

Chapter 5

Trade Integration and Liberalization: Possible Solutions to Keep Food Supply Chains Alive



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Abstract Exploration and better exploitation of comparative and competitive advantages in the agricultural sector contribute to the increases and structural changes in food production, processing, and export. Investigations of such opportunities are particularly relevant for smaller countries of Eastern Europe, which possess significant advantages in agricultural production compared to bigger and more developed EU producers, but often fail to translate them into a stable competitive position in the global market. This chapter analyzes performances of the fourteen Danube region countries along major macroeconomic parameters (GDP, inflation, unemployment, and shares of public debt, external debt, FDI, current account deficits, exports, and imports in GDP). In the case of the Republic of Serbia, the authors estimate the level of specialization and comparative advantage in agricultural exports and analyze the volume and foreign trade balance between Serbia and the EU and the CEFTA. The Balassa index (Revealed Comparative Advantage) and the Grubel-Lloyd index of intra-industrial exchange are used to identify and measure Serbia's comparative advantages across twenty-five categories of agricultural and food products in 2015–2020. The findings on individual levels of comparative and competitive advantages can be used in a cross-section analysis of the agricultural sector performance and planning of future foreign trade developments.

Keywords Agricultural products · Danube region countries · International trade · Macroeconomic performance

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5.1 Introduction

The economic development of a country is conditioned by a number of internal and external (international) factors. Apart from conventional determinants of economic growth such as labor force, capital, production funds, investments, and other economic resources, development has been increasingly driven by education, research, innovation, and technical progress amid progressing globalization (Devetaković et al., 2009). One of the key features of the contemporary global economy is the growing connection between economies through trade. A crucial impact of the latter on economic growth has become particularly obvious in recent decades in the course of a booming intercontinental exchange of goods and services (Makhmutova & Mustafin, 2017).

In the XX century, the growth of the global trade was mainly attributed to developed economies, but on the wave of trade liberalization in the 1990s-2000s, developing economies have been able to significantly increase their contribution to overall trade turnover (Schneider, 2005). Su and Chang (2011) acknowledge that market reforms and transformations in developing countries and economies in transition share various common characteristics, from institutional changes, which promote a market economy, to practical issues, such as the exchange rate regime and the inflow of foreign direct investment. In the course of transformation, countries have launched various programs and adopted a wide range of monetary and fiscal policy measures to be able to increase competitiveness in the global market (Bartlett, 2009). For many of developing and transition economies, accession to the World Trade Organization (WTO), the unification of trade rules, easier access on markets, and specialization in the production of and trade in food and agricultural products has turned out to become key factors of economic growth (Adnan et al., 2013; Koester, 1993). These development speak to the fact that economic growth and development largely depend on the degree of trade openness, but also the willingness of policymakers to implement measures that promote the development of export-oriented production and trade (Eriş & Ulaşan, 2013). Developed and developing countries have been strengthening contacts not only in the economic sphere but also in technologies and other activities (Eaton et al., 2016).

The importance of international trade is huge because it primarily allows countries to receive products and services designed and produced abroad and thus learn about the cultural and historical heritage of other countries (Grupe & Kušić, 2005; Reinsdorf, 2010). According to Anderson et al. (2016), the role of trade in the development of many countries has increased in past decades. Export and import prices have become principal factors in determining real consumption capabilities of nations, making information on the effects of prices volatilities an integral part of the story of macroeconomic developments (Aristei et al., 2013; Cvijanović & Mihailović, 2016; Ignjatijević, 2011; Ignjatijević et al., 2010). Grandov (2009) indicates a permanent increase in international trade and direct investment, i.e. international capital on the global level. Waugh and Ravikumar (2016) and Auer (2016) emphasize that the value of exports has become an indicator of the degree of a country's involvement

in global supply chains, while the share of total production in exports is a good indicator of involvement in international trade (Qiang et al., 2019). According to Osei-Assibey and Dikgang (2020), participation in global production and supply chains is a precondition for efficient and stable development. International trade causes structural changes in the economy, spurs technical and technological development, and improves the balance of payments and internal stability of the economy (Barker, 1977). A country can expect a long-term increase in its share in the world trade and improvement of international exchange by achieving timely and necessary structural changes and adjustments to the requirements of the international market, taking into account the development of the so-called propulsive activities (branches) (Acin, 1995). Propulsive branches are those where an increase in production and trade is most probable (Fedchyshyn, 2020).

Theories of international trade have attempted to answer the questions about the effects of transport, production, consumption, price levels, resource allocation, and other trade-related factors on national welfare (Božić & Nikolić, 2020; Kyereme, 2002). Specialization has been recognized to be one of the principal issues in international trade (Balogh & Jámor, 2020). Competition in trade is different from that in sports. In trade, competitiveness is not a one-time effort, it is based on a variety of long-established factors, advantages, and weaknesses of a country (Čavić et al., 2020). As stated by Mankju (2008), trade allows specializing in those activities that can give the best results. Trade also allows more diverse shopping at lower prices. Countries benefit from the ability to trade with each other and specialization in their best activities. However, trade-related benefits can vary depending on the level of development of a country, its specialization in the global market, and a set of comparative and competitive advantages. Studies on improvement of trade opportunities are particularly relevant for smaller or less developed countries, which may possess significant advantages in agricultural production compared to bigger and more developed producers, but fail to translate them into strong competitive positions in the market (Cvijanović et al., 2016). This chapter aims to analyze performances of the fourteen Danube region countries in the production of and trade in food and agricultural products by using the Republic of Serbia as an example of how a smaller economy can benefit in international supply chains from the exploitation of its agricultural potential.

5.2 Economic Performance of Danube Region Countries and Serbia

Proceeding from the previously discussed relationship between economic growth, gross domestic product (GDP), and foreign trade, we start with studying the existence of a significant conditionality between these three categories of parameters to see if an increase in exports has affected GDP growth in Danube region countries.

Trade effects on GDP have been addressed by many scholars. Amavilah (1998) placed special emphasis on revealing the influences of international trade on economic growth and employment between developing and developed countries. The study demonstrated the existence of such a relationship in the Germany-Namibia trade and also suggested that public expenditures were important for forecasting economic growth and positively affecting foreign direct investment (FDI). On the contrary, Raičević et al. (2016) shown that FDI, public debt, and openness harmed economic growth in the Republic of Serbia. Bergsten (2011) examined export liberalization and the significance of trade agreements for export growth and reduction of the foreign trade deficit. GDP growth affects many macroeconomic parameters, including qualitative and quantitative growth of employment. Vladošić et al. (2020) investigated the goals of macroeconomic stability and revealed the relationship between employment and economic growth in the EU countries. Angeloni et al. (2007) conducted a comprehensive analysis of the macroeconomic of individual EU member states with special emphasis on reduced inflation as a significant factor of GDP per capita growth. Su and Chang (2011) concluded that economic transformations in the countries of Central and Eastern Europe (CEE) had shared various common features, ranging from institutional changes promoting a market economy to practical issues like the exchange rate regime or the inflow of foreign direct investment to industries with comparative advantage.

5.2.1 Methodology and Data

The paper uses data from the International Trade Centre (2021), the World Bank (2001), and the Statistical Office of the Republic of Serbia (2021) for 2015–2020. We compared macroeconomic indicators of the Danube region countries and identified similarities and differences in the impact of trade on economic performance in the fourteen economies. The dependence of a country's economy and food supply on international trade is estimated based on the portion of international trade turnover in the composition of the GDP. The dependence of the GDP (Y) on exports (X) and imports (M) is represented by Eq. 5.1:

$$x + m = \frac{X + M}{Y} \quad (5.1)$$

where $x + m$ represents the total dependence of a country on international trade turnover.

The average and marginal propensity to exports and imports are represented by a series of Eqs. 5.2:

$$PSI = \frac{X}{Y}; PSU = \frac{M}{Y}; MSI = \frac{\Delta X}{\Delta Y}; MSU = \frac{\Delta M}{\Delta Y} \quad (5.2)$$

where:

M —imports over a year;

X —exports over a year,

Y —gross domestic product.

5.2.2 Macroeconomic Performance of Danube Region Countries

The analysis of fiscal policy measures and the stability of food supply shows that they have influenced the level of production, employment, and consumption. In many of developed economies, that are highly indebted, it is difficult to keep the growth of public expenditures under control. Deficit financing has so far proved to be a low-effective tool for ensuring economic growth. However, it can be useful in supporting the balance especially when the economy faces a drop in demand. Increases in budget deficits are commonly followed by increases in public debts used for covering the former (Komazec & Ristić, 2009). In Danube region countries, the improvement of macroeconomic stability after reforms in the 1990s has positively affected GDP and economic growth, while contributed to the reduction of public spending. Trade liberalization and integration increased the inflow of foreign capital. Some countries of the region still lag significantly in terms of GDP per capita, but they all recorded growth in past decades (Fig. 5.1.).

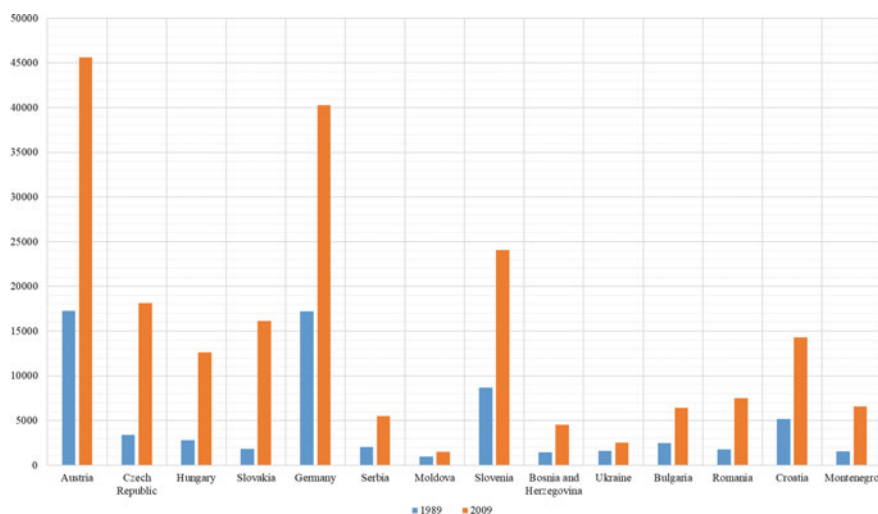


Fig. 5.1 GDP per capita in Danube region countries in 1989–2009. *Source* Authors' development based on World Bank (2021)

Price stability and operation of the public finance sector are some of the results of higher macroeconomic stability. Danube region countries have rather stable economic conditions, stable prices, and low unemployment rates, but a low level of competitiveness in the global market is still a problem for many of them. More developed economies of the region have succeeded to put inflation under control, but Serbia, Romania, and Ukraine continue suffering from rather high inflation (11.45%, 11.53%, and 19.38%, respectively, in 2014–2019) (Table 5.1). In Croatia, Bosnia and Herzegovina, and Montenegro, central banks play a significant role in establishing monetary stability, which has had a positive effect on inflation. To meet the requirements of budgetary discipline, EU member states and Danube region countries have implemented measures to reduce budget expenditures and increase budget revenues. Although the public debt has not yet been reduced to the reference values, the restrictive budget policy should have positive effects on the establishment of market price stability (Đorđević, 2009).

The share of external debt in GDP in 2019 in Ukraine, Serbia, Romania, and Moldova is close to the upper limit of high indebtedness (80%) and represents a threat to macroeconomic stability. In Austria, Germany, Bulgaria, Hungary, Croatia, and Slovenia, the high share of external debt in GDP can be a serious obstacle to further growth and represent an economic burden passed on to future generations.

Table 5.1 Main macroeconomic parameters for Danube region countries in 2014–2019

Countries	Inflation	GDP					Unemployment, total, % of the total labor force
		Public debt	Current account deficit	FDI	Exports	External debt	
Austria	1.73	63.00	2.93	8.33	54.83	200.00	4.63
Bosnia and Herzegovina	4.23	35.63	−12.14	6.50	36.33	48.00	28.27
Bulgaria	6.72	23.32	−15.78	17.66	53.17	99.00	8.40
Czech Republic	2.22	29.22	−2.96	4.83	74.17	45.00	6.62
Croatia	4.43	48.00	−6.19	6.00	41.17	99.00	10.73
Hungary	4.25	66.57	−6.38	21.67	74.67	115.00	6.75
Moldova	9.67	49.83	−10.11	7.00	45.33	79.00	6.40
Germany	0.93	67.07	5.93	1.17	43.83	142.00	9.25
Romania	11.53	19.50	−9.55	6.83	32.33	67.00	6.88
Slovakia	2.32	36.65	−5.49	3.67	79.33		13.38
Slovenia	2.57	27.82	−3.39	2.33	63.67	108.00	5.58
Serbia	11.45	32.80	−15.34	8.17	28.33	80.00	18.07
Ukraine	19.38	17.73	−0.03	5.67	49.50	71.00	7.37
Montenegro	7.00			24.33	40.33		25.20

Source Authors' development based on World Bank (2021)

On the other hand, according to Buturac et al. (2011), rising wages have negatively affected the trade competitiveness of SEE countries, resulting in high current account deficits (11.2% of GDP on average).

A high deficit is a problem for macroeconomic stability. In Serbia, the current account deficit amounts to 15.34% of GDP. It is mainly financed by the inflow of capital funds from FDI. Reduced global liquidity and credit rating declines hinder the inflow of foreign capital and further complicate the economic situation in Bosnia and Herzegovina, Romania, Bulgaria, and Moldova. Due to Serbia's high dependence on imports of raw materials and energy, imports will continue to grow in the foreseeable future. Imports go up due to higher domestic demand for consumer goods and the need for industrial production.

Apart from the high current account deficit, the competitiveness of Danube region countries is negatively affected by high unemployment. Increased labor productivity, privatization, and reduced industrial production have reduced labor demand and driven unemployment. It currently ranges from the lowest 4.63% in Austria to the highest 28.27% in Bosnia and Herzegovina.

5.2.3 Impact of Foreign Trade on the Economy

International trade is one of the principal forms of economic interaction between countries. A high share of exports in GDP indicates the country's dependence on international trade and the importance of trade for domestic development. In Danube region economies, the increase of exports and imports was significantly higher in relation to the GDP growth rate, which influenced the involvement of countries in global production and supply chains and the contribution of trade to GDP. In Slovakia, Hungary, and the Czech Republic, the share of exports in GDP is particularly significant (72.35%, 64.99%, and 63.79%, respectively, in 2015–2020), which indicates a high overall dependence on these countries on trade (Table 5.2). Among Danube region economies, Serbia has the smallest share of foreign trade in GDP (28.33%), which affects economic development with 31.85%. The results indicate that countries with a lower level of openness, i.e. with a smaller share of exports in GDP, have more significant imports, greater dependence on imports, and a higher share of imports in GDP.

In general, Danube region economies face deficits, the highest ones being recorded in Bosnia and Herzegovina, Serbia, and Montenegro. However, Slovakia, Germany, Czech Republic, and Hungary have been able to end up with surpluses.

5.2.4 Macroeconomic Parameters for Serbia

In Serbia, the growth of foreign trade is associated with a significant increase in GDP (annual average of 5.2% in 2011–2018). To a considerable extent, the growth was

Table 5.2 Impact of foreign trade on GDP in Danube region countries

Countries	Relative deficit, 2019	Share of GDP, %, average in 2014–2019	Total dependence on exports and imports, average in 2015–2019	Impact of foreign trade on development, average in 2015–2019
Austria	−0.019	54.83	79.98	39.98
Bosnia and Herzegovina	−0.358	36.33	86.65	43.33
Bulgaria	−0.172	53.17	106.28	53.14
Czech Republic	0.037	74.17	127.58	63.79
Croatia	−0.338	41.17	61.30	30.65
Hungary	0.033	74.67	130.00	64.99
Moldova	−0.436	45.33	105.80	52.90
Germany	0.092	43.83	67.80	33.90
Romania	−0.144	32.33	64.99	32.50
Slovakia	0.004	79.33	144.75	72.35
Slovenia	−0.031	63.67	109.03	54.52
Serbia	−0.316	28.33	63.69	31.85
Ukraine	−0.067	49.50	78.68	39.34
Montenegro	−0.644	40.33		

Source Authors' development based on World Bank (2021)

achieved due to a progressing opening of Serbia's economy to the global market, which indicated the ability of the country to exploit its comparative advantages. However, in 2019, the openness coefficient declined due to the overall reduction in international trade. According to the indicator of trade openness, Serbia's position in the global market is lower than that of neighboring countries. The average propensity to import and export in 2019 amounted to $PSU = 0.732$ and $PSI = 0.379$, the marginal propensity to import and export was $MSU = 2.97$ and $MSI = 1.23$. The marginal propensity to import shows the part of the growth of domestic income excluded from the flow of consumption of domestic products and services. This benefits imports and results in a trade deficit. The cash inflow generated by export is used for the expansion of production, employment, consumption, and, consequently, imports. The percentage of income growth spent in this way is determined by the propensity to spend. In this context, the part set aside for imports is determined by the propensity to import (Komazec & Ristić, 2009).

Our findings indicate a higher value of the marginal propensity to import and a greater impact of imports on the change in national income. Serbia experiences a high foreign trade deficit due to a rather long transition process to the market economy, structural transformations in the economy, and a significant inflow of capital to developed EU countries. Unfavorable economic conditions, inadequate

Table 5.3 Main macroeconomic parameters for Serbia, € million

Year	GDP per capita, € thousand	Export, € billion	Import, € billion	Foreign trade deficit, € billion	Current account deficit, € billion	Coefficient of the economy openness, %	FDI, € billion
2011	1.709	1.923	4.759	-2.836	-0.370	52.1	0.184
2012	2.137	2.202	5.957	-3.755	-1.190	50.9	0.500
2013	2.313	2.441	6.585	-4.144	-1.770	49.8	1.194
2014	2.549	2.832	8.623	-5.792	-3.001	65.8	0.774
2015	2.729	3.608	8.439	-4.831	-2.046	62.8	1.250
2016	3.144	5.102	10.463	-5.360	-2.541	67.6	3.323
2017	3.900	6.432	13.951	-7.519	-5.219	67.6	1.821
2018	4.547	7.429	16.478	-9.049	-7.217	68.4	1.824
2019	4.093	5.961	11.505	-5.543	-2.282	56.4	1.373

Source Statistical Office of the Republic of Serbia (2021)

production systems, low quality of domestic products, insufficient economic incentives, and customs and economic policy also contribute to establishing the foreign trade deficit. Since 2011, Serbia has been continuously increasing exports (by 15.2%) and imports (11.7%), but despite faster growth of exports, Serbia still fails to reach a surplus in foreign trade (Table 5.3).

Serbia recorded a high foreign trade deficit along with a high deficit of current transactions (Stanković et al., 2020). The increase in final consumption conditioned the increase in foreign trade turnover, i.e. imports of goods and services in 2015–2020. The impact of trade openness on economic growth was achieved through FDI and increased labor productivity (Miletić et al., 2019). The resulting current account deficit was financed by foreign capital, loans, and FDI (Slavković & Slavković, 2019). According to Bošnjak (2011), the external imbalance was significantly reduced by remittances contributing 7–8% of GDP. Serbia's total balance of payments was positive, which enabled the growth of total foreign exchange reserves from €2.0 billion in 2011 to €9.2 billion in 2018.

The quality of domestic demand does not stimulate the increase in competitiveness (Stojković & Milićević, 2020). High imports and deficits are the consequence of low savings in the economy and consumption that exceeds disposable incomes. Bošnjak (2011) found that credit and monetary expansion, along with FDI, covered the gap between investment and savings in the private sector, but stimulated consumption and inflation, which further deepened the gap. Also, the fiscal result did not sufficiently reduce the foreign trade imbalance but occasionally increased. The appreciation of the national currency significantly reduced inflation, accelerated the growth of imports, slowed that of exports, and thus contributed to the growth of the foreign trade deficit.

5.3 Export Competitiveness of Serbian Agricultural and Food Products

In the case of Serbia, we studied the level of specialization and comparative advantages in the export of agricultural and food products. The analysis addressed, exports, imports, and foreign trade balance between Serbia, on one side, and the EU and the CEFTA, on the other. The Balasa index (Revealed Comparative Advantage, RCA) and the Grubel-Lloyd index of intra-industrial exchange (GL index) were applied. Serbia's comparative advantages were studied across twenty-five categories of agricultural and food products in 2015–2020.

Acin (1995) underlined that each actor in international exchange seeks to benefit from using the advantages provided by specialization and engage resources in those sectors where products can be produced relatively cheaper compared to foreign residents. Some countries specialize in the production of goods and services based on the absolute differences in production costs. The absolute advantage implies more efficient production measured by labor consumption per unit of output. According to Smith (1937), the natural and acquired advantages of a country affect the achievement of absolute advantages. "As long as one country has advantages comparing to others, it will always be more useful for the others to buy from the former country than to produce itself" (Smith, 1937). Searching for the answer to the question of why some countries perform better in the creation of new competitive products than others, the competitive advantage theory refers to the multidimensional reality of competition, which includes segmented markets, differentiated products, technology diversity, and large-series production (Porter, 1990).

Competitiveness has been abundantly studied for many decades, while the concept of comparative advantages has originated from a situation when many countries participate in international exchange without obtaining absolute advantages in production. Comparative advantage does not imply the existence of competitive advantage at the same time. The theory of comparative advantage was further developed by Balassa (1965). In order to define the comparative advantage, Balassa started from the ratio of participation in exports and the exports-imports ratio and defined the concept of export performance to compare exports in a certain industry in one country with the global exports of similar products (Eq. 5.3):

$$RCA = \left(\frac{X_{ij}}{X_{it}} \right) / \left(\frac{X_{nj}}{X_{nt}} \right) \quad (5.3)$$

where:

- RCA*—revealed comparative advantage;
- X*—exports;
- i*—country;
- j*—product;
- t*—group of products;
- n*—group of countries.

5.3.1 RCA and GL Indexes

The most commonly used variant of the Balassa index is the one that represents the logarithmic value of the relative coverage of imports by exports in certain sectors or products. It was constructed to show comparative advantages of products where exports is bigger than imports (Buturac & Gržinić, 2009) (Eq. 5.4):

$$RCA = \ln \left[\frac{X_i}{M_i} \right] \times \left(\frac{\sum_{i=1}^n X_i}{\sum_{i=1}^n M_i} \right) \times 100 \quad (5.4)$$

where:

RCA —pronounced comparative advantage in year t

X_i —exports of a product i from a country j in year t ;

M_i —imports of a product i to a country j in year t ;

$\sum_{i=1}^n X_i$ —total exports from a country j in year t ;

$\sum_{i=1}^n M_i$ —total imports to a country j in year t .

When a country specializes in the production of goods that it produces cheaper compared to the rest of the world, the RCA value indicates comparative advantages. The higher the RCA value, the bigger the comparative advantage of a country in particular products.

The Grubel-Lloyd Index is used to analyze the level of specialization in intra-industry trade (exports and imports). GL_i^t is the value of the GL index for a product i . X_i^t represents exports, M_i^t —imports. The GL value ranges from 0 to 1. Trade between two countries can be inter-industrial (export or import) and intra-industrial. Intra-industrial exchange is defined as the simultaneous import and export of the same product groups within the same sector. A high GL value indicates high specialization in intra-industrial trade, while a low GL value shows that foreign trade is closer to inter-industrial trade (Grubel & Lloyd, 1975) (Eq. 5.5):

$$GL_i^t = \left(\sum_{i=1}^n (X_i^t + M_i^t) \right) - \sum_{i=1}^n |X_i^t - M_i^t| / \sum_{i=1}^n (X_i^t + M_i^t) \quad (5.5)$$

where:

GL_i^t —intra-industrial trade of sector i in year t ;

X_i^t —exports of a commodity group i in year t

M_i^t —imports of a commodity group i in year t ;

$t \in (2015, 2020)$.

5.3.2 Serbia's Foreign Trade in Agricultural and Food Products

Almost half of Serbia's exports go to the EU market. Exports mainly consists of low-processed primary and labor-intensive products, raw materials, and semi-finished goods. Over the past decade, Serbia has recorded an increase in exports, imports, and foreign trade deficit. However, the increase in trade with the EU has not been accompanied by changes in the composition of exports. Conversely, according to factor intensity, the composition of exports has deteriorated. Compared to 1990, the portion of processed products has decreased, while that of resource-intensive products increased.

The trade openness index represents the ratio of total exports and imports and GDP. It shows the country's dependence on foreign trade. If the index value is above 50%, a country highly depends on foreign trade. With the trade openness index of 68.5% in 2017, Serbia is below the world average in terms of openness to foreign trade. Structural reforms have not resulted in a substantial increase in exports. Trade in food and agricultural products is the only segment in which Serbia enjoys a surplus. During the transition period in the 1990s, Serbia's agricultural trade balance was negative due to international sanctions, customs restrictions, and a low diversified structure of exports. The agricultural trade surplus has been achieved in the course of a preferential trade regime with the EU and liberalization of trade with Western Balkans countries. After 2014, the EU abolished many of customs duties on food and agricultural products from Serbia. Since then, Serbia has been accounting for a large trade surplus with Hungary, Austria, Romania, and France, and other EU member states.

Apart from the EU, Serbia's second-biggest counterpart in food trade is the Central European Free Trade Agreement (CEFTA), which includes (besides Serbia itself) Albania, Bosnia and Herzegovina, North Macedonia, Moldova, and Montenegro. Most CEFTA countries are large and competitive agricultural producers, that is why cooperation with the CEFTA is important for Serbia in terms of its competitiveness not only in the EU but also in the global market.

Our study has shown the increase of Serbia's export by 24.8% and imports by 14.1% per year. The average value of food and agricultural exports amounted to \$1.12 billion. The analysis of foreign trade parameters in 2020 demonstrates an increase in trade value compared to 2015. The most substantial growth is recorded for non-alcoholic beverages, milk and dairy products, cheese and urda, and wheat flour and flour (Table 5.4).

Table 5.4 Changes in Serbia's exports and imports by categories, 2020 compared to 2015, %

Product categories	2020 compared to 2015	
	Exports	Imports
Corn in grain	224.34	95.32
Fruits and fruit products	80.73	115.62
Sugar, molasses, and honey	21.76	-53.33
Solid vegetable fats and oils	263.44	229.50
Cereal products	104.28	6.34
Non-alcoholic beverages	668.71	113.13
Wheat in grain	348.46	298.41
Alcoholic beverages	120.73	71.31
Edible and processed products	109.93	-11.08
Vegetables fresh, frozen, and processed	111.49	72.90
Fodder	299.41	-23.22
Chocolate	93.85	4.32
Milk and dairy products	538.85	236.97
Processed vegetables	83.83	62.47
Wheat flour	432.65	2767.57
Fruit and vegetable juices	6.38	-1.27
Meat and canned products	71.20	194.00
Cheese and urda	498.83	356.13
Spices	104.44	62.14
Flour from other cereals	234.21	-45.61
Animal and vegetable fats and oils	82.63	17.48
Butter	346.61	750.78
Animal raw materials	400.00	17.68
Barley in grain	248.55	-99.70
Other cereals	156.17	204.35

Source: Statistical Office of the Republic of Serbia (2021)

5.3.3 *Comparative Advantages and Index of Intra-Industrial Exchange of Food and Agricultural Products*

The study of comparative advantages is carried out in a form of dynamic analysis (RCA index) at the level of product categories (level of aggregation of 3 digits SITC).

This gives an assessment of the export potential of major agricultural products. Based on the RCA value, product categories can be classified as follows:

- $0 < RCA \leq 1$ —average advantage;
- $1 < RCA \leq 2$ —strong advantage;
- $RCA > 2$ —exceptional advantage.

The results show that raw materials and low-processed consumer products have comparative advantages in trade. Product categories, for which foreign trade balance is positive, commonly demonstrate higher RCA values. In 2020 compared to 2015, comparative advantages improved for most of the categories of food and agricultural products. This can be attributed to a more substantial growth of exports compared to imports. The analysis of the index of intra-industrial exchange and the index of comparative advantage shows that in 2020, product categories with inter-industrial exchange showed the highest level of expressed comparative advantage. The application of the Grubel-Lloyd method at the level of product categories indicates high openness to food trade, diversification of food trade composition, and the high significance of exports and imports in certain sectors. Out of twenty-five product categories included in the study, thirteen demonstrate intra-industrial character and nine—inter-industrial character. High values of the GL index for product categories (0.88 and 0.99) indicate that the values of imports and exports are approximately equal (Table 5.5; Fig. 5.2).

The production and processing of fruits and vegetables are particularly promising in Serbia due to the high comparative advantages recorded in these sectors. This potential should be used to improve Serbia's competitive position in the global food market. The competitiveness can be increased based on a recognizable quality of goods with a protected geographical origin, unique foods produced in the traditional way, and certified organic products, all of which are demanded in the EU market and can be supplied overseas.

5.4 Conclusion

In this chapter, we analyzed the performances of the fourteen Danube region countries in the production of and trade in food and agricultural products. In the case of the Republic of Serbia, we estimated the level of specialization and comparative advantages in agricultural exports across twenty-five categories of agricultural and food products in 2015–2020 to see how a smaller economy can benefit in the global supply chains from the exploitation of its agricultural potential. Exceptional comparative advantages are revealed for barley in grain, wheat in grain, groats, flour from other cereals, corn in grain. Several categories of food and agricultural products demonstrate strong comparative advantages, including sugar, molasses, and honey, non-alcoholic beverages, solid vegetable fats and oils, wheat flour, and fruits and fruit products. In the remaining sectors, Serbia possesses weak comparative advantages (milk and dairy products except for butter, cheese and urda, flour products, processed

Table 5.5 The RCA and the GL values per categories of food products in Serbia in 2015–2020

Product categories	RCA		GL	
	Type of advantage	Value, $\Delta 2020/2015$	Type of exchange	Value, $\emptyset 2020/2015$
Barley in grain	Exceptional comparative advantage	3.97	Inter- and intra-industrial exchange	0.00
Wheat in grain		0.97		100.00
Flour from other cereals		1.53		22.22
Corn in grain		0.91		50.00
Wheat flour	Strong comparative advantages	-0.25		50.00
Sugar, molasses, and honey		0.84		41.38
Solid vegetable fats and oils		0.46		86.67
Fruits and fruit products		0.32		125.00
Non-alcoholic beverages		0.91		33.33
Spices		0.32		83.33
Cereal products	Average comparative advantages	0.44	Inter- and intra-industrial exchange	65.00
Fruit and vegetable juices		0.19		94.64
Alcoholic beverages		0.22	Intra-industrial exchange	84.81
Fodder		0.81		121.82
Processed vegetables		0.16	91.89	
Other cereals		0.03	113.11	
Chocolate		0.36	71.72	
Animal raw materials		0.34	72.73	
Milk and dairy products		0.35	80.65	
Cheese and urda		0.19	84.44	
Vegetables fresh, frozen, processed		0.14	89.36	
Meat and canned meat products		-0.19	140.98	
Butter		-0.24	151.72	
Edible and processed products		0.37	165.00	

(continued)

Table 5.5 (continued)

Product categories	RCA		GL	
	Type of advantage	Value, $\Delta 2020/2015$	Type of exchange	Value, $\bar{\text{O}}2020/2015$
Animal and vegetable fats and oils		0.19		125.32

Source Statistical Office of the Republic of Serbia (2021)

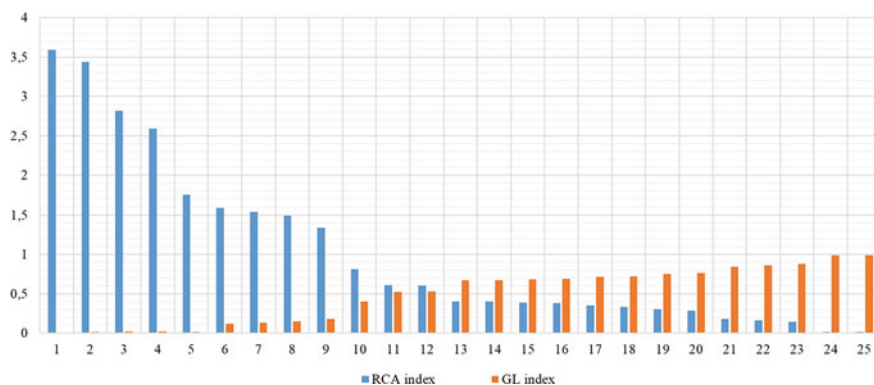


Fig. 5.2 The RCA and the GL values of SITC rev.3 product categories in Serbia in 2020. *Note* 1—barley in grain; 2—wheat in grain; 3—flour from other cereals; 4—corn in grain; 5—wheat flour; 6—sugar, molasses, and honey; 7—solid vegetable fats, oils; 8—fruits and fruit products; 9—non-alcoholic beverages; 10—spices; 11—cereal products; 12—fruit and vegetable juices; 13—alcoholic beverages; 14—fodder; 15—processed vegetables; 16—other cereals; 17—chocolate; 18—animal raw materials; 19—milk and products; 20—cheese and urda; 21—vegetables fresh, frozen, processed; 22—meat, canned products; 23—butter; 24—edible and processed products; 25—animal and vegetable fats and oils. *Source* Authors' development based on Statistical Office of the Republic of Serbia (2021)

vegetables, fruit and vegetable juices, spices, alcoholic beverages, chocolate, and animal fodder.

The government should stimulate investment in the construction of new and upgrade of existing production facilities through subsidized loans and fiscal policy measures. The analysis of foreign food trade at the level of SITC commodity groups with implementation of the Grubel-Lloyd method shows high trade openness, diversification of food trade composition, and the high significance of exports and imports in certain sectors. Many of categories are revealed to have an intra-industrial character in terms of the GL index, where the values of imports and exports are almost equal: alcoholic beverages, animal fodder, processed vegetables, cereals, chocolate, animal raw materials, milk and dairy products, cheese and urda, fresh and frozen vegetables, meat and canned meat products, butter, edible products and cereals, and animal and vegetable fats and oils. Barley, wheat, corn, flour from wheat and

other cereals, sugar, fruits and fruit products, non-alcoholic beverages, and spices are inter-industrial categories.

The dynamic analysis shows an improvement in Serbia's comparative advantages in the production of and foreign trade in food and agricultural products. To increase exports, Serbian farmers should adjust their production to the requirements of domestic consumers and foreign counterparts in terms of quality, quantity, and prices.

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