The Case of International Competitiveness of Polish Fruit and Their Preserves

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Article

The Case of International Competitiveness of Polish Fruit and Their Preserves

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Abstract: The primary purpose of the paper was to evaluate the international competitiveness of Polish fruits and their processed products in comparison to major global exporters. A comparative analysis allows for identifying key competitive advantages and weaknesses. Quantitative data analysis was employed to measure international competitiveness using key indicators such as Market Share (MS), Trade Balance, Competitiveness Ratio (CR), Import Penetration (IP), Intra-Industry Trade (IIT), and Terms of Trade (ToT). These metrics were calculated based on data obtained from Comtrade, with results presented in a time-series format to capture long-term trends. An extensive literature review was conducted to examine various definitions and frameworks of international competitiveness. The study revisits conventional competitiveness indicators to address their limitations in reflecting contemporary global market dynamics. The reinterpretation acknowledges the challenges posed by increased capital mobility and evolving trade patterns, thereby enhancing the accuracy of competitiveness assessments. The study takes into account the need to reinterpret commonly used indicators in the literature due to their decreasing relevance in the context of global market dynamics, characterized by increasing trade and capital flows. The decline in the level of indicators that include imports in their formulas (IP and CR) may lead to an increase in the level of indicators that take exports into account (foreign trade balance, share in global exports). For example, a strong increase in the import of concentrated apple juice results in an increase in the export of this product and an improvement in the competitive position on the global market. The new insights from these indicators can assist policymakers in developing targeted strategies to enhance the competitiveness of the agricultural sector, such as improving production methods, negotiating better trade agreements, or investing in innovation and quality improvement.

Keywords: fruits and their products; measures of international competitiveness; Poland

1. Introduction

The possibility of effectively placing a country's products on foreign markets is nowadays associated with the necessity of competing with offerings from other countries that may possess numerous competitive advantages. In this situation, it seems essential to have tools that enable ad hoc analysis and assessment of existing competitive advantages in relation to other suppliers.

This paper analyzes the fruit and fruit processing sector in Poland. This sector is of significant importance both in terms of turnover value and the share of production in exports, compared to other branches of the agri-food sector in Poland. According to data from IERiGŻ PIB [1], in 2023, revenues from the export of fruits and their processed products exceeded EUR 2.7 billion, while the share of fruit and processed fruit exports in production exceeded 70%. Poland is also one of the greatest frozen fruit and concentrated fruit juices exporter in the world [2]. Therefore, it is necessary to precisely determine Poland's position in comparison with other participants in the global market in terms of the potential to place its products with external recipients.

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For this purpose, various developed and time-tested tools and indicators are typically used to assess a country's competitiveness in the international market for selected products or product groups.

However, the concept of competitiveness is associated with several important methodological issues that need to be clarified due to the topics addressed. Due to the broad and ambiguous nature of the concept of competitiveness, there is still no definitive answer to what it means to be competitive at different levels of the economy—whether at the country level (macro), sector level (meso), or business entity level (micro). This lack of conceptual clarity has resulted in the existence of over 400 definitions of competitiveness in the literature [3–5].

The largest number of definitions pertains to macro-level competitiveness. Regardless of their semantic nuances, these definitions generally conclude that competitive countries are those capable of creating conditions conducive to sustained economic growth and improving citizens' income levels (economic growth theory) or those that can increase their real GDP and produce goods and services that can withstand international competition [2,6–10].

There is also an extensive set of definitions related to micro-level competitiveness, particularly in the context of business entities, specifically manufacturing firms. At the micro level, competitiveness is most often defined as a firm's ability to increase its market share and generate profits [11–13]. Some definitions also highlight factors influencing competitiveness. Certain authors [14–16] describe firm competitiveness in terms of high efficiency, productivity, operational effectiveness, flexibility, entrepreneurship, and innovation.

The smallest number of definitions pertains to meso-level competitiveness, which refers to the competitiveness of economic sectors (industries). The importance of studying competitiveness factors at the industry level (meso level) was emphasized by Porter [17] in his concept of the competitive advantage diamond and the five forces model of competition. These forces include the threat of new market entrants, the threat of substitute products, the bargaining power of buyers, their level of organization, the bargaining power of suppliers, marketing activities, access to distribution channels, and competition among entities within specific economic sectors.

Porter's considerations [18] align with the trade-oriented approach to competitiveness research, which largely focuses on the position of sectors and their products in the international market. Similar to Porter, analysts and researchers of competitiveness generally define sectoral competitiveness as the ability to offer industry-specific products on the international market. Meso-level competitiveness is most often described as the ability to design, manufacture, and sell goods whose prices, quality, and other attributes are more attractive than those of competing foreign products [19], as well as the ability to effectively sell manufactured products in the international market while maintaining or expanding market shares [20–22].

Thus, most researchers derive definitions of sectoral competitiveness from international trade theory and apply them to products manufactured within specific economic sectors. Notably, every definition of international competitiveness at the meso level begins with the phrase "ability to"— a pattern that also applies to macro- and micro-level definitions. Consequently, competitiveness research must consider the sources of competitive advantages or disadvantages in relation to a given industry and its products. Every successful business relies on staying competitive in a constantly changing market economy. Today, numerous methods exist to assess competitiveness, enabling companies to evaluate their ability to survive in a challenging business environment and discover strategies to improve and lead the competition. According to economic theory, profit maximization is the primary goal of a business, as it strengthens a company's resilience against competitive pressures [23–27].

The analysis covers the years 2011–2023, a period that includes significant economic events such as the recovery from the global financial crisis (2008–2009), the COVID-19 pandemic, and the effects of geopolitical conflicts that may have influenced competitiveness. The selection of a 12-year period allows for an examination of the durability of changes and competitive strategies, as well as an assessment of their long-term effects. The primary data source for the study is Comtrade.

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Our study fills the literature gap by identifying and pointing out some limitations of competitiveness measures regarding the fruit and fruit preserves market.

Interpretation of Selected International Competitiveness Indicators

Interpreting the "basic" indicators requires taking into account the reality of market entities operating in a global world characterized by increasing flows of goods and capital.

This primarily concerns imports aimed at increasing volume and, most importantly, the value of exports of products or product groups. Importing for export purposes, usually semi-processed products, can lead to a deterioration in the foreign trade balance for a given product and the CR indicator. However, it can also increase the share of the given product in global trade. The practice of importing for export, and essentially for re-export, is justified when importing products that are cheaper than those produced domestically. In the case of horticultural products in Poland, this primarily concerns concentrated juices, as well as frozen fruit and purees.

The interpretation of the level and quantitative changes of international competitiveness indicators derived from foreign trade theory should be grounded in competitiveness concepts rooted in economic growth theory. Therefore, it is necessary to take into account the size and changes in domestic market demand and the profitability of export-oriented production compared to domestic market placement. This mainly applies to the indicator of export share in domestic production and, consequently, other indicators illustrating foreign trade relations and differences in the growth dynamics of exports in various countries, groups, and globally. A declining share of exports in domestic production does not necessarily indicate a decrease in the competitive capacity of the sector and its products if placing products on the domestic market is more profitable.

Regarding semi-processed products, a decrease in the share of exports in production should even be positively assessed if there is an increase in the production of higher value-added goods placed on the domestic market or exported. It is evident that the assessment of international competitiveness must be conducted with reference to "homogeneous" products with similar quality characteristics. This also applies to cost-price indicators, particularly the terms of trade indicator.

From the perspective of competitiveness assessment, an increasing level of the terms of trade indicator can be positively evaluated when the faster growth of export prices compared to import prices results from favorable export price growth, beneficial changes in export geography, or the search for cheaper import sources, as well as successes in reducing production costs. However, the assessment may be negative when a relatively high increase in export prices results from rising unit production costs, which occurs especially in countries that are gradually losing comparative advantages stemming from the relative abundance of production factors. This primarily concerns raw materials and low-processed products.

According to Abott and Breand [23], in relation to such products, the key factor determining competitive position in global exports is price and cost leadership. As previously stated, regarding price indicators, the most significant factors are the level and changes in the prices of exported products in the analyzed country and in other countries that are major global suppliers of the analyzed products.

Despite the widely accepted necessity of relating competitiveness indicators to single, relatively homogeneous products, it is also reasonable to determine their level and changes for products from individual sectors. However, this should apply to products characterized by direct competitiveness. In the horticultural sector, this could include the group of temperate-zone fruits and vegetables or processed products made from them, taking into account the phenomenon of import for export or re-export. This applies to both quantitative and cost-price indicators.

The level and changes in competitiveness measures for relatively homogeneous product groups depend not only on the cost levels of individual items but also on the entire set of competitive instruments, including changes in the material and geographical structure of foreign trade. It is also necessary to consider situations where unfavorable competitiveness indicators calculated for one

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product lead to opportunities for achieving favorable results concerning another product (or products) within the entire analyzed product group.

For example, a low level and decrease in the competitiveness of fruit intended for processing may favor improved competitiveness of the products made from them. When analyzing indicators that take into account the relationship between the export and import of fresh fruits, it is essential to consider the seasonality of production in the analyzed countries.

It is also possible to assess the international competitiveness of all products belonging to a given sector based on quantitative indicators. In industries with large-scale imports of products not produced domestically (e.g., in the horticultural sector—tropical fruits) and where import plays a significant role in export and re-export, drawing conclusions about the competitiveness of the entire sector based on the level and changes in indicators may lead to incorrect conclusions. Research and analysis results referring to all products within a given sector do not have a significant connection with the competitiveness results commonly adopted in literature assessments.

2. Materials and Methods

The international competitiveness of individual sectors of the economy in various countries is examined and assessed from a product perspective. This product-based approach to competitiveness assessment is central to international trade theory. Indicators calculated for individual products and their respective groups are commonly referred to as ex-post competitive position indicators or competitiveness indicators in the strict sense. These indicators provide valuable insights into the relative performance and market positioning of products within the global economic landscape, thereby facilitating the formulation of strategic policies and decisions aimed at improving competitiveness. The research approach applied in the study is based on the use of selected indicators for assessing international competitiveness and, taking market conditions into account, an expert evaluation of the obtained results. A broad deductive and implicative approach was employed.

The primary indicator of international competitiveness should be considered the share of products or their groups in global, regional, or country-specific exports (MS). Naturally, this concerns countries that are significant players in global exports.

$$MS_k = \frac{X_k}{X_w}$$

where:

X_k – export of country *k*;

X_w – global, regional, or other countries' exports.

A commonly used indicator in external competitiveness assessments is the Revealed Comparative Advantage (RCA) index proposed by Balassa [29]. This indicator is the ratio of two quotients. The first quotient represents the ratio of the export of a given product or product group to the total export in the analyzed country, region, or the world (essentially an MS indicator). The second quotient is the ratio of the total export of a given country to the total export in another country (excluding the given product), grouping, and/or the world.

$$RCA = \frac{X_{ik}}{X_m} : \frac{\sum_i X_{jk}}{\sum X_{jm}}$$

where:

X – export;

i, *j* – product categories;

k, *m* – countries, groupings, world.

An index value above 1 indicates that the analyzed country has a comparative advantage in the given product compared to the world, regions, or other countries. The indicator developed by Balassa, based on the export criterion, essentially reflects all the factors determining its level.

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Commonly used quantitative indicators related to foreign trade also include the trade balance of products or product groups of a given sector, the export-to-import coverage ratio (CR), and is defined by the formula:

$$CR = \frac{X_i}{II_i} * 100\%$$

where:

X – export;

II – import.

I – product categories;

The other important is the Grubel-Lloyd index of intra-industry trade (IIT). The Grubel-Lloyd index (IIT) is defined by the formula:

$$IIT_k = \frac{(X_{ik} + II_{ik}) - (X_{ik} - II_{ik})}{X_{ik} + II_{ik}}$$

where:

X – export;

II – import.

It shows the overlap between export and import streams of goods in a given sector. A high IIT index level is assumed to indicate the country's ability to meet foreign customer demand [30] and the sector's resilience to imported products.

Commonly used quantitative indicators also include the export orientation index (EO), which represents the share of exports in production, and the import penetration index (PE), which measures the share of imports in the supply of a given product or product group. Supply is defined as production plus the trade balance.

In the literature on quantitative competitiveness indicators, other measures are also used, including: Hypothetical Export Index (HE) – calculated as the product of the export volume of a given product in the base period and the growth rate of global exports of that product between the base period and the research period [31]. Constant Market Share (CMS) Index – evaluates the growth rate of exports from a given country compared to global, regional, or individual country exports. Export Supply Structure Adjustment Index – assesses the alignment of the export supply structure with the structure of import demand [32].

The most commonly used indicator of competitive position among cost-price measures is the Terms of Trade (ToT). Price-based Terms of Trade express changes in export prices relative to changes in import prices. The value of this indicator is obtained by dividing two ratios. The first ratio represents the relationship between average export and import prices in the analyzed period, while the second ratio reflects the relationship between these prices in the base period.

$$ToT = \frac{P_{ex}^t}{P_{im}^t} : \frac{P_{ex}^o}{P_m^o}$$

where:

P_{ex} – average export prices of a given product and/or their groups in the analyzed country.;

P_{im} – average import prices;

o – base period;

t – analyzed period

An increase in the level of this indicator means that the prices of export products from a given country have risen more during the compared periods than the prices of imported products. It is the ratio of domestic product prices multiplied by the exchange rate and the prices of imported goods. According to the authors, the list of competitiveness indicators can be expanded with the following indicators, which have relatively simple formulas and interpretations: Share of higher-processed products in the sector's exports (mainly in the agricultural sector): An increase in this indicator reflects the success of competitiveness tools that fall within the group of active competitiveness

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factors, largely dependent on the quality of human capital. Geographical diversification of exports: Dependence on one or two export markets for foreign sales means that they may decrease if there are changes in supply-demand relations, import structures in recipient countries, or unpredictable factors, as pointed out by Dunning [33]. An example of such a factor is Russia's invasion of Ukraine. Export price level indicator for a specific product: This is expressed as the ratio of export prices in a given currency to the export prices of other countries that are most significant in global trade of the analyzed product.

3. Results and Discussion

Analyses and assessments of the international competitiveness of agricultural sectors in individual countries are topics of interest to many researchers, and the range of analytical approaches and research methods used is highly diverse. Some authors base their studies on well-known and proven measurement methods, such as the Balassa index, Relative Trade Advantage Index, Export Market Share Index, Trade Coverage Index, Relative Export and Import Indicators, Export Specialization Index, Cross-Country Indices of Relative Competitiveness, Grubel-Loyd Index [34–42], others use more complex mathematical tools, such as: constant market share (CMS) analysis [43], multiplicative competitive interaction (MCI) model [44], competitiveness pyramid model [45], principal component analysis (PCA) [46], or gravity model [47]. Some focus solely on identifying the factors influencing the competitiveness of the agricultural sector in individual countries, developing their own competitiveness measures based on this analysis, for example, by considering the sector's impact on the natural environment. [48], analysis based on the clustering method which focuses on separation internally homogeneous and externally heterogeneous groups of countries based on their agricultural potential [49]. However, the fundamental challenge for contemporary research on competitiveness seems to be the necessity of accounting for the realities shaped by the impact of globalization on the market. As the international business environment evolves and globalization intensifies, the significance of this phenomenon is rising across all sectors of the economy, including agriculture. Given the broad scope of competition, there is no consensus on how to measure it [50]. However, according to the European Commission [51], productivity is considered the most reliable long-term indicator of competitiveness [52]. In recent years, the globalizing food market has become increasingly volatile due to the growing intertwining of trade ties between countries, worldwide proliferating effects of economic crises, food price fluctuations, trade regulations and restrictions, and many other factors [53–57].

3.1. Level and Changes of International Competitiveness Indicators in Relation to Fresh and Processed Fruits

3.1.1. Fresh Fruits

The analysis of the level and changes in international competitiveness indicators for fruits should be conducted separately for dessert fruits and those intended for further processing in importing countries. However, foreign trade statistics for fresh fruits do not distinguish between dessert fruits and those directed for processing. In Poland, the export of fruits primarily designated for processing in importing countries mainly concerns strawberries, raspberries, currants, sour cherries, and gooseberries. It is estimated that the share of "industrial fruits" in the export of these products in Poland amounts to approximately 80–90%.

A high share of industrial fruits in total exports is not favorable from the perspective of developing a raw material base for domestic processing plants. It should also be noted that the high share of "industrial fruits" in exports mainly concerns countries with relatively low export prices. The position of industrial fruits on the global market is determined almost exclusively by offering lower prices compared to other exporters. Therefore, the decreasing share of Polish strawberries, raspberries, sour cherries, or currants in global exports cannot be assessed negatively.

 doi:10.20944/preprints202504.0416.v1

Table 1. Poland's share in the value of global exports of selected fruits (%).

Specification	2011–2013	2014–2016	2017–2019	2020–2022	2023
Cherries	13.9	7.6	4.5	7.0	6.3
Raspberries	2.8	2.7	0.9	2.7	1.7
Currants	9.2	6.2	4.3	9.0	7.9
Strawberries	1.0	0.9	0.4	0.6	0.9

Source: Calculations based on Comtrade data.

Between 2011 and 2013, Poland had the largest share in the global export of sour cherries and was the second-largest exporter of currants in the world (after the Netherlands). At the beginning of the current decade, countries with a larger share in the global export of sour cherries than Poland included the USA, Hungary, Serbia, and Spain. Poland remained the world's second-largest exporter of currants. Throughout the analyzed period, Poland was not significant in the global export of strawberries or raspberries. It is important to emphasize that the global trade in these fruits is dominated by products intended for direct consumption.

The lack of a rising export trend also leads to a decrease in the positive balance in Poland's foreign trade of raspberries, currants, and sour cherries, and a deepening negative balance in strawberry trade. The CR indicator is also declining, mainly concerning strawberries. Strawberries dominate Poland's imports of soft fruits, mainly during periods of low or no domestic supply.

In summary, regarding fruits dominated by "industrial" fruit exports, the decline in competitiveness indicators is hard to assess negatively. On the other hand, the decreasing overall share of Poland in global exports clearly indicates a lack of sufficient competitive tools for soft fruits intended for direct consumption in importing countries.

The level and changes of competitiveness indicators can be related to the external competitiveness assessment of dessert fruits, naturally considering factors that may distort this assessment (imports for export, tariff and non-tariff restrictions in importing countries). In Poland, apples have the largest share in dessert fruit exports, followed by an increasing importance of highbush blueberries and pears.

Regarding apples, all quantitative indicators considered in the analysis (global export share, foreign trade balance, CR, RTA, and IIT) indicate relatively high external competitiveness of Polish apples. Throughout the analyzed years, with a share of around 6%, Poland maintained the 6th to 8th position in global apple exports. These indicators remained relatively stable despite a marked reduction in the volume and value of apple exports from Poland following Russia's embargo on agricultural and food products from the EU in 2014 and later by Belarus in 2022. (Before 2024, Russia was the largest importer of Polish apples. The embargo imposed by Russia and Belarus is considered a random factor included by Danning in Porter's diamond model).

This situation indicates a lack of an upward trend in the export of these fruits in many countries that are significant players in global exports. Due to the relatively low level of imports between 2011 and 2023, the balance of apple trade in Poland remained positive, with high CR and RCA levels. Throughout the analyzed period, countries with a higher apple trade balance than Poland included China, Italy, the USA, and Chile, with the CR indicator higher in New Zealand and South Africa, and the RCA indicator higher in China, Italy, the USA, New Zealand, South Africa, and France.

However, the IIT indicator level decreased from 16.8 in 2011–2013 to 4.8 in 2020–2022 and 0.7 in 2023. This decline indicates the "resilience" of the Polish apple market to imported apples, reflecting Poland’s growing self-sufficiency in apple production. It is worth noting that many interpreters of the IIT indicator consider high values as evidence of a country's ability to meet the demand preferences of foreign consumers. The decreasing IIT value in Poland largely results from an extended supply of domestically produced apples due to the expansion of controlled-atmosphere storage facilities.

 doi:10.20944/preprints202504.0416.v1

The IIT indicator level is also low in Italy, New Zealand, Turkey, Chile, and South Africa. The small share of imports in apple production confirms the high level of self-sufficiency in Poland and leading global net apple exporters. In Poland, this indicator in the apple harvest volume amounted to 0.2% in 2020–2022 and less than 0.1% in 2023, compared to 1.9% in 2011–2013.

An increase in the share of exports in production largely confirms the high competitiveness of Polish apples on the global market. However, a decrease in this indicator should be assessed negatively if domestic consumption increases. The consumption of apples and other temperate-zone fruits in Poland does not show an upward trend and remains lower than in countries with higher consumer income levels.

Table 2. External competitiveness indicators of apples.

Specification	2011–2013	2014–2016	2017–2019	2020–2022	2023
Share in global exports (%)	5.7	4.8	4.9	4.8	5.4
Foreign trade balance (million USD)	395.4	336.4	357.7	350.7	428.7
CR	16.5	26.3	40.4	114.3	271.1
IIT	16.8	7.8	5.3	4.8	0.7
RCA	0.99	0.98	1.08	1.02	1.21
ToT	–	0.64	0.69	0.64	0.77

Source: Calculations based on Comtrade data.

The share of highbush blueberries produced in Poland in global export value increased from 2.5% in 2011–2013 to 3.0% in 2020–2022 and 4.8% in 2023. For pears, the share rose from 1.3% to 1.7% and 2.1%, respectively. In the case of blueberries, this increase was due to a clear upward trend in exports from Poland.

At the same time, it is challenging to assess negatively the significant decrease in the positive foreign trade balance of blueberries (from an average of USD 27.2 million in 2011–2013 to USD 17.4 million in 2020–2022 and USD 9.9 million in 2023), as well as the decline in the CR indicator (from 5.0 to 1.2 and 1.1) and RCA, along with the rising level of the IIT indicator (from 35.4 to 90.3 and 96.9). A decrease in CR and RCA values and an increase in the IIT level do not necessarily indicate a reduction in the international competitiveness of Polish blueberries, as the growing import mainly occurs during periods (months) when domestic production is not feasible. The increasing import allows consumers access to blueberries even during the off-season.

The negative foreign trade balance of pears in most years of the analyzed period and the rising IIT level do not indicate low competitiveness of Polish pears in the global market. Imported pears are largely re-exported or supplement the domestic supply during periods of relatively low domestic fruit availability.

3.1.2. Processed Fruit Products

In Poland's export of processed fruit products, more than 90% consist of products used in processing plants in importing countries. This includes not only temporarily preserved fruits, purees, and concentrated juices but also, to a large extent, mass-packaged dried fruits, frozen products, and direct-pressed juices. A country's position in the global market for these products is primarily determined by the level of offered prices compared to other exporters.

As with dessert fruits, competitiveness indicators largely reflect changes in external competitiveness. In the case of frozen fruits, all quantitative indicators of external competitiveness in Poland decreased during the analyzed period. Export-to-import ratios deteriorated (foreign trade

 doi:10.20944/preprints202504.0416.v1

balance, CR indicator), while the IIT value and the share of imports in production increased. At the same time, in 2020–2022 and 2023, export prices rose more than import prices.

During these periods, Poland's share in global exports of the entire product group decreased, although it remained the highest in the world, and the RCA indicator level dropped. The decline in all competitiveness indicators was most significant for frozen strawberries. Their share in global exports fell from 16.6% in 2011–2013 to 11.4% in 2020–2022 and 9.8% in 2023. The foreign trade balance decreased from USD 135.2 million in 2011–2012 to USD 101.4 million in 2020–2022 and USD 72.3 million in 2023, while the CR indicator declined from 11.1 to 2.3 and 2.5, respectively.

Due to increased imports, domestic production of frozen strawberries in Poland decreased, while the share of imports in the national supply rose. The decline in external competitiveness indicators for frozen raspberries was less pronounced. The most significant drop was observed in the CR indicator, falling from 10.4 in 2011–2013 to 2.9 in 2023.

Table 3. External competitiveness indicators of frozen fruits.

Specification	2011–2013	2014–2016	2017–2019	2020–2022	2023
Share in global exports (%)	13.4	11.7	11.3	10.0	10.2
Foreign trade balance (million USD)	426.8	390.7	351.2	381.1	102.6
CR	5.5	4.9	3.0	2.3	2.7
IIT	31.1	34.3	49.9	60.1	53.5
RCA	3.15	3.67	4.06	2.53	1.84
ToT	–	0.93	1.04	1.07	1.40

Source: Calculations based on Comtrade data.

It is not possible to precisely determine Poland's position on the global market of other frozen fruits (mainly significant in the production and export of frozen sour cherries) due to the lack of relevant statistical data. However, concerning the entire group of "other" frozen products (CN code 081190), Poland is also experiencing a deterioration in most external competitiveness indicators. Thus, the competitive position of Polish frozen products on the global market is clearly worsening. The global market is increasingly dominated by countries offering relatively low prices and possessing large resources of relatively cheap production factors.

Regarding frozen strawberries, Egypt currently holds the leading position in global exports, with its share increasing from 2.3% in 2011–2013 to 27.4% in 2023. In global frozen raspberry exports, the significance of supplies from Ukraine is dynamically increasing. In 2011–2013, Ukraine participated in global exports with a share of 0.2%, and in 2020–2022 and 2023, this share rose to 5.4% and 5.9%, respectively. In both countries, the level of other international competitiveness indicators is visibly improving.

The analysis of the level and changes in quantitative indicators does not indicate a deterioration in the international competitiveness of fruit juice concentrates produced in Poland during the analyzed period. Regarding apple juice concentrate, which dominates production and exports within this product group in Poland, the foreign trade balance remained consistently positive throughout the analyzed period. The CR index level increased, as did Poland's share in global exports. In all analyzed years, only China had a greater share in global exports than Poland. It is difficult to negatively assess the relatively high IIT index in Poland. Imported apple juice concentrate, sourced from countries offering relatively low export prices and mixed with more expensive juice produced from domestic raw materials, allows for increased price competitiveness of the Polish domestic offer. Therefore, imports do not constitute competition for the development of production and export of juice produced in Poland. This also applies to other countries with relatively high production costs.

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Relatively low production costs are causing a systematic increase in exports (including to Poland) and an improvement in all international competitiveness indicators related to foreign trade results and the global position of concentrated juices produced mainly in Ukraine and Moldova. The growing importance of these two countries in global exports and production is largely due to the location of foreign capital investments (theory of location and exchange of production factors). In Poland, imports do not exceed 15% of domestic supply (IP index), while the share of exports in production (EO index) fluctuates between 80% and 90%.

The level of the EO index is not of great significance in assessing international competitiveness, as in the leading exporter countries, the production of apple juice concentrate, as well as other concentrated juices, is mainly intended for export.

Table 4. External competitiveness indicators of concentrated apple juice.

Specification	2011–2013	2014–2016	2017–2019	2020–2022	2023
Share in global exports (%)	16.0	18.2	18.2	18.6	20.9
Foreign trade balance (million USD)	357.3	287.2	258.9	278.6	395.6
CR	5.9	7.2	5.1	6.4	8.4
IIT	29.7	24.7	35.1	27.9	21.4
RCA	8.71	11.18	15.29	16.84	10.95
ToT	–	0.70	0.62	0.67	0.65

Source: Calculations based on Comtrade data.

It is also worth adding that the decreasing level of most international competitiveness indicators would not be assessed negatively if there was an improvement in these indicators concerning dessert apples, juices, nectars, and beverages made from concentrated juices or an increase in apple consumption on the domestic market. The increase in apple consumption in China has led to a reduction in production and a downward trend in both the production and export of concentrated apple juice in that country.

A very large raw material base in Poland and the growing global market significance of concentrated apple juice supplies from countries with relatively low export prices, along with increasing international demand, have contributed to the dynamic growth in production and export of directly pressed apple juices (NFC – Not From Concentrate). The dynamically growing export, accounting for over 90% of production, has a systematic positive impact on all adopted indicators for assessing the international competitiveness of NFC juices in Poland.

The share of Polish deliveries in the global export value increased from 4.4% in 2011–2013 to 15.6% in 2020–2022 (reaching 14.5% in 2023). The foreign trade balance amounted to -13.9, 82.4, and 81.5 million USD, the CR index was 3.0, 1.9, and 7.8, and the RCA index was 0.76, 3.38, and 2.65. The IIT index decreased from 53.4 to 13 and 22.9%. Based on the adopted indicators, it is difficult to conclude a systematic and dynamic improvement in the international competitiveness of NFC juices exported from Poland.

This is primarily the result of strategies concerning the production structure in companies with foreign capital involvement, which manufacture both concentrated juices and NFC juices. However, this strategy has utilized the comparative advantage of NFC juices produced in Poland and in countries where subsidiaries are located in Poland, mainly Germany.

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Table 5. External competitiveness indicators of unconcentrated apple juice.

Specification	2011–2013	2014–2016	2017–2019	2020–2022	2023
Share in global exports (%)	4.4	5.8	12.9	15.6	14.1
Foreign trade balance (million USD)	13.9	18.1	59.9	82.4	81.5
CR	3.0	8.6	9.9	14.9	7.8
IIT	53.4	50.5	19.7	13.0	22.9
RCA	0.76	1.21	2.86	3.38	2.65
ToT	-	1.06	0.77	0.83	0.67

Source: Calculations based on Comtrade data.

The lack of data makes it impossible to determine competitiveness indicators for individual types of concentrated and drinkable juices produced from other fruits. (In international statistics on foreign trade, all these products (including juices made from tropical fruits) are classified under two customs tariff codes – 200981 and 200989, as well as 200990 (juice blends)).

Among these products manufactured in Poland, concentrated cherry, chokeberry, strawberry, raspberry, and currant juices hold primary importance. Poland is a world leader in exporting these juices. Among the net exporters of juices included in CN code 200989, only Thailand had a greater share during the analyzed years – 16.0%, offering tropical fruit juices to the global market. In Poland, the foreign trade balance of juices produced from "colored" fruits is highly positive. Exports exceed imports by an average of ten times, with imports not exceeding 10% of domestic supply and exports accounting for over 80% of national production. From 2011 to 2023, Poland's share in the global export of mixed juices did not exceed 2%. Poland is a net importer of these products.

Regarding dried fruit exports, Poland is significant only in the global market for dried apples and dried plums. Poland's share of global dried apple exports increased from 5.1% in 2011–2013 to 8.0% in 2020–2022 and 11.9% in 2023. Among net exporters, only Chile and Italy had a higher share in recent years. The levels of other external competitiveness indicators have also significantly improved. However, dried pomace resulting from the production of concentrated apple juice dominates the Polish offer. These are primarily used as animal feed in recipient countries. Poland is not considered an exporter of dried apples intended for direct consumption, which dominate the global dried apple trade. This confirms the need to assess international competitiveness in relation to "homogeneous" products with a similar usage direction.

Dried plums are naturally intended for direct consumption, and therefore competitiveness indicators commonly used in the literature can be fully applied to assess the competitive position of individual countries. The negative trade balance of these products in Poland and the rising IIT index clearly indicate that the increase in Poland's share of global exports – from 0.6% in 2011–2013 to 1.8% in 2020–2022 and 2% in 2023, along with the growth of CR and RCA indicators – is almost exclusively the result of re-exports. It should be noted that Poland is still outside the top ten largest exporters of dried plums worldwide. The quality of dried plums produced in Poland is lower compared to the main exporting countries – especially Chile and southern European countries.

Due to the lack of relevant data, it is difficult to determine the position of Poland or other countries in the global market for fruit purees, pastes, jams, or preserves. However, fruit purees dominate both global trade and Polish exports, so the competitive position of this product group can be assessed based on the adopted competitiveness indicators. Poland's share in the global export of this entire group of products is not significant – 2.1% in 2011–2013, 2.3% in 2020–2022, and 2.8% in 2023 (ranking 12th in global export in 2020–2022). The foreign trade balance is significantly positive, and the IIT index level increased from 43.9 in 2011–2013 to 60.6 in 2020–2022 (54.5 in 2023). The IIT index is also rising in other countries significant in exporting these products, and its increasing level

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cannot be assessed negatively if it does not lead to a substantial reduction in the share of individual exporting countries in international trade.

Among the small group of products intended for direct consumption, primarily offered on the global market in unit packaging, Poland mainly exports canned goods made from strawberries and sour cherries. (The system of assigning products and their groups to specific CN codes allows for assessing external competitiveness indicators only for preserves made from cherries and strawberries. However, Poland is not a significant player in the global export of preserves made from other fruits, including plums, pears, sweet cherries, or berry fruits. The decisive factor is consumers' preference for the taste of these fruits originating from countries with warmer climates.) It should be clearly noted that these preserves are sold under the brands of foreign companies operating in Poland or brands of companies from recipient countries. Throughout the analyzed years, Poland was the sixth-largest global exporter of canned strawberries – with a 6.5% share in 2020–2022 – and the ninth-largest exporter of canned cherries. The trade balance for these products remains consistently positive, with exports significantly exceeding imports. However, the IIT index is rising. This does not indicate a decrease in self-sufficiency in the production of these preserves, as imported preserves with a different taste profile than those made from domestic raw materials enrich the supply offer on the domestic market while the export level of domestic products also increases.

4. Conclusions

The analysis conducted confirms that, given the increasing flows of capital and goods worldwide, it is necessary to consider these factors when interpreting the level and changes of external competitiveness indicators of horticultural products (as well as other agri-food products). This primarily applies to indicators that include the volume and value of imports in their formulas—mainly CR, IP, and IIT. A potential decrease in the level of these indicators as a result of increased imports should not be viewed negatively if the share of specific products or product groups in global exports increases or remains at a high level, and the foreign trade balance is significantly positive. In Poland, this mainly concerns concentrated fruit juices.

Moreover, it should be noted that analyzing the IIT indicator for horticultural products clearly highlights the level and changes in self-sufficiency of production of specific items in individual countries, rather than the degree of product adaptation to market demands (as interpreted in the literature on external competitiveness indicators). The use of competitiveness indicators is not fully applicable to products that are significantly subject to re-export. The resulting increase in a country's share of global exports is primarily an outcome of the operational efficiency of trading companies that achieve trade margins based on a thorough understanding of market realities. In Poland, as the scale of re-export increases, the share of pears and dried plums in global exports grows. In re-exporting countries, the foreign trade balance for analyzed products is usually negative, and the IIT indicator increases.

Analyzing CR, IP, and IIT indicators for "seasonal" fruit imports (such as berries and sour cherries) has limited cognitive value. An increase in imports and a deterioration in these indicators for these fruits in Poland does not necessarily mean a decline in external competitiveness, as imports are made during periods of domestic supply shortages. Increased imports of these fruits lead to an extended period of availability for consumers.

Regarding semi-processed products intended primarily for export (in Poland, mainly concentrated juices), there is no justification for analyzing the level and changes of the EOD indicator, as production is functionally linked to the volume of exports. A decrease in this indicator should be positively assessed if it occurs alongside an increase in the consumption of finished products made from semi-processed goods. In Poland, the consumption of processed fruit products (including juices) and most fruits does not show an upward trend. For semi-processed products, the ToT indicator does not fully apply.

When assessing the international competitiveness of the horticultural sector in Poland, it must be clearly emphasized that its relatively high share in the global export of products from this sector

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primarily results from still relatively low production costs (Porter). The growing importance of countries with relatively low prices in the global trade (such as Ukraine, Morocco, and Egypt) clearly indicates the significance of this factor. Of course, this primarily applies to semi-processed products.

Poland's gradual loss of dominance in the export of semi-processed fruit products—mainly frozen products—indicates a deterioration in the external competitiveness of the entire fruit sector. Improving competitiveness indicators for products intended for direct consumption on target markets—such as dessert fruits, packaged processed products (including drinking juices and frozen goods)—becomes a key determinant of competitiveness. However, this requires the use of effective competitive instruments in the global market.

It must be clearly emphasized that the most developed countries in the world (e.g., Germany, the United Kingdom, France, or the USA) are typically net importers of horticultural products and have unfavorable international competitiveness indicators. However, the standard of living and economic development indicators in these countries are higher than in countries with favorable competitiveness indicators that base their competitive advantage on possessing large resources of relatively cheap production factors.

When evaluating external competitiveness based on its indicators, it is essential to take into account the "superiority" of economic development theory over foreign trade theories.

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