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prof. dr hab. Anna Wziątek-Kubiak[1]
Institute of Economics
Polish Academy of Sciences

dr Marta Adamiv[2]
Department of Foreign Trade and Customs
Lviv Polytechnic National University
Scholarship holder at the Institute of Economics
Polish Academy of Sciences

Changes in Ukraine's foreign trade as a reflection of its progress in integration with the European Union[3]

Introduction

Ukraine's integration into the European Union (EU) has been an essential element of the country's domestic and international policy for many years. After years of consultations, negotiations, and internal perturbations, Ukraine signed an Association Agreement with the EU in 2014. Since January 1, 2016, both parties have implemented their Deep and Comprehensive Free Trade Agreement (DCFTA) as part of this Association Agreement. These processes have been accompanied by economic reforms, the alignment of Ukrainian legislation with that of the EU, and structural changes reflecting the progress of its integration into the EU. Ukraine was granted EU candidate status in June 2022, and the European Commission will monitor its progress as part of a regular enlargement package.

[1] Correspondence address: ul. Nowy Świat 72, 00-330 Warsaw; e-mail: hkubiak@inepan.waw.pl. ORCID: 0000-0003-0516-1391.

[2] Correspondence address: ul. Nowy Świat 72, 00-330 Warsaw; e-mail: madamiv@inepan.waw.pl. ORCID: 0000-0001-5506-0404.

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Economic theory and international experience show that foreign trade and its performance is an essential factor and measure of a country's development, including progress in international integration. The foreign trade performance of an EU candidate country reflects changes in its ability to compete in both the EU and domestic markets. If a country can penetrate the EU market and cope with import competition from EU firms before full membership without the benefit of protective measures such as tariffs or subsidies for domestic producers, then once it becomes a member of the EU, it will be able to withstand competitive pressure from foreign firms and continue to grow. Hence, the EU's accession criteria, known as the Copenhagen criteria, state that to become a member of the EU, a country must prove that it has, among other things, the capacity to cope with competitive pressure and market forces within the EU. The candidate country's goods must, therefore, be competitive.

The paper aims to show that the fundamental restructuring of Ukraine's foreign trade that accompanied its progressive integration into the EU reflected changes in the competitiveness of the Ukrainian economy. So, we show that the progress of Ukraine's integration into the EU resulted from changes in the competitiveness of its production on the EU market. To assess it, we used several measurement metrics. Even though the study encompasses the years 2010–2021, which is before Russia invaded Ukraine and the destruction of a considerable part of its production potential, the intangible part of this potential, specifically knowledge, skills, and understanding of the European market and how it works, endures and can be utilised in the future. However, that will require an influx of capital and technology.

The paper consists of three parts. In the first part, we show the radical changes in geographical trade flows between 2010 and 2021. In the second part, we focus on the changes in the commodity structure of Ukraine's trade with the EU: its concentration and deepening specialisation. In the third part, we estimate the changes in Ukraine's trade competitiveness in the EU market using different measurement metrics. The work closes with the conclusions of the analysis.

Literature review

To date, research on Ukraine's EU integration can be roughly divided into two main groups. The first group focuses on the opportunities and challenges for the Ukrainian economy within the DFTCA and the impact of signing the Association Agreement with the EU (Grytsenko et al., 2021; Savelyev et al., 2021; Soroka, 2022). This group of papers analysed the directions of changes in Ukraine's foreign policy, including foreign trade (Babenko et al., 2019; Balezentis, Yatsenko, 2018; Ruzhynskas, 2022) and regional policy (Babenko et al., 2020; Nowakowska et al., 2022) that will accompany its integration into the EU. These papers focus on

Ukraine's EU integration processes and their impact on its development rather than increasing its ability to compete in the EU market, which marks its progress towards integration.

The second group of papers (Artamonova, 2019; Palinchak et al., 2023; Pliushch, 2020; Shnyrkov et al., 2020; Totska, 2023) examines trends in developing Ukraine's foreign trade with the EU. Some papers (Dankevych et al., 2018; Matyushenko et al., 2018) focus on the prospects for developing Ukraine's foreign trade with the EU in the agricultural sector. In turn, Artamonova (2019), analysing the changes in Ukraine's foreign trade with the EU, assesses the possibilities and directions of its development in the EU market. Palinchak *et al.* (2023) and Totska (2023) examine the impact of the Russian-induced war on Ukraine's foreign trade characteristics. Using a gravity model, Pliushch (2020) estimates the impact of various factors on Ukraine's trade with the EU.

The works cited above do not examine and show the relationship between changes in Ukraine's foreign trade, especially the level and changes in product competitiveness, and the country's progress towards EU integration. The findings of Shnyrkov *et al.* (2020) appear to be complementary from the perspective of the topic addressed in this paper and the research results. Indeed, they show the impact of the integration of the Ukrainian economy into the EU and the significant reduction of Russia's share in Ukraine's foreign trade. Due to the very high concentration of the commodity structure of Ukrainian exports to the EU market, the impact of trade diversification on the progress of the integration of the Ukrainian economy into the EU is negligible. However, it is difficult to expect the Ukrainian economy to progress further towards EU integration without progressive trade diversification. This means that diversification of the commodity structure of Ukraine's foreign trade is becoming a requirement for the future.

Reorientation of the geographical structure of Ukraine's foreign trade in 2010–2021

Since gaining independence in 1991, Ukraine's foreign trade has heavily depended on one partner, Russia. Over time, especially since 2010, the geographical structure of Ukraine's exports and imports has changed radically (Table 1 and Table 2). In 2010, Russia was the leading buyer of Ukrainian goods (with a share of 26.12%) and a source of foreign supplies, and its share in Ukraine's exports was similar to that of the 28 EU countries. The share of other countries in Ukraine's exports did not exceed 6%. Since 2012, Russia's share of Ukraine's goods exports has started to decline rapidly in favour of the EU and China. Besides Russia, the shares of Belarus, Kazakhstan, Iran, and Lebanon also decreased significantly over that period (Table 1).

In 2014, the EU's share of Ukraine's goods exports was nearly twice that of Russia's; in 2021, it was eight times higher. In 2021, the value of Ukraine's goods exports to Poland and Italy was higher than to Russia. This year, Ukrainian exports of goods to the EU were concentrated on deliveries to four countries (Poland, Italy, Germany, and the Netherlands), accounting for almost 50% of Ukrainian exports to the EU. The shares of China, India, and the USA in Ukrainian goods exports also increased strongly between 2010 and 2021 (Table 1).

Table 1. Geographical structure of Ukraine's exports of goods in 2010–2021, in %

Country	2010	2014	2016	2020	2021
Russia	26.12	18.18	9.88	5.5	5.02
Belarus	3.69	3.00	2.48	2.71	2.17
Kazakhstan	2.53	1.98	1.1	0.68	0.64
Lebanon	2.01	0.51	0.93	0.67	0.57
Iran	2.00	1.31	1.94	0.53	0.92
EU, including	25.38	31.54	37.12	37.82	39.36
Poland	3.48	4.91	6.05	6.65	7.68
Italy	4.69	4.58	5.31	3.92	5.1
Germany	2.92	2.95	3.92	4.21	4.21
Netherlands	1.1	2.05	2.74	3.66	3.32
Spain	0.8	2.16	2.76	2.54	2.46
Hungary	1.67	2.8	2.9	2.57	2.38
Romania	1.37	1.08	1.97	2.2	2.27
Czech Republic	1.22	1.43	1.54	1.68	2.08
China	2.56	4.96	5.04	14.43	11.76
Turkey	5.88	6.61	5.64	4.95	6.09
India	2.77	3.37	5.23	4.01	3.66
Egypt	2.58	5.31	6.23	3.29	2.86
Japan	0.2	0.39	0.51	0.37	0.51
USA	1.58	1.24	1.17	2.0	2.37
Canada	0.14	0.13	0.08	0.17	0.24

Source: own calculations based on data from the State Statistics Service of Ukraine.

Table 2 shows the reorientation of Ukrainian imports over 11 years (2010–2021). In 2010, Russia was also the largest foreign supplier of goods to Ukraine (with a share of 36.6%), and its share in Ukraine's imports of goods was only 5.1 percentage points higher than that of the EU. The shares of the other countries did not exceed 8%.

However, between 2010 and 2021, Russia's share in Ukraine's imports of goods was reduced to a quarter of its previous level (from 36.6% to 8.4%), and from 2020 it fell below Germany's share. During this period, the EU's share increased by a third (from 31.5% to 39.8%). At the same time, most EU countries increased their share of Ukrainian imports. China's share of Ukraine's imports doubled (from 7.7% to 15.1%), and the shares of the USA, Turkey, and Switzerland also increased strongly (Table 2). In 2021, Ukraine's imports of goods from the EU were concentrated on supplies from three countries (Germany, Poland and Italy), and their share of Ukraine's imports from the EU was close to 50%.

Table 2. Geographical structure of Ukraine's imports of goods in 2010–2021, in %

Countries	2010	2014	2016	2020	2021
Russia	36.55	23.33	13.12	8.36	8.35
Belarus	4.23	7.3	7.08	5.29	6.62
Kazakhstan	1.26	0.7	1.11	0.78	1.16
EU, including	31.45	38.71	43.67	43.91	39.75
Germany	7.58	9.85	11.0	9.83	8.63
Poland	4.59	5.64	6.86	7.62	6.81
Italy	2.29	2.77	3.46	3.92	3.67
France	1.82	2.33	3.9	2.7	2.42
Hungary	2.00	2.69	2.04	2.58	2.16
Czech Republic	1.23	1.26	1.67	1.77	2.03
Lithuania	1.05	1.9	1.25	1.5	1.77
Netherlands	1.38	1.4	1.39	1.38	1.39
Romania	1.12	1.56	0.97	1.26	1.09
Spain	0.77	1.12	1.28	1.35	1.34
Slovakia	0.73	0.78	1.11	2.1	1.27
Great Britain	1.35	1.27	1.81	1.35	1.53
China	7.74	9.94	11.94	15.31	15.08
Switzerland	0.84	0.96	2.51	1.61	3.43
Turkey	2.14	2.39	2.8	4.45	4.48
Japan	1.32	1.13	1.41	1.98	1.68
India	1.12	1.21	1.24	1.33	1.32
Egypt	0.14	0.17	0.12	0.15	0.2
USA	2.91	3.54	4.3	5.65	4.58
Canada	0.26	0.35	0.55	0.37	0.36

Source: own calculations based on data from the State Statistics Service of Ukraine.

The strong reorientation of Ukraine's foreign trade in goods was very much, if not decisively, influenced by the conflict with Russia in 2014, caused by the annexation of Crimea and Russia's seizure of Ukraine's eastern regions. The largest decrease in the share of Ukrainian exports to Russia was recorded between 2013 and 2015 (by almost 47%) and for imports between 2014 and 2016 (by almost 44%). At the same time, in 2014, Ukraine signed the Association Agreement with the European Union. As a result, the implementation of the Deep and Comprehensive Free Trade Area Agreement (DFTCA) began on January 1, 2016. It introduced several preferences for Ukrainian companies, such as the abolition of customs duties on Ukrainian goods, facilitating their access to the EU market, and helping to improve their competitiveness in this market.

As mentioned above, the sharp decline in Russia's share of Ukraine's foreign trade in goods between 2012 and 2021 was accompanied by a substantial increase in the shares of EU countries (especially Poland and Germany) and China. However, the reorientation of the geographical structure of Ukraine's exports of goods to the EU was more substantial than that of its imports. Indeed, the EU's share of Ukraine's exports of goods increased by 55%, while Ukrainian imports rose by 26%. If in the exports of Ukraine's goods, the place of Russia and other countries (see Table 1) was taken mainly by EU countries, China, and the USA, then in imports against the background of the decrease in Russia's share, in addition to the countries mentioned above, the shares of Switzerland and Turkey also increased substantially. These changes demonstrate the gradual decoupling of Ukraine's trade with Russia and a shift in the direction of Ukraine's foreign trade, mainly towards the EU. All in all, the directions of changes in the geographical structure of Ukraine's foreign trade in goods after 2010 were similar to those in the early 1990s in the post-socialist countries that became EU members in 2004 (Kamiński et al., 1996).

Changes in the commodity structure of Ukraine's foreign trade with the European Union in 2012–2021

Changes in the shares of EU countries in Ukraine's foreign trade have inevitably been accompanied by changes in the commodity structure of this trade. The long-term dependence of Ukraine's exports on Russia has led to a concentration of its commodity structure on raw materials and low-processed products (Table 3). Between 2012 and 2021, raw materials and other manufactured goods, according to the SITC classification, accounted for more than 50% of Ukraine's exports to the EU. During the period under review, their share in the supply of Ukrainian goods to the EU market increased from 55% to 66%. This indicates a growing concentration of Ukrainian exports of goods to the EU (see Figure 1), demonstrating Ukraine's deepening export specialisation in these commodities.

Table 3. Changes in the commodity structure of Ukraine's exports to the EU in 2012–2021, in %

Commodity groups, according to SITC	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Food and drink	16.08	15.67	17.42	20.80	17.83	17.90	20.11	21.47	19.02	14.11
Raw materials	25.17	26.12	24.24	24.00	26.36	27.78	26.44	29.84	30.06	30.71
Energy	10.49	8.21	7.58	4.00	3.88	5.56	3.45	3.66	3.07	3.73
Chemicals	4.90	3.73	3.79	4.00	3.10	3.09	3.45	3.66	3.68	4.56
Machinery and vehicles	10.49	9.70	10.61	11.20	11.63	11.73	12.64	12.04	13.50	10.37
Other manufactured goods	30.07	32.84	32.58	32.00	33.33	31.48	32.76	28.80	30.67	35.68
Other goods	3.50	4.48	3.79	4.00	3.10	3.09	1.72	1.05	0.61	0.41
Total	100	100	100	100	100	100	100	100	100	100

Source: own calculations based on Eurostat data.

In contrast, commodity groups integrated into global supply chains by added value account for a much smaller share of Ukrainian exports to the EU. These are mainly goods in the machinery and vehicles group according to the SITC classification. During the period under review, their share ranged from 9.5% to 13.5%. However, apart from 2021, between 2012 and 2020, the shares of machinery and vehicles (almost 29%) and food and drink (nearly 19%) in the supply of Ukrainian goods to the EU market increased, even though the EU was a net exporter of these products.

The literature (Finger, Kreinin, 1979; Herfindahl, 1955; Oliver, Hirschman, 1946) mainly uses three indicators to measure exports' degree of concentration (diversification). These are the normalised Hirschman index of export concentration, the Herfindahl index of export diversification, and the index of absolute export deviation. In this paper, we will use the normalised Hirschmann concentration index. This indicator (H_{jt}) measures the extent to which a country's exports are concentrated in a small number of products. It is calculated using the following formula (Oliver, Hirschman, 1946):

$$H_{jt} = \frac{\sqrt{\sum_{i=1}^{n}\left(\frac{x_{it}}{X_{jt}}\right)^2} - \sqrt{\frac{1}{n}}}{1 - \sqrt{\frac{1}{n}}}, \qquad (1)$$

where:

x_{it} – value of the country's j exports of goods within the commodity group i during the period t;

X_{jt} – value of the country's j total exports of goods during the period t;

n – number of commodity groups.

The normalised Hirschmann concentration index takes values from 0 to 1. The higher the indicator's value, the more concentrated the export commodity structure of a country.

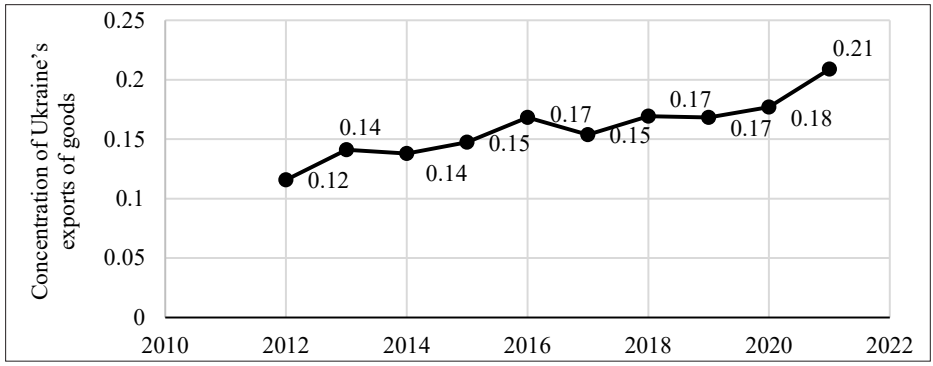

Figure 1. Concentration of Ukraine's exports of goods to the EU in 2012–2021

Source: own calculations based on Eurostat data.

Between 2012 and 2021, the concentration rate of Ukrainian supplies to the EU market increased (Figure 1). This resulted from an increase in the shares of raw materials and other manufactured goods in Ukraine's exports to the EU (see Table 3). Given that Ukraine's exports in the period under review were mainly based on raw materials and low-processed products, the increase in the concentration of the country's exports may reflect an underperforming trend in changes in the country's commodity structure.

Machinery and vehicles accounted for the largest share of Ukraine's imports from the EU between 2012 and 2021 (Table 4). These imports were much higher than other manufactured and chemical product shares. The shares of chemicals, machinery, and vehicles in Ukraine's imports from the EU hardly changed during the period under review. At the same time, the largest increase in Ukraine's share of imports from the EU was recorded in the agri-food sector (almost 28%). Overall, changes in the commodity structure of Ukraine's foreign trade with the EU have not been as strong as in its geographical structure.

Table 4. Changes in the commodity structure of Ukraine's imports from the EU in 2012–2021, in %

Commodity groups, according to SITC	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*
Food and drink	7.73	7.73	8.98	8.03	8.02	7.58	8.37	9.09	11.26	9.89
Raw materials	2.15	2.58	2.40	2.92	3.09	3.03	2.79	2.48	2.60	2.47
Energy	8.15	11.16	11.98	10.22	6.79	8.59	10.23	8.68	6.06	9.54

1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*
Chemicals	19.31	18.88	20.96	21.90	20.37	19.19	19.07	19.01	19.91	19.79
Machinery and vehicles	36.91	33.91	28.74	29.93	35.80	37.37	35.81	36.78	35.93	35.34
Other manufactured goods	24.03	24.03	25.15	24.82	24.07	22.73	22.79	21.90	22.51	21.55
Other goods	1.72	2.15	1.80	2.19	1.23	2.02	1.86	1.65	1.73	1.41
Total	100	100	100	100	100	100	100	100	100	100

Source: own calculations based on Eurostat data.

Between 2012 and 2021, the commodity structure of Ukraine's imports from the EU was more concentrated than its exports to the EU. In 2012, the share of chemicals, machinery, vehicles, and other manufactured goods in Ukraine's imports from the EU was close to 80%, falling slightly to 76.7% in 2021. While Ukraine's deliveries to the EU in 2012–2021 were mainly based on raw materials and other manufactured goods, the commodity structure of Ukraine's imports from the EU was dominated by machinery, vehicles, chemical, and industrial products. This indicates the low competitiveness of the production of electrical machinery and chemical products. As a result, the growing demand for advanced products from these industries, associated with their expansion and modernisation, has been met mainly by supplies from the EU.

Changes in Ukraine's ability to compete with non-EU suppliers of goods on the EU market

When a new country joins the EU, it faces the challenge of building an economy that can compete in the single market. This is due to the Copenhagen criteria defined by the European Council at the Copenhagen Summit in 1993. These include the existence of a market economy and the ability to cope with competitive pressure within the EU market without the support of trade barriers or tariffs.

Merely presenting and analysing the structure of Ukrainian exports to the EU market is insufficient to draw conclusions on the level and changes in the competitiveness of these exports. In the literature, changes in market shares, e.g. the share of exports in a foreign market, are taken as a measure of changes in the competitiveness of a country's goods. It is crucial to bear in mind that the source of changes in the market share of a country's exports can be driven both by the level of competitiveness of those goods and by changes in demand. On the one hand, an increase in demand can increase the presence of less competitive

production in the market. On the other hand, an increase in the competitiveness of production does not always contribute to the rise in its market share. If the demand for a commodity is declining, the market's share of the commodities whose level of competition has increased may decrease with the intensification of competition in the market (Wziątek-Kubiak, 2000).

In this paper, we use changes in the share of a country's exports in the EU's external imports to measure changes in Ukraine's international competitiveness, reflecting the fulfilment of one of the Copenhagen criteria, i.e. coping with competitive pressure.

Between 2012 and 2021, the share of Ukraine's exports in EU external imports increased by nearly 36% and in EU external imports from European (non-EU) countries by almost 62% (Table 5). This suggests an increase in Ukraine's ability to compete with European (non-EU) countries in the EU market. We verify such a conclusion by estimating two measures of international competitiveness: the Balassa index of revealed comparative advantage (Table 7) and the Lafay index (Table 8).

Table 5. Shares of Ukraine's exports in EU external imports in 2012–2021, in %

Shares	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Shares of Ukraine's exports in EU external imports	0.84	0.82	0.81	0.76	0.80	0.92	0.91	0.99	0.95	1.14
Shares of Ukraine's exports in EU external imports from European non-EU countries	2.28	2.19	2.24	2.25	2.42	2.76	2.73	3.06	3.11	3.70

Source: own calculations based on Eurostat data.

The data in Table 5 show that the competitiveness of Ukrainian goods on the EU market improved between 2012 and 2021. This suggests that Ukrainian goods are adapting to the requirements of the EU market.

Between 2012 and 2021, the share of almost all commodity groups except energy in EU external imports increased (Table 6). Raw materials (up by almost 51%) and other manufactured goods (up by nearly 39%) showed the largest increases. Both groups showed the largest increases in their shares of EU external imports (Table 5) and Ukraine's exports to the EU (see Table 3). This may indicate their improving ability to adapt to the growing demand in the EU market.

During the period under review, the share of Ukraine's exports of chemicals, machinery, and vehicles in EU external imports stabilised. At the same time, although the EU was a net exporter of foods and drinks, the share of Ukraine's exports of these goods in EU external imports increased. This suggests an increase in the competitiveness of these products in the EU market compared to non-EU suppliers.

Table 6. Shares of Ukraine's exports in EU external imports by commodity groups in 2012–2021, in %

Commodity groups, according to SITC	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Food and drink	2.44	2.18	2.33	2.37	2.11	2.55	3.03	3.51	2.72	2.92
Raw materials	4.61	4.77	4.49	4.26	5.08	5.75	5.69	7.02	6.15	6.93
Energy	0.28	0.23	0.23	0.17	0.21	0.27	0.15	0.19	0.21	0.24
Chemicals	0.38	0.31	0.30	0.25	0.19	0.21	0.27	0.28	0.27	0.40
Machinery and vehicles	0.35	0.32	0.31	0.27	0.30	0.34	0.37	0.36	0.37	0.38
Other manufactured goods	1.18	1.24	1.14	0.96	1.02	1.14	1.22	1.16	1.12	1.64

Source: own calculations based on Eurostat data.

The literature (Jarosz-Angowska et al., 2022; Matkovski et al., 2021; Smutka et al., 2018) provides various indicators for measuring export competitiveness. The study will focus on two indicators: the revealed comparative advantage (RCA) index of Balassa (1965) and the Lafay (1992) index. Both indicators are used to assess the competitiveness of the country's exports compared to reference countries or the world. Therefore, we will use them to evaluate the competitiveness of Ukraine's exports of specific commodity groups to the EU market compared to non-EU suppliers. Both indicators therefore refine the results of Table 6, which shows changes in the competitive pressure of Ukrainian goods on the EU market relative to goods exported by non-EU countries.

The RCA index is calculated using the following formula (Balassa, 1965):

$$RCA_{nkj} = \frac{E_{nkj}}{E_{kj}} : \frac{I_{nj}}{I_j}, \tag{2}$$

where:

RCA_{nkj} – revealed comparative advantage index of the country *k* in exports of a commodity *n* in the market of the country *j;*

E_{nkj} – value of exports of a commodity *n* from the country *k* to the country *j*;

E_{kj} – the value of the total exports of commodities from the country *k* to the country *j*;

I_{nj} – value of imports of a commodity *n* to the country *j*;

I_j – value of the total imports of commodities to the country *j*.

The RCA index takes on positive values. The results are, therefore, within a range starting from zero, while the upper limit of the range is not defined. An index exceeding 1 indicates the presence of a revealed comparative advantage, while a value not exceeding 1 indicates the absence of such an advantage.

Our calculations in Table 7 show that between 2012 and 2021, Ukraine had a constant relative advantage in exporting raw materials, agri-food products, and other manufactured goods to the EU market compared to non-EU suppliers.

Table 7. Indexes of revealed comparative advantage (RCA) in Ukraine's exports to the EU by commodity groups relative to non-EU suppliers in 2012–2021

Commodity groups, according to SITC	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Food and drink	2.93	2.70	2.85	3.16	2.60	2.80	3.36	3.54	2.89	2.56
Raw materials	5.49	5.84	5.55	5.65	6.40	6.31	6.32	7.15	6.53	6.14
Energy	0.34	0.28	0.29	0.21	0.24	0.31	0.17	0.20	0.24	0.20
Chemicals	0.47	0.34	0.34	0.33	0.25	0.25	0.30	0.30	0.27	0.36
Machinery and vehicles	0.41	0.38	0.39	0.36	0.36	0.37	0.40	0.37	0.39	0.33
Other manufactured goods	1.42	1.51	1.39	1.26	1.27	1.25	1.34	1.18	1.18	1.44

Source: own calculations based on Eurostat data.

Ukrainian raw materials showed a strong comparative advantage in the EU market. It increased by almost 12% over the period under review. Although there was a slight decrease in the value of the RCA index in Ukrainian agri-food exports to the EU between 2012 and 2021, these products retained a moderate advantage over non-EU suppliers (in some years, the value of the RCA index exceeded 2 or 3). The values of the RCA index for other manufactured goods vary slightly from year to year (see Table 7). This indicates a stabilisation of the specialisation of Ukraine's exports to the EU for the commodity groups mentioned.

During the period under review, Ukraine had no comparative advantage in exporting chemicals, machinery, vehicles, and energy to the EU market. The values of the RCA index for these commodity groups decreased steadily.

Leaving aside raw materials, for which the comparative advantage results from natural resource endowments, the agri-food products and other manufactured goods had relatively higher comparative advantages than non-EU suppliers.

Another measure of foreign trade competitiveness used in the literature is the Lafay index (1992). It is one variation of the RCA index of Balassa. It is based on exports and imports of the country's different commodity groups, which means that it also considers the trade balance. A trade surplus in a given commodity group is equivalent to a country's comparative advantage in exporting the goods of this group. At the same time, a deficit implies the absence of such an advantage.

The Lafay index (1992) is calculated using the following formula:

$$LFI_{nkj} = 100 * \left(\frac{E_{nkj}-I_{nkj}}{E_{nkj}+I_{nkj}} - \frac{\sum_{n=1}^{N} E_{nkj}-I_{nkj}}{\sum_{n=1}^{N} E_{nkj}+I_{nkj}}\right) * \frac{E_{nkj}+I_{nkj}}{\sum_{n=1}^{N} E_{nkj}+I_{nkj}}, \quad (3)$$

where:

LFI_{nkj} – Lafay index of a country's *k* foreign trade of a commodity *n* with the country *j*;
E_{nkj} – value of exports of a commodity *n* from the country *k* to the country *j*;
I_{nkj} – value of imports of a commodity *n* of the country *k* from the country *j*;
N – number of commodity groups.

If the value of the Lafay index exceeds zero, a country has a comparative advantage in exporting goods of a given group to a given market compared to other countries. The higher the value of the Lafay index, the higher the degree of specialisation in exporting the goods of a given group to a given market. In contrast, a value of the index not exceeding zero indicates the absence of such an advantage.

Table 8. Lafay indexes of Ukraine's foreign trade with the EU by commodity groups in 2012–2021

Commodity groups, according to SITC	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Food and drink	3.89	3.65	4.16	6.37	4.88	5.08	5.79	6.03	3.71	2.12
Raw materials	10.79	10.84	10.77	10.52	11.58	12.17	11.63	13.42	13.25	14.08
Energy	1.07	-1.37	-2.17	-3.10	-1.44	-1.50	-3.32	-2.50	-1.46	-2.88
Chemicals	-6.82	-7.01	-8.47	-8.93	-8.57	-7.93	-7.64	-7.62	-7.89	-7.55
Machinery and vehicles	-12.51	-11.20	-8.94	-9.34	-11.99	-12.64	-11.32	-12.32	-10.93	-12.38
Other manufactured goods	2.75	4.02	3.66	3.58	4.62	4.29	4.94	3.28	3.87	7.09

Source: own calculations based on Eurostat data.

The data in Table 8 confirm and complement the research results presented above. From 2012 to 2021, Ukraine's exported raw materials stood out as having the highest comparative advantage on the EU market compared to other commodity groups, as measured by the Balassa RCA index and the Lafay index. In different years, the value of the Balassa RCA index for these goods ranged from 5.5 to 7.2, and the Lafay index from 10.5 to 14. The increase in these two indicators for this commodity group indicates a progressive specialisation of Ukrainian raw material exports in the EU market. During the period under review, two other commodity groups (different manufactured goods and food and drink) also had a comparative advantage in Ukraine's exports to the EU compared to non-EU countries. At the same time, the value of the Lafay index for manufactured goods increased over

the period, while for food and drink, it did not show a unidirectional change trend (see Table 8). Between 2012 and 2021, Ukraine had no comparative advantage in exporting machinery, vehicles, chemical products, and energy to the EU market.

Conclusions

International economic integration is inevitably accompanied by changes in the geographical and commodity structure of a country's foreign trade, connecting with changes in the specialisation of production and reflecting changes in the international division of labour. These, in turn, result from differences in levels and changes in the competitiveness of goods. Therefore, one of the conditions for EU membership, formulated in the form of the Copenhagen criteria, is that the candidate country must be able to compete in the EU market.

Between 2010 and 2021, there was a very strong reorientation of the geographical structure of Ukraine's foreign trade. The EU took Russia's place. In 2021, Russia's share in Ukraine's exports of goods was smaller than that of Poland and Italy, and its share in imports was smaller than that of Germany. The changes in the geographical structure of Ukraine's foreign trade since 2010 have been similar to those of the ten post-socialist new EU member states in the early 1990s.

Although the radical changes in the geographical structure of Ukraine's foreign trade with the EU have not been accompanied by equally profound changes in the commodity structure, Ukraine's inherited export specialisation in two groups of commodities (raw materials and other manufactured goods) has deepened. Their share of Ukraine's exports to the EU increased from 55% to 66%. This specialisation reflected the significant and improving competitiveness of these commodity groups, as confirmed by the estimates made in the study. The effect of the comparative advantages of Ukraine's food and drink exports has been to increase their share in the EU's external imports from European non-EU countries and (to a lesser extent) in total extra-EU imports. These three commodity groups, which account for 80% of Ukraine's exports to the EU, have been the main drivers of Ukraine's growth in EU market share and have been crucial to its integration with the EU. The small and almost stable shares of exports of chemicals, machinery, and vehicles in the EU's external imports reflect the need for more competitiveness of these goods. The Balassa and Lafay indexes confirm this. Thus, improvements in the competitiveness of Ukraine's highly specialised exports have had a substantial impact on the country's progress towards EU integration, although this progress has been selective. This suggests that foreign trade performance can be used to assess a country's progress in international economic integration. However, it appears that further integration of the Ukrainian economy into the EU will increasingly depend on the diversification of the Ukrainian economy and exports to the EU.

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Summary

The study aims to assess changes in the ability of Ukrainian goods to compete in the EU market. It reflects Ukraine's progress towards EU integration in the run-up to Russia's attack on Ukraine. Using foreign trade measures, including international specialisation, we show the specifics of Ukraine's integration into the EU. By estimating the level and changes in the market shares of Ukraine's commodity groups in the EU market, we show its progress in penetrating this market compared to non-EU countries. On the one hand, the geographical structure of Ukraine's foreign

trade changed radically between 2010 and 2021. On the other hand, more minor changes in the commodity structure of exports and Ukraine's international specialisation were accompanied by an increased market share of Ukraine's exports in the EU market. It reflected an improvement in the ability of Ukrainian goods to compete, thus fulfilling one of Ukraine's accession criteria. Calculated on the basis of market shares, the increase in the ability of Ukrainian goods to compete is confirmed by estimates of export competitiveness indicators: the Balassa index of revealed comparative advantages and the Lafay index. Levels and changes in the three indicators varied between commodity groups. The increase in the market shares of three commodity groups (raw materials, so-called "other manufactured goods" (medium and low technology) and food products) was accompanied by significant and increasing levels of export competitiveness indicators. The decline in the market shares of other commodity groups was accompanied by low and declining levels of export specialisation indicators. Thus, Ukraine's integration into the EU has so far been based on the expansion of competitive and competitive-enhancing goods, in the production of which Ukraine specialises.

Keywords: Ukraine's foreign trade, Ukraine's integration into the EU, Ukraine's competitiveness, trade specialisation.

Zmiany handlu zagranicznego Ukrainy jako odzwierciedlenie jej postępu w integracji z Unią Europejską

Streszczenie

Celem pracy jest ocena zmian zdolności towarów ukraińskich do konkurowania na unijnym rynku. Odzwierciedla ona postęp Ukrainy w integracji z UE w okresie poprzedzającym napaść Rosji na Ukrainę. Wykorzystując mierniki handlu zagranicznego, w tym międzynarodowej specjalizacji, pokazujemy specyfikę integracji Ukrainy z UE. Szacując poziom oraz zmiany udziałów rynkowych grup towarowych Ukrainy na unijnym rynku, wskazujemy na jej postęp w penetracji tego rynku względem krajów nieunijnych. Z jednej strony, w latach 2010–2021 miały miejsce radykalne zmiany struktury geograficznej handlu zagranicznego Ukrainy. Z drugiej, mniejszym zmianom struktury towarowej eksportu i międzynarodowej specjalizacji Ukrainy, towarzyszył wzrost udziałów rynkowych eksportu Ukrainy na unijnym rynku. Odzwierciedlał on poprawę zdolności ukraińskich towarów do konkurowania, a więc spełnienia przez Ukrainę jednego z kryteriów akcesji. Obliczony, na podstawie udziałów rynkowych, wzrost zdolności do konkurowania ukraińskich towarów potwierdzają szacunki wskaźników konkurencyjności eksportu: ujawnionych przewag komparatywnych Balassa oraz Lafaya. Poziom i zmiany trzech wskaźników konkurencyjności były zróżnicowane między grupami towarowymi. Wzrostowi udziałów rynkowych trzech grup towarów: surowców, tzw. pozostałych wyrobów przemysłowych (o średnim i niskim poziomie technologii) i żywności towarzyszył znaczący i rosnący poziom wskaźników konkurencyjności eksportu. Spadkowi udziałów rynkowych pozostałych grup towarów towarzyszył niski i zmniejszający się poziom wskaźników specjalizacji eksportu. Tym samym dotychczasowa integracja Ukrainy z UE oparta jest na ekspansji towarów konkurencyjnych i zwiększających konkurencyjność, w produkcji których Ukraina się specjalizuje.

Słowa kluczowe: handel zagraniczny Ukrainy, integracja Ukrainy z UE, konkurencyjność Ukrainy, specjalizacja handlowa.

JEL: D40, F10, F15.