agriculture

MDPI

Article

Market Performance and Competitiveness: The EU–Serbia Sugar Gap

Bojan Matkovski [1,*], Teodora Tica Ilić [2], Žana Jurjević [1], Danilo Đokić [1] and Stanislav Zekić [1]

[1] Department of Agricultural Economics and Agribusiness, Faculty of Economics in Subotica, University of Novi Sad, 24000 Subotica, Serbia; zana.jurjevic@ef.uns.ac.rs (Ž.J.); danilo.djokic@ef.uns.ac.rs (D.Đ.); stanislav.zekic@ef.uns.ac.rs (S.Z.)

[2] Department of Finance and Accounting, Faculty of Economics in Subotica, University of Novi Sad, 24000 Subotica, Serbia; teodora.tica.ilic@ef.uns.ac.rs

* Correspondence: bojan.matkovski@ef.uns.ac.rs

Abstract

The European Union (EU) sugar sector has undergone significant transformations, particularly after the abolition of sugar production quotas in 2017, which reshaped market dynamics and competitiveness. Serbia, as one of the few European countries with a sugar production surplus, faces both opportunities and challenges in positioning itself within the regional and global sugar market. This study intends to examine the competitiveness and structural characteristics of the sugar sector in the EU and Serbia, focusing on market concentration, trade performances, and financial sustainability. Using the revealed comparative advantage (RCA) index and the Intra-Industry Trade (GLIIT) index, Serbia's market integration and competitiveness in comparison to the EU is evaluated. Additionally, a panel data regression model assesses the effect of market concentration on the profitability of sugar processors. The results indicate that the EU sugar market is greatly concentrated, with dominant manufacture in Germany and France, collectively accounting for over half of total production, while Serbia emerges as a significant regional producer with export volumes comparable to Denmark and Sweden. The findings also highlight a positive link between market concentration and profitability, emphasizing the role of economies of scale and market power. The findings suggest that Serbia maintains strong comparative advantages in sugar production, but its long-term competitiveness is challenged by increasing market liberalization, shifting EU trade policies, and the dominance of larger multinational players. The research underscores the need for strategic policies to ensure sustainable production amid global trade fluctuations.

Keywords: sugar industry; comparative advantage; market concentration; trade performance; European Union; Serbia

Academic Editor: Karolina Pawlak

Received: 14 October 2025
Revised: 11 November 2025
Accepted: 17 November 2025
Published: 20 November 2025

Citation: Matkovski, B.; Ilić, T.T.; Jurjević, Ž.; Đokić, D.; Zekić, S. Market Performance and Competitiveness: The EU–Serbia Sugar Gap. *Agriculture* **2025**, *15*, 2399. https://doi.org/10.3390/agriculture15222399

1. Introduction

Sugar is a very important food item in the diet, and the production of a sufficient quantity of sugar and sugar beet is extremely important for food safety [1]. Sugar is utilized globally as an essential sweetening ingredient, making it one of the most vital goods in the international food market [2–4]. The food supply chain combines a diverse range of parties—from modest farms to multinational retailers. The marked disparities in their size within this market structure have attracted the attention of both academic inquiry and regulatory attention [5].

Sugar is a key agricultural commodity and a critical component of the global food industry, influencing trade policies, market structures, and economic stability. Sugar production in the European Union is characterized by quotas that protect this market from cane sugar imports and, to a certain extent, from cane sugar production [6]. When it comes EU production quantities, it amounts to an annual average of about 17 million tons, and more than 50% of the total is concentrated in Germany and France [7]. According to the European Commission, the EU is the preeminent global producer of sugar from sugar beets, with almost 50% of total worldwide output while only 20% of the global sugar supply is generated from sugar beets, whilst the remaining 80% originates from sugarcane whose production is the most prevalent in parts of South America [8,9]. Accordingly, the European Union contributes slightly less than 10% to total global centrifugal sugar production, positioning it as the third-largest producer worldwide, following Brazil and India [10]. Almost all EU sugar production is derived from sugar beet, as sugar cane is grown in tropical and subtropical regions [11].

Although the impact of trade openness on economic growth is empirically supported [12], some economies still adopt various protective measures to shield their domestic markets. The policy that caused the disruption of sugar import induced the development of domestically cultivated sugar crops with latest technology [13]. This approach has led to domestic sugar prices that are approximately around thrice higher than those on the global market, resulting in overproduction that may possibly be exported only through significant subsidies [14].

Additionally, several measures have impacted the EU sugar industry, shaping its market dynamics and production landscape [1]. One of the earliest was EU sugar regime which started in 2006 that marked a significant transformation in the regulation of the sugar market inside the EU, harmonizing strategies and regulations with World Trade Organization (WTO) standards and resolving issues related to excessive protectionism and subsidies for EU sugar producers [15]. The EU implemented a highly expensive supply management system for the local sugar sector with substantial price subsidies and import tariffs [3]. The reform intended to lower guaranteed sugar prices, improve the EU's worldwide competitiveness, and reduce domestic sugar output to reduce market surpluses [16]. The European Union has implemented sugar market regulation measures which, although subject to debate, are by no means unprecedented in a global context. The EU sugar market has been changing its character and adapting to the ending of production quotas system [17]. Such a strictly regulated sugar market in the EU still allowed certain imports from the Balkan countries at a reduced tariff rate, and previous research shows that sugar production in the Balkan countries is additionally negatively influenced by the liberalization of the EU regime [18].

The EU has also introduced various actions to ensure an adequate sugar supply while limiting excessive consumption, including taxes on high-calorie sugary products [19]. Motivated by public health concerns, many EU member states introduced taxes on sugar-sweetened beverages in the early 2010s, with France leading in 2012 [20]. Additionally, EU sugar production growth remains limited due to high input costs and the unavailability of alternatives to neonicotinoid insecticides [11].

Concern over market competition and power imbalances in the EU food supply chain led to the adoption of Directive (EU) 2019/633 to protect suppliers, especially small and medium-sized firms, from unequal trade practices [21]. Applicable from 2019, the directive requires all member states to implement protection measures and enforcement procedures to ensure ethical trading practices [22].

Amid concerns over market competition and power imbalances in the EU food supply chain, Serbia remains one of the few European countries with a sugar surplus for

both domestic use and export. Serbia has a long tradition of sugar production, primarily concentrated in Vojvodina, with an annual output averaging 358,000 tons and sugar beet production covering around 53,500 hectares and amounted to around 2.2 million tons [7]. Approximately 96% of Serbia's overall sugar beet production is centered in Vojvodina, characterized by high vertical integration within the sugar sector. Production concentration is significant, since over 70% of the sugar beet cultivation area is managed by farms that holds over 100 hectares [23]. Serbia is the only country in the Western Balkans that has achieved self-sufficiency in sugar production [24,25]. Following the abolition of production quotas in the EU, the country's export potential has shown a declining trend [23]. In particular, the liberalization of the EU sugar regime has undermined the competitiveness and production capacity of sugar industries in the Balkan region [18]. It is important that the state has recognized the need to subsidize sugar beet production at a time when sugar production in Europe is in crisis. Currently, Serbia provides subsidies of 35,000 dinars per hectare to support the sector, a form of direct income support financed through the national agricultural budget, aimed at reducing production costs, ensuring price competitiveness, and stabilizing farmers' income amid fluctuating sugar prices [26]. By contrast, sugar producers in the European Union operate under the framework of the Common Agricultural Policy (CAP), which, since the abolition of sugar production quotas in 2017, no longer provide crop-specific price or production subsidies. Instead, EU farmers receive direct payments under the Basic Income Support for Sustainability (BISS) scheme, along with eco-schemes, support for small farms (PSF), support available for young farmers (CISYF) and complementary redistributive income support (CRISS). These instruments are not specific to sugar beet but are integrated within a broader sustainability and market-resilience strategy [27]. In contrast to Serbian approach, EU funding emphasizes environmentally conditioned payments that promote structural efficiency and sustainability rather than short-term price support. This difference illustrates the transitional character of Serbia's agricultural policy and its gradual approximation to the CAP model, a process that directly affects the competitiveness and adaptability of the sugar sector.

This research aims to analyze the features and competitiveness of the sugar industry in the EU and Serbia by investigating the structural disparities and financial performance of both sugar industries, aiming to provide insights into the policy-related drivers of the EU–Serbia sugar gap. In this direction, the methodology of estimating revealed comparative advantages, and the index of intra-industry trade will be used. The impact of market concentration on the profitability of sugar processors, as key players in the supply chain of this commodity, will also be examined. Given that the processing sector in agriculture, including the sugar industry, is often highly concentrated, this topic could be crucial for assessing market competitiveness and industry dynamics.

The manuscript is organized as outlined below: the introduction is followed by a literature review, providing a synthesis of previous scientific research on the topic. The third part defines the research approach and data sources. The results are then presented and analyzed in combination with a discussion to relate the outcomes of this investigation with previous academic findings. The conclusion outlines the sector's potential and provides strategic recommendations for key stakeholders in the sugar supply chain.

2. Literature Review

Agricultural competitiveness in plant production across European countries is shaped by an interplay of production factors and market conditions, with older EU members like Belgium and the Netherlands relying more on labor and capital efficiency, while newer member states emphasize market adaptability factors [28]. When it comes to previous research on the sector of sugars in the EU, it is important to highlight that sugar supply is

determined by production volumes, existing sugar stocks, raw sugar imports, and sugar beet yields per hectare, while the price of sugar is largely influenced by its past levels and by political or policy changes affecting the agricultural market [3]. It is necessary to point out that this sector is highly influenced by production quotas applied for several decades, which are highly concentrated in countries such as Germany and France, and a monopoly has been created in these regions, which leads to unfair competition in the European sugar market [6]. Galović and Bezić [29] analyzed the competitiveness of sugar producers in the EU using dynamic panel data models and indicated the different influences of technology, investments, production of raw materials (sugar beet), labor costs, input prices, and mean revenue of the European Union sugar sector. The same research also concluded that inputs, income from the prior interval, and investments are critical determinants of the sugar market's competitiveness within the EU. When it comes to individual EU countries, numerous studies in the literature utilize comparative advantages and an index of intra-industry trade for the entire agri-food sector, as well as for the sugar and sugar confectionery sectors. Even though these studies use broader product groups (e.g., SITC 06), they remain relevant for the regional comparison due to the limited number of empirical analyses based on the more disaggregated HS 1701 and 1702 classifications used in this paper. For example, Kraciuk [30] analyzed intra-industry trade in agri-food goods among Poland and other states, and results for sugars show very good integration with the global and EU markets, which is interesting. Gavrilescu [31] analyzed Romanian agri-food trade using comparative advantages and an index of intra-industry trade and concluded that there are no comparative advantages for sugar, and in most years, there is no intra-industry trade.

Since 2000, sugar has become one of the most important export products in Serbia [32], and the export possibilities, comparative advantages, and index of intra-industry trade have been examined within the framework of several studies in the literature. For example, authors Matkovski et al. [33] examined the foreign trade liberalization and export of the Serbian agriculture and food sector and concluded that the sugar sector has extremely high comparative advantages. The same research showed that in the case of sugar, intra-industry specialization is significant, both on the worldwide market and on the EU market. The same conclusion regarding the index of intra-industry trade was made by other authors Marković et al. [34] who analyzed the index of intra-industry trade for the entire agri-food sector in Serbia and concluded that sugar is highly incorporated with the global market and with the EU market. Another study [35], which dealt with the region of Vojvodina, which is dominant in Serbia when it comes to the production of sugar beet and sugar, also pointed to the existence of comparative advantages, equally on the world marketplace and on the EU and CEFTA countries market. However, the same research indicated a weak index of intra-industry trade, especially in the CEFTA countries, where inter-industry specialization prevails.

While the sugar industry in Serbia has demonstrated strong comparative advantages and integration into global and regional markets, its market structure and competitive dynamics raise important questions regarding the correlation between market concentration and financial performance. This association is extensively examined in professional and academic literature. However, a definitive theoretical framework that fully captures its complexity remains doubtful. Scholarly discourse suggests that this relationship may manifest in various forms, from positive and negative to neutral—depending on the structural dynamics, competitive intensity, and regulatory environment of a given industry. In line with the theoretical uncertainties highlighted in the literature, different findings indicate that these relationships are not generally consistent. Specifically, while some industries with high concentration align with standard expectations—exhibiting high markups, robust profitability, and reduced investment levels—others with similar concentration levels demonstrate below-average profit margins [36].

A positive association is frequently interpreted through the lens of the market power hypothesis. The market power hypothesis, originally articulated by Bain [37], claims that high market concentration enhances firm profitability by facilitating anti-competitive conduct. Highly concentrated markets may progress into oligopolistic or monopolistic structures, wherein firms empower their dominance not through superior efficiency or innovation but by restricting market competitive pressure and utilizing disparities in market strength. These findings have also been validated by research conducted in Serbia. Kastratović et al. [38] analyzed this topic on sample of more than 30 thousand statements of financial position and income of companies operating in Serbian manufacturing sector and determined that market concentration exerts a significant, positive influence on profitability.

However, Keil [39] examines the concentration–profitability paradox in the sense of challenges for firms in industries dominated by cost-efficient competitors. As he explains, in highly concentrated markets, larger firms benefit from economies of scale, leaving high-cost companies struggling despite prolonged underperformance. Furthermore, according to Classical pricing theory, increased concentration drives prices down and compresses profit margins. Exit barriers, such as high sunk costs or regulatory constraints, force underperforming industry members to remain, challenging the mainstream view that higher concentration necessarily yields higher profitability. Vuković et al. [40] confirmed these findings through a study on a sample of tobacco industry companies in Serbia. The study identified an adverse link between market share and profitability rate among leading tobacco companies in Serbia. Notwithstanding market dominance, they exhibited diminished efficiency and financial performance. Utilizing reduced domestic expenses and taxation, they provided global factories where prices for tobacco products were considerably higher. However, Koppenberg and Hirsch [41] assert that product differentiation is an effective strategy for small businesses to endure in highly concentrated marketplaces. Small enterprises often concentrate on specialized products in particular market segments, allowing them to impose larger markups and enhance profitability. This indicates that specialization for the market niche is a more effective approach compared to cost leadership in sectors characterized by similar goods.

The effectiveness and competitiveness of agribusiness operations are primarily influenced by the cultivation, processing, and distribution of agricultural commodities [42]. Moreover, the financial sustainability of these enterprises is fundamentally connected to the resilience and operational efficiency of their supply chains, as fluctuations in production and market conditions directly impact overall performance [43]. Matkovski et al. [44] highlight that Serbia exhibits a lower level of food security compared to the EU, a disparity that could accelerate a critical issue during periods of crisis. In such circumstances, agricultural companies have a fundamental function in maintaining the stability of the home-grown food supply. Given their significance, it becomes imperative to conduct a comprehensive analysis of the entire supply chain, involving agricultural production at the farm level, sugar manufacturing processes, and distribution networks. Such an approach ensures a general understanding of the factors influencing food security and supply chain resilience.

3. Materials and Methods

To analyze the export positions of sugar, the revealed comparative advantages (RCAs) were calculated. This research used the basic methodology established by the author Balassa [45]. RCAs are calculated as follows:

$$RCA_{ij} = \frac{\frac{X_{ij}}{X_{it}}}{\frac{X_{nj}}{X_{nt}}} \quad (1)$$

where X—export; i—country; j—headings 1701 and 1702 according to HS Classification; t—total export; n—world. In cases where RCA > 1 is considered, comparative advantages are revealed.

The index defined by the author of [46] was used to calculate the index of intra-industry trade (GLIIT):

$$GLIIT_j = \left[1 - \frac{\sum_j |X_{ij} - M_{ij}|}{\sum_j |X_{ij} + M_{ij}|}\right] \times 100 \quad (2)$$

where X—export, M—import, i—country, j—headings 1701 and 1702 according to HS Classification. GLIIT > 15% implies the intra-industry character of trade, which indicates a good integration of the country's sugar market analyzed with the world market. In line with standard empirical practice in the GLIIT literature [47–49], a GLIIT value above 15% is interpreted as economically relevant intra-industry trade rather than incidental two-way flows.

For the purposes of this analysis, data from several relevant databases were used for the period 2015–2023. For data on foreign trade, the UN Comtrade [50] was used; for data on production levels, the FAOSTAT [7] was used; certain data for Serbia were obtained from the Statistical Office of the Republic of Serbia [23] database. All trade indicators (foreign trade, RCA, GLIIT) are calculated using only HS 1701 (cane or beet sugar) and HS 1702 (other sugars, including syrups, were from Chapter 17 of HS).

Financial information for the sugar industry analysis is collected from statements of financial position and income retrieved via the TP Catalyst repository [51]. According to the NACE Rev. 2 classification [52], a database search was conducted to identify active sugar processors classified under code 1081—Manufacture of sugar with registered turnover in at least one year within the period from 2015 to 2023. The dataset included 5 sugar processors headquartered in the Republic of Serbia and 107 sugar processors headquartered in 23 European Union states. A search revealed that no results were obtained for this industry classification code from the other EU member states. In Table 1, the structure of the EU member states sample is presented.

Table 1. Structure of EU countries sample.

Country	No. of Companies	% of EU	Country	No. of Companies	% of EU *
Austria	1	0.93%	Italy	8	7.48%
Belgium	9	8.41%	Latvia	1	0.93%
Bulgaria	4	3.74%	Lithuania	2	1.87%
Croatia	1	0.93%	Netherlands	1	0.93%
Czech Republic	7	6.54%	Poland	3	2.80%
Denmark	3	2.80%	Portugal	3	2.80%
Finland	2	1.87%	Romania	10	9.35%
France	12	11.21%	Slovakia	5	4.67%
Germany	2	1.87%	Slovenia	1	0.93%
Greece	6	5.61%	Spain	20	18.69%
Hungary	4	3.74%	Sweden	1	0.93%
Ireland	1	0.93%	Republic of Serbia	5	100% *
Total EU	107	Total Serbia	5	Total Sample	112

Source: The authors' calculation. * Except Republic of Serbia.

The analysis of factors affecting profitability, including market concentration, will be conducted through the evaluation of a regression model using panel data analysis. Before performing the analysis, necessary fundamental presumption of panel analysis will be tested.

In further analysis, financial performance will be measured through profitability, specifically using the Return on Assets (ROA) indicator. ROA is a fundamental metric of profitability, as it assesses a company's ability to produce income in relation to its total assets [53]. It offers a thorough evaluation of a firm's resource use for value creation through the assessment of profitability and asset efficiency [54]. In contrast to other profitability metrics that rely exclusively on net income or shareholder returns, ROA considers the complete asset base, providing it especially valuable for comparing organizations across industries with differing capital structures.

Based on this perspective, market structure and competition dynamics perform a vital function in determining the efficacy and sustainability of agribusiness operations. A key measure employed by competition policy authorities to assess market concentration is the Herfindahl–Hirschman Index (HHI) [55]. A higher HHI signifies a greater consolidation of sales or production capacity among a limited number of firms, reflecting increased market concentration. The extent of market share and concentration influences the competitive environment and the characteristics of a nation's market, ranging from perfect rivalry to oligopoly [56]. The HHI formula is provided below.

$$HHI = \sum_{i=1}^{N} {S_i}^2 \quad (3)$$

The index is defined as the total of the squared market portions (S) of specific firms (i), where market share is calculated as the proportion of a firm's (i) operating revenue, net profit, capital and number of workforces relative to the aggregate of all categories of all N firms operating in the given market. In Table 2, the HHI values for the Serbian and EU sugar industry are presented by year and according to four criteria.

A variety of research in international literature has focused on analyzing different variables that affect the profitability of corporations. This study primarily aimed to examine the influence of market concentration on ROA. However, the following variables were identified as influencing profitability and are included in the regression model referred to as control factors. Table 2 offers a detailed overview of the variables used and evaluated.

Table 2. Explanation of the regression model variables.

Variable	Abbreviation	Formula	Estimated Impact
Profitability	ROA	Net profit/Total assets	/
Market concentration based on:			
– Operating revenue (OR) – Net income (NI) – Equity (EQ) – Number of employees (NoE)	HHI	The aggregate of the squared percent of the market of all companies within a specified four-digit sector. See Equation (3)	+
Liquidity	LIQ	Current assets/Short-term liabilities	+
Financial leverage	FL	Total liabilities/Equity	−
Debt ratio	DEBT	Total liabilities/Total assets	−
Company size	SIZE	Natural logarithm of total assets	+
Sales growth	SG	$(Sales_t - Sales_{t-1})/Sales_{t-1}$	+
Total assets turnover	Total AT	Turnover/Average total assets	+

Source: Based on research conducted by [57–61].

4. Results and Discussion

4.1. Production and Trade Performances of Sugars

The production of sugar beet in the EU in the last ten years amounts to over 110 million tons, while in the same period, sugar is produced in an average amount of 17 million tons [7]. The largest EU producers of sugar and sugar beet are France and Germany (Figure 1), where

over 50% of production is concentrated. Large producers of sugars is also in Poland, the Netherlands, and Belgium. Previous research indicates that production is shaped according to the EU quota holder system, which is highly concentrated in counties such as Germany, France, and the Netherlands and is controlled by companies or alliances present in those regions [6]. Serbia is a significant producer. That is, it produces products like Denmark and Sweden, which are among the top 10 sugar producers in the EU. According to FAOSTAT [7], sugar beet has been produced in Serbia in the past ten years in an average amount of about 2.2 million tons, while sugar is produced in an average of about 358 thousand tons.

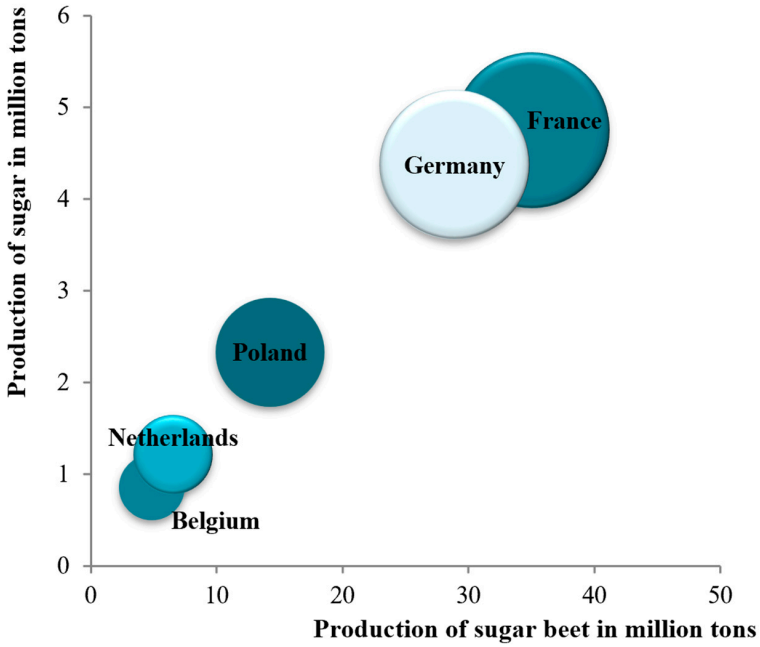

Figure 1. The biggest producers of sugar beet and sugar (average for the period 2014–2023 for sugar beet and 2014–2022 for sugar). Source: The authors' calculation based on FAOSTAT [7].

Considering the largest producers of sugars, it is logical that the largest exporters are France, Germany and the Netherlands (Figure 2). The value of exports from France, on average, for the ten-year period analyzed, is about 1.5 billion USD, while Germany, on average, achieves an annual export value of 1.3 billion USD. Regarding Serbia, the value of sugars exports is, on average, around 77 million USD, and it was quite unstable in the analyzed period [50].

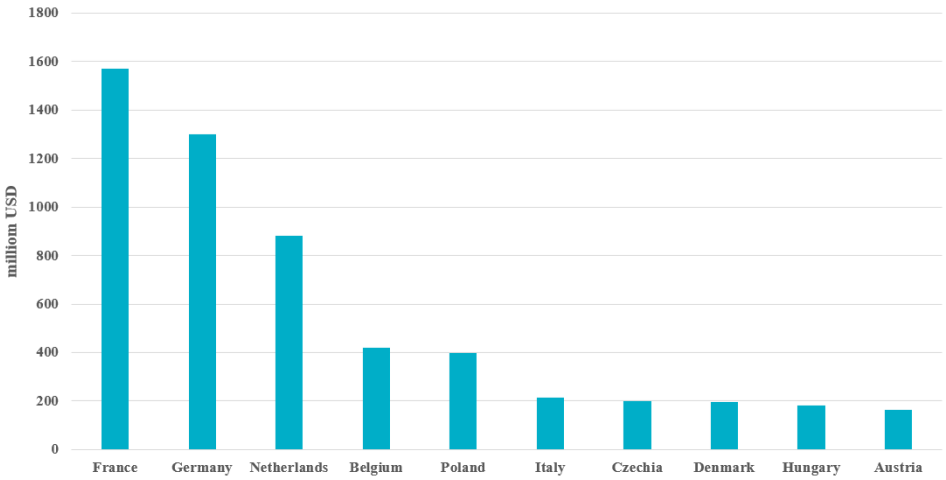

Figure 2. The biggest exporters of sugars (average for the period 2015–2023). Source: The authors' calculation based on UN Comtrade [50].

Analyzing the net export of sugars (Table 3), it is obvious that the EU is divided. Namely, there is a positive balance of 10 EU countries, mainly those of the biggest exporters. Countries with extremely poor production conditions have the largest negative balance. When it comes to Serbia, it has achieved a positive foreign trade balance (averaging 47.2 million USD for the analyzed period).

Table 3. Net-export of sugars for the period 2015–2023 in million USD.

Country	2015	2016	2017	2018	2019	2020	2021	2022	2023
Austria	−40.51	−44.87	−28.34	−34.64	−40.07	−88.05	−89.42	−17.78	−116.67
Belgium	−0.09	−101.75	−148.07	−9.72	4.51	8.77	−117.34	−170.24	−261.62
Bulgaria	−49.88	−58.42	−43.53	−20.60	−35.25	−38.13	−9.65	−18.18	60.21
Croatia	1.21	60.98	7.75	46.49	−11.52	6.05	−1.12	−21.50	−50.46
Cyprus	−11.56	−13.64	−14.56	−12.79	−12.20	−12.86	−13.16	−23.68	−26.19
Czechia	8.48	43.40	37.69	39.88	22.18	14.95	39.86	59.95	96.20
Denmark	−7.49	39.10	45.50	25.65	16.12	56.86	87.45	62.57	84.13
Estonia	−15.23	−19.58	−22.93	−19.96	−19.55	−21.60	−24.90	−30.55	−38.20
Finland	−59.33	−67.07	−75.63	−59.50	−68.29	−72.14	−77.00	−96.47	−103.39
France	752.50	677.24	941.31	1000.65	621.35	653.49	1118.39	1488.22	1717.65
Germany	−109.35	91.84	294.49	374.38	259.03	251.93	580.12	577.38	150.19
Greece	−169.12	−184.34	−206.19	−152.44	−156.15	−175.97	−187.47	−291.65	−312.72
Hungary	18.84	−11.31	49.18	41.46	21.04	20.00	24.64	36.03	15.69
Ireland	−180.34	−158.12	−237.16	−223.65	−216.45	−241.27	−213.07	−246.07	−343.67
Italy	−614.05	−759.09	−812.08	−666.77	−649.65	−704.91	−737.39	−881.20	−1412.46
Latvia	−21.21	−28.21	−30.25	−27.05	−26.89	−29.03	−32.20	−39.00	−53.09
Lithuania	42.39	52.16	65.13	57.29	63.23	73.51	86.70	90.84	128.02
Luxembourg	−5.34	−5.31	−5.49	−5.73	−5.23	−6.22	−6.18	−6.63	−9.00
Malta	−18.28	−18.93	−16.32	−12.94	−12.67	−12.67	−11.96	−18.19	−17.64
Netherlands	25.55	95.45	219.73	268.60	194.45	282.80	438.13	248.27	477.78
Poland	64.80	47.85	208.24	199.42	93.58	111.72	169.73	110.15	330.12
Portugal	−95.04	−88.65	−113.88	−44.04	−77.74	−80.85	−54.44	−95.97	−52.82
Romania	−181.76	−184.52	−199.23	−190.01	−220.07	−185.59	−253.54	−317.68	−317.14
Serbia	68.20	104.21	67.51	16.29	24.89	21.13	74.44	45.59	2.89
Slovakia	97.37	78.56	107.42	66.53	69.47	65.60	91.36	106.90	94.42
Slovenia	−40.68	−26.65	−41.36	−38.57	−35.01	−18.80	−48.30	−56.12	−63.27
Spain	−464.84	−429.83	−626.27	−536.32	−690.62	−554.39	−673.41	−914.81	−1355.81
Sweden	−22.73	0.04	−17.55	−27.72	−39.76	−27.91	−32.98	−46.85	−84.40

Source: The authors' calculation based on UN Comtrade [50].

The analysis revealed comparative advantages for the EU and Serbia (Table 4). It shows that only six countries possess revealed comparative advantages, and Croatia, Bulgaria, Lithuania, and France, among the EU countries, achieve extremely strong comparative advantages in exports. Serbia also belongs to the same group of countries with extremely strong comparative advantages. A strong level of comparative advantage is also achieved by Portugal. EU countries that do not have conditions for production traditionally have poorly disclosed comparative advantages. Serbia has achieved comparative advantages in almost all analyzed years; however, a decline in this indicator can be observed.

Despite the positive RCA and the stable position of the net exporter, the volume of Serbian sugar exports to the EU remains limited. According to Regulation 2020/761 (order No. 09.4326) [62], the annual export quota is 181,000 tons, which structurally limits further export growth even when competitiveness improves.

Table 4. RCA of sugars for the period 2015–2023.

Country	2015	2016	2017	2018	2019	2020	2021	2022	2023
Austria	0.52	0.43	0.46	0.50	0.52	0.51	0.54	0.69	0.57
Belgium	0.83	0.64	0.74	0.98	0.79	0.70	0.72	0.52	0.67
Bulgaria	1.65	1.42	1.36	1.74	1.72	1.48	1.80	2.16	2.60
Croatia	4.45	5.84	3.48	3.39	2.57	1.49	1.61	1.52	2.01
Cyprus	0.00	0.01	0.00	0.01	0.05	0.05	0.01	0.04	0.01
Czechia	0.62	0.56	0.48	0.55	0.53	0.46	0.55	0.60	0.62
Denmark	0.95	0.91	0.88	0.99	1.04	0.99	1.19	1.00	0.93
Estonia	0.22	0.06	0.02	0.04	0.03	0.02	0.03	0.03	0.02
Finland	0.21	0.24	0.14	0.10	0.06	0.05	0.06	0.04	0.20
France	1.47	1.18	1.38	1.81	1.42	1.40	1.89	1.97	1.82
Germany	0.38	0.36	0.42	0.55	0.54	0.49	0.62	0.58	0.48
Greece	0.22	0.38	0.63	0.30	0.22	0.15	0.17	0.11	0.07
Hungary	0.90	0.78	0.79	0.81	0.75	0.70	0.79	0.91	0.88
Ireland	0.29	0.36	0.11	0.12	0.13	0.10	0.12	0.07	0.06
Italy	0.23	0.21	0.21	0.24	0.23	0.20	0.21	0.24	0.21
Latvia	0.29	0.26	0.16	0.13	0.21	0.18	0.15	0.15	0.15
Lithuania	1.51	1.58	1.50	1.76	1.84	1.69	1.80	1.61	1.93
Luxembourg	0.03	0.03	0.03	0.03	0.03	0.02	0.03	0.04	0.03
Malta	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00
Netherlands	0.79	0.70	0.74	1.00	0.94	0.88	0.98	0.73	0.81
Poland	0.73	0.69	0.92	1.03	0.88	0.75	0.86	0.72	0.98
Portugal	0.96	1.20	0.95	1.26	1.01	0.94	1.28	1.09	1.59
Romania	0.40	0.35	0.26	0.28	0.21	0.23	0.15	0.31	0.66
Serbia	3.99	4.14	2.68	1.58	1.74	1.46	2.60	1.66	0.84
Slovakia	1.11	0.84	0.97	0.88	1.01	0.79	0.94	0.96	0.81
Slovenia	0.53	0.38	0.18	0.32	0.44	0.42	0.40	0.32	0.53
Spain	0.26	0.31	0.21	0.25	0.22	0.17	0.20	0.19	0.19
Sweden	0.20	0.25	0.20	0.19	0.18	0.18	0.16	0.14	0.13

Source: The authors' calculation based on UN Comtrade [50].

The GLIIT analysis for the EU and Serbia (Table 5) indicates that the majority of the analyzed countries' sugar markets are well integrated with the global market. That is the intra-industry nature of exchange prevails. Looking at the results of the analysis, GLIIT is greater than 15% in all analyzed countries except Cyprus, Malta, Estonia, and Greece. Among the EU countries, Hungary, Belgium, Czechia, Croatia, and Germany have the highest degree of integration with the global marketplace, while Serbia ranks thirteenth in the entire sample. The average GLIIT for Serbia for the analyzed period is approximately 59%, indicating that the Serbian market is generally well-integrated with the international market for sugars.

The presented findings are in accordance with prior studies in the literature, which show the dominance of Germany and France in the production and trade of sugar (Figure 3), based on the analysis of net exports (Figure 3a), revealed comparative advantage (RCA) (Figure 3b), and the Grubel–Lloyd Intra-Industry Trade Index (GLIIT) (Figure 3c) for the period 2015–2023 [6]. Some projections from earlier research indicate that, between 2023 and 2032, there will be a 4.5% drop in supply and an 11.5% increase in prices [3].

Table 5. GLIIT of sugars for the period 2015–2023.

Country	2015	2016	2017	2018	2019	2020	2021	2022	2023
Austria	86.29	85.15	91.41	88.27	86.34	76.56	78.51	96.51	82.17
Belgium	99.99	87.58	85.88	98.97	99.35	98.76	87.99	83.38	81.47
Bulgaria	74.32	72.89	80.09	89.40	82.16	81.12	95.98	95.45	87.54
Croatia	99.37	77.35	96.42	63.20	91.47	92.60	98.97	86.33	81.09
Cyprus	0.25	1.21	0.25	1.34	4.14	4.45	0.74	2.61	0.47
Czechia	97.38	86.83	88.10	86.33	91.91	94.93	88.53	86.72	83.82
Denmark	97.59	87.68	85.81	91.26	94.75	81.78	76.57	84.10	82.12
Estonia	40.50	14.68	4.18	9.04	6.69	5.94	7.25	8.19	4.99
Finland	41.76	46.14	33.14	27.19	15.53	14.67	15.52	11.69	40.52
France	55.97	60.52	53.39	51.27	61.41	61.93	51.55	46.72	49.00
Germany	94.02	95.11	86.48	82.85	87.11	88.06	77.30	79.68	95.55
Greece	10.93	19.37	28.69	18.72	13.21	9.46	11.79	7.03	5.33
Hungary	93.44	96.70	84.55	83.81	91.15	92.65	92.34	91.91	97.36
Ireland	40.76	55.54	20.74	20.99	22.70	20.86	25.40	17.67	14.15
Italy	36.72	34.34	34.45	36.99	34.63	32.80	34.88	38.59	30.60
Latvia	35.27	30.45	21.96	17.80	23.71	24.80	21.73	23.89	20.22
Lithuania	51.76	53.36	44.69	50.91	41.63	38.28	37.63	47.07	44.85
Luxembourg	20.41	20.60	21.26	21.40	21.35	15.26	19.81	23.91	17.18
Malta	0.02	0.14	0.48	0.05	3.49	0.01	0.08	0.00	0.04
Netherlands	97.91	92.39	84.11	81.68	85.38	79.84	73.79	85.59	77.87
Poland	84.38	90.63	66.74	66.79	82.43	79.59	74.90	85.44	72.32
Portugal	65.30	75.60	67.97	86.31	70.95	71.39	84.58	76.72	91.67
Romania	31.06	33.51	27.04	25.77	16.88	23.42	14.15	25.18	47.74
Serbia	39.61	30.74	42.97	77.86	65.12	72.87	43.29	63.14	97.40
Slovakia	47.33	58.49	52.22	62.49	62.70	62.13	56.80	58.85	70.58
Slovenia	53.84	62.14	36.36	47.15	57.15	74.26	54.48	52.51	68.37
Spain	34.84	45.83	29.98	32.00	23.54	25.22	26.19	23.18	20.19
Sweden	80.55	99.97	87.75	76.80	67.00	77.68	73.49	67.84	57.80

Source. The authors' calculation based on UN Comtrade [50].

In the context of Serbia's accession to the EU, gradual alignment with the CAP and the EU sugar market regime may have significant implications. Numerous previous studies have shown that market liberalization with the EU and CEFTA countries has had statistically significant and positive effects on agri-food exports, including the existence of comparative advantages in the sugar sector [33,63]. Accession to the EU implies the abolition of bilateral tariff quotas, which would theoretically allow for higher export volumes, while compliance with competition rules and adaptation to EU production and quality standards could increase pressure on domestic producers. Research shows that Sanitary and Phytosanitary Measures (SPS) and Technical Barriers to Trade (TBT) have a negative impact on agricultural trade, with this effect being more pronounced in the case of countries exporting to the EU market, where these regulations become one of the main non-tariff restrictive factors [64]. Therefore, future competitiveness dynamics will depend not only on prices and yields, but also on the degree of regulatory convergence with the European Union sugar market.

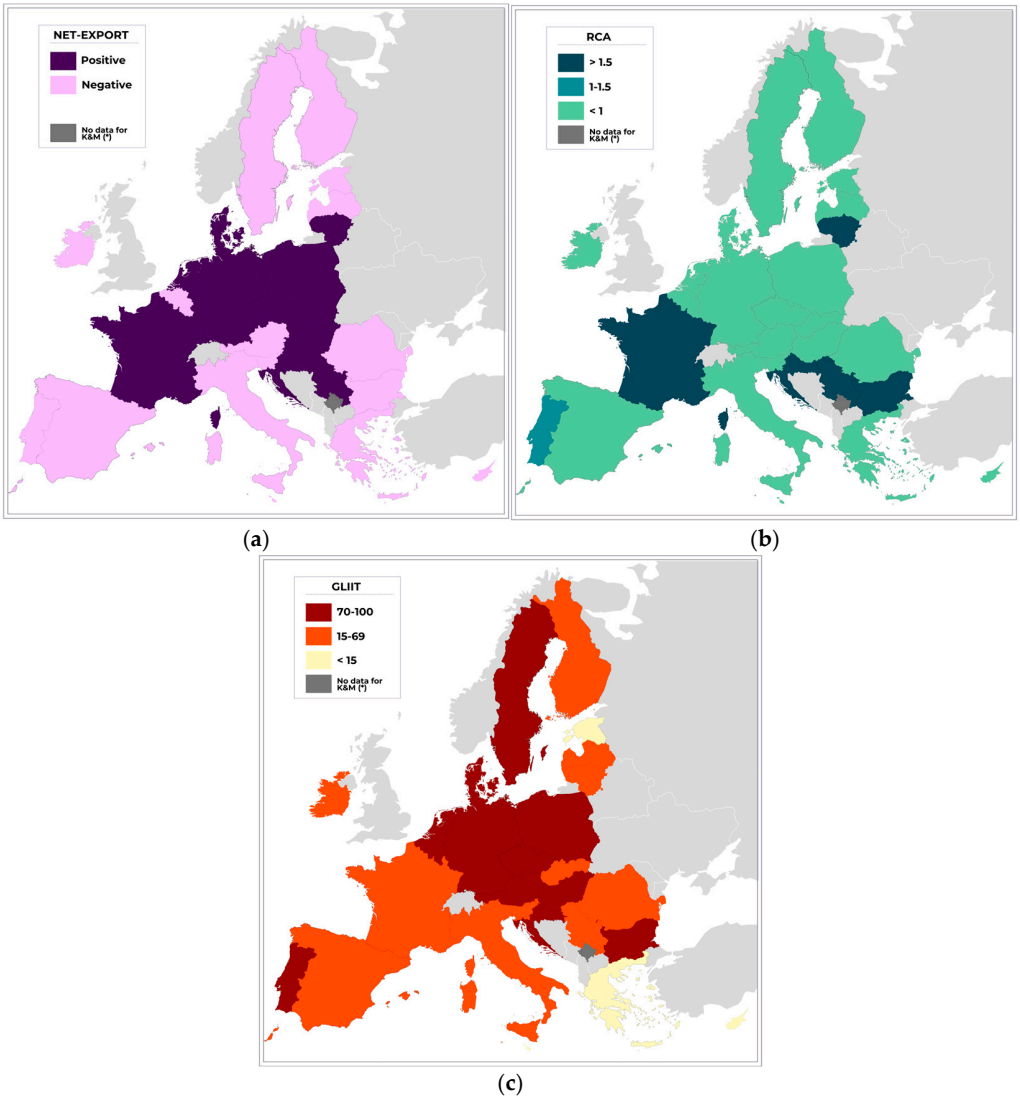

Figure 3. Visualization of main performances of sugars (average for the period 2015–2023) based on: (**a**) net exports; (**b**) revealed comparative advantage (RCA); (**c**) the Grubel–Lloyd Intra-Industry Trade Index (GLIIT). * Kosovo and Metohija. Source: The authors' calculation based on UN Comtrade [50].

4.2. Industrial Processing and Refining Performances of Sugars

In economic theory and regulatory practice, a rising HHI is generally associated with an elevated probability of market power exertion, which, in turn, may lead to reduced competitive pressures and higher prices for consumers. Table 6 presents the Herfindahl–Hirschman Index results for both analyzed regions across all four specified criteria.

In Figure 4, trends in the Herfindahl–Hirschman Index (HHI) over time for both locations (Figure 4a for Serbia and Figure 4b for EU) across four criteria are compared, providing a clearer understanding of market concentration dynamics in Serbia and the EU. The analysis reveals significant structural differences: Serbia has a considerably higher HHI, indicating a more concentrated market with fewer dominant firms. Among the four criteria, Serbia's HHI based on net profit shows the highest concentration, reaching 0.99 in 2019. In contrast, the EU demonstrates greater stability, with the highest HHI value measured by equity at 0.3801 in 2022, indicating a more competitive market. Overall, both markets exhibit a rising trend in HHI values, signaling increased market concentration and declining competitiveness.

Table 6. HHI results for the sugar industry in Serbia and the EU.

Herfindahl–Hirschman Index	Operating Revenue		Net Income		Equity		Number of Employees	
Year	**Serbia**	**EU**	**Serbia**	**EU**	**Serbia**	**EU**	**Serbia**	**EU**
2015	0.4515	0.0821	0.9458	0.1106	0.3232	0.1097	0.3593	0.0770
2016	0.5089	0.0933	0.5223	0.1139	0.3818	0.1145	0.4304	0.0659
2017	0.4378	0.0942	0.7110	0.0694	0.3824	0.0623	0.4226	0.0649
2018	0.5185	0.0725	0.9823	0.1833	0.2948	0.0973	0.4115	0.0538
2019	0.5173	0.0735	0.9936	0.1385	0.2941	0.0999	0.4237	0.0630
2020	0.5604	0.0852	0.8315	0.0941	0.2939	0.1057	0.4573	0.0635
2021	0.5102	0.1079	0.6904	0.0849	0.2927	0.1143	0.4094	0.0769
2022	0.5234	0.0881	0.9891	0.0693	0.3805	0.3801	0.4093	0.0817
2023	0.5316	0.1147	0.6125	0.0927	0.3923	0.0895	0.4222	0.1187

Source: The authors' calculation.

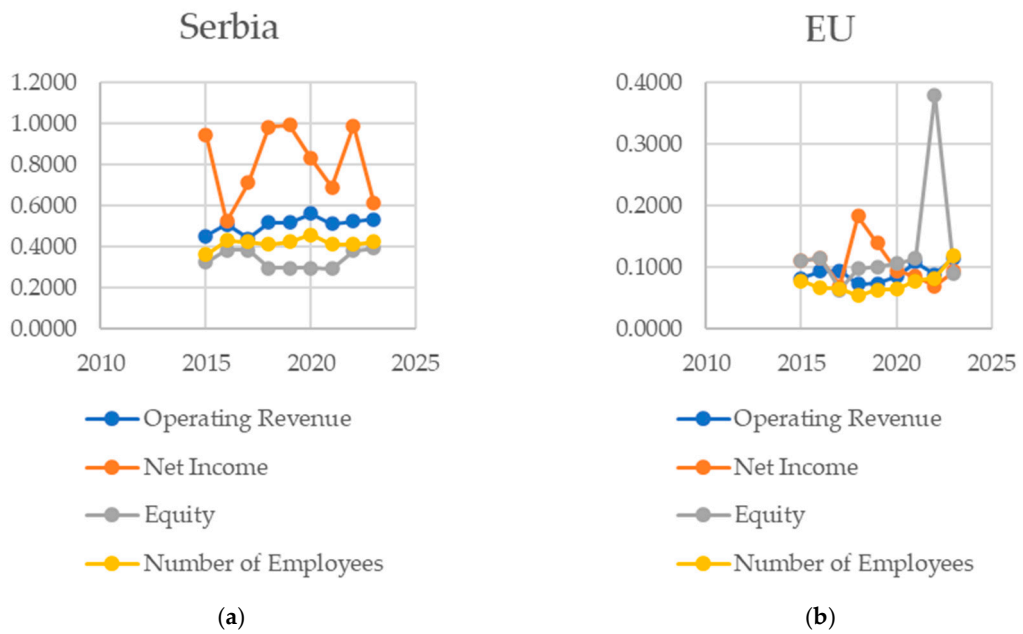

Figure 4. Herfindahl–Hirschman Index trends in the sugar industry: (**a**) Serbia; (**b**) EU. Source: The authors' calculation.

Following the computation of market concentration indexes, the effect of concentration on profitability was examined. The Hausman test has been used to determine the optimal model specification (Table 7). The *p*-value of 0.0000 for EU model indicated the fixed-effects model is preferred over the random-effects model because the assumption that the random-effects model produces unbiased estimates is violated. a preference for a fixed-effects model. However, *p*-value of 0.2537 for Serbian model indicated a preference for a random-effects model.

Table 7. Panel data analysis presumption tests.

Model	EU		Serbia	
Test	***p*-Value**	**Conclusion**	***p*-Value**	**Conclusion**
Hausman test	0.0000	The fixed-effects model is adequate	0.2537	The random-effects model is adequate
Wooldridge test	0.7629	No autocorrelation	0.2730	No autocorrelation
Breusch–Pagan/Cook–Weisberg test	0.0000	Heteroskedasticity	0.3245	No heteroskedasticity

Source: The authors' calculation.

Subsequently, fundamental assumptions for panel data analysis were assessed. Variance inflation factors and tolerance (Table 8) indicated no significant multicollinearity. The Wooldridge test confirmed no autocorrelation in both models. The Breusch–Pagan/Cook–Weisberg test detected heteroskedasticity at a 1% significance level in the EU model, requiring adjustment with robust standard errors, while no such issue was found in the Serbian model.

Table 8. Multicollinearity test results.

Region	**EU**		**Serbia**	
Variable	**VIF**	**TOL**	**VIF**	**TOL**
LIQ	1.09	0.921554	1.68	0.597010
FL	1.01	0.985641	2.39	0.419071
DEBT	1.06	0.943505	1.54	0.649608
SIZE	1.13	0.887683	2.64	0.378762
TOTAL AT	1.12	0.892238	4.40	0.227405
SQ	1.02	0.979552	1.65	0.607380
HHI OR	4.11	0.243237	1.99	0.502110
HHI NI	2.42	0.413501	1.74	0.575467
HHI EQ	1.53	0.651827	1.76	0.568037
HHI NoE	2.60	0.384039	2.12	0.472271

Source: The authors' calculation.

Table 9, the analysis of the HHI impact on profitability in the EU and Serbia reveals a positive and statistically significant impact. In the EU, higher market concentration measured by equity (coefficient = 12.983, *p*-value = 0.004) and number of employees (coefficient = 90.586, *p*-value = 0.011) both enhance profitability. In Serbia, market concentration based on the number of employees (coefficient = 193.694, *p*-value = 0.016) also strongly correlates with increased profitability, implying that firms operating in more concentrated labor markets achieve significantly higher profitability.

Table 9. Panel data analysis results.

Region	**EU**		**Serbia**	
ROA	**Coefficient**	***p* Value**	**Coefficient**	***p* Value**
LIQ	0.394	0.000	5.683	0.000
FL	0.001	0.000	−0.090	0.007
DEBT	2.024	0.167	29.628	0.000
SIZE	1.078	0.000	2.199	0.002
TOTAL AT	9.510	0.000	19.446	0.001
SQ	0.229	0.039	10.508	0.018
HHI OR	25.396	0.591	−12.661	0.790
HHI NI	−24.146	0.069	−15.973	0.081
HHI EQ	12.983	0.004	−17.273	0.604
HHI NoE	90.586	0.011	193.694	0.016
Constant	−24.333	0.000	−105.726	0.001

Source: The authors' calculation.

These findings highlight the relationship between market concentration and profitability, raising important questions about the underlying mechanisms driving this effect. The observed impact in both the EU and Serbia aligns with established economic theories. The market power hypothesis suggests that firms in concentrated markets face fewer competitors, allowing them to use greater pricing power and sustain higher profit margins. However, excessive concentration may have adverse long-term implications. Reduced competitive pressure may diminish innovation incentives, while monopolistic practices could lead to consumer welfare losses and regulatory scrutiny. Firms may prioritize market

dominance over productive investments, potentially stifling industry dynamism. Beyond its implications for competition and innovation, market concentration also has broader macroeconomic effects. In highly concentrated markets, firms with significant pricing power can amplify inflationary pressures by raising profit margins in response to demand shocks, further exacerbating economic instability [65]. Moreover, the concentration of market power enables companies to limit inflation in wages while enhancing their profit margins, so continuing these systemic changes in the market [66]. Generally, none of contemporary agri-food market fulfills the criteria for competitive marketplaces [67]. In practice, agricultural markets often exhibit varying degrees of market concentration, where dominant firms follow the patterns previously described.

5. Conclusions

The analysis of sugar and sugar beet production and trade in the EU highlights the dominance of France and Germany, which together account for more than half of total production. Serbia stands out as a notable producer in the region, achieving production levels comparable to Denmark and Sweden, as well as substantial export values. However, its trade balance has shown fluctuations over the years. The analysis of revealed comparative advantages indicates that Serbia holds a strong position in the international market, although a decline in this indicator has been observed in recent years. Additionally, the EU sugar market is highly integrated with the global market, with Serbia maintaining a solid position within this framework.

The analysis of the HHI trends in the EU and Serbian sugar industries reveals significant structural differences in market concentration. Serbia exhibits a substantially higher HHI, indicating a more concentrated market dominated by fewer companies. In contrast, the EU demonstrates a more balanced and competitive market structure. The observed trend of rising HHI values in both regions suggests an overall increase in market concentration and a corresponding decline in competitiveness. Further econometric analysis highlights a strong and statistically significant link among market concentration and firm financial position in both the EU and Serbia, supporting the market power hypothesis and economies of scale as key drivers of profitability.

Regarding limitations, this study is based on available trade and financial data, which may not fully reflect informal market dynamics or short-term fluctuations. While the analysis of market concentration and profitability is methodologically robust, it does not encompass all external factors influencing financial performance, such as policy changes, global trade disruptions, or shifts in consumer behavior. Also, further limitation of this analysis lies in the comparison between Serbia, treated as a single national market, and the European Union, analyzed as an integrated market entity. Although the European Union operates as aggregated market mechanisms, including production quotas (until 2017), import tariffs, and internal price supports, it may not fully capture structural differences and concentration disparities that exist among individual EU member states. Furthermore, a significant limitation of this research is the exclusion of the effects of the Russia-Ukraine war and the COVID-19 pandemic.

Based on these findings, several policy and strategic recommendations could be made. First, future research should investigate the long-term impact of EU sugar market liberalization on smaller producers and exporters, examine the effectiveness of government subsidies and policy incentives, and analyze the potential effects of emerging global shocks on trade and competitiveness. Second, policymakers in Serbia should prioritize strengthening competition policy and encouraging entry opportunities for smaller producers to mitigate excessive market concentration. Furthermore, greater alignment of Serbia's market regulations with EU standards would facilitate smoother integration into the single market

structure. Finally, monitoring market concentration trends and profitability determinants on a continuous basis is essential for ensuring a balanced and resilient sugar industry. Future studies should also incorporate a wider range of supply chain participants to provide a more extensive assessment of industry resilience and challenges.

Author Contributions: Conceptualization, B.M. and T.T.I.; methodology, B.M., T.T.I. and D.Đ.; software, B.M. and T.T.I.; validation, B.M., T.T.I. and D.Đ.; formal analysis, Ž.J.; investigation, S.Z.; resources, Ž.J.; data curation, S.Z.; writing—original draft preparation, B.M. and T.T.I.; writing—review and editing, D.Đ. and Ž.J.; visualization, Ž.J.; supervision, D.Đ. and S.Z.; project administration, B.M.; funding acquisition, B.M. All authors have read and agreed to the published version of the manuscript.

Funding: This research was supported by the Science Fund of the Republic of Serbia, 10911, *Potentials for improving the competitiveness of the agri-food sector in the function of sustainable economic development*—POT4food.

Institutional Review Board Statement: Not applicable.

Data Availability Statement: The original contributions presented in this study are included in the article. Further inquiries can be directed to the corresponding author.

Conflicts of Interest: The authors declare no conflicts of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

Abbreviations

The following abbreviations are used in this manuscript:

DEBT	Debt ratio
EQ	Equity
EU	European Union
FL	Financial leverage
GLIIT	Grubel–Lloyd Intra-Industry Trade
HHI	Herfindahl–Hirschman Index
LIQ	Liquidity
NI	Net income
NoE	Number of employees
OR	Operating revenue
RCA	revealed comparative advantage
ROA	Return on Assets
SG	Sales growth
SIZE	Company size
Total AT	Total assets turnover
WTO	World Trade Organization

References

1. Vladu, M.; Tudor, V.C.; Mărcuță, L.; Mihai, D.; Tudor, A.D. Study on the Production and Valorization of Sugar Beet in the European Union. *Rom. Agric. Res.* **2021**, *38*, 447–455. [CrossRef]
2. Wal, P.; Pal, R.S.; Wal, A. A Review on the Sugas Alternatives. *Int. J. Pharm. Sci. Res.* **2019**, *10*, 1595–1604.
3. Maitah, M.; Procházka, P.; Rojík, S.; Činčalová, S.; Malec, K.; Smutka, L.; Gebeltová, Z.; Koželský, R.; Maitah, K.; Tomšík, K. Future Development of Sugar Market in the European Union in the Period 2023–2032. *Sugar Tech* **2024**, *26*, 295–304. [CrossRef]
4. Xie, Y.; Chen, R.-K.; Chen, N.; Que, Y. Operational Efficiency and Influencing Factors in Sugar Industry: From the Perspective of Chinese Sugar Companies Listed on the Stock Market. *Sugar Tech* **2024**, *26*, 489–501. [CrossRef]
5. Nes, K.; Colen, L.; Ciaian, P. Market structure, power, and the unfair trading practices directive in the EU food sector: A review of indicators. *Agric. Resour. Econom. Rev.* **2024**, *53*, 454–477. [CrossRef]
6. Maitah, M.; Řezbová, H.; Smutka, L.; Tomšík, K. European Sugar Production and its Control in the World Market. *Sugar Tech* **2016**, *18*, 236–241. [CrossRef]

7. FAOSTAT. Food and Agriculture Data. Available online: https://www.fao.org/faostat/en/ (accessed on 8 September 2025).
8. Sugar—European Commission. Available online: https://agriculture.ec.europa.eu/farming/crop-productions-and-plant-based-products/sugar_en (accessed on 8 October 2025).
9. Mora Villalobos, C.A.; Rendón Acevedo, J.A. Analysis of the Concentration and Specialization of the Sugarcane Production (*Saccharum officinarum* L.) in Colombian Municipalities between 2007 and 2021. *Res. World Agric. Econ.* **2024**, *5*, 126–142. [CrossRef]
10. United States Department of Agriculture Foreign Agricultural Service. Sugar: World Markets and Trade. 2025; pp. 1–9. Available online: https://apps.fas.usda.gov/psdonline/circulars/sugar.pdf (accessed on 1 October 2025).
11. OECD; Food and Agriculture Organization of the United Nations. *OECD-FAO Agricultural Outlook 2024-2033*; OECD-FAO Agricultural Outlook; OECD: Paris, France, 2024; ISBN 978-92-64-72259-0.
12. Dekkiche, D.; Leila, O.B. Effect of trade openness on economic growth within BRICS countries: An ARDL panel approach. *Anal. Ekon. Fak. u Subotici* **2024**, *60*, 105–121. [CrossRef]
13. Muir, B.M.; Anderson, A.R. Development and Diversification of Sugar Beet in Europe. *Sugar Tech* **2022**, *24*, 992–1009. [CrossRef]
14. Guimarães Nobre, G.; Hunink, J.E.; Baruth, B.; Aerts, J.C.J.H.; Ward, P.J. Translating large-scale climate variability into crop production forecast in Europe. *Sci. Rep.* **2019**, *9*, 1277. [CrossRef] [PubMed]
15. Areté; Directorate-General for Agriculture and Rural Development (European Commission); IHS Markit; Gentile, E.; Loi, A.; Gentile, M.; Bruni, M.; Berisio, S.; Roda, F.; Piccoli, G.; et al. *Study on the Adaptation Strategies of the Sugar Supply Chain After the End of the Sugar Quotas: Final Report*; Publications Office of the European Union: Luxembourg, 2022; ISBN 978-92-76-41508-4.
16. OECD. *Sugar Policy Reform in the European Union and in World Sugar Markets*; OECD: Paris, France, 2007; ISBN 978-92-64-04020-5.
17. Řezbová, H.; Maitah, M.; Sergienko, O.I. EU Quota Sugar Market Concentration—The Main Drivers of EU Sugar Market. *Agris On-line Pap. Econ. Inform.* **2015**, *7*, 131–142. [CrossRef]
18. Haß, M. Liberalising the EU sugar market: What are the effects on third countries? *Aust. J. Agric. Resour. Econ.* **2022**, *66*, 638–667. [CrossRef]
19. Hornowski, A.; Pawlak, K.; Smutka, L.; Kotyza, P. Concentration in the Czech and Polish sugar markets. *Sugar Ind.* **2020**, *145*, 224–233. [CrossRef]
20. Sugar-Sweetened Beverage Taxes in the WHO European Region: Success Through Lessons Learned and Challenges Faced. Available online: https://iris.who.int/items/db76af79-3d6c-4b12-934d-ae24dd10fec1 (accessed on 8 October 2025).
21. Deconinck, K. *Concentration and Market Power in the Food Chain*; OECD Food, Agriculture and Fisheries Papers; OECD Publishing: Paris, Frace, 2021; Volume 151.
22. Official Journal of the European Union. Directive—2019/633—EN—EUR-Lex. Available online: https://eur-lex.europa.eu/eli/dir/2019/633/oj/eng (accessed on 5 October 2025).
23. Statistical Office of the Republic of Serbia. Available online: https://www.stat.gov.rs/ (accessed on 18 September 2025).
24. Brankov, T.; Matkovski, B.; Jeremić, M.; Đurić, I. Food Self-Sufficiency of the SEE Countries; Is the Region Prepared for a Future Crisis? *Sustainability* **2021**, *13*, 8747. [CrossRef]
25. Brankov, T.; Matkovski, B. Is a Food Shortage Coming to the Western Balkans? *Foods* **2022**, *11*, 3672. [CrossRef]
26. Službeni Glasnik Republike Srbije. Uredba o Finansijskoj Podršci Poljoprivrednim Proizvođačima Šećerne Repe Roda 2023. 123/2022 i 18/2024. Available online: https://pravno-informacioni-sistem.rs/eli/rep/sgrs/vlada/uredba/2022/123/2/reg (accessed on 11 October 2025).
27. European Commission Income Support—Agriculture and Rural Development—European Commission. Available online: https://agriculture.ec.europa.eu/common-agricultural-policy/income-support_en (accessed on 11 November 2025).
28. 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]
29. Galović, T.; Bezić, H. The competitiveness of the EU sugar industry. *Zb. Rad. Ekon. Fak. u Rijeci* **2019**, *37*, 173–189. [CrossRef]
30. Kracuik, J. Intra-Industry Trade in Agri-Food Products Between Poland and European Union Countries. *Roczniki* **2023**, *4*, 243–254. [CrossRef]
31. Gavrilescu, C. A View of Structural Evolutions of the Romanian Agri-Food Trade and its Competitiveness in the Last Two Decades. *Agric. Econ. Rural. Dev.* **2022**, *19*, 165–181.
32. Božić, D.; Munćan, P.; Bogdanov, N. Economic Characteristics of Sugar Sector in Serbia. *Res. J. Agric. Sci.* **2010**, *43*, 445–452.
33. Matkovski, B.; Lovre, K.; Zekic, S. The foreign trade liberalization and export of agri-food products of Serbia. *Agric. Econ.* **2017**, *63*, 331–345. [CrossRef]
34. Marković, M.; Krstić, B.; Rađenović, Ž. Export competitiveness of the Serbian agri-food sector on the EU market. *Ekon. Poljopr.* **2019**, *66*, 941–953. [CrossRef]
35. Matkovski, B.; Zekić, S.; Jurjević, Ž.; Đokić, D. The agribusiness sector as a regional export opportunity: Evidence for the Vojvodina region. *Int. J. Emerg. Mark.* **2022**, *17*, 2468–2489. [CrossRef]
36. Davis, L.; Orhangazi, Ö. Competition and monopoly in the U.S. economy: What do the industrial concentration data show? *Compet. Change* **2021**, *25*, 3–30. [CrossRef]

37. Bain, J.S. Relation of Profit Rate to Industry Concentration: American Manufacturing, 1936-1940. *Q. J. Econ.* **1951**, *65*, 293. [CrossRef]
38. Kastratović, R.; Lončar, D.; Milošević, S. Market concentration and profitability: The empirical evidence from Serbian manufacturing industry. *Zb. Rad. Ekon. Fak. u Rijeci* **2019**, *37*, 213–233. [CrossRef]
39. Keil, J. Explaining the Concentration-Profitability Paradox. *Rev. Political Econ.* **2017**, *29*, 209–231. [CrossRef]
40. Vukovic, B.; Mijic, K.; Spahic, N. Concentration of tobacco market: Evidence from Serbia. *Ekon. Polj.* **2015**, *62*, 385–398. [CrossRef]
41. Koppenberg, M.; Hirsch, S. Output market power and firm characteristics in dairy processing: Evidence from three EU countries. *J. Agric. Econ.* **2022**, *73*, 490–517. [CrossRef]
42. Hui, A.; Manqi, Z. Agribusiness performance and supply chain concentration. *Custos E Agronegócio Online* **2023**, *19*, 337–351.
43. Čechura, L.; Samoggia, A.; Jamali Jaghdani, T. Concentration, market imperfections, and interbranch organization in the Italian processed tomato supply chain. *Agric. Econ.* **2024**, *55*, 603–620. [CrossRef]
44. Matkovski, B.; Đokić, D.; Zekić, S.; Jurjević, Ž. Determining Food Security in Crisis Conditions: A Comparative Analysis of the Western Balkans and the EU. *Sustainability* **2020**, *12*, 9924. [CrossRef]
45. Balassa, B. Trade Liberalisation and "Revealed" Comparative Advantage. *Manch. Sch.* **1965**, *33*, 99–123. [CrossRef]
46. Grubel, H.G.; Lloyd, P.J. *Intra-Industry Trade The Theory and Measurement of International Trade in Differentiated Products*; Wiley: London, UK, 1975.
47. Egger, H.; Greenaway, D.; Egger, P. Intra-Industry Trade with Multinational Firms: Theory, Measurement and Determinants. 2004, pp. 1–59. Available online: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=715967 (accessed on 5 October 2025). [CrossRef]
48. Fontagné, L.; Freudenberg, M. Intra-Industry Trade: Methodological Issues Reconsidered. *CEPII* **1997**, *01*, 1–52.
49. Dominguez, N.P. Vertical and Horizontal Patterns of Intra-Industry Trade between Mexico and China. *Int. J. Bus. Mark. Manag. (IJBMM)* **2018**, *3*, 59–62.
50. UN Comtrade. Available online: https://comtradeplus.un.org/ (accessed on 8 October 2025).
51. TP Catalyst. Available online: https://login.bvdinfo.com/R1/TPCatalyst (accessed on 8 October 2025).
52. Eurostat. *NACE Rev. 2: Statistical Classification of Economic Activities in the European Community*; European Commission, Ed.; Publications Office: Luxembourg, 2008; ISBN 978-92-79-04741-1.
53. Dakić, S.; Nuševa, D.; Peštović, K.; Ilić, T.; Tica, N.; Jakšić, D. Panel Analysis of Relationship Between Sales and Profitability of Crop Production Companies in the Republic of Serbia. *Contemp. Agric.* **2024**, *73*, 250–258. [CrossRef]
54. Tica, T.; Matkovski, B.; Đokić, D.; Jurjević, Ž. Characteristics of the Supply Chain of Tobacco and Tobacco Products: Evidence from Serbia. *Agriculture* **2023**, *13*, 1711. [CrossRef]
55. OECD. *The Use of Structural Presumptions in Antitrust*; OECD Roundtables on Competition Policy Papers; OECD: Paris, France, 2024; Volume 317. [CrossRef]
56. Pjanić, M.; Vuković, B.; Mijić, K. Analysis of the market concentration of agricultural enterprises in AP Vojvodina. *Strateg. Manag.* **2018**, *23*, 40–45. [CrossRef]
57. Keil, J. Is there a causal effect of concentration on persistent profitability differentials? *Ind. Corp. Change* **2019**, *28*, 241–257. [CrossRef]
58. Pervan, M.; Pervan, I.; Ćurak, M. Determinants of firm profitability in the Croatian manufacturing industry: Evidence from dynamic panel analysis. *Econ. Res.-Ekon. Istraživanja* **2019**, *32*, 968–981. [CrossRef]
59. Novaković, D.; Milić, D.; Zekić, V.; Vukelić, N.; Novaković, T.; Jocić, B.; Erak, D. Determinants of Profitability of Grain Production Enterprises from Ap Vojvodina. *Contemp. Agric.* **2024**, *73*, 222–227. [CrossRef]
60. Vuković, B.; Milutinović, S.; Mijić, K.; Krsmanović, B.; Jakšić, D. Analysis of financial performance determinants: Evidence from the european agricultural companies. *Custos e Agronegócio Line* **2023**, *18*, 285–306.
61. Tekić, D.; Mutavdžić, B.; Milić, D.; Matkovski, B.; Đokić, D.; Novaković, T. Profitability determinants of small agricultural and food companies in the Republic of Serbia. *Custos e Agronegócio Line* **2022**, *18*, 124–145.
62. Official Journal of the European Union. *Commission Implementing Regulation (EU) 2020/761 of 17 December 2019 Laying Down Rules for the Application of Regulations (EU) No 1306/2013, (EU) No 1308/2013 and (EU) No 510/2014 of the European Parliament and of the Council as Regards the Management System of Tariff Quotas with Licences*; The European Commission: Brussels, Belgium, 2019; Volume 185, pp. 1–43.
63. Matkovski, B.; Đokić, D.; Jović, L.V. How CEFTA influenced the competitiveness of agri-food trade in the Western Balkans. *Econ. Ann.* **2022**, *67*, 37–66. [CrossRef]
64. Disdier, A.-C.; Fontagne, L.; Mimouni, M. The Impact of Regulations on Agricultural Trade: Evidence from SPS and TBT Agreements. 2007. Available online: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1194969 (accessed on 9 September 2025). [CrossRef]
65. Menezes, F.M.; Quiggin, J. Market power amplifies the price effects of demand shocks. *Econ. Lett.* **2022**, *221*, 110908. [CrossRef]

66. Cairó, I.; Sim, J. Market power, inequality, and financial instability. *J. Econ. Dyn. Control* **2024**, *164*, 104875. [CrossRef]
67. Fu, R.; Li, C.; Wang, L. Market Power in the Irish Beef Processing Industry. *Sustainability* **2021**, *13*, 6453. [CrossRef]