Examining the interplay between agri-food and trade competitiveness: A review of literature

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Abstract

Every nation strives to establish its competitiveness in the global agri-food trade. However, defining and quantifying this concept remains a challenge, lacking a universally accepted description or a consolidated metric. Among the prevalent gauges in international research are the Balassa index and its adaptations (such as revealed trade advantage, revealed competitiveness, normalized revealed comparative advantage, and revealed symmetric comparative advantage), alongside diverse indicators tied to exports and imports (like the Grubel-Lloyd index or trade balance index). This comprehensive literature review identifies these metrics and highlights key determinants for bolstering competitiveness in agri-food trade. Foremost among these factors is the presence of supportive legislation and effective trade policies, followed by the production of higher value-added and more sophisticated goods, as well as efficient and profitable manufacturing processes. While the European Union (EU) and its member states feature prominently in the studied materials, the analysis extends to encompass candidate countries and significant EU trade partners including Canada, China, and ASEAN nations. As such, several of these insights could potentially be applied more broadly.

Keywords: Agri-food trade, trade competitiveness, international trade

Introduction

Competitiveness constitutes a pivotal factor within the realm of the market economy, transcending specific sectors of interest. While the terminology itself has evolved significantly, a universally accepted definition or amalgamated metric remains elusive. Adam Smith initially introduced the concept of absolute advantage, emphasizing cost-effective production. Subsequently, Ricardo advanced the idea of comparative advantage, predicated on disparities in price and costs. This concept was subsequently refined by Heckscher and Ohlin, who incorporated efficiency considerations (Maneschi, 1992). Balassa contributed substantially by establishing the theoretical foundation for comparative advantages and validating it empirically. Researchers worldwide frequently employ the Revealed Comparative Advantage (RCA), also referred to as the Balassa index, as a pivotal metric (Balassa, 1965). As articulated by Cho and Moon (2000), Smith formulated a trade theory associating prosperity with endowments, while Porter devised a competitiveness theory contending that choices underpin wealth creation. In their view, these theories shared similar phases of development and discourse, culminating in the assessment of national competitiveness as exemplified by the national competitiveness report. From this perspective, the Balassa index serves as a conduit for aligning international trade theories with competitiveness by utilizing trade data to compute revealed comparative advantages (Mizik et al., 2020). The index juxtaposes a nation's export share of a specific product against the global export share of the same product within a reference group. An RCA exceeding 1 signifies a pronounced revealed comparative advantage, whereas a value below 1 indicates a relative disadvantage. Fundamentally, the Balassa index serves to convert trade performance into a measure of competitiveness (Borodin, 2006, Aggarwal, 2017b).

Given its ubiquitous usage in international economics, comprehending the essence of competitiveness remains an enduring research challenge. A clear distinction can be made between macro-level (pertaining to regions or countries) and micro-level (pertaining to individual firms) competitiveness. On the macro scale, the emphasis lies on effectiveness and achieving a favorable trade balance, whereas on the micro scale, the pivotal factor is profitability. Composite indices such as the IMD World Competitiveness Yearbook and the Global Competitiveness Report, presented by the World Economic Forum, serve as measures for macro-level competitiveness. These indices leverage numerous indicators to formulate country rankings and profiles; however, their focus is primarily on the overall economy, excluding the specific agri-food sector. Conversely, analyzing competitiveness at the micro level necessitates access to micro level data, which is generally arduous to gather and even more challenging to compile for comparative purposes.

Concerning the agri-food sector, the RCA (along with its variations like relative trade advantage or revealed competitiveness) emerges as a widely employed instrument in studies pertaining to competitiveness. In conjunction with the RCA index, another commonly utilized tool is the Domestic Resource Cost (DRC), calculated as the domestic resource cost divided by the value added on the border/reference price (Bruno, 1965). Much like the RCA index, a value surpassing 1 indicates competitiveness at the global level. Furthermore, this index presents diverse iterations such as Bilateral Resource Cost (BRC) and Private Cost Ratio (PCR). Furthermore, noteworthy are the considerations of total factor productivity (Malmquist, 1953) and the assessment of operational competitiveness ratings (Parkan, 1994).

Nations can exhibit competitiveness through various avenues. For specific goods, competition primarily hinges on pricing, while for other products, nonprice factors take precedence (Gehlhar and Pick, 2002). The latter scenario is often referred to as quality competitiveness. Literature consensus outlines the pivotal determinants of competitiveness, including:

- Typically, competitive countries are also characterized by heightened productivity, thereby establishing a positive correlation between these terms (Bojnec and Fertő, 2019, Fertő, 2018).
- Goods with elevated value added, such as semi-processed or processed items, generally possess greater competitiveness and manifest higher revealed comparative advantages (Bojnec and Fertő, 2018a).
- The extent of a country's export orientation correlates with the likelihood of sustaining its competitive position (Bojnec and Fertő, 2018b).

Starting in 2010, the global trade in agri-food has experienced fluctuations, ranging from USD 14.2 billion in 2010 to USD 18.0 billion in 2018 annually. By 2020, its share had grown to nearly 10% of the total global trade (World Bank, 2021). The scale of this market underscores the criticality of maintaining competitiveness to secure increased export revenues. The export and import distribution display a degree of similarity, with the top three regions in terms of value remaining consistent: Europe–Central Asia, East Asia–Pacific, and North America. This regional categorization aligns with the classification system of the World Bank's World Integrated Trade Solution (WITS). An additional noteworthy aspect gleaned from the figure is the trade balance of these regions. Latin America emerges as the foremost net exporter of agri-food products, boasting a surplus of USD +123 billion, while East Asia–Pacific holds the position of the most significant net importer among these regions, facing a trade deficit of USD 115 billion. Beyond Latin America, Europe–Central Asia, South Asia, and Sub-Saharan Africa maintain trade surpluses; conversely, all other regions registered as net importers of agri-food products in 2020.

Regional and Country-Level Analysis

The literature extensively examined the impact assessment of EU accession, with a focus on various factors. Antimiani et al. (2012) conducted an analysis employing the PRODY index, which integrates the RCA with the per capita GDP of the country under consideration. Their investigation encompassed two periods: before accession (1996-1997) and post-accession (2006-2007). They highlighted that a greater proportion of advanced agri-food products led to enhanced trade competitiveness for Poland and the Czech Republic. Conversely, Bulgaria, Hungary, and Romania exhibited weaker performance.

In a separate study, Bojnec and Fertő (2017) evaluated 23 countries responsible for 60% of global agri-food trade. Surprisingly, their findings indicated that factors like economic development, higher agricultural employment rates, and diverse agri-food product portfolios did not yield significant positive impacts on comparative advantages. This trend persisted even during the global economic crisis, as denoted by a dummy variable. Conversely, attributes such as agricultural land abundance, agricultural support, and export diversification were associated with a reduced likelihood of decline in comparative advantages between 2000 and 2011. Bojnec and Fertő extended their analysis to EU member states, identifying the Netherlands, France, and Spain as particularly successful in terms of comparative advantages (Bojnec and Fertő, 2019; Aggarwal, 2023a, 2023c). They concluded that EU accession did not notably elevate the overall competitiveness of agri-food exports. They attributed this to the relatively short time span post-accession, suggesting that new member states required more time to catch up. Additionally, they noted that the EU's most competitive products constituted a limited portion of their exports.

However, when examining the duration of the EU's agri-food export comparative advantage, Bojnec and Fertő found that factors such as population, GDP per capita, and EU enlargement positively influenced this duration. Notably, the contribution of new member states to the EU's export competitiveness surpassed that of old member states (Bojnec and Fertő, 2018b). This trend was underpinned by the greater economies of scale within specialized products. Predictably, elevated trade costs exerted a negative influence on the duration of international competitiveness. Carraresi and Banterle (2015), utilizing the export market share

(EMS) and various RCA indices, determined that Germany and the Netherlands were primary beneficiaries of the enlargement, whereas France encountered declining competitiveness. They emphasized the interconnectedness of competitive performance and export specialization, noting that a high EMS did not necessarily correlate with high RCA values. Similar to Bojnec and Fertő (2018b), they highlighted the positive impact of accession on new member states, particularly within their agriculture sectors.

In conjunction with the EU accession, the 2008 global financial crisis left a profound imprint on the EU's agri-food trade landscape. Utilizing the normalized revealed comparative advantage index (NRCA), Bojnec and Fertő (2018a) highlighted the adverse influence of the economic crisis on the duration of the EU-28's agri-food trade's comparative advantage. Nonetheless, this detrimental effect was notably more restrained in the case of differentiated products. Employing the revealed competitiveness index, Crescimanno et al. (2014) meticulously examined the competitive stance of France, Italy, Spain, and Turkey, with a particular emphasis on the global financial crisis. Strikingly, the agri-food sector exhibited remarkable resilience during the crisis. Among the nations analyzed, Turkey emerged as the most competitive, its prowess experiencing only a marginal decline post-crisis. This phenomenon can be partially attributed to the country's diminished reliance on foreign markets structurally. Generally, sectors exhibiting competitiveness demonstrated commendable performance, while those lacking competitiveness faced substantial challenges. Key determinants of competitiveness encompass agri-food production, pricing, income dynamics, and consumption patterns.

Through a computation of price and quality competition, Bojnec and Fertő (2015a) reached the conclusion that a majority of the EU's agri-food trade demonstrated effective competitive dynamics, with quality bearing even greater significance than price. This observation underscores the prominence of exporting higher value-added products, notably evident in the cases of the Netherlands (a longstanding member state) and Poland (a newly joined member state). Additionally, it's worth noting that the duration of competitive performance typically proves lengthier for the established member states compared to their newly incorporated counterparts (Bojnec and Fertő, 2015b). Not only did the EU draw significant scrutiny, but the agri-food trade of its member states also underwent comprehensive analysis. Huan-Niemi et al. (2017) employed the Global Trade Analysis Project (GTAP), a general equilibrium model, in tandem with the Delphi method, to assess how policy alterations impacted the competitive landscape of Finland's agri-food sector. In scenarios involving reduced or absent Common Agricultural Policy (CAP) subsidies, the Finnish agricultural sector faced substantial declines in competitiveness, particularly in the beef segment. They pinpointed issues such as elevated land prices and a considerable reliance on support for farms as pivotal challenges. Moreover, they observed that diminished subsidies could lead to lower land prices, potentially facilitating market entry for newcomers.

Through the utilization of the Revealed Comparative Advantage (RCA) and export similarity indices, Majkovic et al. (2006) scrutinized Slovenia's agri-food export trade and highlighted a diminishing competitiveness compared to the nine new member states that joined the EU in 2004. Comparable results were obtained through intra-industry trade (IIT) analysis (Majkovic et al., 2007). These findings indicated that enhancing product quality could be the most effective strategy for bolstering the competitiveness of Slovenia's agri-food sector within the competitive single market. This could be grounded in the development of human, physical, and technological capital. Majkovic and Turk (2007) additionally discovered declining quality and price competitiveness of Slovenian agri-food trade in the Croatian market. Employing the Revealed Symmetric Comparative Advantage (RSCA) and the Trade Balance Index (TBI), Smutka et al. (2018) ascertained that the Czech agri-food sector held higher competitiveness on European markets (EU-28, other European countries, and the Commonwealth of Independent States) compared to

other nations. The chief issue identified was the prevalence of low-value-added products. Stankaityte (2016), employing the International Competitiveness Index (LIIC), established the competitiveness of Lithuanian dairy products in EU markets, noting an upward trend. However, competitiveness varied when assessed in third countries' markets—there was a marked drop in competitiveness in Russian markets due to import bans.

Using the Grubel-Lloyd (GL) index, Szczepaniak (2013) evaluated the competitiveness of Poland's food sector, revealing competitive performance during the analyzed period (2001-2011), particularly following EU accession. The country's competitiveness stemmed from intensive intra-industry trade driven by common market demand, economies of scale resulting from specialization, and the increasing purchasing power of Polish consumers. Similar trends were observed from 2004 to 2017 when applying RCA and TBI (Szczepaniak, 2019, Aggarwal, 2023e). The escalating values underscored increasing competitiveness of Polish agri-food products on international markets, a progression steered by sectoral transformations. Applying the RCA index, Ubrežiová et al. (2012) discerned declining competitiveness within Slovakia's agri-food sector, proposing modernization, investment in production factors, and legislative reforms to reduce administrative burdens and enhance market access. Rusali (2010) emphasized the underdeveloped processing industry as a bottleneck in Romania's agri-food sector, leading to a low Unit Value Index (UVI). This situation resulted in raw material exports and high-value-added processed goods imports. Through Balassa indices, Fertő and Hubbard (2003) evaluated the competitiveness of Hungary's agri-food sector in the '90s, revealing comparative advantages in 22 product groups, albeit with a slight decline over the analyzed years. The role of government interventions in this context is noteworthy; while they play a pivotal role, they inversely correlate with competitiveness, as the most supported sectors aren't always the primary beneficiaries of different forms of assistance. Juhász and Wagner (2013), using the Constant Market Share Analysis, examined the competitiveness of Hungary's agri-food exports. Their results highlighted cereals, oilseeds, and poultry as crucial and competitive export products. The inadequacy of Hungary's transportation infrastructure emerged as a major hurdle, significantly weaker compared to its rivals.

Comparisons conducted at the country level, involving the EU or its member states alongside their trading partners, held significant importance. Qineti et al. (2009) undertook an analysis of agri-food trade between Slovakia and the EU with Russia and Ukraine. Their findings revealed a loss of competitiveness for the EU on these markets post-enlargement, while Slovakia experienced a similar decline in the Russian market, yet slightly improved its position in the Ukrainian market. Verter et al. (2020) investigated agri-food trade between the EU-28 and Nigeria. The majority of Nigerian products lacked comparative advantage or exhibited a declining trend. Their suggestions encompassed promoting agri-food value chains and implementing a more protective trade policy to enhance self-sufficiency. Zdráhal et al. (2020), employing a product mapping tool, assessed South Africa's agri-food trade with the EU. South Africa emerged as more competitive in African markets in contrast to the EU-28 market. The diversity of African export trade presented opportunities for entities less competitive in the EU markets. They also identified enhanced production and export of higher value-added products as pivotal competitiveness drivers. Utilizing the Constant Market Share (CMS) model, Guo et al. (2011) discerned both short and long-term impacts. Notably, the CAP reform in Germany (1999) and China's WTO accession (2001) led to immediate adverse effects on the Germany-China trade relationship. However, over the long term, positive impacts emerged within their agri-food trade. The authors emphasized the role of exchange rate fluctuations in influencing competitiveness.

The EU exerts a magnetizing influence in the arena of other countries' agri-food trade. Coretchi and Gribincea (2013) established a connection between competitiveness and low productivity as well as economic growth. For Moldova, they emphasized organic production and elevated product quality as

potential remedies. Employing various Balassa indices and the GL index for intra-industry trade analysis, the Moldavian agri-food sector demonstrated competitiveness, albeit with two-thirds of its products being raw materials. This sector grapples with insufficient state support and a dearth of long-term financial resources. As a result, Cimpoies (2013) emphasized the necessity for a comprehensive reform that could establish a stable political landscape. Recognizing the linkage between export competitiveness and production, they underscored the significance of diverse support programs, investments, and the creation of high-quality products. Senyshyn et al. (2019) advocated a plethora of measures to enhance the competitiveness of Ukraine's agri-food sector. These include diversifying the export commodity structure, robust quality and food security management, international marketing, adherence to international standards, information sharing, and fostering cooperation. Examining the Serbian agri-food export to the EU using net trade (NTI) and GL indices, Markovic et al. (2019) generally determined the sector's competitiveness, although its values remain low and on a declining trajectory. Instead of fixating on quantity, they proposed a strategy of export restructuring and product differentiation. Their results pointed toward the increased export of fruits and vegetables as a prime example of quality competitiveness. Beyond product quality, they highlighted the importance of processing. Matkovski et al. (2017) also highlighted the revealed comparative advantages of Serbian agri-food products, even though a majority of these items are raw materials or minimally processed goods, with cereals being a primary export product. Trade agreements with the EU and CEFTA (Central European Free Trade Agreement) countries played a pivotal role in furthering export growth. They stressed that the sector's performance hinges on its adaptability to foreign market demands, particularly concerning product security and quality. Drawing from Matkovski et al.'s study (2022), cereals' export holds particular significance in the Vojvodina region. They additionally noted lower competitive pressures in terms of quality and quantity within the CEFTA markets, which renders them essential. Elevating competitiveness necessitates substantial action, such as innovation, knowledge transfer, and investments in the agricultural product processing phase. Matkovski et al. (2019) identified the policy challenge of enhancing competitiveness in South-East Europe, especially for countries deeply integrated into the EU. Addressing this challenge demands notable strides in collaboration and infrastructure development (including transport, storage, finance, institutions, etc.).

Ignjatijevic et al. (2013) conducted an analysis encompassing a "mixed" region involving both EU member states and candidate countries. Through the utilization of the Balassa, Lafay (LFI), and GL indices, they scrutinized the trade competitiveness within the Danube region. Notably, they observed increasing RCA values for most countries that initially possessed comparative advantages. They underscored the significance of collaboration, emphasizing cost-efficient production, adherence to quality standards, establishment of shared transportation routes, and more. Achieving this necessitates measures not just on a legal front but also involving financial considerations.

Similar methodological tools were employed to analyze other global regions. The case of the Association of Southeast Asian Nations (ASEAN) countries demonstrated that while productivity is a potential source of competitiveness, it is not the sole determinant (Mizik, 2020). A shared obstacle to heightened competitiveness appears to be insufficient processing capacities, which not only affects ASEAN but also the Commonwealth of Independent States (CIS). Nonetheless, a shared trend emerges among these country groups: significant agri-food producers exhibit elevated comparative advantages and superior trade performance (Mizik, 2021).

Chen et al. (2000) employed the Constant Market Share (CMS) approach to investigate China's export competitiveness, revealing that trade policy reforms could lead to a decline in agri-food export competitiveness. However, discerning the precise impacts of these changes proves challenging, considering the interplay of various factors like global and regional demand. In their study of China's vegetable sector,

Xue and Revell (2009) used the Export Specialization Index (XSP). Given that most of China's foreign markets are price-sensitive, they stressed the paramount importance of efficient and cost-effective logistics, which fundamentally underpin competitiveness, especially in the absence of economies of scale.

In conjunction with the RCA and NRCA, Sarker and Ratnasena (2014) employed the Heckscher–Ohlin–Vanek (H–O–V) model to assess the competitiveness of Canada's wheat, beef, and pork sectors, yielding intriguing findings. Throughout the analyzed period, wheat demonstrated international competitiveness, while pork did not fare as well. The North American Free Trade Agreement (NAFTA) initially propelled the beef sector's performance, but this momentum was reversed due to the outbreak of bovine spongiform encephalopathy (BSE). Since then, the sector has grappled with an incomplete recovery. Identifying the prime influences on trade competitiveness, the authors pinpointed the following factors:

- Seed costs and the Western Grain Stabilization Act exerted a significant adverse impact on the wheat sector's competitiveness, while the Western Grain Transportation Act yielded a positive effect. This underscores the potential for diverse policy measures to have drastically different outcomes.
- Meat processing costs exerted a negative influence on both the pork and beef sectors.
- The decoupled safety net program and the National Tri-Partite Stabilization Program favored the beef sector but had a minor effect on the pork sector.
- Unlike the beef sector, fluctuations in the Canada–US exchange rate negatively affected the wheat and pork sectors.

Fertő (2018) conducted an extensive analysis of global agri-food trade competitiveness, differentiating between gross and value-added exports, and gauging competitiveness using the NRCA index. Notably, his study unveiled a distinction in NRCA rankings between the two export categories. Within the agricultural sector, China displayed the highest value for gross exports but the lowest for value-added exports. Conversely, Brazil emerged as the leading performer in terms of value-added exports. In the food sector, NRCA values were generally elevated, with Brazil leading in gross exports and Thailand in value-added exports.

Product Level Analysis

As a result of the accession, Benus et al. (2021) observed that Slovak producers encountered heightened competition within the common European market, leading to a significant decline in their competitiveness within the spirits industry. Amongst these, only the liqueurs and cordials sector managed to enhance their competitive edge. Meanwhile, vodka products were able to maintain a portion of their competitiveness from 2004 to 2018, as indicated by their Balassa-type indices. Using similar indices, Benus (2019) conducted an analysis on the Czech meat industry, revealing that fresh, chilled, or frozen poultry meat demonstrated the strongest performance, albeit with a declining trend, particularly post-accession. Conversely, bovine meat (fresh or chilled) exhibited no initial relative export advantage, but all corresponding indices exhibited an upward trajectory. The author also underscored the interconnectedness between meat industry competitiveness and livestock farm profitability.

Balogh and Jámbor (2017) explored the European cheese market, finding that factors such as GDP per capita, protected designation of origin (PDO), and EU accession positively influenced trade competitiveness, leading to higher RCA values. However, foreign direct investment had a detrimental effect, largely due to the predominance of domestic cheese producers. At the national level, the Netherlands, Denmark, Cyprus, and Luxembourg emerged as the most competitive cheese producers within the EU (Balogh and Jámbor, 2018). Török and Jámbor (2013), using various Balassa indices and unit value

difference (UVD), analyzed the competitiveness of fruit spirits labeled with geographical indications in six Central and Eastern European countries. While most of these spirits possessed a comparative advantage and competitiveness, there was a declining trend in competitiveness and market positioning post-accession. The same researchers also evaluated the European ham market (Török and Jámbor, 2016). Their findings, based on the RSCA, identified four competitive member states (Portugal, Spain, Italy, and Slovenia), with only Portugal managing to bolster its competitiveness over the analyzed period. Echoing established literature, factors such as endowments, geographical indications, and EU accession positively impacted competitiveness, while FDI had a negative influence.

In the context of the Italian wine sector, specialization and product quality emerged as vital factors in addressing diverse consumer demands (Crescimanno and Galati, 2014). The former played a larger role in new markets, while the latter was essential for maintaining relationships with traditional export partners. Utilizing export and import market share, as well as the relative trade advantage (RTA), Crescimanno and Galati (2014) identified heightened competitiveness within the Italian wine sector from 2000 to 2011. El Chami et al. (2014) adopted RTA and revealed competitiveness (RC) to dissect the Lebanese wine industry, unearthing a comparative advantage. Their analysis underscored the importance of a consistent, long-term sectoral policy in maintaining and enhancing competitiveness.

Concerning spices, it appears that countries possessing the greatest comparative advantages (such as Guatemala, Sri Lanka, and India) are focused on the most competitive spice products, including cardamoms, cloves, dried pepper, and cumin seeds. The factors contributing positively to their trade competitiveness are land and labor productivity (Jámbor et al., 2018). In the peanut market, Nicaragua and Senegal display both the highest and consistently stable competitive potential, yet the survival test conducted reveals a landscape of fierce competition (Jámbor and Gibba, 2017).

The study by de Oliveira et al. (2019) highlights a diminishing competitiveness within Portugal's tomato industry. Given the highly competitive nature of the global tomato market, product differentiation becomes paramount to reduce dependence on pricing strategies. Alongside product quality, the authors also emphasize the significance of adopting sound agricultural and environmental practices as influential factors for maintaining traction in their established markets. Recognizing the looming threat of climate change, collaborative efforts in research and development are imperative, encompassing both production and processing facets.

Used Methodologies and Recommendations

Table 1. Summary of the methodology and recommendations for higher agri-food trade competitiveness

Methodology	**Identified Factors of Higher Agri-Food Trade Compeititveness**
Balassa type indices	• product differentiation (Aggarwal, 2017a, Oliveira et al.,2019) • factor endowments (Aggarwal, 2023b, Balogh and Jámbor, 2017) • geographical indication (Aggarwal and Chakraborty, 2017, Török and Jámbor, 2016) • R&D (Aggarwal and Chakraborty, 2019, Ignjatijević et al., 2013) • innovation and investment (Aggarwal, 2016, Mizik, 2021) • developed infrastructure (Matkovski et al., 2019, Ignjatijević et al., 2013)
Export and/or import related indices	• higher value added/more sophisticated goods (Antimiani et al., 2012, Bojnec and Fertő, 2015a) • supportive legislation (Aggarwal, 2023d, Zdráhal et al., 2020) • focused market strategy (Crescimanno and Galati, 2014)

CMS	• policy reform (Nag et al., 2021, Chen et al., 2000) • WTO accession (Guo et al., 2011) • developed infrastructure (Aggarwal et al., 2022, Juhász and Wagner, 2013)
IIT	• trade cooperation (Aggarwal et al., 2023, Majkovic et al., 2007) • innovation and investment (Aggarwal and Chakraborty 2020a, 2020b, 2020c)
Trade equation model	• factor endowments (Aggarwal et al., 2021, Coretchi and Gribincea, 2013) • product diversification (Aggarwal and Chakraborty, 2021, 2022)
GTAP	• profitable production (Aggarwal, 2020, Huan-Niemi et al., 2017)

Summary and Conclusion

Assessing competitiveness, both overall and specifically within the agri-food sector, remains a complex endeavor. Numerous avenues for this assessment exist, each presenting its own set of pros and cons. The selection of appropriate methodological tools hinges on the data at hand and the researcher's preferences. Methodologically speaking, the evaluation of agri-food competitiveness essentially revolves around export-oriented and export-import-related indices. A comprehensive listing of the frequently employed indices in the reviewed literature can be found in Table 2 for reference.

Table 2. Competitiveness-related indices and data needs for their calculation

Data Need	**Name of the Index**
export	CMS, EMS, RCA
export and import	GL, IIT, RC, RTA
export, GDP per capita	PRODY index

The tabulated information reveals that the predominant indices utilized in the chosen studies were rooted in trade data. Simpler indices exclusively incorporated export data, while more intricate indices integrated import data into their evaluations. A notable outlier is the PRODY index, which merges the RCA index with GDP per capita-based weighting. The selected studies were categorized into two primary groups. The majority delved into matters concerning regions or countries, while a smaller subset scrutinized the competitiveness of individual agri-food products or product clusters. The assessments conducted at the regional and country levels can be bifurcated into two key aspects. Firstly, most of the encompassed articles evaluated either the European Union (EU) or one of its member states, dissecting the pivotal agri-food trade occurrences spanning the last 15 years: the EU accession, the global financial crisis, and the Russian embargo. Findings at the country level suggested that the older member states generally exhibited a more advantageous trade composition with an augmented portion of processed goods. This appears to stand as a crucial facet of agri-food trade competitiveness. The preponderance of EU-centric articles can be attributed to the authors' origin, as a significant portion hailed from European nations.

Secondly, akin methodologies (Balassa-type indices and export and/or import-related indices) were employed to appraise other countries as well. Several of these countries bore close associations with the EU, such as candidate countries, while others maintained substantial trading ties with the EU, like Canada, China, or ASEAN nations.

Considering that agricultural production underpins all trade endeavors, enhancing this sector emerges as a prudent strategy for numerous countries. This can be achieved through more effective and profitable production, horizontal and vertical cooperation, research and development (R&D), innovation and investment, well-developed and efficient infrastructure encompassing logistics, and facilitative legislation and/or trade policies. This alignment intersects in part with the inventory of prominent factors: facilitating legislation and/or trade policies, elevated value addition, and robust, efficient, and lucrative production. Remarkably, this roster was consistent across both Balassa-type indices and export and/or import-related indices.

The ramifications of EU accession on agri-food trade at the product level also garnered significant attention in international literature. At this granular level, the determinants of agri-food trade competitiveness mirror those observed at the country/regional level. It's worth noting that enhancing agri-food competitiveness at the product level is comparatively swifter and more feasible with targeted interventions and policies in contrast to country-level competitiveness. Key and effective measures at the product level encompassed product differentiation, utilization of distinct geographical indications, and promotion of organic production.

Considering future research trajectories, numerous possibilities lie ahead. Incorporating endowments into ongoing analyses might yield divergent conclusions. Employing alternative keywords could yield a distinct sample and subsequently divergent outcomes. Another avenue might involve a focused examination of each major index, considering their applicability to scrutinize other sectors of the economy.

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