drabik and Bartova (2008)	2000–2005	Changes in the specialisation of agri-food trade in eight new member states of the EU (Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, and Slovenia) were examined [5].
Ball et al. (2010)	1973–2002	The studies looked at international competitiveness of agriculture in 11 countries of the European Union and in the United States. Relative competitiveness and differences in productivity between the European Union and the United States were analysed [54].
Kravčáková, Vozárová (2013)	2007–2012	The studies covered an assessment of the competitiveness of agriculture in the member states of the European Union from the point of view of trade in products of agriculture. The analysis was conducted for products from groups 0, 1, 2, and 4 according to SITC (Standard International Trade Classification) [55].
Figiel, Kufel (2013)	2004–2009	The macroeconomic performance of agri-food sectors in the national economies of EU member states and the competitiveness of those sectors reflected in international trade specialisation were compared.

Table 1. Cont.

Author and Year of Publication	Years Covered by the Survey	Scope of Survey
Antimiani et al. (2012)	1996–2007	The dynamics of export of agri-food products in new and old member states of the European Union during the process of expansion of the European Union [56].
Carraresi, Banterle (2015)	1995–2011	The studies covered an assessment of the competitiveness of agriculture and the agri-food industry in the EU as well as of the effect of EU expansion and economic slowdown on the competitiveness of respective countries [1].
Bojnec, Fertő (2015)	2000–2011	The competitiveness of prices and quality was examined along with the comparative advantage of the agri-food trade in new and old member states of the European Union on a global market [2].
Bojnec, Fertő (2019)	2000–2011	Comparative advantages were determined for 27 EU countries in respect of selected groups of the agri-food sector's products (grain products, fruit and vegetable products, dairy products and meat products), using overall global trade as a point of reference [12].
Nowak et al. (2020)	2007 and 2017	A synthetic measure was applied to assess the competitiveness of agriculture in the EU's new and old member states [57].
Jarosz-Angowska et al. (2020)	2007 and 2017	The competitiveness potential of the agri-food sector in the member states of the European Union was evaluated and differences between them with reference to their position in international agri-food trade were identified [8].
Pawlak (2022)	2010 and 2020	The paper assessed the competitive position of the EU agri-food sector in transatlantic trade with regard to the free trade area agreement between the EU and the USA [10].
Matkovski et al. (2022)	2005–2016	Based on the index of revealed comparative advantages, the agri-food sector of the West Balkan countries was analysed and their trends in the process of EU integration were taken into account. In addition, reference was made to improvement in the export position of agri-food products [58].

3. Materials and Methods

The study aimed to assess changes in the competitiveness of the agricultural sector in 13 countries newly admitted to the European Union (EU-13) in the context of integration processes. The studies were based on data derived from the EUROSTAT and FAOSTAT databases. The subjective scope of the study covers 28 countries of the European Union divided into old (EU-15) and new (EU-13) member states. This division was introduced to examine the effect of integration processes on changes in the competitiveness of countries that acceded to the EU in or after 2004. The analysis covers the period from 2004 to 2020.

At the first stage of the survey, old and new member states were compared in terms of their competitive potential. To this end, the following indicators were selected: share of agriculture in the total GVA (%), labour productivity, and land productivity. The first indicates the role of agriculture in the economy of a respective country and is among the most commonly used indicators of the relationship between this sector and the econ-

omy. By contrast, productivity indicators are a measure of the level of development of agriculture [59]. Labour productivity was calculated as gross value added to number of agricultural workers. In turn, land productivity was determined as the value of agricultural production per 1 ha UAA.

The next stage comprised the evaluation of the international competitive position of new member states (EU-13) in comparison with the old ones (EU-15). The competitive position of EU-13 in agricultural trade, compared to other member states of the European Union, was assessed according to the following indicators: share of agricultural export and import of respective EU member states in the intracommunity agricultural export and import of the whole EU, trade balance, share of agricultural export in the total intracommunity export of respective member states of the EU, trade coverage ratio, the Grubel–Lloyd’s Intra-Industry Trade Ratio, and the revealed comparative advantage ratio [17,60–63]. Some measures occur at absolute values, for example, trade balance, or reflect the share in the EU market, depending on the country’s size. Other measures are standardised by country size.

The competitive position of EU-13 in the trade in products of agriculture, compared to other member states of the European Union, was assessed based on the Classification of Products by Activity (CPA), version 2.1., introduced by the Commission Regulation (EU) No. 1209/2014 effective as of 1 January 2015. The classification of products by activity (CPA ver. 2.1.) is consistent with the official classification of sectors of economic activity (NACE). The international competitive position was evaluated with reference to CPA Section A01 covering products of agriculture and hunting and supporting services. The spatial range of the analysis covers trade between member states on the internal EU market.

A principal indicator measuring the competitive position of respective member states of the EU in the trade in products of agriculture on the common market is the share of agricultural export and import of the examined country in the export and import of products of agriculture of the whole cluster (SX , SM). An increase in the share of export and import of the whole cluster is most frequently identified with an improved position of the respective country on the international arena. These measures were calculated as follows:

$$SX = \frac{X_{aj}}{X_{aEU}} \times 100 \quad (1)$$

$$SM = \frac{M_{aj}}{M_{aEU}} \times 100 \quad (2)$$

where:

a —products of agriculture

j —analysed country

M —value of intracommunity import

X —value of intracommunity export

X_{aEU} , M_{aEU} —intracommunity export/import of products of agriculture in all member states of the European Union

The trade balance (TB) was calculated as the difference between the intracommunity export and import of products of agriculture in the examined EU member state, according to the following equation:

$$TB = X_{aj} - M_{aj} \quad (3)$$

where:

X_{aj} —value of intracommunity export of products of agriculture in the respective country “ j ”

M_{aj} —value of intracommunity import of products of agriculture in the respective country “ j ”

Surplus of export over import in a respective country means that the country has a comparative advantage. A growing surplus of trade balance can be interpreted as an improvement of competitive position. A maintained increase in the trade deficit can be interpreted as a deterioration in the competitive position of products of agriculture.

The significance of trade in products of agriculture for respective EU countries was evaluated based on the share of export of products of agriculture in total exports of those countries (IX).

$$IX = \frac{X_{aj}}{X_{tj}} \quad (4)$$

where:

X_{aj} —see above

X_{tj} —value of intracommunity export of all products in country “j”

Export specialisation of the country in products of agriculture is expressed as the Trade Coverage Ratio (TCR):

$$TCR = \frac{X_{aj}}{M_{aj}} \times 100 \quad (5)$$

where:

X_{aj} , M_{aj} —see above

If the value of TCR is higher than 100, it can be assumed that the country specialises in agricultural production because it exports more of such a commodity (group of commodities) than it imports. Thus, purportedly, the country has a relative comparative advantage over its business partner.

The Grubel–Lloyd Intra-Industry Trade ratio (IIT) is used for indicating simultaneous export and import within a specific group of products [64]. It is expressed by the following formula:

$$IIT = \frac{(X_{aj} + M_{aj}) - |X_{aj} - M_{aj}|}{X_{aj} + M_{aj}} \times 100 \quad (6)$$

where:

X_{aj} , M_{aj} —see above

The IIT ratio can assume values from 0 to 100. If it equals 0, we are dealing with inter-industry exchange only. According to the definition of inter-industry trade, this means that export and import do not overlap or—in other words—export and import do not occur simultaneously within a specific industry, e.g., there is only export without import or import without export. The closer to 100, the more intensive the intra-industry trade is. If IIT equals 100, the trade exchange occurs only within the industry (export is equal to import within a specific industry).

Another measure used in the paper for measuring the competitive position of the agricultural sector of respective member states on the common market of the EU is the so-called Revealed Comparative Advantage ratio [65], initially proposed by B. Ballassa [66]. Afterwards, it was modified by T.L Vollrath [67] and transformed into the Relative Export Advantage ratio (RXA). The method of calculating this indicator proposed by Vollrath allowed eliminating double counting of the analysed countries and industries. This ratio can be written as follows:

$$RXA = \frac{\frac{X_{aj}}{X_{t-a,j}}}{\frac{X_{(a,EU-j)}}{X_{(t-a,EU-j)}}} \times 100 \quad (7)$$

where:

X_{aj} —intracommunity export of products of agriculture of country “j”

$X_{t-a,j}$ —total intracommunity export of country “j” after subtracting products of agriculture

$X_{(a,EU-j)}$ —total intracommunity export of products of agriculture of all EU countries after subtracting country “j”

$X_{(t-a,EU-j)}$ —total intracommunity export of all products from all EU countries after subtracting products of agriculture and country “j”

An RXA above 100 implies that the analysed country has revealed comparative advantages on the analysed market in the trade of a specific group of commodities, and values below 100 mean that the country does not have such advantages.

4. Results and Discussion

4.1. Evaluation of the Competitive Potential of New Member States (EU-13) Compared with Old Member States (EU-15) in Agricultural Production

Agriculture is a sector that plays an important role in the member states of the European Union. Changes in the agricultural sector and its role in the economic development have formed a very important part of the economic history of Europe [23]. In discussions on the role of agriculture in economic development, the key question is how agriculture contributes to economic growth. A peculiar paradox is that as the level of economic development of respective countries declines, the share of agriculture in the structure of gross value added increases, and at the same time, the productivity of this sector grows [68,69]. In the member states of the EU, the share of the agricultural sector in the total GVA from 2004 to 2020 ranged from 0.4% in Luxembourg to 9.3% in Romania. In addition, countries in which this share is still high include Bulgaria, Greece, Latvia, Hungary, Croatia, and Lithuania. In all the above-mentioned countries, it did not exceed 4%. A clear disparity can be observed between old (EU-15) and new (EU-13) member states. An average share of agriculture in the total GVA of EU-15 was 2% in the analysed period and was two times higher for EU-13 (Figure 1).

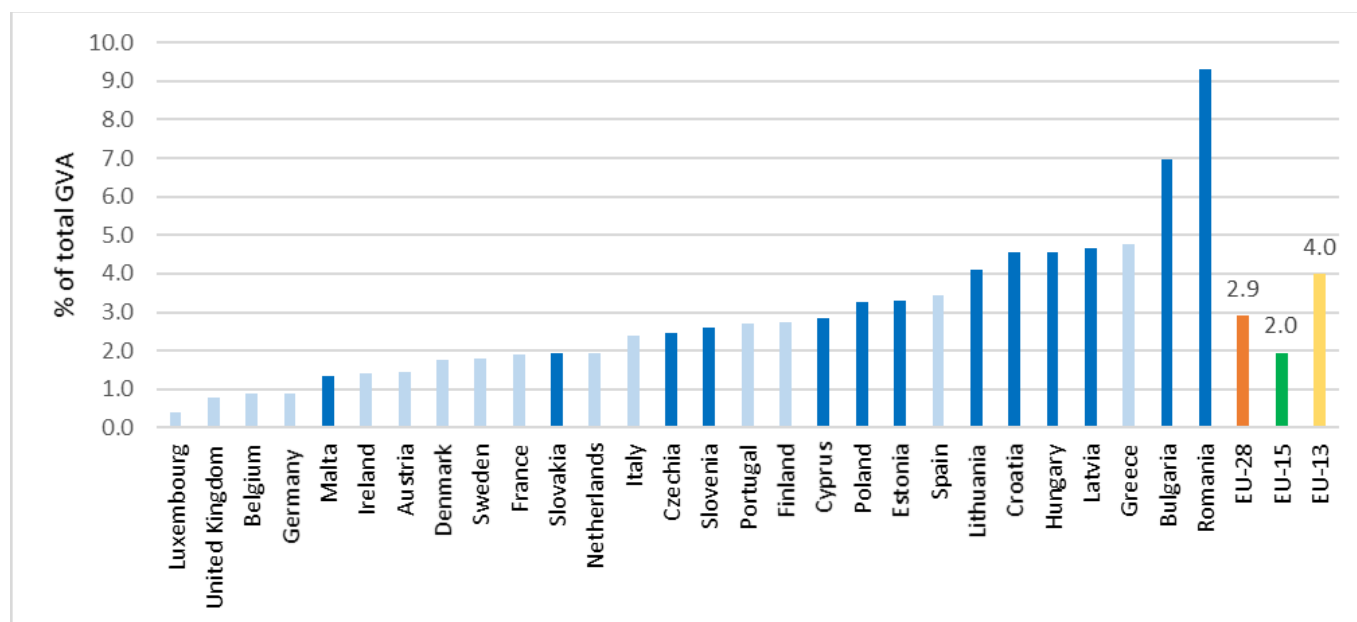


Figure 1. Ranking of EU member states according to the share of agriculture in the total GVA from 2004 to 2020 (%). Note: The old member states (EU-15) are shown in light blue and the new member states (EU-13) in dark blue.

Analysis of changes in the share of agriculture in the total GVA from 2004 to 2020 shows that these changes were faster in most of the new member states. The largest decline of the analysed indicator was noted in Romania and Bulgaria, where it was 9.8 and 5.9 p.p., respectively. An average decrease in the share of the examined sector in the total GVA in the group of new member states was 1 percentage point, while in EU-15 it was only 0.1 p.p. (Figure 2). This is a consequence of structural transformations and socio-economic development the dynamics of which increased in new member states after they acceded to the EU. In spite of a reduced relative economic significance of the primary sector, its economic role remains important [70]. The economic significance of agriculture is generally higher in the east and south of Europe than it is in the west and north [71].

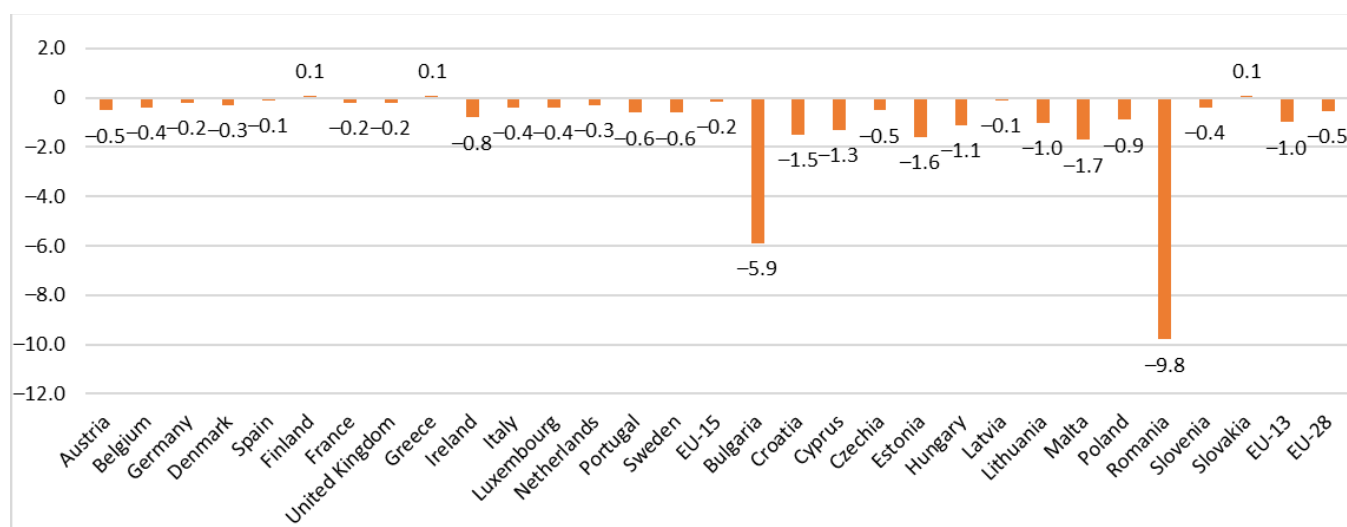


Figure 2. Changes in the share of agriculture in the total GVA in EU member states from 2004 to 2020 (p.p.).

Many scientific papers point to differences in the agricultural sector between EU member states. These are differences not only in the production potential but also in its efficient use [72–74]. This view is corroborated by research presented in this work. The basic determinants of the international competitive capacity, both at the macro- and meso-economic level, are related to the size, quality, structure, and efficient use of the available production resources [74]. One of the key measures of competitiveness is productivity [75]. Therefore, labour and land productivity were analysed and the dynamics of these changes after the accession of new member states to the EU was examined (Table 2). In 2004, the average labour productivity in old member states was EUR 27,541.4/AWU, ranging from EUR 55,168.8/AWU in Belgium to approximately EUR 8000/AWU in Finland and Portugal. None of the new member states reached even the mean level of labour productivity in the EU, and its average level in the group of these countries (EU-13) was EUR 6093/AWU. The positive impact of integration processes on newly admitted countries is testified by labour productivity dynamics higher than in the EU-15. The only country in which the examined indicator declined in 2020 compared to 2004 was Malta. In contrast, the slightly lower growth dynamics in Croatia should be attributed to its shorter membership in the EU (from 2013). In spite of an increase in labour productivity, it remains much lower in the EU-13 than in old member states. Gołaś [76] underlines that its low level in many EU countries is the basic barrier to transition to intensive growth. In addition, changes in labour productivity will largely determine the degree to which significant differences in the level of socio-economic development of the EU are eliminated. Jaroszewska and Pietrzykowski [77] also demonstrated that countries that joined the EU after 2004 improved their labour productivity faster than old EU member states. Their studies imply that these countries decreased the labour input in agriculture.

Disparities between old and new member states are also visible in their land productivity. In the EU-15, from 2004 to 2020 the average value of production per 1 ha UAA was EUR 3151.4, and in the EU-13 amounted to EUR 2298.0. This is a reflection of, among other things, differences in production intensity. According to EUROSTAT, in 2020, the average cost of intermediate consumption per 1 ha UAA amounted to EUR 2045, and in countries newly admitted to the EU, it was lower by nearly 40% (EUR 1260.1/ha). From 2004 to 2020, land productivity in most member states increased. It is interesting that this increase was higher in the group of old member states. However, considering respective member states, worth noting are Lithuania, Latvia, Poland, and—in the EU-15—Spain where the growth dynamics were the highest and exceeded 150%. Analysis shows that the efficiency of agricultural production, and as a consequence, its competitiveness on an international scale,

is largely determined by the relationships between production factors [74]. The findings of, among other authors, Guth and Smędzik-Ambroży [75] and Nowak and Kamińska [53] were similar.

Table 2. Labour and land productivity in agriculture of EU member states from 2004 to 2020.

EU Member State	Labour Productivity (EUR/AWU)				Land Productivity (EUR/ha)			
	2004	2020	2004–2020 (Average)	Dynamics (2004 = 100)	2004	2020	2004–2020 (Average)	Dynamics (2004 = 100)
Austria	17,202.3	25,650.1	22,657.1	149.1	2011.8	2546.5	2261.5	126.6
Belgium	55,168.8	219,271.6	103,536.3	397.5	5548.4	6473.6	5962.8	116.7
Denmark	59,014.1	77,571.6	70,008.5	131.4	3633.4	4507.1	3857.2	124
Finland	8464.5	23,631	17,673.3	279.2	1486.3	1662.9	1,605	111.9
France	31,803.9	37,081.3	34,968.8	116.6	2353.3	2318	2329.4	98.5
Germany	31,490.3	33,400.2	31,006.3	106.1	2941.8	3083.1	2961.7	104.8
Greece	10,160.7	15,358.9	12,617.9	151.2	1377.5	1822.5	1516.9	132.3
Ireland	17,604.2	15,020	11,445.4	85.3	1633.4	1685.7	1442.4	103.2
Italy	21,220.2	23,878	22,793.8	112.5	3213.8	3324.4	3281.4	103.4
Luxembourg	28,584.8	31,608.5	29,179.3	110.6	2515.1	2629	2493.6	104.5
Netherlands	52,737.9	68,353.6	63,193.6	129.6	11,674.6	14,206.7	13,159	121.7
Portugal	8489.2	12,081	9595.6	142.3	1774.3	1947.5	1790	109.8
Spain	20,000.8	37,515.4	26,451.2	187.6	1298.4	1952.1	1535.4	150.4
Sweden	22,449.3	29,562.6	27,158.6	131.7	1621	1966.8	1723	121.3
United Kingdom	28,729.5	28,595.1	29,243.7	99.5	1314.7	1405.4	1351.2	106.9
EU-15	27,541.4	45,238.6	34,102.0	155.3	2959.8	3435.4	3151.4	115.7
Bulgaria	2227.9	6060.7	3981.0	272.0	695.7	641.5	688.5	92.2
Croatia	6494.0	7150.4	7032.3	110.1	2264.1	1811.8	1976.5	80.0
Cyprus	10,252.0	33,907.0	18,550.8	330.7	6766.3	5761.5	5625.0	85.1
Czechia	9590.6	16,469.1	12,066.3	171.7	1177.7	1350.1	1234.1	114.6
Estonia	6189.5	14,907.4	10,750.7	240.9	688.4	924.1	750.2	134.2
Hungary	5288.7	8403.2	6304.1	158.9	1270.7	1578.9	1307.1	124.2
Latvia	1718.9	8806.5	4016.6	512.3	427.7	696.9	547.4	162.9
Lithuania	3020.7	11,231.1	6532.8	371.8	653.9	996.6	796.8	152.4
Malta	17,414.0	8659.7	12,389.2	49.7	12,512.0	9673.4	11,501.4	77.3
Poland	2870.8	5709.3	4062.3	198.9	1110.1	1688.2	1381.7	152.1
Romania	3507.7	4806.9	4033.8	137.0	1149.5	1072.8	1075.6	93.3
Slovenia	4798.0	7394.8	5262.5	154.1	2365.0	2057.8	1911.7	87.0
Slovakia	5836.1	10,351.8	7136.5	177.4	1226.6	1113.7	1078.3	90.8
EU-13	6093.0	11,066.0	7855.3	222.0	2485.2	2259.0	2298.0	111.3
EU-28	17,583.2	29,372.7	21,916.0	167.1	2739.5	2889.2	2755.2	105.5

4.2. Evaluation of the Competitive Position of New Member States (EU-13) Compared with Old Member States (EU-15) to the Extent of Products of Agriculture

The biggest exporters of products of agriculture on the internal EU market both in the first year after accession of new member states to the EU and in 2020 were invariably the so-called old member states of the EU—the Netherlands, France, and Spain (Figure 3). In 2020, France and Spain only changed places, as Spain moved up to second position, leaving France behind. These three main EU exporters hold more than 50% of the internal EU market (62.57% in 2004, 55.4% in 2020), which testifies to a high concentration of intracommunity export of products of agriculture and a slight loss of the market share by old member states to new members of the EU. They are followed by other countries from the so-called EU-15—Belgium, Germany, and Italy. Changes can be seen in subsequent months only. Two new member states of the EU, Poland, and Hungary, move two places up, ahead of the United Kingdom and Denmark. Czechia moved from 14th place in 2004 to 12th place in 2020. The top fifteen biggest exporters of products of agriculture now additionally include two new member states representing the EU-13—Romania and Bulgaria. Overall, the share of all new member states from the EU-13 increased by 10 percentage points from

less than 6% in 2004 to 16% in 2020, at the expense of decreasing the share of old member states from the EU-15, except the Netherlands, Denmark, Austria, Portugal, and Greece.

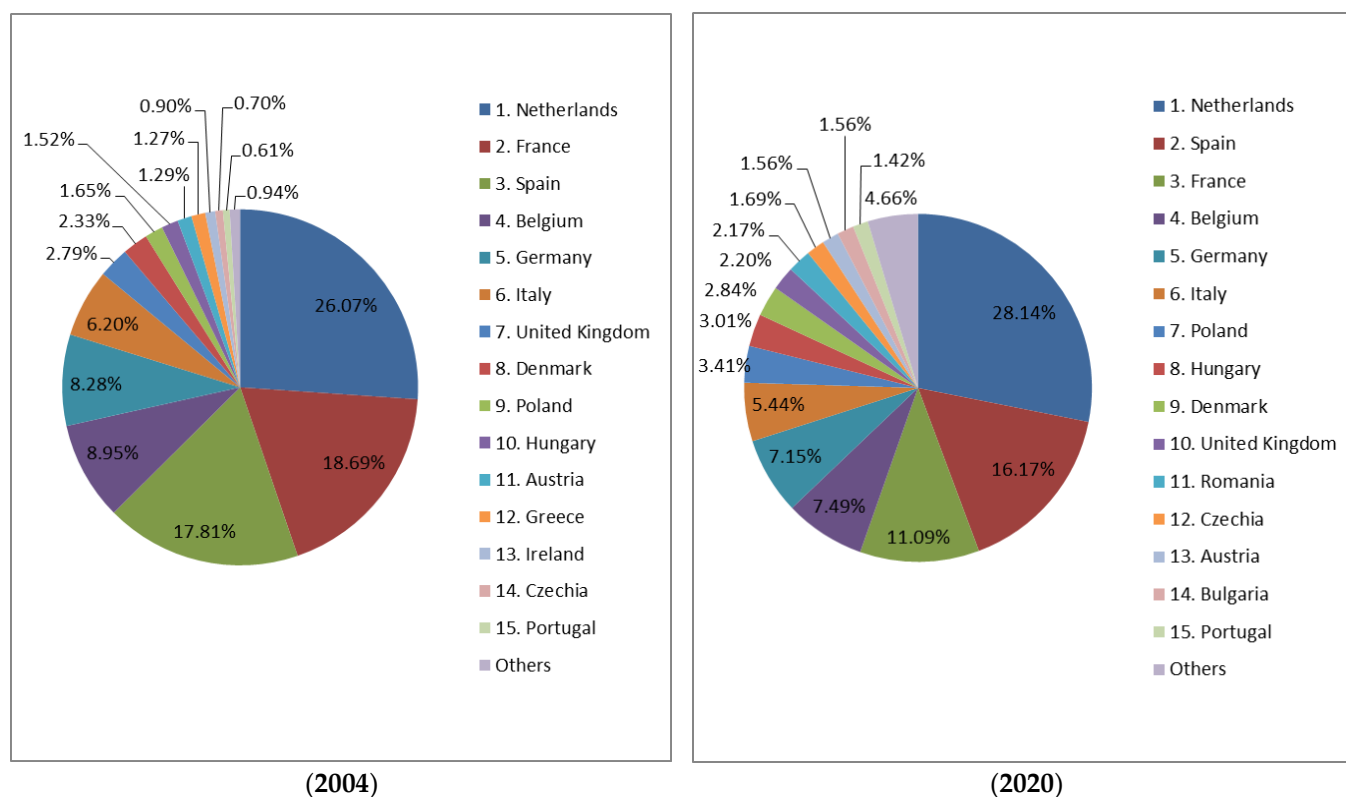


Figure 3. Share of export of products of agriculture by EU main exporters in EU agricultural export on the internal market in 2004 and 2020.

The concentration of intracommunity import of products of agriculture is slightly lower in comparison with export. A trend opposite to that seen in export can be observed, as three main importers of products of agriculture representing the EU-15 slightly increased their share in the EU market from 48.49% in 2004 to 49.11% in 2020. The three biggest importers in 2020 were joined by the Netherlands, while the United Kingdom dropped from second to fifth position. In addition, in the analysed period, among the seven biggest importers of products of agriculture are enduringly Germany in first position and France, Italy, Belgium, and Spain (Figure 4). New member states of the EU that joined the top ten in 2020 were only Poland and Romania. Czechia improved its ranking and Hungary moved up to position 15, thus displacing Greece. The share in the intracommunity export and import of products of agriculture is undoubtedly associated with the country's size and the significance of agricultural production in the economy of the respective country [20]. These simple indicators can be used for determining that five new member states play an important role on the EU market. These are: Poland, Hungary, Czechia, Romania, and Bulgaria.

Evaluating international competitiveness of new member states (EU-13) in the trade in products of agriculture, the trade balance allows stating that in 2004, four out of eight countries with a positive trade balance were the so-called new member states and were competitive on the common market of the EU. In 2020, the situation improved both in old and new member states. Eleven EU countries, including five new member states, had a positive trade balance. Countries with the highest surplus in trade exchange were, enduringly throughout the analysed period, the Netherlands and Spain. By contrast, the biggest deficit in the trade in products of agriculture was noted in the United Kingdom and Germany. Among new member states, Poland increased its trade deficit the most—more than five times (5.6 times). A negative trade balance increasing year on year

was also recorded by Czechia, where the highest deficit occurred in 2019, amounting to EUR 597.5 million. A similar trend was observed for Malta, where the maximum deficit in 2013 amounted to EUR 73.5 million, and for Cyprus where a negative balance increased until 2012 when it reached the minimum of EUR 76.9 million, and later noted a slight improvement until 2020. In Estonia, the negative balance was reduced until 2012, when the value of export and import was equal and from that time on the trade deficit increased. A largely negative and alternately positive (in certain years) balance of trade in products of agriculture was observed for Latvia (positive balance in 2010, 2012, 2015–2017, and 2019), Slovakia (2009, 2012, 2013, and 2017), Slovenia (2010–2012 and 2018–2020), Lithuania (2005 and 2020) and Croatia (2020). Upon its accession to the EU in 2007, Romania noted a negative trade balance that was later transformed into an increasing surplus of export over import, with a peak in 2018 amounting to EUR 761 million, but in 2020 its balance of trade in products of agriculture was negative again. The only new member states of the EU that throughout the analysed period recorded a positive balance of trade in products of agriculture were Bulgaria and Hungary (Figure 5).

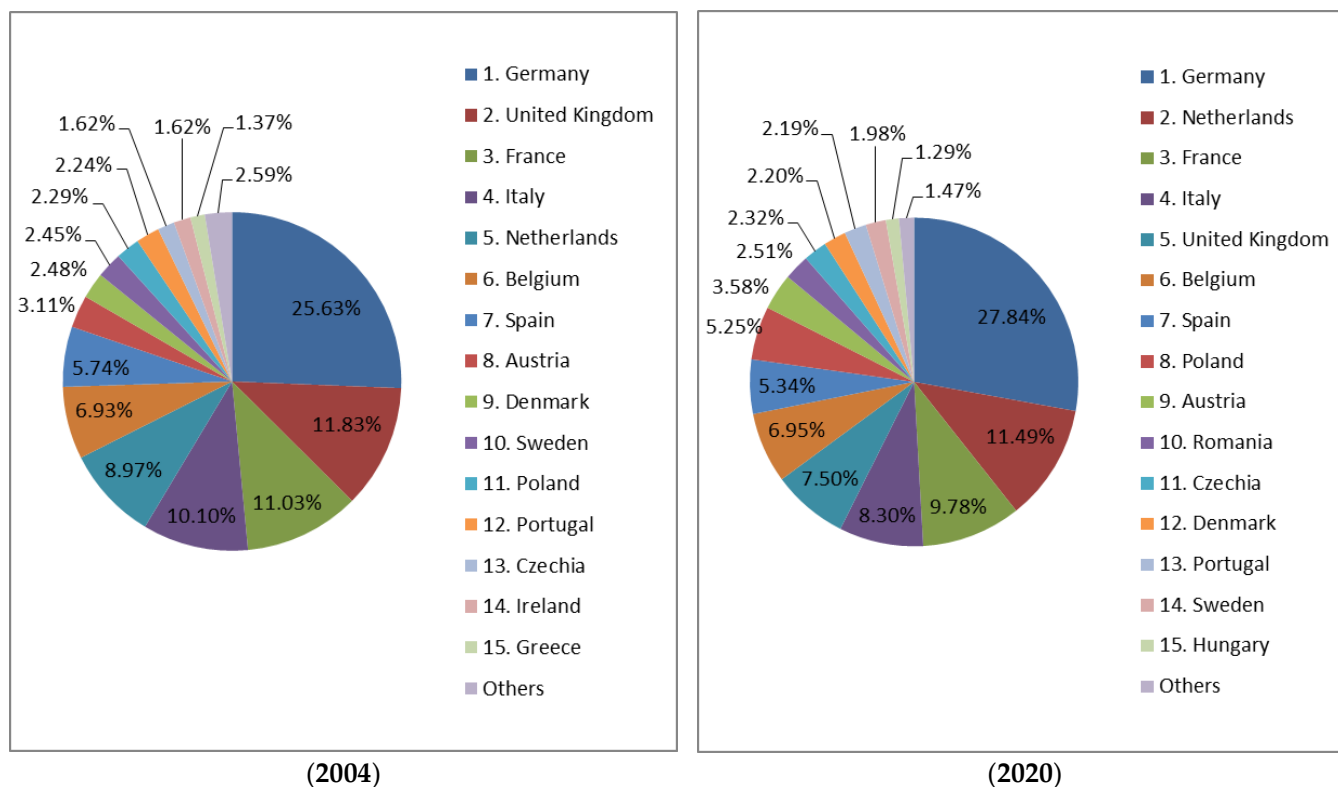


Figure 4. Share of import of products of agriculture by EU main importers in EU agricultural import on the internal market in 2004 and 2020.



Figure 5. Ranking of EU countries based on the trade balance of products of agriculture in 2004 and 2020.

Analysing the significance of products of agriculture in the total export of respective member states of the EU (Table 3), a large span can be identified between the analysed countries. Among old member states making the EU-15, agricultural export is particularly important in Spain, Greece, and the Netherlands as well as Denmark and France. In contrast, new member states from the EU-13 with a high share of agricultural export in total export are Cyprus, Bulgaria, Latvia, Lithuania, and Romania (above 3% for all the above-mentioned countries). However, for all the EU countries, with slight exceptions (Greece, Italy, and Malta), the significance of agricultural export to total export increased. Higher dynamics of agricultural export in comparison with total export is due to the fact that prior to accession to the EU, the limitations on trade in products of agriculture were greater than for other products, and that the EU-13 faced the protectionism in agricultural trade. Lifting of barriers and releasing agricultural trade contributed to an increase in both export and import flows. The Trade Coverage Ratio (TCR) (Table 3) informs us whether the export or import growth rate was faster. Analysis of the TCR leads to the conclusion that the competitive position of nearly all EU-13 countries, except Poland, Romania, Cyprus, and Malta, improved their competitive position on the common market. In those four countries import grew faster than export. Countries such as Lithuania, Croatia, Slovakia, and Slovenia, which became specialised in the export of products of agriculture, did well and their TCR was close to or above 100. Among the old member states making the EU-15, the competitive advantage of the biggest importers such as the Netherlands, Belgium, Spain, and France, measured by TCR, declined slightly. In turn, Denmark and Greece improved their export specialisation. New member states making up the EU-13 compare well to old member states making up the EU-15, which can be determined by comparing changes in the TCR calculated for the whole EU-15 and EU-13. In the analysed period, the TCR for EU-15 increased in 2020 compared with that recorded in 2004 by only 0.5 p.p., whereas for new member states making up the EU-13, this ration increased by 19.2 p.p.

Analysis of the Grubel–Lloyd ratio (IIT) (Table 4) leads to the conclusion that among old member states making the EU-15 the highest intensity of intra-industry trade in products of agriculture can be observed in Belgium, Denmark, and Greece (92.5, 91.5, and 88.3 average in 2004–2020), while among new member states making up the EU-13, Slovakia, Latvia, Romania, and Czechia scored highest for trade intensity (respectively, 94.5, 88.1, 87.6, and 85.7), and Croatia, Estonia, and Slovenia significantly improved their position (from 20.3 in 2004 to 97.1 in 2020, 26.0 to 70.8, and 60.3 to 84.6 appropriately). The agricultural production range in those countries is largely complementary to the agricultural production of other EU member states. Products exported by those countries are purchased on the EU market. At the same time, these countries are a selling market for other members of the EU.

Interpretation of the Revealed Comparative Export Advantage (RXA) index allows identifying countries with a comparative advantage on the common market of the EU. Among such new member states (EU-13), a clear comparative advantage (RXA index above 100) in 2020 was revealed by: Bulgaria (265.5, almost double increase from 156.3 in 2004), Croatia (207.7, almost a tenfold increase from 21.1 in 2004), Cyprus (198.2—there was a decline in the competitive position from the level 733.2 in 2004), Latvia (around fivefold increase from 44.4 in 2004 to 204.3 in 2020), Lithuania (from 98.9 to 190.2, double increase), Romania (likewise a double increase from 77.1 to 142.7), and Hungary (a slight increase from 86.5 in 2004 to 108.4 in 2020). Countries such as Slovakia, Slovenia, Estonia and Czechia improved their position measured by RXA, although they are still far from gaining a comparative advantage on the common market of the EU (RXA index in these countries is below 100, as shown in Table 4).

Table 3. Share of agricultural export in total export (IX) and Trade coverage ratio (TCR) for products of agriculture of EU member states from 2004 to 2020. Source: own elaboration and calculations based on EUROSTAT.

EU Member State	Agricultural Export/Total Export (100%)					Trade Coverage Ratio (100%)				
	2004	Rank	2020	Rank	2004–2020	2004	Rank	2020	Rank	2004–2020
Austria	0.8	17	1.3	21	1.1	41.6	17	43.8	20	43.2
Belgium	2.0	9	2.6	14	2.2	129.4	8	108.3	10	116.6
Denmark	2.3	7	4.7	9	3.5	94.4	9	129.4	6	117.0
Finland	0.5	22	0.5	26	0.6	23.4	22	17.5	26	23.9
France	3.3	5	4.0	10	3.5	169.6	5	114.0	9	148.5
Germany	0.8	18	0.9	23	0.9	32.3	18	25.8	25	33.4
Greece	7.1	2	6.5	3	6.9	93.0	10	174.4	5	125.6
Ireland	0.7	20	0.2	27	0.9	55.7	15	16.6	27	54.1
Italy	1.6	12	2.0	15	1.8	61.4	14	65.8	16	70.2
Luxembourg	0.4	25	1.9	17	1.1	23.5	21	42.8	21	34.9
Netherlands	4.8	4	5.9	4	4.8	291.0	2	246.2	2	270.2
Portugal	1.1	14	3.0	12	2.0	27.1	19	64.9	18	43.9
Spain	7.0	3	8.1	1	7.1	310.6	1	304.3	1	302.0
Sweden	0.4	24	0.6	25	0.5	22.4	23	27.2	23	23.8
United Kingdom	0.7	19	0.9	24	0.8	23.6	20	26.4	24	25.9
EU-15	2.2	×	2.9	×	×	93.3	×	93.8	×	×
Bulgaria	3.3	6	7.0	2	7.4	236.9	3	243.2	3	316.1
Croatia	0.5	23	5.6	5	2.2	11.3	26	105.9	11	43.1
Cyprus	13.7	1	5.4	7	7.9	136.1	7	36.6	22	63.6
Czechia	0.6	21	1.0	22	1.1	43.2	16	73.3	15	76.2
Estonia	0.4	26	1.4	20	1.2	14.9	25	54.8	19	55.5
Hungary	1.8	10	3.0	13	2.8	203.4	4	234.3	4	249.4
Latvia	1.0	15	5.5	6	4.5	22.0	24	89.8	13	87.4
Lithuania	2.1	8	5.1	8	3.7	83.4	11	126.1	7	77.4
Malta	0.2	28	0.0	28	0.3	7.1	28	0.7	28	6.5
Poland	1.5	13	1.6	18	1.6	72.4	13	65.3	17	66.7
Romania	1.6	11	3.9	11	3.4	164.0	6	86.9	14	123.4
Slovenia	0.2	27	1.9	16	1.3	10.3	27	117.6	8	76.2
Slovakia	0.9	16	1.5	19	1.4	77.5	12	98.0	12	93.5
EU-13	2.1	×	3.3	×	×	83.3	×	102.5	×	×

The results of research on the competitive position in agricultural trade can be referred to the outcomes of studies by other authors, but with certain reservations due to different objective, spatial and time scope of research and selected research methods. An improvement in the competitive position of Czechia on the EU market was mentioned by Kuzmenko et al. [78], in particular with regard to respective groups of products of agriculture such as animal feedstuffs, sugar and sugar preparations, and cereals and cereal preparations [79]. Bielík and Qineti [80] note that, after the accession, neither Czechia nor Slovakia, despite having improved their competitive position, did not achieve comparative advantage in agri-food trade compared with other EU countries. An improvement in the competitiveness of the processed food sector in Hungary and Bulgaria is corroborated, by means of RCA, by Ignatijevic et al. [81]. In contrast, Jambor and Hubbard [82] point to a decline in the competitive position of Hungary and the lack of Hungary's competitive advantage in trading in products of agriculture processed after its accession to the EU, while a comparative advantage was maintained for products of agriculture used as raw materials such as wheat, maize, and swine meat. Andrei et al. [83] identify the necessity to increase the efficiency of management and the need for agricultural restructuring as the conditions for improving the competitiveness of agri-food trade in Romania.

Table 4. Intra industry trade intensity (IIT) ratio and revealed comparative export advantage (RXA) for products of agriculture of EU member states from 2004 to 2020. Source: own elaboration and calculations based on EUROSTAT.

EU Member State	IIT (%)					RXA (%)				
	2004	Rank	2020	Rank	2004–2020	2004	Rank	2020	Rank	2004–2020
Austria	58.8	15	60.9	16	60.3	38.2	17	44.0	21	43.8
Belgium	87.2	5	96.0	3	92.5	93.0	9	91.9	14	93.6
Denmark	97.1	1	87.2	9	91.5	107.6	7	175.5	9	149.9
Finland	37.9	22	29.8	26	38.4	21.0	23	18.5	26	24.5
France	74.2	10	93.5	5	81.0	172.0	5	148.5	10	160.8
Germany	48.9	17	41.1	25	50.0	30.2	20	27.1	24	32.0
Greece	96.4	2	72.9	14	88.3	358.5	3	244.6	4	313.2
Ireland	71.6	11	28.4	27	69.3	32.7	18	6.4	27	38.4
Italy	76.1	8	79.4	11	82.4	71.5	12	69.7	15	76.5
Luxembourg	38.0	21	60.0	17	50.8	16.8	25	67.2	16	42.9
Netherlands	51.2	16	57.8	20	54.1	277.6	4	261.9	3	244.8
Portugal	42.7	19	78.7	13	60.0	51.5	14	109.0	12	82.1
Spain	48.7	18	49.5	22	49.9	395.1	2	342.6	1	353.3
Sweden	36.6	23	42.7	23	38.4	18.2	24	21.2	25	18.8
United Kingdom	38.2	20	41.8	24	41.1	31.8	19	35.0	23	34.2
EU-15	60.2	×	61.3	×	×	114.4	×	110.9	×	×
Bulgaria	59.4	14	58.3	19	50.9	156.3	6	265.5	2	332.2
Croatia	20.3	26	97.1	2	55.5	21.1	22	207.7	5	89.4
Cyprus	84.7	6	53.5	21	73.7	733.2	1	198.2	7	374.2
Czechia	60.3	13	84.6	10	85.7	29.6	21	35.5	22	44.1
Estonia	26.0	25	70.8	15	69.4	16.7	26	49.3	20	50.9
Hungary	65.9	12	59.8	18	58.1	86.5	10	108.4	13	121.4
Latvia	36.1	24	94.6	4	88.1	44.4	15	204.3	6	191.6
Lithuania	91.0	3	88.4	8	81.4	98.9	8	190.2	8	156.5
Malta	13.2	28	1.4	28	11.8	10.9	28	1.2	28	13.2
Poland	84.0	7	79.0	12	79.7	70.5	13	55.1	18	66.5
Romania	75.8	9	93.0	6	87.6	77.1	11	142.7	11	145.9
Slovenia	18.7	27	91.9	7	80.0	11.0	27	67.1	17	55.3
Slovakia	87.3	4	99.0	1	94.5	41.2	16	53.6	19	59.4
EU-13	55.3	×	74.7	×	×	107.5	×	121.4	×	×

Countries that noted a clear decline in their competitive position on the EU market are Poland and Malta, being the only new member states in which the RXA in 2020 declined in comparison to 2004. However, while Malta is a small country in which agricultural production plays a marginal role, the case of Poland should be analysed in more detail. The outcomes of studies conducted by other authors indicate an improvement in the competitive position of Poland in trade in products of agriculture as a whole following its accession to the EU. In particular, an improved position of the food sector on the global market is mentioned [84,85]. However, fewer studies focus on analysing products of agriculture only and on the intracommunity market only, so it is difficult to make reference to other authors. A significant structural deficiency in the Polish agricultural sector and a related possibility of not utilising the potential of the Polish agricultural sector and a decline in the position of Poland in agricultural trade is reported by Pawlak and Poczta [20] in their analyses.

International trade and share in the global value chain (GVC) are the key factors affecting employment in and income of the agricultural sector [86]. The share of agriculture in GVC is a driving force behind the economic transformation and growth with a strong domino effect to improve the living standard, increase production, and enhance efficiency [87,88]. A protectionist rhetoric, disturbances to trade, and tariff and extra-tariff barriers slow down the growth and development of the agricultural sector. The integration of central and eastern Europe with the European Union and participation in the common market of the EU provided options to a more efficient trade environment supported by

clearer requirements regarding the supply, demand, and prices. Countries newly admitted to the EU were incorporated in the EU's manufacturing chains forming part of global value chains, which could underpin the increase in export from those countries to the EU-15 markets, and the increase in import from the EU-15 to the EU-13. In addition, NMS could improve their infrastructure under various aid programmes financed under the Common Agricultural Policy of the EU and gained access to financing such as direct payments at levels gradually adapted to the aid provided to farmers from the old member states making up the EU-15. Integration of new member states with the EU market facilitated access to resources consisting of intellectual property (e.g., genetic resources), and stimulation of public and private research and development. All the above-mentioned factors had a beneficial effect on the development of the agricultural sector and export growth options. However, on the other hand, integration with the EU market necessitated stronger competition between new member states that had to compete for their market position with countries that were more advanced in technology and were definitely more efficient. New member states making up the EU-13 handled new challenges in various ways—some better and others worse, as presented in Tables 3 and 4. However, it should be highlighted that, as a group, those countries improved their competitive position in the trade in the products of agriculture on the common market of the EU, as corroborated by the calculated collective means for the EU-13. The mean TCR increased by 19.2 p.p., IIT increased by 9.4 p.p., and RXA by 13.9 p.p.

4.3. Evaluation of Changes in the Competitive Position of the EU-13 Countries in the Context of Competitive Potential of Those Countries

According to the Revealed Comparative Export Advantage (RXA) and Trade Balance (TB), the EU-13 was classified into four groups: group A consisting of net exporters with a comparative advantage; group B comprising net importers with a comparative advantage; group C, that is, countries with a positive trade balance and comparative disadvantage; and group D made up by countries with a negative trade balance and comparative disadvantage in the trade in products of agriculture. Tables 5 and 6 illustrate changes in the competitive position of countries making up the EU-13 in 2020 compared with 2004. Six countries, Croatia, Hungary, Latvia, Lithuania, Romania, and Slovenia improved their position; and six, Bulgaria, Czechia, Estonia, Malta, Poland, and Slovakia did not change it; Cyprus was the only country that noted a slight decline.

Table 5. Position of EU-13 countries according to comparative advantage and trade balance in 2004.









B	Comparative advantage	RXA > 100	A	Comparative advantage	RXA > 100
	Net importer	TB < 0		Net exporter	TB > 0
			Bulgaria, Cyprus		
D	Comparative disadvantage	RXA < 100	C	Comparative disadvantage	RXA < 100
	Net importer	TB < 0		Net exporter	TB > 0
Croatia, Czechia, Estonia, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia			Hungary, Romania		

Table 6. Position of EU-13 countries according to comparative advantage and trade balance in 2020.

B	Comparative advantage	RXA > 100	A	Comparative advantage	RXA > 100
	Net importer	TB < 0		Net exporter	TB > 0
Cyprus, Latvia, Romania			Bulgaria, Croatia, Hungary, Lithuania		
D	Comparative disadvantage	RXA < 100	C	Comparative disadvantage	RXA < 100
	Net importer	TB < 0		Net exporter	TB > 0
Czechia, Estonia, Malta, Poland, Slovakia			Slovenia		

In addition, it was verified how the competitive position of respective member states of the EU-13 expressed as Revealed Comparative Export Advantage (RXA) changed compared with changes in the labour productivity (LP) of agriculture from 2004 to 2020 (Table 7). It was assumed that an increase in RXA corresponds to an improvement in competitiveness, and an increase in labour productivity reflects an improvement in the competitive potential. Depending on the change in both indicators, respective member states were assigned to one of the four groups: group A is countries that noted both an increase in RXA and in labour productivity; group B includes countries where labour productivity decreased and RXA increased; group C is formed by countries in which RXA decreased and labour productivity simultaneously increased; and group D comprised countries in which the value of both indicators declined in the study period. According to research, in ten new member states of the EU, the competitiveness of agriculture improved along with labour productivity in that sector. A simultaneous decline in RXA and labour productivity was observed in Malta. It should be added that it was the only country where labour productivity in agriculture declined but was still among the highest in the EU-13. Despite having improved their competitive potential, Poland and Cyprus showed a lower competitive position. With regard to relatively large land and labour resources in Poland, it should be deemed that, as a result of further structural transformations and utilisation of funds from the CAP, this country has a potential to improve its competitive position in the international trade in products of agriculture.

Table 7. Changes in comparative advantage and labour productivity of agriculture in EU-13 countries from 2004 to 2020.

B	Comparative advantage	RXA 	A	Comparative advantage	RXA 
	Labour productivity	LP 		Labour productivity	LP 
			Bulgaria, Croatia, Hungary, Lithuania, Latvia, Romania, Czechia, Estonia, Slovakia, Slovenia		
D	Comparative disadvantage	RXA 	C	Comparative disadvantage	RXA 
	Labour productivity	LP 		Labour productivity	LP 
Malta			Cyprus, Poland		

5. Conclusions

This paper evaluates the competitiveness of the agricultural sector of the 13 new member states admitted to the European Union from 2004 to 2020. This allows verifying the effect of integration processes on the competitive position of respective countries as member states of the EU from the point of view of their ability to reach a competitive advantage in the international trade in products of agriculture. The significance of studies on the competitiveness of the agricultural sector increases at the time of progressing internationalisation and globalisation of the world economy, and for new member states of the EU, as a result of existing in conditions created by the Community. The inclusion of the examined group of countries in the Single European Market put them in the face of strong competitive pressure from other member states of the Community and from third countries. At the same time, the openness of trade exchange increased and products of agriculture manufactured in central and eastern Europe gained unlimited access to the EU market. Taking the whole period of membership of countries admitted to the EU in or after 2004 into account contributes to the discussion on the impact of respective countries' accession on the international competitiveness of their agricultural sectors. In addition, an added value of this paper is that it focuses on the agricultural sector alone, which due to being resource-oriented, is completely different from the food industry.

On the one hand, our research concerned changes in the competitive potential of agriculture, and on the other, the competitive position of the examined countries in international trade. Indicators adopted for research showed that agriculture in the EU-13 featured a considerably lower labour and land productivity, and a higher share of this sector in gross value added for most of the member states. A positive phenomenon was an increase in labour productivity that in the EU-13 was characterised by higher dynamics than in old member states. Nevertheless, the gap between these countries and the EU-15 still remains big, which adversely affects their competitive capacity.

To sum up the analysis of ratios measuring the international competitive position of countries making up the EU-13 in the trade in products of agriculture on the internal EU market, it can be concluded that the position of these countries in 2020, compared with 2004, improved. In 2004, a negative balance of agricultural trade and a comparative disadvantage ($RXA < 100$) was found for as many as nine countries from the EU-13: Croatia, Czechia, Estonia, Latvia, Lithuania, Malta, Poland, Slovakia, and Slovenia. Bulgaria, Hungary, Romania, and Cyprus showed a positive balance of agricultural trade with the EU, but Romania and Hungary had no comparative advantage. Only Bulgaria and Cyprus had a comparative advantage measured as RXA in 2004. In 2020, in the area of trading in products of agriculture Bulgaria, Hungary, Lithuania and Croatia performed the best. These countries are net exporters with a comparative advantage ($RXA > 100$). A comparative advantage with a negative trade balance was also found for Romania, Latvia and Cyprus. A positive trade balance, although without a comparative advantage ($RXA < 100$) was noted for Slovenia. However, the worst-position net importers without a comparative advantage were Poland, Czechia, Slovakia, and Estonia.

In conclusion to the study, peripheral countries in which agriculture plays a significant role in the economy should focus their political efforts on supporting productive, sustainable, and resilient agri-food systems, and allowing farmers to increase competitiveness and profitability, and supporting trade in products of agriculture and food. Such focused political efforts can help generate economic growth and increase the income of agricultural holdings and contribute to building food safety. It is in the interest of respective member states of the EU, both new and old, and acquires a new meaning in the context of global challenges such as the COVID-19 pandemic, and warfare in neighbouring countries of the EU, disturbing the operation of global agricultural markets.

The conducted research is not without limitations and requires continuation. Measurement of the competitiveness of agriculture encounters many methodological problems resulting from the lack of accordance as to its assessment. Further research should focus on constructing a synthetic measure of competitiveness.

Author Contributions: Conceptualisation, A.J.-A., A.N., E.K. and H.K.; methodology, A.J.-A. and A.N.; software, A.J.-A. and A.N.; validation, A.J.-A., A.N., E.K. and H.K.; formal analysis, A.J.-A., A.N., E.K. and H.K.; investigation, A.J.-A., A.N., E.K. and H.K.; resources, A.J.-A., A.N., E.K. and H.K.; data curation, A.J.-A. and A.N.; writing—original draft preparation, A.J.-A., A.N., E.K. and H.K.; writing—review and editing, A.J.-A., A.N., E.K. and H.K.; visualisation, A.J.-A., A.N., E.K. and H.K.; supervision, A.J.-A., A.N., E.K. and H.K.; project administration, A.J.-A. and A.N.; funding acquisition, A.J.-A., A.N., E.K. and H.K. All authors have read and agreed to the published version of the manuscript.

Funding: The APC was funded by the University of Life Sciences, Faculty of Agrobioengineering (grant number RKA/S/8/2022/EFI) and the vouchers.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Data used in surveys is sourced from EUROSTAT. Raw data were converted in accordance with the adopted methodology given in the publication. Data from databases are widely available for use. (<https://ec.europa.eu/eurostat/data/database>, accessed on 10 July 2022).

Conflicts of Interest: The authors declare no conflict of interest.

References

- Antimiani, A.; Carbone, A.; Costantini, V.; Henke, R. Agri-food exports in the enlarged European Union. *Agric. Econ.–Czech* **2012**, *58*, 354–366. [\[CrossRef\]](#)
- Bojnec, Š.; Fertő, I. Are new EU member states catching up with older ones on global agri-food markets? *Post-Communist Econ.* **2015**, *27*, 205–215. [\[CrossRef\]](#)
- Carraresi, L.; Banterle, A. Agri-food competitive performance in EU countries: A fifteen-year retrospective. *Int. Food Agribus. Manag. Rev.* **2015**, *18*, 37–62.
- Hermans, C.M.L.; Geijzendorffer, I.R.; Ewert, F.; Metzger, M.J.; Vereijken, P.H.; Woltjer, G.B.; Verhagen, A. Exploring the future of European crop production in a liberalised market, with specific consideration of climate change and the regional competitiveness. *Ecol. Model.* **2010**, *221*, 2177–2187. [\[CrossRef\]](#)
- Drabik, D.; Bartova, L. Agri-food trade specialisation pattern in the new EU Member States. European Association of Agricultural Economists (EAAE). In Proceedings of the International Congress, Ghent, Belgium, 26–29 August 2008.
- Thuczak, A. Potential and competitiveness of EU countries in terms of slaughter livestock production. *Agric. Econ.–Czech* **2019**, *65*, 550–559. [\[CrossRef\]](#)
- Fertő, I.; Hubbard, L.J. Revealed comparative advantage and competitiveness in Hungarian agri-food sectors. *World Econ.* **2003**, *26*, 247–259. [\[CrossRef\]](#)
- Jarosz-Angowska, A.; Angowski, M.; Kakol, M.; Nowak, A.; Różańska-Boczula, M. Agricultural Competitive Potential and Competitive Position in the International Trade of Agricultural and Food Products in the European Union. *Eur. Res. Stud.* **2020**, *23*, 779–803. [\[CrossRef\]](#)
- Juchniewicz, M. Food producers' competitiveness gap in Poland on the European Union market. *Acta Sci. Pol. Oeconomia* **2017**, *16*, 65–75. [\[CrossRef\]](#)
- Pawlak, K. Competitiveness of the EU Agri-Food Sector on the US Market: Worth Reviving Transatlantic Trade? *Agriculture* **2022**, *12*, 23. [\[CrossRef\]](#)
- Johnson, H.G. *International Trade and Economic Growth (Collected Works of Harry Johnson) Studies in Pure Theory*; Routledge: New York, NY, USA, 2013.
- Bojnec, Š.; Fertő, I. Agri-food comparative advantages in the European Union countries by value chains before and after enlargement towards the East. *Agrarteadus J. Agric. Sci.* **2019**, *30*, 69–77. [\[CrossRef\]](#)
- Harvey, D.; Hubbard, C.; Gorton, M.; Tocco, B. How Competitive is the EU's Agri-Food Sector? An Introduction to a Special Feature on EU Agri-Food Competitiveness. *J. Agric. Econ.* **2017**, *68*, 199–205. [\[CrossRef\]](#)
- Krugman, P. Competitiveness: A Dangerous Obsession. *Foreign Aff.* **1994**, *73*, 28–44. [\[CrossRef\]](#)
- Krugman, P. Making Sense of the Competitiveness Debate. *Oxf. Rev. Econ. Policy* **1996**, *12*, 17–25. [\[CrossRef\]](#)
- Dunn, M.H. Do Nations Compete Economically? A Critical Comment on Prof. Krugman's Essay, Competitiveness: A Dangerous Obsession. *Intereconomics* **1994**, *29*, 303–308. [\[CrossRef\]](#)
- Olczyk, M. *Competitiveness. Theory and Practice*; CeDeWu: Warsaw, Poland, 2008; p. 175. (In Polish)
- Karodia, A.; Soni, D.; David, J.E. International Competitiveness, Globalization and Technology for Developing Countries: Some Reflections from Previous Research. *SJBEMS* **2014**, *2*, 25–34. [\[CrossRef\]](#)
- Woś, A. *Internal Competitiveness of Agriculture*; IERiGŻ: Warsaw, Poland, 2001; p. 51. (In Polish)
- Pawlak, K.; Poczta, W. Competitiveness of Polish Agriculture in the Context of Globalization and Economic Integration—Competitive Potential and Position. *Probl. Agric. Econ.* **2020**, *4*, 86–107. [\[CrossRef\]](#)
- Radło, M.J. International Competitiveness of the Economy. Notes on Definitions, Factors and Measures. In *Factors and Measures of International Competitiveness of Economies in the Context of Globalization—Preliminary Research Results*; Bieńkowski, W., Weresa, M.A., Eds.; Papers and Materials, SGH: Warsaw, Poland, 2008; Volume 284, p. 33. (In Polish)
- Reinert, E.S. Competitiveness and its Predecessors—A 500 Year across National Perspective. *Struct. Chang. Econ. Dyn.* **1995**, *6*, 23–42. [\[CrossRef\]](#)
- Martin, R.L. *A Study on the Factors of Regional Competitiveness. A Draft Final Report for The European Commission Directorate-General Regional Policy*; Cambridge Econometrics: Cambridge, UK, 2003; p. 184.
- Sung, J. *Exploring Economic Success of Singapore: The Developmental Worker as Missing Linked*; Edward Elgar Publishing Inc.: Cheltenham, UK; Northampton, MA, USA, 2006; p. 208.
- Cho, D.S.; Moon, H.C. *From Adam Smith to Michael Porter: Evolution of Competitiveness Theory*; Asia-Pacific Business Series; World Scientific: Singapore, 2013; Volume 7, p. 348. [\[CrossRef\]](#)
- Fagerberg, J.; Lundvall, B.A.; Srholec, M. Global Value Chains, National Innovation Systems and Economic Development. *Eur. J. Dev. Res.* **2018**, *30*, 533–556. [\[CrossRef\]](#)
- Miozzo, M.; Walsh, V. *International Competitiveness and Technological Change*; Oxford University Press: Oxford, UK, 2006; p. 376.
- Dunning, J.H. Internationalizing Porter's Diamond. *Manag. Int. Rev.* **1993**, *33*, 7–15.
- Alvarez, I.; Marin, R. FDI and Technology as Levering Factors of Competitiveness in Developing Countries. *J. Int. Manag.* **2013**, *19*, 232–246. [\[CrossRef\]](#)

30. Aigigner, K. Competitiveness: From a Dangerous Obsession to a Welfare Creating Ability with Positive Externalities. *J. Ind. Compet. Trade* **2006**, *6*, 161–177. [\[CrossRef\]](#)
31. Kucera, J.; Vochozka, M.; Rowland, Z. The Ideal Debt Ratio of an Agricultural Enterprise. *Sustainability* **2021**, *13*, 4613. [\[CrossRef\]](#)
32. Kołodziej, E.; Kobiałka, A.; Zakrzewska, A. *Supervision over Financial Markets and Institutions in Poland and Euro Zone*; Institute of Scientific and Publishing “Spatium”: Radom, Poland, 2021; p. 152. (In Polish)
33. Oziewicz, E. *Dilemmas of Economic Development of Southeast Asian Countries against the Background of Globalization Processes*; Scientific Publishing House of the University of Gdańsk: Gdansk, Poland, 2007; p. 204. (In Polish)
34. Porter, M.E. The Competitive Advantage of Nations. *Harv. Bus. Rev. March–April*. 1990. Available online: <https://hbr.org/1990/03/the-competitive-advantage-of-nations> (accessed on 12 July 2022).
35. Siebert, H. Locational Competition: A Neglected Paradigm in the International Division of Labour. *World Econ.* **2006**, *29*, 137–159. [\[CrossRef\]](#)
36. Misala, J. *International Competitiveness of National Economy*, 1st ed.; PWE: Warsaw, Poland, 2011; p. 308. (In Polish)
37. Adamowicz, M. Competition and Competitiveness in Agribusiness. Theoretical and Practical Aspects. *Probl. Agric. Econ.* **1999**, 2–3, 3–19. (In Polish)
38. Kennedy, P.L.; Harrison, R.W.; Kalaitzandonakes, N.G.; Peterson, H.C.; Rindfuss, R.P. Perspectives on Evaluating Competitiveness in Agribusiness Industries. *Agribus. Int. J.* **1997**, *13*, 385–392. [\[CrossRef\]](#)
39. Matkovski, B.; Kalas, B.; Zekić, S.; Jeremić, M. Agri-food competitiveness in South East Europe. *Outlook Agric.* **2019**, *48*, 326–335. [\[CrossRef\]](#)
40. Woś, A. *Competitiveness of the Polish Food Sector. Synthesis*; IERiGŻ: Warsaw, Poland, 2003; p. 98. (In Polish)
41. Pawlak, K. Comparative Advantages of the Polish Agri-Food Sector on the US Market. In Proceedings of the 2018 International Scientific Conference ‘Economic Sciences for Agribusiness and Rural Economy’, Warsaw, Poland, 7–8 June 2018; Volume 2, pp. 223–230. [\[CrossRef\]](#)
42. Latruffe, L. Competitiveness, Productivity and Efficiency in the Agricultural and Agri-Food Sectors. *OECD Food Agric. Fish. Work. Pap.* **2010**, *30*, 64. [\[CrossRef\]](#)
43. *The Global Competitiveness Report 2013–2014*; World Economic Forum: Geneva, Switzerland, 2013; p. 552.
44. Fagerberg, J.; Knell, M.; Srholec, M. The Competitiveness of Nations. Economic Growth in ECE Region. *Econ. Surv. Eur.* **2004**, *2*, 51–66.
45. Buckley, P.J.; Pass, C.L.; Prescott, K. Measures of International Competitiveness: A Critical Survey. *J. Mark. Manag.* **1988**, *4*, 175–200. [\[CrossRef\]](#)
46. Gorynia, M.; Łażniewska, E. (Eds.) *Competitiveness Knowledge Compendium*, 1st ed.; PWN Scientific Publishers: Warsaw, Poland, 2009; p. 352. (In Polish)
47. Bieńkowski, W. *Reaganomics and Its Impact on the Competitiveness of the U.S. Economy*; PWN Scientific Publishers: Warsaw, Poland, 1995; p. 431. (In Polish)
48. Jambor, A.; Babu, S. *Competitiveness of Global Agriculture—Policy Lessons for Food Security*, 1st ed.; Springer: Cham, Switzerland, 2016; p. 199. [\[CrossRef\]](#)
49. Jarosz-Angowska, A. Assessment of the Importance of Agri-Food Products Trade Between the European Union and China. In *Eurasian Economic Perspectives, Proceedings of the 24th Eurasia Business and Economics Society Conference*; Eurasian Studies in Business and Economics; Bilgin, M.H., Danis, H., Demir, E., Can, U., Eds.; Springer: Berlin/Heidelberg, Germany, 2019; Volume 11/1, pp. 105–124. [\[CrossRef\]](#)
50. Carbaugh, R.J. *International Economics*, 13th ed.; South–Western Cengage Learning: Mason, OH, USA, 2010; p. 580.
51. Kerr, W.A.; Gaisford, J.D. (Eds.) *Handbook on International Trade Policy*; Edward Elgar Publishing: Cheltenham, UK; Northampton, MA, USA, 2007; p. 560. [\[CrossRef\]](#)
52. Beluhova-Uzunova, R.; Roycheva, A.; Atanasov, D. Farm Competitiveness Determinants and Drivers. *Agric. Sci. J. Agric. Univ. –Plovdiv* **2018**, *10*, 41–46. [\[CrossRef\]](#)
53. Nowak, A.; Kaminska, A. Agricultural Competitiveness: The Case of the European Union Countries. *Agric. Econ.–Czech* **2016**, *62*, 507–516. [\[CrossRef\]](#)
54. Ball, V.E.; Butault, J.P.; San Juan, C.; Mora, R. Productivity and international competitiveness of agriculture in the European Union and the United States. *Agric. Econ.* **2010**, *41*, 611–627. [\[CrossRef\]](#)
55. Kravčáková Vozárová, I. The measurement of the competitiveness of EU agricultural production at the macroeconomic level. *Exclus. J. Econ. Soc. Environ.* **2013**, *1*, 155–162.
56. Figiel, S.; Kufel, J. Macroeconomic performance and international competitiveness of the agro-food sectors in the EU countries: Implications for the Future CAP. *Procedia Soc. Behav. Sci.* **2013**, *81*, 405–410. [\[CrossRef\]](#)
57. Nowak, A.; Różańska-Boczula, M.; Krukowski, A. Competitiveness of agriculture in new member states of the European Union. *Eur. Res. Stud.* **2020**, *23*, 160–175. [\[CrossRef\]](#)
58. Matkovski, B.; Zekić, S.; Dokić, D.; Jurjević, Ž.; Đurić, I. Export Competitiveness of Agri-Food Sector during the EU integration process: Evidence from the Western Balkans. *Foods* **2022**, *11*, 10. [\[CrossRef\]](#)

59. Dorward, A. Agricultural labour productivity, food prices and sustainable development impacts and indicators. *Food Policy* **2013**, *39*, 40–50. [\[CrossRef\]](#)
60. Bombińska, E. Selected Measures of a Country's International Competitive Position. *Zesz. Nauk. Akad. Ekon. W Krakowie* **2002**, *575*, 13. (In Polish)
61. Jagiełło, M. Indicators of international competitiveness of the economy. *Studia i Materiały. Inst. Koniunktur I Cen Handlu Zagr.* **2003**, *80*, 8–12.
62. Pilarska, C. *The International Competitiveness of the Polish Economy against the Background of the EU's New Member States*; Wydawnictwo UE w Krakowie: Kraków, Poland, 2017; pp. 150–160. (In Polish)
63. Łukiewska, K. *Methodological Aspects of Measuring International Competitiveness of the Industry on the Example of the Food Industry*; Wydawnictwo Uniwersytetu Warmińsko-Mazurskiego w Olsztynie: Olsztyn, Poland, 2019. (In Polish)
64. Grubel, H.G.; Lloyd, P.J. *Intra-Industry Trade. The Theory and Measurement of International in Differentiated Products*; Macmillan: London, UK, 1975.
65. Panić, M.; Rajan, A.H. *Product Changes in Industrial Countries' Trade: 1955-1968. Two Studies*; National Economic Development Office, NEDO Monograph: London, UK, 1971; p. 25.
66. Balassa, B. Trade Liberalisation and, Revealed" Comparative Advantage. *Manch. Sch. Econ. Soc. Stud.* **1965**, *33*, 92–123. [\[CrossRef\]](#)
67. Vollrath, T.L. A Theoretical Evaluation of Alternative Trade Intensity Measures of Revealed Comparative Advantage. *Weltwirtschaftliches Arch.* **1991**, *127*, 275–278. [\[CrossRef\]](#)
68. Meijerink, G.; Roza, P. *The Role of Agriculture in Development. Markets; Chains and Sustainable Development Strategy and Policy Paper*, No 5; Stichting DLO: Wageningen, The Netherlands, 2007. Available online: <http://www.boci.wur.nl/UK/Publications/> (accessed on 10 August 2022).
69. Jarosz-Angowska, A. Changing role of European Union agriculture on the background of global economy in the years 2000-2012. *Ann. UMCS Sect. H Oeconomia* **2015**, *49*, 62–71. [\[CrossRef\]](#)
70. Byerlee, D.; de Janvry, A.; Sadoulet, E. Agriculture for development: Toward a new paradigm. *Annu. Rev. Resour. Econ.* **2009**, *1*, 15–31. [\[CrossRef\]](#)
71. Giannakis, E.; Bruggeman, A. The highly variable economic performance of European agriculture. *Land Use Policy* **2015**, *45*, 26–35. [\[CrossRef\]](#)
72. Nowak, A.; Janulewicz, P.; Krukowski, A.; Bujanowicz-Haraś, B. Diversification of the level of agricultural development in the member states of the European Union. *Cah. Agric.* **2016**, *25*, 55004. [\[CrossRef\]](#)
73. Tłuczak, A. Diversity of the selected elements of agricultural potential in the European Union countries. *Agric. Econ. Czech.* **2020**, *66*, 260–268. [\[CrossRef\]](#)
74. Pawlak, K.; Smutka, L.; Kotyza, P. Agricultural potential of the EU countries: How far are they from the USA? *Agriculture* **2021**, *11*, 282. [\[CrossRef\]](#)
75. Guth, M.; Smędzik-Ambroży, K. Economic resources versus the efficiency of different types of agricultural production in regions of the European Union. *Econ. Res. Ekon. Istraživanja* **2020**, *33*, 1036–1051. [\[CrossRef\]](#)
76. Gołaś, Z. Convergence of labour productivity in agriculture of the European Union. *Probl. Agric. Econ.* **2019**, *358*, 22–43. [\[CrossRef\]](#)
77. Jaroszewska, J.; Pietrzykowski, R. Convergence of the labour productivity in European Union agriculture. *Probl. World Agric.* **2017**, *17*, 120–129. [\[CrossRef\]](#)
78. Kuzmenko, E.; Rumankova, L.; Benesova, I.; Smutka, L. Czech comparative advantage in agricultural trade with regard to EU-27: Main developmental trends and peculiarities. *Agriculture* **2022**, *12*, 217. [\[CrossRef\]](#)
79. Rumankova, L.; Kuzmenko, E.; Benesova, I.; Smutka, L. Selected EU countries crop trade competitiveness from the perspective of the Czech Republic. *Agriculture* **2022**, *12*, 127. [\[CrossRef\]](#)
80. Bielik, P.; Quinet, A. The position of Czech and Slovak agro-food trade in the European markets. *Delhi Bus. Rev.* **2009**, *10*, 43–53. [\[CrossRef\]](#)
81. Ignjatijević, S.; Milojević, I.; Cvijanović, G.; Mersida Jandrić, M. Balance of comparative advantages in the processed food sector of the Danube countries. *Sustainability* **2015**, *7*, 6976–6993. [\[CrossRef\]](#)
82. Jambor, A.; Hubbard, L.J. Changing product structure and comparative advantage: The case of Hungarian agri-food trade. *Econ. Cas.* **2013**, *61*, 846–860.
83. Andrei, J.V.; Popescu, G.H.; Nica, E.; Chivu, L. The impact of agricultural performance on foreign trade concentration and competitiveness: Empirical evidence from Romanian agriculture. *J. Bus. Econ.* **2020**, *21*, 317–343. [\[CrossRef\]](#)
84. Kowalska, A.S.; Gurkova, K.; Olszańska, A.; Soukal, I.; Matejcek, M. Assessment of the Competitive Position of the V4 Group Countries in the Foreign Trade of Agri-Food Industry Products. In Proceedings of the International Scientific Conference Hradec Economic Days 2021; Maci, J., Maresova, P., Firlej, K., Soukal, I., Eds.; University of Hradec Kralove, Czech Republic: Hradec Kralove, Czech Republic, 2021; Volume 11, pp. 449–470. [\[CrossRef\]](#)
85. Szczepaniak, I. Changes in comparative advantages of the Polish food sector in world trade. *Equilib. Q. J. Econ. Econ. Policy* **2019**, *14*, 463–480. [\[CrossRef\]](#)
86. Szymczak, S.; Wolszczak-Derlacz, J. Global value chains and labour markets—Simultaneous analysis of wages and employment. *Econ. Syst. Res.* **2022**, *34*, 69–96. [\[CrossRef\]](#)

-
87. Business at OECD (BIAC). Business priorities for Agricultural Policy. *November 2021*. Available online: <https://biac.org/wp-content/uploads/2022/04/Agriculture-Recovery-and-Resilience-November-2021-1.pdf> (accessed on 10 July 2022).
 88. Białowąs, T.; Budzyńska, A. The importance of global value chains in developing countries' agricultural trade development. *Sustainability* **2022**, *14*, 1389. [[CrossRef](#)]