

**GEO-ECONOMIC ROLE OF UKRAINE'S FOREIGN TRADE
AND MECHANISM OF ITS IMPLEMENTATION IN THE
CONDITIONS OF EUROPEAN INTEGRATION**

Kropyvnytskyi - 2025

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
CENTRAL UKRAINIAN NATIONAL TECHNICAL UNIVERSITY

**GEO-ECONOMIC ROLE OF UKRAINE'S FOREIGN TRADE
AND MECHANISM OF ITS IMPLEMENTATION IN THE
CONDITIONS OF EUROPEAN INTEGRATION**

Monograph

Kropyvnytskyi - 2025

UDC 339.5:061.1EC](477)

Recommended by the Academic Council of Central Ukrainian National Technical University
(Minutes No. 8 of 28.04.2025)

Reviewers:

Savelyev Y.V. - Doctor of Economics, Professor (West Ukrainian National University)

Mykhailyshyn L.I. - Doctor of Economics, Professor (Vasyl Stefanyk Precarpathian National University)

Geo-economic role of Ukraine's Foreign Trade and Mechanism of its Implementation in the Conditions of European Integration. Monograph / Mytsenko I.M., Babets I.H., Mytsenko V.I., Sokolovska O.M. Kropyvnytskyi, CUNTU, Polygraph-Service, 2025. – 336 p.

ISBN 978-966-2294-99-6

Монографію присвячено дослідженню проблем розвитку зовнішньої торгівлі України в євроінтеграційних процесах. Висвітлено сутність, напрями та рівні зовнішньої торгівлі в умовах гео економічних змін. Визначено загальні закономірності зовнішньоекономічної діяльності та характеризувано генезис теоретико-методологічних засад зовнішньої торгівлі в контексті глобальних трансформацій.

Проаналізовано динаміку географічної структури та зміни у торгівлі товарами з основними країнами-партнерами. У зв'язку з військовою агресією росії проти України, виділено основні дестабілізуючі чинники та окреслено напрями вдосконалення механізму зміцнення позицій зовнішньої торгівлі на світових ринках. На основі поглиблення співпраці України з країнами ЄС з урахуванням мережевої світової економіки, означено перспективну участь України в глобальних ланцюгах доданої вартості в умовах повоєнного відновлення національної економіки.

Для фахівців у сфері зовнішньоекономічної політики, науковців, викладачів та здобувачів усіх рівнів освіти, які цікавляться проблемами зовнішньої торгівлі.

The monograph is dedicated to the study of the development challenges of Ukraine's foreign trade within the framework of European integration processes. It highlights the essence, directions, and levels of foreign trade under conditions of geoeconomic change. The work defines general patterns of foreign economic activity and characterizes the genesis of the theoretical and methodological foundations of foreign trade in the context of global transformations.

The dynamics of the geographical structure and changes in trade in goods with key partner countries are analyzed. In light of russia's military aggression against Ukraine, the main destabilizing factors are identified, and directions for improving the mechanism for strengthening foreign trade positions in global markets are outlined. Based on the deepening of Ukraine's cooperation with EU countries and considering the nature of the networked global economy, the study highlights Ukraine's promising involvement in global value chains in the context of the post-war recovery of the national economy.

For professionals in the field of foreign economic policy, researchers, teachers, and students at all levels who are interested in foreign trade issues.

CONTENTS

INTRODUCTION	6
CHAPTER 1. THEORETICAL FOUNDATIONS OF THE FORMATION OF MECHANISM OF FOREIGN TRADE OF COUNTRIES UNDER EUROPEAN INTEGRATION CONDITIONS ... (Ivan Mytsenko)	10
1.1. The Essence of International Trade and Its Significance for the Economic Development of Countries	10
1.2. The Role of International Trade in Ensuring Development of the National Economy	26
1.3. The Relationship Between Trade Openness and Economic Growth	36
1.4. Trade Liberalization Processes in the EU and Their Impact on the Trade Openness of CEE Countries	45
1.5. International Experience of Implementation of Foreign Trade Strategies ..	54
Conclusions of the Chapter	62
CHAPTER 2. METHODOLOGY FOR STUDYING TRADE ASPECTS OF INTEGRATION PROCESSES (Ivan Mytsenko)	65
2.1. Conceptual Approaches to Defining the Efficiency of Functioning of Countries' Integration Associations	65
2.2. Assessment of Impact of Global Value Chains on Economic Growth	72
2.3. Effectiveness Assessment of Global Value Chains	81
2.4. Methodical Approaches to Assessing the Impact of Trade Openness on Economic Growth	91
2.5. Methodology for Assessing the Balance of Advantages and Threats in a Country's Foreign Trade	99
Conclusions of the Chapter	107

CHAPTER 3. PECULIARITIES OF THE FORMATION OF GLOBAL VALUE CHAINS IN THE CONTEXT OF DEEPENING

INTEGRATION PROCESSES (Valerii Mytsenko)	109
3.1. The Essence and Conceptual Framework for the Formation of Global Value Chains	109
3.2. Global Value Chains as a Basis for the Formation of International Production Networks	125
3.3. Current Trends in the Development of Global Production Networks	144
3.4. Effective Functioning of Global Value Chains in the Face of Increasing Threats	154
3.5. Key Trends in the Participation of Countries in Global Value Chains	162
Conclusions of the Chapter	169

CHAPTER 4. UKRAINE'S PARTICIPATION IN GLOBAL PRODUCTION NETWORKS AND THE PROCESS OF EUROPEAN INTEGRATION (Valerii Mytsenko)

172	
4.1. Degree of Ukraine's Involvement in Global Value Chains	172
4.2. Comparative Analysis of Ukraine's and EU Countries' Integration into Global Value Chains	179
4.3. Factors Determining Participation of Ukrainian Industry in GVCs	188
4.4. The Relationship Between Ukraine's Economic Growth and Participation in the International Production Networks	197
4.5. Prospects for Ukraine's Participation in Global Value Chains in the Post-war Economic Recovery	204
Conclusions of the Chapter	220

CHAPTER 5. TRANSFORMATION OF TRADE OPENNESS AND BALANCE OF UKRAINE IN THE PROCESS OF INTEGRATION

INTO THE EU (Iryna Babets)	224
5.1. Comparative Analysis of Foreign Trade Openness of Ukraine and Central and Eastern European Countries	224

5.2. Main Determinants of Ukraine's Trade Openness in the Context of European Integration	232
5.3. The Impact of Foreign Trade Openness on Economic Growth in CEE Countries and Ukraine	240
5.4. Assessment of the Balance of Ukraine's Foreign Trade	256
5.5. Tools for Maximizing Benefits of the European Integration Process to Improve Ukraine's Trade Balance	280
Conclusions of the Chapter	288
CHAPTER 6. PREREQUISITES, PROBLEMS AND PROSPECTS OF ECONOMIC INTEGRATION OF UKRAINE WITH THE EU	292
(Olena Sokolovska)	
6.1. Assessing the Effectiveness of Economic Integration within the EU	292
6.2. Prerequisites for Deepening Ukraine's European Integration	301
6.3. Problems of Ukraine's Integration into the EU in the Context of War	309
6.4. Transformation of Ukraine's Economy During Wartime and Its Impact on Cooperation with EU Countries	316
6.5. Mechanisms of Enhancing Ukraine-EU Economic Cooperation	325
Conclusions of the Chapter	333

INTRODUCTION

Current stage of international relations development is characterised by deepening integration processes, which lead to strengthening of regionalisation trends as opposed to globalisation of the world economy. The European Union is the most successful integration association in the world, functioning as an economic union, while forming a powerful political grouping of states aimed at maintaining peace in the region, ensuring welfare and sustainable development of all member states. Ukraine's European integration aspirations are primarily driven by the attractiveness of European institutions, which have created transparent conditions for doing business in the EU, strong investment potential, and opportunities for creating and using latest technologies.

Ukraine's accession to the EU has long been viewed by economists and politicians as an objective necessity, and in the current environment, as an important instrument for changing geopolitical situation and strengthening security in Europe. Accordingly, after the full-scale invasion of Ukraine by Russian troops, Ukraine's economic ties with the EU countries have increased, due to both economic and political factors. However, in the context of the war, Ukraine's European integration process faces significant challenges arising from the opposition of some countries to deepening the EU's economic relations with Ukraine in order to protect their domestic markets from Ukrainian goods.

The global economy is undergoing rapid changes that are intensifying globalisation. Development of information and communication technologies has facilitated international commercial and industrial operations. These changes have reduced transaction costs, reduced the risk associated with establishing and maintaining contacts between entities from different countries, and made it easier to coordinate international projects and control production processes. The development of information and communication technologies is accompanied by changes in the regulatory environment, companies' strategies that focus on core competencies, the emergence of new demand patterns, and the systemic liberalisation of international trade and investment. As a result of these processes, the share of foreign trade and

investment within global production networks, which are formed from global value chains, is growing.

Ukraine is a participant in these processes, as evidenced by the high level of economic openness and the ever-growing share of foreign trade in GDP. Branches of multinational corporations operate in Ukraine, and domestic enterprises enter into partnership agreements and carry out export and import operations with suppliers and buyers of goods and services they offer. In the global economy, much of the growth in trade is driven by an increase in trade in semi-finished and intermediate goods between countries. The share of these goods in Ukraine's imports is more than 50%, indicating that the domestic economy is highly integrated into global value chains. At the same time, the involvement of countries in global supply chains has a different impact on the economic growth of countries depending on their level of development and depends on institutional, financial, and technological factors. In this regard, it is important to study Ukraine's participation in global production networks and identify threats and opportunities arising from changes in external and internal factors in the context of deepening cooperation with the EU.

The formation of global value chains has led to a deepening of the vertical division of labour, where countries specialise in certain stages and specific tasks in the production of a particular commodity. As a result of this change, today's competition is not between domestic and foreign goods, but between countries for a place in global value chains, which reduces the importance of the traditional concept of comparative advantage in the production of goods. The growing role of global value chains has changed the conditions for the functioning of the world economy, exerting an increasing influence on the economies of certain countries. However, since global value chains are a relatively new economic phenomenon, the extent of their influence and its consequences for the economies of countries with different levels of development have not yet been fully studied. In this regard, assessing the actual level of Ukraine's participation in global value chains and its impact on the development of domestic industry is an important scientific task, and the relevant conclusions from the analysis may form the basis for making decisions in the field of trade policy, labour

market, international competitiveness or economic growth.

Economic growth in Central and Eastern Europe (CEE) is largely based on foreign trade. After joining the EU, these countries were able to increase national income and fill the gap with Western Europe. Trade liberalisation has increased the level of openness of the national economies of CEE countries, contributed to productivity growth, and boosted exports and imports. Ukraine's foreign trade is mainly linked to the markets of the European Union. Over the past few years, Ukraine's trade with the EU has been liberalised under the Association and Free Trade Area Agreement and a temporary duty-free regime has been introduced, which has a significant impact on both the level of openness of the Ukrainian economy and the country's economic growth. As Ukraine has been granted the status of an EU candidate country, studying the experience of CEE countries is an important component of assessing the impact of trade openness on Ukraine's economic growth.

Foreign trade is a prerequisite for the development of every country and forms the basis for sustainable economic growth, allows for an increase in national income and is often an effective way to reduce disparities in economic development. Each country tries to build its relations with other countries in such a way that its balance of economic, social and political advantages is as large as possible. Ukraine's foreign trade is mainly linked to the markets of highly developed countries, most of which are members of the European Union. In addition to the benefits of geographical proximity and product complementarity, this direction of foreign trade poses a number of threats to the Ukrainian economy. On the one hand, Ukraine's trading partners are rich countries with high per capita incomes, politically stable and reliable in terms of payments, and with a low level of trade risk, while on the other hand, these countries are often characterised by low economic growth, declining consumer demand due to the deteriorating demographic situation, and a stable protectionist policy towards third countries.

Conducting international business in the context of liberalised global capital markets and the movement of production means provides an opportunity to reduce business costs and increase net profit. Export activities in foreign markets are an

important element of the development of foreign trade of enterprises. However, foreign markets are often characterised by a high level of economic and political risk, and therefore they can generate more threats to export activities than the benefits they provide. Thus, an assessment of the benefits and threats that the Ukrainian economy receives in the process of foreign trade in goods is an important component of the development of Ukraine's Export Strategy and strengthening the competitive position of domestic exporters in foreign markets.

In view of the above, it is important to study the peculiarities of economic relations between Ukraine and the EU, determine economic efficiency of European integration and the problems of domestic economy that need to be overcome on the way to integration into the EU common market, as well as substantiate promising areas for deepening Ukraine's cooperation with the EU.

CHAPTER 1. THEORETICAL FOUNDATIONS OF THE FORMATION OF MECHANISM OF FOREIGN TRADE OF COUNTRIES UNDER EUROPEAN INTEGRATION CONDITIONS

(Ivan Mytsenko)

1.1. The Essence of International Trade and Its Significance for the Economic Development of Countries

International trade serves as a powerful driver of economic development. Empirical literature provides compelling evidence that expanding participation in international trade can stimulate economic growth, which is a crucial prerequisite for achieving improved developmental outcomes. By integrating global markets with producers and consumers in developing countries, trade – both through exports and imports – establishes a vital channel for the flow of capital, technology, and services necessary for enhancing production capacities in agriculture, industry, and the service sector. These improvements, in turn, are essential for the structural transformation of the economy. For instance, a key factor in the economic growth of developing countries in East and Southeast Asia has been their ability to strengthen competitive manufacturing and export capabilities – initially in traditional agriculture, as well as textile and apparel production, and later in labor-intensive industries, which in some cases rapidly evolved into high-tech manufacturing, such as electronics¹. Thus, export-driven growth in these countries has often been the result of strategic trade liberalization, along with policies aimed at fostering the positive spillover effects of trade on economic and social development.

According to the World Bank, between 1990 and 2017, developing countries increased their share of global exports from 16% to 30%, while the global poverty rate declined from 36% to 9%² over the same period. Clearly, not all countries benefit equally from expanding international trade volumes; however, trade generally contributes to global economic development, as evidenced by the reduction of the

¹ The role of international trade in the post-2015 development agenda. Trade and Development Board. Trade and Development Commission. Sixth session. Geneva, 5–9 May 2014. https://unctad.org/system/files/official-document/cid33_en.pdf

² Trade Has Been a Powerful Driver of Economic Development and Poverty Reduction. <https://www.worldbank.org/en/topic/trade/brief/trade-has-been-a-powerful-driver-of-economic-development-and-poverty-reduction>

world's impoverished population by approximately one billion people over the past few decades.

Economic growth is a necessary condition for poverty reduction, particularly in low-income countries. When a country's gross domestic product (GDP) per capita reaches a sufficiently high level, poverty alleviation can largely be addressed through income redistribution. However, in low-income developing countries, redistributive transfers alone are insufficient for reducing poverty and may even hinder the process. In such cases, poverty reduction requires economic growth in terms of increasing the share of income received by each member of the population, which, in turn, necessitates higher output per worker which is usually close to GDP per capita³.

The essence of international trade lies in the exchange of goods between countries, whereby each country exports surplus production and imports goods that it either cannot produce domestically or whose production is relatively more expensive. When countries engage in trade with one another, both parties inevitably benefit, as each country increases its utility and expands the range of goods available to its citizens on the domestic market through imports. Moreover, developing countries tend to benefit from the technology spillovers that accompany the exchange of goods and services. This perspective is supported by economists who view trade as a "positive-sum game"⁴. On the other hand, when it comes to international trade in developing countries, there is a different view – "trade as a zero-sum game where there must be a winner and a loser"⁵. However, empirical data have shown that while countries generally benefit from international trade, the extent of these benefits varies. It is important to note that the interpretation of international trade as a "positive-sum game" remains predominant among international trade experts and scholars.

The scholarly debate on the contribution of international trade to the economic growth of developing countries has been ongoing. However, since the 1990s,

³ The role of international trade in the post-2015 development agenda....

⁴ Abiodun Kehinde. Contribution of International Trade to Economic Growth in Nigeria. Awards for Excellence in Student Research and Creative Activity. 2017. http://thekeep.eiu.edu/lib_awards_2017_docs/1

⁵ Abiodun Kehinde. Contribution of International Trade....

researchers have reached a consensus regarding the impact of international trade on economic development. Krueger A. highlighted the existence of a consensus among economists regarding the "positive impact of an open trade regime on economic growth in developing countries"⁶. Numerous empirical studies have identified links between international trade and economic growth. In particular, fundamental empirical research by J. Sachs and A. Warner, J. A. Frankel, and D. Romer has confirmed the role of international trade in stimulating economic growth. Thus, a study on the impact of international trade on the growth of 122 countries revealed that nations with a high level of trade openness experienced higher growth rates compared to those that implemented protectionist measures⁷. Scientists also established that trade openness contributed to an increase in income levels in 63 countries in 1985⁸.

Similar results were obtained by R. Kavoussi, who studied 73 developing countries with medium and low-income levels to determine the contribution of trade to economic growth. As a result of the research, the scholar found that high economic growth rates in these countries were closely linked to high export growth rates for both medium- and low-income countries, with the impact diminishing in accordance with the country's level of economic development⁹. The conclusions reached by R. Kavoussi were confirmed by H. Chenery and A. Strout in their study, the results of which showed that over a long period, there was no developing country that exhibited stable economic growth rates exceeding its export growth. They also found that since 1950, the growth rates of individual developing countries have depended more on their export performance than on any other economic indicators¹⁰.

Similarly, a qualitative impact of non-oil export expansion on Nigeria's economic growth during the period 1960–1983 was identified. Based on a modeling

⁶ Krueger, A. O. Trade Policy and Economic Development: How We Learn. *American Economic Review*. 1997. №87(1). pp. 1-21

⁷ Sachs, J. and Warner, A. M. Sources of Slow Growth in African Economies. *Journal of African Economics*. 1997. Vol. 6(3). pp. 335-376. <https://academic.oup.com/jae/article/6/3/335/993260>

⁸ Frankel, J. A., and D. H. Romer. "Does Trade Cause Growth?" *American Economic Review*. 1999. Vol. 89(3). pp. 379-399. <https://www.aeaweb.org/articles?id=10.1257/aer.89.3.379>

⁹ Kavoussi R. M. Export expansion and economic growth: Further empirical evidence. *Journal of Development Economics*. 1984. Vol. 14(1). pp. 241-250

¹⁰ Chenery, H. and A. Strout. International Trade and Development in African countries. *Journal of Modern African Studies*. 1994. Vol. 7(2). pp. 12-18.

experiment, it was determined that a 75% increase in non-oil exports contributed up to a 1.4% increase in real GDP. Consequently, the study concluded that promoting exports is essential to enhancing Nigeria's GDP growth¹¹. Obadan M., in his study, emphasized that trade exhibits significant potential in influencing economic growth and reducing poverty among nations¹². In this context, T. Awokuse asserts that an increase in external demand for domestic export products can lead to overall production growth through increased employment and income in export sectors¹³.

Relatively recent empirical studies on the impact of international trade on 70 developing countries, using a dynamic panel and three different indicators of liberalization and international trade, have identified a significant positive relationship between trade and economic growth¹⁴. As previously noted, there is undoubtedly a relationship between international trade and economic growth; however, the impact of trade on growth may occur with a certain time lag. This perspective was confirmed by D. Dollar and A. Kraay, who, after examining the relationship between international trade and growth, agreed that openness to international trade accelerates economic growth. However, they added that "...faster growth may be a transition effect rather than a shift to a new steady state growth rate. This transition may take several decades or more, so it is reasonable to speak of trade openness as accelerating growth rather than merely leading to a sudden one-time adjustment in real income"¹⁵.

China is an example of a developing country that has successfully leveraged the benefits of international trade. Lin J. and Li Y. studied the contribution of foreign trade to China's economic growth and found that previous studies on foreign trade underestimated the contribution of exports to GDP growth and failed to account for the indirect effects of exports on domestic consumption, investment, government

¹¹ Egwaikhide F.O Economic growth through export expansion: evidence from Nigeria. Working Papers from African Economic Research Consortium. 1991

¹² Obadan, M. I. Economic Globalization, Markets and National Development: How Sensibly do the Poor Countries (Nigeria Included) Stand? Inaugural Lecture Series. 2008. University of Benin

¹³ Awokuse T. O. Trade openness and economic growth: is growth export-led or import-led? Applied Economics. 2008. Vol. 40(2). pp. 161-173

¹⁴ Greenaway D., Morgan W. and Wright P. Trade liberalisation and growth in developing countries. Journal of Development Economics. 2002. Vol. 67 (1). pp. 229-244

¹⁵ Dollar D., Kraay A. Growth Is Good for the Poor. Journal of Economic Growth. 2002. Vol. 7(3). pp. 195-225.

expenditures, and imports. They proposed a new assessment method and discovered that a 10% increase in exports led to a 1% increase in China's GDP in 1990 when both direct and indirect contributions were considered¹⁶.

Sun P. and Heshmati A. conducted an econometric analysis based on six years of balanced panel data from 31 Chinese provinces between 2002 and 2007. Their findings confirmed that increased participation in global trade enables China to gain both static and dynamic advantages, fostering rapid national economic growth. According to the researchers, "both the volume of international trade and the structure of trade with high-tech exports have a positive impact on China's regional productivity. The Eastern region of China experienced the fastest development, whereas the central and western provinces lagged behind in terms of both economic growth and participation in international trade"¹⁷.

Thus, research indicates that, in the long term, an increase in international trade is generally associated with higher economic growth, and no country develops sustainably without intensive trade with other nations. Trade enables countries to specialize in the production of goods and services that align with their comparative advantages. It also allows consumers and producers to access a wider range of goods at lower prices.

The important role of trade in GDP formation is associated with the use of the "income channel"¹⁸, which, in turn, increases the economy's ability to generate income by supplying surplus products to foreign markets. Through the "income channel", a country's participation in international trade affects a wide range of development outcomes by changing relative prices in the domestic economy. Trade can reduce the cost of goods and services that are not produced domestically to an acceptable price level, as well as improve the quality and range of such goods and services on the domestic market. A better and more diverse range of imported inputs – such as fuel

¹⁶ Lin J., Li Y. Export and Economic Growth in China: A Demand-oriented Analysis. https://www.researchgate.net/publication/228465883_Export_and_Economic_Growth_in_China_A_Demand-oriented_Analysis

¹⁷ Sun P., Heshmati A. International Trade and its Effects on Economic Growth in China. Discussion Paper. 2010. №5151

¹⁸ The role of international trade in the post-2015 development agenda...

and raw materials, intermediate goods, and machinery – reduces production costs and enables the manufacturing of goods that would otherwise be impossible to produce domestically without trade. Improved access to essential goods and services, including medicines and vaccines, medical equipment, food, energy, and environmentally related products, provides direct benefits for consumer welfare and enhances the economic efficiency of certain public expenditures, such as healthcare. Furthermore, international trade can facilitate the dissemination of environmental goods, services, technologies, and sustainable and socially equitable production methods across countries¹⁹.

The volume of international trade and its impact on economic growth largely depend on trade policy, which determines the terms of trade between countries, within integration blocs, and with third countries. In the short term, trade policy plays a crucial role in addressing poverty and ensuring the economic well-being of nations. Certain essential goods for low-income populations, such as food products, often become more expensive due to high import tariffs and non-tariff barriers in many countries. Reducing prices through tariff elimination and lowering trade barriers helps to alleviate poverty and increase real household incomes. Trade liberalization also facilitates access to cheaper imported inputs and provides households with more affordable or higher-quality resources, thereby improving overall welfare. Finally, it can lead to increased demand for labor-intensive export goods, boosting labor demand through job creation and rising wages. Consequently, trade liberalization has a direct and tangible impact on the well-being of countries.

At the same time, trade liberalization can also have negative consequences. Changes in trade policy are likely to affect income distribution in different ways. For instance, broad trade liberalization, through an increase in imported goods, may intensify competition in the domestic market, potentially leading to job losses for workers employed in national enterprises. Additionally, excessive liberalization may reduce demand for non-competitive domestic production of inputs and raw materials, resulting in layoffs and additional costs for workforce retraining. In this regard, it is

¹⁹ The role of international trade in the post-2015 development agenda...

crucial for governments to understand, anticipate, and, where possible, mitigate these effects, particularly when they impact the most vulnerable segments of the population.

The overall consensus in the field of trade has significantly evolved since the early 1990s when trade liberalization was at the center of political debates. Several decades later, although average import tariffs have decreased, new challenges have emerged: the use of non-tariff measures to protect domestic producers has significantly intensified; the role of services in trade and economic growth has expanded; financial crises have revealed the considerable vulnerability of countries to external shocks from globally integrated markets; commodity markets are increasingly affected by volatility, posing risks for commodity exporters; the proliferation of regional and bilateral preferential trade agreements has created a complex system of incentives that does not necessarily align with multilateral trade arrangements; logistics costs constitute a significant share of total trade expenses; and other forms of non-tariff regulation impose substantial barriers to trade²⁰.

Foreign trade reflects economic ties between individual economies and constitutes part of a country's external relations, encompassing the exchange of a portion of its production. Developing countries are increasingly influencing global economic indicators. Trade between developing nations is becoming as significant as trade between them and developed economies. Accordingly, a country's economic development depends on improving the efficiency of its key production factors (labor, capital, knowledge, and land), maintaining a favorable and stable political environment, and enhancing the productivity and competitiveness of national companies in international markets.

Thus, in the era of globalization, foreign trade has become a crucial component of international relations, contributing to national economies by attracting additional investments, advanced technologies, and the import of intermediate goods and high-quality finished products at competitive prices. The intensity of production internationalization, information research, marketing, technology transfer, and human

²⁰ Trade Policy Development – WBG. <https://hub.unido.org/category/trade-policy-development-wbg>

resource development continue to grow, enhancing countries' ability to utilize their potential more effectively while mitigating risks and threats that may hinder economic growth due to escalating internal crises. Consequently, each country must analyze the advantages and challenges arising from its participation in international trade and implement measures to balance its positive and negative effects on economic development.

A country's participation in the international division of labor over time shapes its economic specialization in the production of goods for which it has factor advantages. As a result of specialization, the country ensures the production of goods that are superior in quality and cost compared to similar products in other countries. Consequently, surplus production is exported to partner countries, enabling further improvement and expansion of the respective production capacities. On the other hand, the foreign exchange earnings generated through exports allow the country to procure goods from abroad that are either impossible or inefficient to produce domestically. Based on this understanding of international trade, the benefits a country derives are categorized into those obtained from production specialization and those gained from trade exchange.

The benefits of trade arise from differences in relative prices between domestic and foreign goods. This difference leads to an increase in consumption beyond the production capabilities of a given economy without requiring changes in the production structure. Access to a broader supply of goods allows for better satisfaction of consumer needs and preferences. On the other hand, the advantages of specialization lie in the reallocation of resources and the adaptation of the production structure to the conditions of free trade. This enables more efficient resource utilization and increased production. Scholars argue that government intervention through trade policy instruments harms a country's welfare, as it distorts the informational function of prices, thereby hindering the optimal allocation of resources²¹. Therefore, free trade is considered an ideal that governments should strive for, as the transition from a closed

²¹ Piekutowska A. Handel zagraniczny jako źródło zwiększenia efektywności gospodarowania. Studia Ekonomiczne. Uniwersytet Ekonomiczny w Katowicach. 2014. №180. Cz. 2. S. 227-235, p. 228

to an open economy is accompanied by increased economic efficiency. This is reflected in improved production and consumption efficiency. As a result, the national economy produces more goods without an increase in production factor resources and can consume more goods while gaining access to a wider variety of products²². Thus, international trade, by enhancing production efficiency, contributes to an overall increase in the standard of living and economic well-being within a given country.

Specialization involves a country producing only a portion of the goods it requires, but in quantities sufficient to meet both domestic and international demand. At the same time, it ceases production of goods in which other countries specialize. As a result, specialization shapes the structure of production and trade, reflecting one country's advantage over another in producing specific goods²³. This advantage arises from relative differences in production costs, which, in turn, may be attributed to varying levels of resource endowment across countries.

According to international trade theory, specialization that enhances economic efficiency cannot develop without the free movement of goods. Free trade encourages a country to focus its productive efforts on activities in which it performs relatively better, that is, where it has a comparative (relative) advantage²⁴. In this case, trade participants derive the greatest benefits. By leveraging comparative advantages, a country can restructure its production by developing more efficient industries, particularly high-tech sectors.

Countries possess different levels of production factors, which consequently leads to variations in their production capacities. As a result, relative production costs for specific goods differ across countries, forming the basis for trade. Trade can also be beneficial even when one country produces all goods at a lower cost. According to D. Ricardo, the existence of relative differences in production costs is a sufficient condition for gaining advantages from trade. Thus, a country has a comparative advantage over another in the production of a particular good if it can produce it at

²² Rynarzewski T. Strategiczna polityka handlu międzynarodowego. Warszawa: PWE, 2005, 251 p., P. 20.

²³ Piekutowska A. Handel zagraniczny..., P. 229

²⁴ Guzek M. Międzynarodowe stosunki gospodarcze: zarys teorii i polityki handlowej. Warszawa: PWE, 2006, pp. 40-41

lower opportunity costs. In countries with a relative abundance of certain production factors, the theory of comparative advantage suggests that they will export goods that rely heavily on these factors. A country typically has a comparative advantage in products that intensively utilize its abundant resources²⁵. Empirical data indicate that the principle of comparative advantage effectively explains trade patterns. Notably, Japan's experience demonstrates the positive effects of transitioning in the nineteenth century from a state of near-total isolation to extensive trade liberalization²⁶.

Thus, according to the principles of classical international trade theory, every country participating in international exchange benefits by importing goods whose domestic production would be more expensive than in other countries (where absolute or comparative costs are higher). To finance these imports, a country must specialize in the production of certain goods. Such specialization should be accompanied by an expansion of production scale, which in turn allows for a reduction in production costs. Moreover, classical economic theory, assuming full labor mobility, asserts that any country engaged in international trade and foregoing the production of certain goods retains a portion of its workforce, which can then be redirected toward increasing exports. The additional revenue generated from exports, in turn, facilitates the importation of essential goods²⁷.

Specialization, which enhances economic efficiency in various ways, is a prerequisite for achieving economies of scale. By focusing on the production of certain (relatively cheaper) goods, fewer production factors are utilized, leading to a reduction in the average unit cost across the economy. Specialization also lowers unit costs by expanding market reach, thereby increasing production capacity, optimizing the use of resources, and ultimately improving the efficiency of the national economy. The benefits derived from specialization become particularly evident in the long run and are referred to as economies of scale. Economies of scale occur when long-term

²⁵ Ortiz-Ospina E., Beltekian D. and Roser M. Trade and Globalization. <https://ourworldindata.org/trade-and-globalization#explaining-trade-patterns-theory-and-evidence>

²⁶ Bernhofen, D., & Brown, J. A Direct Test of the Theory of Comparative Advantage: The Case of Japan. *Journal of Political Economy*. 2004. №112(1). pp. 48-67. <http://www.jstor.org/stable/10.1086/379944>

²⁷ Piekutowska A. *Handel zagraniczny...*, P. 230

average costs decrease as production volume increases, assuming constant technological knowledge and factor prices²⁸.

Different types of production activities exhibit a decrease in unit costs as output increases. However, this requires more complete utilization of production capacities, which is feasible only if a country has a sufficiently large market. Otherwise, reducing average costs becomes challenging, even with the application of modern technology, which is known to be cost-effective only at sufficiently high production volumes. In the case of a small domestic market, economies of scale can still be realized if domestic demand is supplemented by external demand. Only international trade enables a country to achieve these advantages, as it expands the market for domestically produced goods, allowing industries to benefit from larger-scale production and improved efficiency²⁹. Thus, the economies of scale effect are one of the primary motives for a country's participation in international trade. The more a country engages in international exchange, the greater advantages it gains. Consequently, every country seeks to expand its access to external markets as much as possible. By opening new markets, international trade creates incentives for increasing production in the exporting country and facilitates higher employment levels. Expanding export opportunities allows businesses to achieve greater efficiency, optimize resource utilization, and enhance overall economic growth.

Thus, international trade provides numerous advantages for a country. Trade fosters faster productivity growth, particularly in sectors and economic activities engaged in global value chains (GVCs). These linkages enable developing countries to specialize in the production of specific components rather than complete products. As a result of participating in GVCs, countries gain access to foreign technologies, know-how, and investments, which further enhance their economic development and

²⁸ Moore L. *The Economic Analysis of Preferential Trading Areas*. W: *The Economics of the European Union. Policy and Analysis*. Red. M. Artis, N. Lee. Oxford University Press, Oxford 1995, P. 80.

²⁹ Caves R. E., Frankel J. A., Jones R. W. *Handel i finanse międzynarodowe*. Warszawa: PWE, 1998, pp. 69-70.

industrial capabilities³⁰. Trade facilitates the dissemination of technologies that reduce greenhouse gas emissions and support the adaptation of production processes to climate change. Through international trade, domestic consumers gain access to a broader range of goods and services at lower prices. However, certain firms and workers in specific sectors may experience increased competitive pressure as a result.

Alongside the discussed benefits of international trade, globalization also brings risks and challenges for national economies. These include job losses in the manufacturing sector of developed economies, environmental degradation, and disruptions in the supply of essential goods. The intensification of these threats, combined with geopolitical tensions, drives countries to increase trade barriers and investment restrictions, as well as to expand subsidies for domestic producers of goods deemed essential and strategic³¹. In 2022, many countries responded to disruptions in food supplies from Ukraine by imposing export restrictions on wheat, corn, and other food products. This, in turn, led to rising prices and increased the short-term risk of a global food crisis.

Despite the liberalization processes actively taking place over the past decades, the debate among economists regarding the dependency and causal relationship between openness, growth, and income distribution continues. Empirical findings predominantly indicate that, in the long run, countries oriented toward external trade exhibit higher economic growth rates. More detailed studies on the relationship between economic growth and trade openness, incorporating two additional dimensions of integration into global trade—quality and diversification—have confirmed that countries exporting higher-quality products and those with more diversified exports tend to develop faster. The impact of the trade dependency coefficient appears to be nonlinear: it is lower (and even negative) for countries whose

³⁰ Trade Has Been a Powerful Driver of Economic Development and Poverty Reduction. <https://www.worldbank.org/en/topic/trade/brief/trade-has-been-a-powerful-driver-of-economic-development-and-poverty-reduction>

³¹ Trade Has Been a Powerful Driver...

exports are minimally diversified or concentrated on low-quality products³². Accordingly, in countries with low levels of economic development, despite large volumes of exports and imports, economic growth may remain low. This is primarily due to the dominance of raw materials in exports, dependency on a limited number of export markets, and import reliance on technological goods. In such cases, the country does not fully benefit from participation in international trade, while the risks and threats to the national economy remain high.

In light of the aforementioned, the development of an open economy must be studied with consideration of national economic security criteria. As Bila S. notes, "provided that national economic security is maintained, economic openness and a country's integration into global economic processes bring significant advantages: increased labor productivity, accelerated scientific and technological progress, structural transformation of sectoral economies, promotion of entrepreneurship in the domestic market, and the creation of incentives for production and employment growth in other countries through their involvement in value chains, participation in the international division of labor, and cooperation"³³.

However, the absolute adherence to or attainment of the highest level of national security within a country is not possible, as derived from the principles of the theory of security in socio-economic systems. Although the value of the integral security index can theoretically range from 0 to 1, these extreme values are never reached in real-world economies. As Babets I. explains, this is due to the fact that "a zero value of interest realization signifies the complete absence of security, rendering any activity within the system meaningless, while a value of 1 corresponds to a state of absolute

³² Huchet M., Le Mouël C., Vijil M. The relationship between trade openness and economic growth: some new insights on the openness measurement issue. XIII^{ème} Congrès de l'Association Européenne des Economistes Agricoles (EAAE), Aug. 2011, Zurich. <https://institut-agro-rennes-angers.hal.science/hal-00729399>

³³ Bila S.O. Modern Trends in the Development of Foreign Trade Relations and the Risks of "Neo-Protectionism". Ukraine's Development Strategy. 2017. №1. pp. 11-16, P. 13.

security, which is a theoretical construct and unattainable in real-world systems"³⁴. Thus, alongside the benefits of international trade, the national economy is always subject to a range of risks and threats that arise as a result of trade openness.

Among the most common risks and threats to the national economy resulting from increased trade openness are: "the negative impact on the country's domestic and foreign policy exerted by the global community and individual competitive nations (e.g., embargoes, anti-dumping investigations); increased political dependence on economic partners, especially on suppliers of 'critical imports' (such as oil, gas, and energy resources); uncertainty in strategic economic forecasting due to fluctuations in global prices for natural resources and raw materials; aggressive competition and destructive policies of competitors in global markets; export of national natural resources at dumping prices; the country acquiring the status of a 'raw materials appendage' to the economies of developed nations; and increased financial and technological dependence on economically advanced countries"³⁵.

Babets I. and Mytsenko I. identify several key threats to economic security arising in the field of foreign trade, which lead to imbalances in economic development. These include: "an irrational export structure; import dependence and the loss of domestic markets; limited access to foreign markets; increasing external debt; and a low level of national added value in exported goods"³⁶. Kokovsky L. highlights the threats associated with a negative trade balance, which result in issues related to the country's balance of payments. The scholar notes that applying the concept of a "broad basic balance, which includes the current account balance and foreign direct investment (FDI)" in practice allows for an assessment of the sustainability of a

³⁴ Babets I. H. *Foreign Economic Security of Ukraine's Regions in the Context of Cooperation with EU Countries: Theoretical, Methodological, and Applied Aspects: Monograph*. Lviv: PAIS, 2011. 400 p., pp. 71-72.

³⁵ *Doing Business 2017: An Opportunity for All*. World Bank Group. Flagship Report. Washington: WBG, 2016. 356 p.

³⁶ Mytsenko I. M., Babets I. H. *Transformation of the Management System of Ukraine's Foreign Economic and Investment Security in the Context of Globalization: Monograph*. Kropyvnytskyi: CNTU, Polihraf-Servis, 2021. 464 p., P. 38.

country's balance of payments. According to Kokovsky, "a positive value of this indicator shows that foreign currency inflows from the most stable components of the balance of payments (exports and FDI) exceed the financing needs for import volumes"³⁷. Summarizing the perspectives of scholars on the negative factors arising from external trade imbalances that impact the national economy and further deepen trade deficits, we can identify the key threats, their economic consequences, and the measures to counteract these threats (Table 1.1).

Table 1.1

The Nature of Threats Arising in the Sphere of External Trade and Measures for Counteraction³⁸

The nature of the threat	Implications for the economy	Countermeasures
Negative foreign trade balance	Increase in external gross and public debt; depreciation of the national currency in times of unfavorable external conditions; loss of the domestic market and increased dependence on imports	Development of the domestic market; development of government programs to stimulate import substitution; gradual devaluation of the national currency
High export dependence	Increased dependence of the country's economy on external conditions in export markets and global prices; underdevelopment of the domestic market; rising cost of imports	Development of the domestic market and import substitution; search for reserves for domestic consumption of export goods
High import dependence	Loss of the domestic market and reduction of domestic production	Development of the domestic market and import substitution; devaluation of the national currency
Low share of innovative products in exports	Irrational export structure; weakening of the country's international competitiveness	Creating favorable conditions for the development of the innovative sector of the economy
Raw material export structure	Technological backwardness of the economy; irrational structure of the economy	Stimulating the development of manufacturing industries; creating conditions for innovative economic development; imposing restrictions on the export of raw materials
Limited choice of partners and suppliers of necessary products	The country's dependence on the foreign economic and customs policy of the partner country; the risk of economic crisis transfer from the partner country; increased dependence on imports of goods	Government support for export diversification; diversification of import supplies

³⁷ Kokovskyi L. O. Current Problems of Ukraine's Foreign Economic Security and Ways to Overcome Them. Effective Economy. 2011. № 10. <http://www.economy.nayka.com.ua/?op=1&z=738>

³⁸ Compiled based on: Mytsenko I. M., Babets I. H. Transformation of the Management System of Ukraine's Foreign Economic and Investment Security...; Kokovskyi L. O. Current Problems of Ukraine's Foreign Economic Security and Ways to Overcome Them. Effective Economy. 2011. № 10. <http://www.economy.nayka.com.ua/?op=1&z=738>

As seen in the table, government policy in the foreign economic sphere is a crucial factor in counteracting or mitigating threats. Additionally, government policy in foreign trade is directly linked to international trade agreements. Consequently, national governments must find a balance between the benefits of binding trade policies through multilateral and/or regional commitments, on the one hand, and the need for flexibility to adapt trade and development policies to national conditions, on the other. Participation in international agreements and the fulfillment of political commitments contribute to increased trade and investment flows, as they create a transparent and predictable institutional environment for trade and foreign direct investment in the country.

However, for government policy in the field of foreign trade to be effective, it must align with the specific needs of the country. In particular, negotiations on free trade agreements between partners with asymmetric economic weight require thorough analysis to achieve a balanced combination between political obligations under international agreements and national interests. Countries with low levels of economic development may be granted special and differentiated treatment within multilateral and preferential agreements, which exempts them from certain obligations³⁹.

Over the past decade, trade disputes and the increase in restrictions imposed by countries have significantly weakened the World Trade Organization system, which is based on the principles of global trade liberalization. Smaller developing economies cannot be self-sufficient; they need to import goods and intermediate products, which, in turn, necessitates increasing exports to other countries. However, their ability to compete fairly with other countries is constrained by protectionist policies and the use of subsidies in partner countries, which distort trade conditions. Moreover, developing countries generally lack sufficient budgetary resources to support national producers in response to the subsidies used by developed countries to lower domestic production costs.

³⁹ The role of international trade in the post-2015 development agenda...

Although it is believed that trade restrictions and subsidies currently affect a small portion of world trade⁴⁰, they create significant threats and imbalances in the foreign trade of countries with low levels of economic development. At the same time, countries can benefit from trade by expanding regional trade agreements, for example, by stimulating trade by reducing the cost of moving goods across borders through simplified border procedures and improved infrastructure. Participation in the global trading system should be used by countries as a tool to reduce threats to national economic security and ensure reliable access to essential goods that contribute to economic development.

1.2. The Role of International Trade in Ensuring Development of the National Economy

In a globalized world, no country can develop in economic isolation. The functioning of industrial sectors and services, as well as macroeconomic indicators (income levels, employment, and living conditions), depend on relationships with trade partners, leading to the international movement of goods and services, labor, technology, investment capital, and the expansion of business structures. Accordingly, the national economic development policy of each country is shaped with consideration of economic interactions with other nations to ensure a balanced fulfillment of the needs of all participants in trade cooperation. Thus, international trade is one of the factors that, under certain conditions, can contribute to a country's economic development.

International trade and economic development are interconnected, as confirmed by theoretical principles and empirical research findings. In the academic community, debates regarding the role of international trade in promoting economic growth have persisted for many years. Consequently, a substantial theoretical foundation has been established for studying and explaining the processes occurring within national economies that actively participate in the international exchange of goods and services.

⁴⁰ Trade Has Been a Powerful Driver...

As it is known, international trade encompasses the flow of goods and services directed from one country to others and received from partner countries into the host country. International trade enables nations to sell domestically produced goods to other countries to gain economic benefits. Thus, trade with other countries or participation in any trade agreement should have a positive impact on a country's economic growth⁴¹.

Depending on the period of emergence and the justification of its key principles, the theory of international trade is divided into classical, neoclassical, and modern theories. The classical theory asserts that countries can achieve economic gains by adopting free trade. The most well-known classical theories include Adam Smith's theory of absolute advantage and David Ricardo's theory of comparative advantage. Neoclassical theories, the most prominent of which is the Heckscher-Ohlin theory, suggest that countries can benefit from free trade by specializing in the production of certain goods, provided that resources are used efficiently⁴².

Most modern theoretical approaches to studying the role of international trade in the national economy are based on the principles of the theory of comparative advantage, identifying economies of scale as an important source of economic growth⁴³. Before Adam Smith, there was the theory of mercantilism, developed in the sixteenth century. According to this theory, a country's wealth was determined by promoting exports and restricting imports. This theory did not support free trade, and global wealth was considered fixed, as countries could not simultaneously benefit from trade.

The concept of absolute advantage was previously developed by Adam Smith in his book "*The Wealth of Nations*" to demonstrate how nations can benefit from trade by specializing in the production and export of goods they produce more efficiently than other countries and importing goods that other countries produce more efficiently. In his theory of absolute advantage, Adam Smith argues that under free trade, countries

⁴¹ Abdullahi, A. O., Safiyanu, S. S., & Soja, T. International Trade And Economic Growth: An Empirical Analysis Of West Africa. IOSR Journal of Economics and Finance. 2016. Vol. 7(2). <https://doi.org/10.9790/5933-07211215>

⁴² Usman, O. A. Performance evaluation of foreign trade and economic growth in Nigeria. Research Journal of Finance and Accounting. 2011. Vol. 2(2). <https://core.ac.uk/download/pdf/234629174.pdf>

⁴³ Usman, O. A. Performance evaluation of foreign trade....

can produce and export goods and services that they can produce more efficiently than other countries, while importing those goods that they would produce less efficiently, thus ensuring mutual benefit for all nations. In other words, absolute advantage refers to a country's ability to produce a good or service at a lower absolute cost than another country producing the same good or service⁴⁴.

However, the principles of the theory of absolute advantage did not provide an answer to whether countries that have or lack absolute advantages in both goods could still benefit from international trade. This theoretical gap was filled by David Ricardo's theory of comparative advantage, which asserts that a nation benefits from international trade by exporting goods in which it has the greatest comparative productivity advantage and importing those in which it has the smallest comparative advantage. In this theory, the factors of production are labor and production technology. In general, a country can still gain from international trade by allocating all its resources to the most profitable industries, even if other countries have an absolute advantage in those goods. In other words, comparative advantage refers to a nation's ability to produce goods and services at lower opportunity costs⁴⁵.

David Ricardo's theory of comparative advantage builds on this idea, demonstrating that a country can benefit from trade even if it is a less efficient producer. The model considers labor as the only factor of production and, given that labor is limited, each trading country faces constraints on how much it can produce. Essentially, the opportunity cost of producing one product is the amount of labor that could have been used to produce another product. By allocating labor to produce a specific combination of goods, each nation benefits if it produces goods with lower opportunity costs and trades its surplus with other nations⁴⁶.

The theories of Smith and Ricardo did not provide answers to the questions of what factors determine comparative advantage and how international trade affects factor

⁴⁴ Nyasulu, T. Assessing the impact of exports and imports on economic growth: A case study of Malawi from 1970 to 2010. Institute of the Western Cape, 2013.

⁴⁵ Nyasulu, T. Assessing the impact of exports....

⁴⁶ Feenstra, R. C., & Taylor, A. M. International trade (Fourth edition). Worth Publishers, Macmillan Learning, 2017.

income in trading countries. In the early 1900s, Swedish economists Eli Heckscher and Bertil Ohlin focused on how a country could gain a comparative advantage by producing goods that utilize its abundant factors. Their theory is based on a country's factors of production, such as land, labor, and capital, which provide the resources for investment in factories and equipment. According to the Heckscher-Ohlin model, a country is likely to export capital-intensive goods and import labor-intensive goods⁴⁷.

The presence of economies of scale is another reason why countries actively trade with one another. This theory is used to explain trade between countries with similar characteristics. It argues that countries specialize in the production and export of a limited range of goods, leveraging the benefits of economies of scale (reducing average costs as production increases). In other words, economies of scale mean that large-scale production (higher output) can be achieved at lower costs. Both exports and imports function as production factors, and if utilized efficiently, they can generate profit margins for the economy and enhance productivity at scale⁴⁸.

Theoretical provisions generally indicate the existence of a relationship between economic growth and the components of international trade. Many researchers have agreed on the fact that barrier-free international trade leads to GDP growth by creating a market for surplus production, generating employment, and increasing national income⁴⁹.

Empirical studies on the economic development of the Asian Tigers (South Korea, Taiwan, Singapore, and Hong Kong) in the 1970s confirmed the positive impact of international trade on GDP growth. Through an export-oriented policy, these countries transitioned from the group of least developed countries to middle-income economies. This positive experience proved beneficial for other developing nations, including African countries, encouraging them to actively engage in international trade as a means of boosting economic growth⁵⁰. The reasons for this positive effect are

⁴⁷ Nyasulu, T. Assessing the impact of exports....

⁴⁸ Nyasulu, T. Assessing the impact of exports....

⁴⁹ Lee, J.-W. Capital goods imports and long-run growth. *Journal of Development Economics*. 1995. Vol. 48 (1). P. 91-110. <https://www.sciencedirect.com/science/article/abs/pii/0304387895000151>

⁵⁰ Lall, S. Selective Industrial and trade policies in developing countries: Theoretical and empirical issues. Working Paper No. 48. Queen Elizabeth House. University of Oxford, 2000. <http://workingpapers.geh.ox.ac.uk/RePEc/geh/gehwp/gehwp48.pdf>

explained by the fact that "international trade generates resources that finance industrialization, enabling the production of more goods, the creation of jobs, and, consequently, an increase in economic growth."⁵¹.

During the implementation of export-oriented policies in developing countries, varying GDP growth outcomes were observed⁵². Each country experiences its own current economic growth, although, in general, the pace of growth in the modern world has shifted from slow and uneven to more dynamic, rapid, and continuous, especially following the Industrial Revolution ⁵³.

International trade enables countries to expand markets and gain access to goods and services at a moderate price, which are either not produced domestically or are manufactured in insufficient quantities by national enterprises to meet consumer demand. The relationship between international trade and economic growth has long been the subject of numerous studies examining the impact of trade on a country's income growth rates. As mentioned earlier, many scholars agree that countries actively engaged in international trade have a higher likelihood of achieving a certain level of economic growth compared to economies that do not fully utilize the benefits of external trade.

Economic growth is the increase in national income derived from the production of goods and the provision of services that can be sustained over a long period. In other words, it is a balanced process through which a country's productive capacity expands over time to ensure the growth of national output and capital income⁵⁴.

In general, economic growth consists of three components: capital accumulation, an increase in population and labor force, and technological progress. Capital accumulation occurs when a portion of personal income is saved and invested to

⁵¹ Hachicha, N. Exports, export composition and growth: A simultaneous errorcorrection model for Tunisia. *International Economic Journal*. 2003. Vol. 17(1). P. 101-120. <https://doi.org/10.1080/10168730300080007>

⁵² Rodrik, D., & Rodriguez, F. (2000). Trade Policy and Economic Growth: A Skeptic's Guide to the Cross-National Evidence. <https://drodrik.scholar.harvard.edu/files/dani-rodrik/files/trade-policy-economic-growth.pdf>

⁵³ Antunes, A. J. (2012). The effects of international trade on economic growth: An empirical comparison between Portugal and the Netherlands. <https://repositorio.iscteul.pt/bitstream/10071/6521/1/Dissertation%20Ant%C3%B3nio%20Antunes%20Mestrado%20Economia.pdf>

⁵⁴ Usman, O. A. Performance evaluation of foreign trade....

enhance future production and income. An increase in the labor force is reflected in the growth of productive workers, while a larger overall population expands the potential size of domestic markets. Technological progress results from the development and application of new and improved methods for performing traditional tasks and operations, leading to labor and capital savings⁵⁵.

The Harrod-Domar growth model explains the economic mechanism through which increased investment leads to higher growth. According to this model, a country's economic growth depends not only on its savings rate but also on its ability to minimize current consumption levels and increase investments. Investments generate income and enhance the productive capacity of the economy by expanding the stock of capital⁵⁶. In this case, economic growth is a direct result of a country's ability to increase both its savings and the capital-to-output ratio or GDP, as shown in the equation below:

$$\frac{\Delta Y}{Y} = \frac{s}{k}, \quad (1.1)$$

where: Y - national output (GDP), ΔY - GDP change, s - savings ratio, k - capital release ratio.

The idea of this model is that when savings and the share of GDP invested in the country increase, greater economic growth occurs, and vice versa.

Scientists have proven that in countries with low levels of economic development, obtaining financial loans and foreign aid is aimed at covering resource deficits due to low savings rates and high levels of consumption, which reduce GDP growth rates. Encouraging exports can help bridge the gap between the interest rate on external loans and foreign currency inflows. Domar's model also asserts that imports can contribute to economic growth if a country imports capital goods and technologies that can increase its capital stock, thereby stimulating GDP growth⁵⁷.

⁵⁵ Usman, O. A. Performance evaluation of foreign trade....

⁵⁶ Ray, D. Development Economics. Princeton University Press, 1998.

⁵⁷ Ghatak S. Introduction to Development Economics (Fourth edition). London: Routledge, 2003. https://api.pageplace.de/preview/DT0400.9781134462810_A23777671/preview-9781134462810_A23777671.pdf

Overall, the economic growth model presented above (1.1) demonstrates that international trade can positively impact the economy through export revenues, which support savings in the country's financial development. Furthermore, the model also asserts that import-driven economic growth is possible if it results from the import of capital goods from abroad, enhancing productivity while simultaneously increasing GDP.

The two-gap economic growth model complements the Harrod-Domar model by stating that economic growth results from closing the savings gap and the foreign exchange gap. This means that for a national economy to develop, a country must generate sufficient savings for investments while simultaneously ensuring foreign currency inflows from international trade:

$$G = \frac{s}{k} + \frac{f}{k}, \quad (1.2)$$

where: G – national output (GDP), s – savings ratio, f – requirement for foreign currency exchange ratio, k - investment ratio⁵⁸. Equation 1.2 demonstrates that GDP growth results from an increase in the level of domestic savings and the volume of foreign currency inflows.

Many of the least developed countries are unable to achieve economic growth due to a significant savings deficit or foreign exchange gap. In this case, international trade (exports and imports) is considered an effective solution to this problem. Trade policy should take into account the potential for export-oriented growth, which is believed to generate resources for increasing national income, financing the country's development process, repaying foreign loans, and expanding the country's foreign currency reserves. Moreover, imports can positively contribute to economic growth if they consist of productive capital goods rather than consumer goods, which could otherwise widen the trade gap⁵⁹.

⁵⁸ Ghatak S. Introduction to Development Economics....

⁵⁹ Krueger, A. O. Import substitution versus Export Promotion. International Monetary Fund. External Relations Dept. 1985. Vol. 22(2). <https://www.elibrary.imf.org/view/journals/022/0022/002/article-A007-en.xml>

Thus, for countries that are highly dependent on imports, export-oriented growth can generate revenue to finance the country's development process, bridge the external trade balance deficit, and create foreign currency reserves. On the other hand, imports aimed at compensating for the savings gap should consist of capital equipment and goods that contribute to increasing production volumes.

The traditional neoclassical growth theory is a modified version of the Harrod-Domar model, incorporating a second factor of production – labor – and introducing a third technological variable into the economic growth equation. According to the traditional neoclassical growth theory, the expansion of production results from an increase in the quantity and quality of the labor force (through population growth and education), an increase in capital (through investments), and technological advancements⁶⁰.

In addition to the aforementioned factors, the theory also suggests that other elements, such as international trade (exports and imports), play a significant role in growth. The model demonstrates that GDP growth driven by trade results from the movement of foreign capital and investments between countries. In this case, capital flows can influence growth from both the export and import sides. The export of foreign capital generates investment returns for the exporting country, while the import of foreign capital can increase the capital stock and enhance productivity in the importing country, assuming other conditions remain unchanged⁶¹.

The neoclassical growth model developed by R. Solow suggests that an economy approaches a balanced growth path when the growth rate of per capita output is determined by the rate of technological progress. Solow's model aligns with the principles of neoclassical economic growth theory, considering economic growth (Y) as an increase through a production function that includes factors such as labor (L), capital (K), and the level of technology (A), while accounting for diminishing marginal returns to labor (β) and capital ($1-\beta$) in relation to production⁶²:

⁶⁰ Todaro, M., & Smith, P. Economics development (30th ed.). Harlow: Pearson Education, 2020. <https://elibrary.pearson.de/book/99.150005/9781292291208>

⁶¹ Ghatak S. Introduction to Development Economics....

⁶² Todaro, M., & Smith, P. Economics development....

$$Y = K^\beta (AL)^{1-\beta}. \quad (1.3)$$

This theory demonstrates that international trade plays a crucial role in sustaining economic growth. From the perspective of international trade, the import of foreign technologies and skills enhances the efficiency and productivity of labor and capital within the national economy, enabling a country to maximize its comparative advantage and achieve GDP growth through the benefits derived from trade⁶³.

In summary, the main advantage of R. Solow's model lies in its explanation of GDP growth not only through the capital-output ratio, as in the Harrod-Domar model, but also by incorporating other factors such as labor, technology, and other exogenous variables, including international trade. Despite being developed within the framework of traditional growth theory, Solow's model remains significant for analyzing a country's economic growth, as it has served as a foundation for the development of other growth theories⁶⁴.

The endogenous growth model, also known as the new growth theory, is an extended version of the traditional neoclassical model, which is based on the principle of diminishing marginal returns to scale in relation to output. Typically, the factors of production in R. Solow's model primarily exhibit constant marginal returns to productivity and capital accumulation, and this neoclassical approach to growth cannot fully explain the significant differences in national income levels between developing and developed countries. According to this model, GDP growth occurs through internal production processes, while the level of technology in a country depends on international capital flows between developed economies and countries with low economic development.

To outline the policies of countries that have successfully developed their export markets, terms such as "export-led growth," "outward-oriented," "export promotion," and "export substitution" are used. Many countries, particularly those with low levels of economic development, focus on exports because it fosters specialization in the

⁶³ Gunter, B. G., Taylor, L., & Yeldan, E. Analysing macro-poverty linkages of external liberalization: Gaps, achievements and alternatives. *Development Policy Review*. 2005. Vol. 23(3). pp. 285-298.

⁶⁴ Easterly, W. *The elusive quest for growth: Economists' adventures and misadventures in the tropics*. Cambridge, MA: MIT Press, 2001.

production of goods whose sale contributes to increasing national output and reducing domestic prices. Exports facilitate the utilization of resources within the economy for the production of goods and services, with any surplus being sold abroad to meet external demand. At the same time, this process boosts national production and generates foreign exchange earnings, which can be used to finance economic development⁶⁵.

Overall, the relationship between economic growth and imports is generally considered negative, primarily because most import expenditures reduce national income resources. However, economists largely agree that the impact of imports on GDP is influenced by the fact that imports bring into the country production factors that it cannot generate independently due to a lack of necessary technologies, labor force, or skills. Imports serve as a key channel for the dissemination of capital and technology since imported foreign technical expertise has the potential to enhance domestic production levels. Additionally, imports facilitate economic interaction between national entrepreneurs and their external partners⁶⁶.

Scientists have identified several channels through which imports influence GDP growth. Firstly, they noted that the import of intermediate and capital goods can increase the level of productive capital in a country, ultimately accelerating economic growth. Secondly, imports contribute to GDP growth by allowing countries with low technical expertise, such as developing nations, to adapt and adopt advanced technological innovations from developed countries with higher levels of technology. Thirdly, imports provide countries with the opportunity to learn more efficient resource allocation methods, which have a significant impact on productivity and the overall increase in national income⁶⁷.

Thus, imports can enhance the quality of domestic technologies by fostering competition, which compels national industries to improve their production

⁶⁵ Krueger, A. O. Import substitution versus Export Promotion...

⁶⁶ Grossman, G. M., & Helpman, E. Innovation and Growth in The Global Economy. Cambridge: MIT Press, 1991.

⁶⁷ Coe, D. T., Helpman, E., & Hoffmaister, A. W. International R and D spillovers. IMF Working Paper No. 08/104, 2008. <https://www.imf.org/external/pubs/ft/wp/2008/wp08104.pdf>

technologies. Since imports increase the variety of goods available in the economy, they consequently balance economic productivity for both producers and consumers. This is because their consumption and production decisions are based on cost reduction and the maximization of satisfaction and profit, respectively⁶⁸.

Therefore, economists and policymakers have long studied the relationship between economic development and international trade, which depends on numerous factors. In particular, an increase in export and import volumes can significantly accelerate a country's economic growth. Furthermore, through international trade, countries can benefit from the technological and innovative advancements of other nations, which can also be advantageous for economic development. The relationship between economic development and trade is also influenced by factors such as trade policies and international trade agreements. Specifically, free trade agreements can expand international trade volumes and, consequently, promote economic growth by eliminating trade barriers between countries. However, the contribution of international trade to economic growth is not always positive. For instance, an increase in trade surplus in countries with low levels of development may, due to rising import volumes, substantially lower domestic prices. In this case, the competitiveness of domestic producers may deteriorate, leading to slower economic growth. Additionally, trade imbalances can have adverse effects on economic growth.

1.3. The Relationship Between Trade Openness and Economic Growth

Foreign trade and the factors of economic development that enter a country through the import of capital and technologies are crucial for ensuring economic growth in the context of global competition. In recent decades, there has been a trend toward trade liberalization and an increase in international trade on a global scale, which has contributed to higher levels of development among nations. While a country's economic prospects in foreign trade are assessed based on its ability to adapt to changes in global markets, its sustained growth and development also depend on the efficiency of trade and the benefits derived from such trade. The volume of foreign

⁶⁸ Todaro, M., & Smith, P. Economics development....

trade serves as an important criterion for determining a country's position in the international market, while the balance between exports and imports significantly reflects the effectiveness of national trade policy. When shaping foreign trade policy, one of the key objectives is to improve the trade balance in favor of the country while increasing the overall volume of foreign trade. This necessitates measures aimed at minimizing imports and expanding exports.

Trade openness, improvement of working conditions, and the promotion of overall "greater stability and security for all" contribute to enhancing the economic development indicators of countries⁶⁹. The opening of the national economy to trade with other countries allows domestic producers to expand production volumes, considering that the market is growing, competition encourages innovation, and provides access to technologies and ideas that would be impossible without trade [ibid.].

The importance of international trade is confirmed by the functioning of numerous organizations and agreements that promote trade openness and enhance the efficiency of outcomes among trading partners. Organizations such as the International Monetary Fund (IMF) and the Organization for Economic Co-operation and Development (OECD) contribute to ensuring stable economic growth for countries and the expansion of global trade⁷⁰. The European Union (EU) was also established, functioning as an economic and political coalition that facilitates free trade among its member countries⁷¹, along with the World Trade Organization (WTO), a multilateral trading system that regulates trade rules and trade negotiations⁷².

Overall tariffs and trade barriers significantly decreased in the 1990s, with tariffs in OECD countries experiencing the smallest reduction. However, they remain lower

⁶⁹ Why open markets matter. OECD. <https://www.oecd.org/trade/understanding-the-global-trading-system/why-open-markets-matter>

⁷⁰ OECD. (2020). The OECD at 60: 60 Years of Consensus Building. https://www.oecd-ilibrary.org/agriculture-and-food/the-oecd-at-60_afb7f6a8-en

⁷¹ European Commission. The European Union. Publications Office, 2020. <https://data.europa.eu/doi/10.2775/923488>

⁷² WTO in Brief. https://www.wto.org/english/thewto_e/whatis_e/inbrief_e/inbr_e.htm

than those in non-OECD and developing countries⁷³. Over the past few centuries, the global economy has experienced overall steady positive growth, accompanied by a significant increase in global trade and trade agreements⁷⁴.

Countries that implemented market liberalization reforms, such as the Washington Consensus, experienced mixed economic outcomes. The consensus was based on reducing trade and investment barriers, driven by the recognition that protectionism distorts economic processes⁷⁵. The outcomes of the reforms cast doubt on the broad support for trade liberalization⁷⁶. The latest round of negotiations among WTO members aimed at reducing tariffs on agricultural and industrial goods and services encountered resistance from developed countries concerned about the potential threat of foreign competition⁷⁷.

The role of trade flows in the modern economy has gained significance and become a focal point due to escalating trade disputes, such as the tariff war between the United States and China, geopolitical tensions, countries exiting alliances, and pressures from global financial crises, as observed in 2008, as well as the COVID-19 pandemic. For example, the recent pandemic exposed the vulnerability of national economies stemming from their dependence on global trade in critical products (e.g., microchips, pharmaceuticals, vaccines) and highlighted the appeal of autarky. Moreover, trade barriers have been increasing. Notably, the European Commission recorded 43 new trade restrictions in 2019, noting that "a paradigm shift is occurring, with protectionism taking root in trade relations"⁷⁸. Although this may contradict the classical economic theory's premise that international trade generates benefits and fosters economic growth, contemporary conditions have seen the implementation of

⁷³ Dao, A. T. Trade Openness and Economic Growth. Mark A. Israel'91 Endowed Summer Research Fund in Economics. 2014. №2. http://digitalcommons.iwu.edu/israel_economics/2

⁷⁴ Beltekian, D., & Ortiz-Ospina, E. Trade and Globalization. Our World in Data - 2018. <https://ourworldindata.org/trade-and-globalization#data-sources>

⁷⁵ Williamson, J. A Short History of the Washington Consensus. Law and Business Review of the Americas. 2009. Vol. 15. pp. 7-15.

⁷⁶ Economic Growth in the 1990s: Learning from a Decade of Reform. World Bank Publications, 2005.

⁷⁷ Dao, A. T. Trade Openness and Economic Growth. ...

⁷⁸ European Commission. The European Union. Publications Office, 2020

trade and travel restrictions between countries. These measures aim to enhance security, protect domestic jobs, and ensure the self-sufficiency of national economies⁷⁹.

To understand the essence of the processes resulting from trade liberalization and its impact on a country's economy, it is essential first to define the key term – "trade openness" – which is interpreted differently by many economists. However, the underlying justifications for these definitions are similar. Fatima S. et al. define trade openness as "the degree to which countries influence global trade through the inflow and outflow of goods and services"⁸⁰. Similarly, Ijirshar V. defined trade openness as "the enhanced integration of countries through trade liberalization to facilitate imports and exports across borders"⁸¹. It can be concluded that the unrestricted movement of goods, services, investments, and labor between countries is at the core of the above-mentioned definitions.

Furthermore, international organizations have also used various definitions regarding trade openness. According to the definition provided by the World Trade Organization, trade openness is "the elimination or reduction of restrictions or barriers to the permitted exchange of goods between countries"⁸². OECD experts have defined trade openness "as the ratio of the average export and import of goods to GDP"⁸³. Thus, trade openness results from the elimination or significant reduction of restrictions (tariffs, technical requirements, certification rules) on the movement of goods, services, and investments between countries. It is important to note that the term "openness" can be somewhat ambiguous, as a high ratio of trade volume to GDP does not necessarily indicate a high level of openness to international trade but may be influenced by various factors, such as the scale of the economy, the country's geography, and barriers to

⁷⁹ Global supply chains are still a source of strength, not weakness. *The Economist*. 2021, March 31. <https://www.economist.com/leaders/2021/03/31/global-supply-chains-are-still-a-source-of-strength-not-weakness>

⁸⁰ Fatima, S., Chen, B., Ramzan, M., & Abbas, Q. The Nexus between trade openness and GDP growth: Analyzing the role of human capital accumulation. *Economic Development*. 2020. Vol. 10(4). pp. 1-18.

⁸¹ Ijirshar, V. Impact of trade openness on economic growth among ECOWAS countries: 1975-2017. *CBN Journal of Applied Statistics*. 2019. Vol. 10(1). pp. 75-96

⁸² The case for open trade. World Trade Organization. https://www.wto.org/english/thewto_e/whatis_e/tif_e/fact3_e.htm

⁸³ Trade openness, in OECD science, technology and industry scoreboard 2011. OECD Publishing, 2011. https://doi.org/10.1787/sti_scoreboard-2011-60-en

foreign trade⁸⁴. Thus, trade openness encompasses two main components: a high level of trade volumes and a low level of trade barriers. Accordingly, some scientific studies have focused on determining both the impact of trade volumes (exports and imports) on economic growth and the impact of trade restrictions (tariffs and trade taxes) on economic growth.

Scientific studies conducted in the 1990s confirmed a strong positive relationship between trade openness and economic growth, influencing both policymakers and researchers. The key findings of numerous empirical studies indicated that trade openness is a crucial driver of economic growth, which was further validated by transformations in international trade relations following the establishment of the World Trade Organization (WTO)⁸⁵. In the context of trade volume, the export dimension of trade openness not only facilitates the reallocation of resources but also encourages firms to enhance efficiency through economies of scale, thereby contributing to economic expansion⁸⁶. Emphasizing exports allows economies to specialize in industries where they have a comparative advantage. Regarding imports, access to international markets facilitates the adoption of innovative equipment and products, strengthening international competition⁸⁷.

Dollar D. and Kraay A. demonstrated that trade liberalization, particularly within the framework of the WTO, has significantly accelerated economic growth⁸⁸. The scientists examined the importance of institutions by controlling for the impact of institutional quality (rule of law and property rights index), domestic market size (population), and trade openness (the ratio of export and import volumes to GDP) on economic growth (real GDP per capita). As a result, they concluded that international trade and institutions play a crucial role in ensuring economic development, with a

⁸⁴ Trade openness, in OECD science, technology and industry scoreboard 2011....

⁸⁵ Tahir, M., & Ali, D. H. Trade Openness and Economic Growth: A Review of the Literature. *Asian Social Science*. 2014. Vol. 10(9). P. 137. <https://doi.org/10.5539/ass.v10n9p137>

⁸⁶ Grossman G. M. & Helpman E. Endogenous Innovation in the Theory of Growth. NBER Working Papers 4527. National Bureau of Economic Research, 1993.

⁸⁷ Hye, Q. M. A., & Lau, W. Trade Openness and Economic Growth: Empirical Evidence from India. *Journal of Business Economics and Management*. 2015. Vol. 16. pp. 188-205.

⁸⁸ Dollar, D., & Kraay, A. Institutions, trade, and growth. *Journal of Monetary Economics*. 2003. Vol. 50(1). pp. 133–162. [https://doi.org/10.1016/S0304-3932\(02\)00206-4](https://doi.org/10.1016/S0304-3932(02)00206-4)

possible reverse causal relationship—meaning that economic growth leads to greater trade openness⁸⁹.

Rodriguez F. and Rodrik D., while not entirely refuting the positive relationship between trade openness and economic growth, carefully analyzed the justification of independent variables and the methodology of previous studies. The researchers conducted a regression analysis, taking into account non-trade factors related to the geographical location of countries, arguing that geographic positioning influences income not only through trade but also through access to natural resources. The results of this study indicated that non-trade geographical effects are, in fact, factors that stimulate foreign trade⁹⁰. Moreover, the researchers pointed out the weakness of arbitrarily setting 40 average tariffs as a qualification for a closed economy, considering that global average tariff rates during the studied period were significantly lower.

Empirical research results indicate that open economies achieve higher per capita GDP growth than closed economies. Scholars analyzed the average growth rates of per capita GDP, investment levels, and the openness of economies before and after trade liberalization. As a result, they concluded that countries experiencing growth shortly after trade liberalization tend to intensify their liberalization efforts, while domestic development policies remain unchanged⁹¹.

Economic expansion through exports is also considered a crucial factor in economic growth, measured by real GDP per capita. Using the fixed effects method, researchers identified that export volumes had the most significant positive impact on economic growth. Additionally, gross fixed capital formation and energy consumption were also found to be positive influencing factors, whereas import volumes had a negative impact on economic growth⁹². Based on empirical research, Ijirshar V. asserts

⁸⁹ Dollar, D., & Kraay, A. Institutions, trade, and growth...

⁹⁰ Rodríguez, F., & Rodrik, D. Trade Policy and Economic Growth: A Skeptics Guide to the Cross-National Evidence. NBER Macroeconomics Annual. 2000. Vol. 15. pp. 261–325. <https://doi.org/10.1086/654419>

⁹¹ Wacziarg, R., & Welch, K. H. Trade Liberalization and Growth: New Evidence. The World Bank Economic Review. 2008. Vol. 22(2). pp. 187–231. <https://doi.org/10.1093/wber/lhn007>

⁹² Altaee, H. H. A., & Al-Jafari, M. K. Trade Openness and Economic Growth in the GCC Countries: A Panel Data Analysis Approach. International Journal of Business and Economic Sciences Applied Research. 2018. Vol. 11(3). pp. 57–64.

the existence of both positive and negative relationships between trade openness and trade development in Gambia over the short and long term, respectively, during the period from 1975 to 2017⁹³. On the contrary, Menyah et al. argue that there is no correlation between economic progress and trade openness in twenty-one Sub-Saharan African countries⁹⁴.

Some studies on trade openness and economic development have been largely considered inaccurate due to the application of inappropriate methods, which call the obtained results into question. In view of this, scholars have examined the relationship between economic growth and trade openness, taking into account trade structures characterized by the quality and diversity of exports⁹⁵. M. Huchet, Ch. Le Mouël, and M. Vijil, based on an assessment of an endogenous growth model using panel data from 169 countries over the period 1988–2014, confirmed that economies exporting higher-quality and innovative products grow faster. The researchers identified a nonlinear relationship between the export ratio and the quality of the export basket, indicating that trade openness may negatively impact growth in countries specializing in low-quality products. Additionally, they found a nonlinear relationship between export diversification, the export ratio, and economic growth, which can be explained by the fact that economies that expand their exports tend to grow faster after reaching a certain level of extensive export margin⁹⁶.

By the late 1990s, it was widely believed among scholars and practitioners that growth and higher living standards were achieved more rapidly in countries with higher levels of openness to international trade. Opening a country to trade has three notable effects on economic growth: an increase in human capital, the transfer of knowledge (spillover effect), and technological innovations (competitiveness effect)⁹⁷. Similarly,

⁹³ Ijirshar, V. Impact of trade openness....

⁹⁴ Menyah, K., Nazlioglu, S., Wolde-Rufael, Y. Financial development, trade openness and economic growth in African countries: new insights from a panel causality approach. *Economic Modelling. Journal of Social Science*. 2014. pp. 386-394.

⁹⁵ Huchet M., Le Mouël Ch., Vijil M. The relationship between trade openness and economic growth: Some new insights on the openness measurement issue. *January World Economy*. 2018. Vol. 41(1). pp.59-76.

⁹⁶ Huchet M., Le Mouël Ch., Vijil M. The relationship between trade openness and economic growth...

⁹⁷ Siregar A. P., Widjanarko N. P. The Impact of Trade Openness on Economic Growth: Evidence from Agricultural Countries. *Journal of Asian Finance Economics and Business*. 2022. Vol. 9(3). pp. 23-31.

Lee J. and Pak M. found that trade openness fosters economic growth through technological innovations and the efficient use of resources in both domestic and international markets⁹⁸.

Scientists highlight the benefits of tariff reductions for economic growth in developing countries⁹⁹. However, research conducted by Rodrik and Edwards in the 1990s cautions against overly optimistic expectations regarding trade liberalization and the excessive emphasis on its significance. Rodríguez F. and Rodrik D. critically assess the effectiveness of reducing trade barriers and provide limited evidence that a liberal trade policy, characterized by lower tariffs and fewer non-tariff barriers, contributes to economic growth¹⁰⁰. Ulasan B. indicates a negative correlation between trade openness and economic growth from 1960 to 2000, based on statistical data from over one hundred countries¹⁰¹.

At the same time, most research findings have shown that international trade, which enables countries to integrate into the global economy, is one of the main drivers of a nation's economic development. L. Andersen and R. Babula examined the correlation between international trade and economic growth by analyzing whether trade alone is sufficient to ensure a continuous improvement in living standards. They found a strong relationship between international trade and aggregate national income¹⁰². Using a panel model for 108 countries, M. Busse and J. Koeniger confirmed that international trade had a significant impact on economic growth¹⁰³.

Nam H.-J. and Ryu D. examined the benefits and potential drawbacks of trade openness in 10 ASEAN member states over the period 2000–2022 using fixed-effect

⁹⁸ Lee, J. H., Pak, M. S. Revisiting the Nexus of Trade Openness and Economic Growth: A Focus on the Moderating Role of Port Infrastructure. *Journal of Korea Trade*. 2022. Vol. 26(2). pp.1 – 20.

⁹⁹ Kim, D.-H., Lin, S.-C., & Suen, Y.-B. Nonlinearity between Trade Openness and Economic Development. *Review of Development Economics*. 2011. Vol. 15. pp. 279-292.

¹⁰⁰ Rodríguez, F., & Rodrik, D. Trade Policy and Economic Growth...

¹⁰¹ Ulasan, B. Trade Openness and Economic Growth: Panel Evidence. *Applied Economics Letters*. 2015. Vol. 22. pp. 163-167.

¹⁰² Andersen L., Babula R. The link between openness and long-run economic growth. *Journal of International Commerce and Economics*. 2009. https://www.usitc.gov/publications/332/journals/openness_growth_link.pdf

¹⁰³ Busse, M., Koeniger, J. Trade and Economic Growth: A Re-Examination of the Empirical Evidence. *Economics Bulletin, AccessEcon*. 2012. Vol. 35(4). pp. 2862-2876.

regression and two-stage least squares regression with fixed effects. The researchers separately analyzed the impact of trade restrictions, such as tariffs and trade taxes, on economic growth and the effect of trade volumes on economic growth. Based on their findings, they concluded that trade openness affects GDP differently: the reduction of trade barriers, which indicates greater trade openness, had a negative impact on economic growth, whereas an increase in trade volumes, which also signifies greater trade openness, positively influenced economic growth. According to the researchers, this "dichotomy highlights the differentiated roles that trade openness plays in economic growth, encompassing both the strengthening of trade restrictions and the promotion of larger trade volumes."¹⁰⁴.

Thus, theoretical principles and empirical research findings indicate the existence of a close and direct relationship between trade openness and economic growth. An open economy facilitates market expansion, enhances competitiveness, attracts foreign investment, and accelerates economic development. The primary mechanisms of this relationship can be outlined as follows: (1) access to new markets, allowing countries to export more goods and services, thereby increasing production and income; (2) the import of technologies and knowledge, which improves productivity and production efficiency; (3) the scale effect from increased production volumes, as larger markets enable the reduction of average costs per unit of output; (4) competition with foreign producers, which stimulates local companies to enhance product quality, reduce costs, and improve technologies. At the same time, trade openness can also amplify several risks for a country's economy, such as vulnerability to external shocks and fluctuations in international markets (e.g., changes in raw material prices, financial crises), as well as uneven sectoral development due to foreign competition, leading to job losses and income declines in certain industries.

¹⁰⁴ Hyun-Jung Nam, Doojin Ryu. Does trade openness promote economic growth in developing countries? *Journal of International Financial Markets, Institutions and Money*. 2024. Vol. 93, 101985 <https://www.sciencedirect.com/science/article/abs/pii/S1042443124000519>

1.4. Trade Liberalization Processes in the EU and Their Impact on the Trade Openness of CEE Countries

One of the most significant political and economic processes in Europe over the past two and a half decades has been the expansion of the European Union through the inclusion of former socialist economies from Central and Eastern Europe (CEE). This process has led to the creation of one of the world's largest markets, encompassing more than 500 million consumers¹⁰⁵. Integration into the European Union (EU) required prospective member states to implement reforms in several areas, ranging from macroeconomic stabilization to institutional reforms, enterprise restructuring, and market liberalization. One of the most impactful reforms on the economies of these countries was trade liberalization, which accompanied their accession to the EU. However, this process unfolded unevenly across the region. While some CEE countries benefited from preferential trade conditions as early as the first half of the 1990s, others, such as Slovenia and particularly Croatia, experienced improved access to the EU market only in the second half of the 1990s or even the first half of the 2000s.

The speed of transition to free trade also influenced the direction of foreign direct investment (FDI) inflows, export competitiveness, and productivity growth. In Central and Eastern European (CEE) countries, the majority of FDI was directed toward the high-tech manufacturing sector, where both the direct impact on productivity growth and the indirect spillover effects were more pronounced. Meanwhile, in other transition economies, most FDI was channeled into low-tech manufacturing and/or the service sector. Bartlett V. notes that "CEE countries were quicker to adopt market-oriented policies, whereas in Southeastern Europe, the liberal political approach was less popular, and state intervention in the economy persisted for a longer period"¹⁰⁶. As a result of all these factors, differences in the structure and quality of exports, as well as the overall competitiveness of export goods, began to emerge in CEE countries as early

¹⁰⁵ 30 years of the European single market. European Commission. <https://ec.europa.eu/libguides.com/SingleMarket>

¹⁰⁶ Bartlett W. Shut Out? South East Europe and the EU's New Industrial Policy. LEQS Paper No. 84, 2014.

as the 1990s. By the second and third decades of the transition period, these differences became even more pronounced¹⁰⁷.

The group of CEE countries includes those that historically belonged to the Eastern Bloc, located west of the post-World War II border with the former Soviet Union, the independent states of the former Yugoslavia, and the three Baltic states (Estonia, Latvia, and Lithuania)¹⁰⁸. These countries were former communist states that, over the past three decades, have undergone extensive political, economic, and institutional reforms. Almost all of them implemented trade liberalization policies to open their markets to external trade partners. Thus, studying the experience of these countries is an essential component of analyzing the impact of trade openness on economic growth. For instance, Nannicini T. and Billmeier A., in their research on transition economies, including CEE countries, found that trade liberalization has a positive effect on their economic growth¹⁰⁹. Awokuse T., in his study, confirmed that trade stimulates growth in CEE countries¹¹⁰, while Wacziarg R. and Welch K. demonstrated that trade liberalization contributes to the growth of certain CEE countries¹¹¹. Thus, existing research has produced conflicting results, leaving the aforementioned issue open for further investigation.

Iyke B., using fixed-effects regressions for 17 CEE countries over the period 1994–2014, found that trade openness is a significant prerequisite for growth in CEE countries, and an increase in trade openness is associated with an acceleration in real GDP per capita growth in these countries. Moreover, the results remained largely unchanged even after excluding Croatia and Estonia – two historically "closed"

¹⁰⁷ Stojčić N., Vojinić P., Aralica Z. Trade liberalization and export transformation in new EU member states. *Structural Change and Economic Dynamics*. 2018. Vol. 47. pp. 114-126.

¹⁰⁸ *Unleashing Prosperity: Productivity Growth in Eastern Europe and the Former Soviet Union*. World Bank Documents, Washington, 2008.
<http://siteresources.worldbank.org/ECAEXT/Resources/publications/UnleashingProsperity.pdf>

¹⁰⁹ Nannicini, T. and Billmeier, A. Economies in transition: How important is trade openness for growth? *Oxford Bulletin of Economics and Statistics*. 2011. Vol. 73(3). pp. 287-314.

¹¹⁰ Awokuse, T. O. Causality between exports, imports, and economic growth: Evidence from transition economies. *Economics Letters*. 2007. Vol. 94(3). pp. 389-395.

¹¹¹ Wacziarg, R. and Welch, K. H. Trade liberalization and growth: new evidence. *World Bank Economic Review*. 2008. Vol. 22(2). pp. 187–231.

economies – from the panel data. Thus, these two "closed" economies may not influence the overall economic growth of CEE countries¹¹².

The trade integration of Eastern and Western Europe began with the reduction of tariffs on bilateral imports, leading to a significant increase in regional trade. However, even after the removal of most political barriers, there remains substantial potential for further trade expansion. This suggests that reducing other types of obstacles to European trade is still possible. At the same time, it confirms the existence of additional determinants of trade that are less explored in the literature but no less important in shaping trade patterns. Another factor underwent significant changes during the same period: institutions in transition economies. The abandonment of centralized systems in these countries and their increasing willingness to join the EU prompted their governments to undertake extensive reforms in this area. Institutional reforms were a key requirement imposed by the EU on new candidate countries. To ensure the proper functioning of the enlarged union, candidate states were required to amend their legislation, enhance the efficiency of their judicial systems, reduce corruption, and more. However, unlike trade policy, progress in this area varied significantly across different countries and was generally more moderate. This paper examines institutional heterogeneity and regional trade liberalization in Europe and develops specific policy recommendations for further trade integration.

In the early 1990s, all transition economies embarked on an extensive process of trade liberalization with the EU. Although the timelines and specific measures varied from country to country, by the early twenty-first century, trade between each country and the EU was characterized as nearly fully liberalized. However, the annual growth rates of bilateral trade between CEE and the EU varied significantly. A substantial increase in bilateral trade between CEE countries and the EU occurred in the mid-1990s. At the same time, most regional trade liberalization measures took effect after 1995 and can only be considered responsible for the subsequent growth in bilateral

¹¹² Iyke Bernard, Njindan. Does Trade Openness Matter for Economic Growth in the CEE Countries? Review of Economic Perspectives. 2017. Vol. 17(1). pp. 3-24, <https://doi.org/10.1515/revecp-2017-0001>

trade. In terms of trade potential utilization, the significant "early boom" in foreign trade among transition economies can be attributed to their reintegration into the global economic system¹¹³.

However, not all trade growth between transition economies and the EU, even after 1995, can be attributed solely to regional trade liberalization. For instance, the highest export growth rates of transition economies to their EU partners do not always correspond to the lowest average EU import tariff levels (Table 1.2). Clearly, other factors, such as national institutions, played a significant role, both directly and through external trade policy. Overall, institutions serve as a strong determinant of economic growth, and there is a significant inverse relationship between GDP per capita growth and institutional quality¹¹⁴. Effective national institutions are an essential prerequisite for economic growth; however, their formation is also shaped by the level of a country's economic development.

Table 1.2

Export growth, trade liberalization and the quality of institutions in CEE¹¹⁵

Country	Industrial exports to the EU, growth rates, 1993-2000 (%)	Changes in the EU average tariff, 1993-2000	Index of Economic Freedom (IEF score), 2000	EBRD score, 2000	Rating by Kaufman Index, 2000	Fraser score, 2000
Estonia	647	-2,75	0,67	0,62	0,68	0,68
Lithuania	364	-2,75	0,47	0,54	0,59	0,61
Slovakia	323	-4,25	0,50	0,55	0,59	0,54
Hungary	288	-6,17	0,63	0,68	0,68	0,63
Romania	242	-2,58	0,39	0,46	0,46	0,43
Czech Republic	230	-6,17	0,67	0,61	0,64	0,67
Latvia	199	-2,75	0,57	0,52	0,58	0,65
Bulgaria	153	-2,58	0,42	0,50	0,52	0,50
Poland	149	-6,14	0,53	0,62	0,64	0,52
Slovenia	51	-4,42	0,50	0,56	0,68	0,57

¹¹³ Cheptea A. Trade liberalization and institutional reforms. *Economics of Transition*. 2007. Vol. 15 (2). pp. 211-255.

¹¹⁴ Jansen, M. and Nordas, H. K. Institutions, trade policy and trade flows. CEPR Discussion Paper 4418. London: Centre for Economic Policy Research, 2004.

¹¹⁵ Cheptea A. Trade liberalization and institutional reforms. *Economics of Transition*. 2007. Vol. 15 (2). pp. 211-255.

Central and Eastern Europe is a region that underwent significant institutional changes throughout the 1990s. The transition from a planned to a market-oriented economy led to substantial reforms in domestic institutions, though the extent of these reforms varied across the region. As a result, the impact of institutional changes on trade is even more pronounced in the case of transition economies. Table 1.2 presents assessments of four institutional indicators for CEE countries in the year 2000. The Index of Economic Freedom (IEF), calculated by experts from the Heritage Foundation, reflects the level of economic freedom in a country and can be considered an indicator of the overall institutional environment. The European Bank for Reconstruction and Development (EBRD) composite index captures the progress of the transition process, indicating reforms aimed at ensuring the shift to a market economy. For comparison, the last two columns present corresponding institutional assessments calculated by Kaufmann et al.¹¹⁶ and the Fraser Institute. A score closer to 1 corresponds to a higher level of economic freedom in a country, better functioning of market institutions, or improved governance. Countries are ranked according to the growth rate of their exports to EU partners throughout the 1990s. By the beginning of the twenty-first century, EU tariffs on imports from CEE countries had been almost entirely eliminated. As shown in Table 1.2, countries with higher institutional ratings demonstrated stronger export performance to the EU. The highest export growth to the EU was observed in countries with the best score on the Index of Economic Freedom. Thus, it can be concluded that at least part of the uneven trade growth between CEE and the EU was due to differences in national institutions.

The accession of Central and Eastern European (CEE) countries to the European Union (EU) brought about significant economic and institutional transformations in the external trade sector of the new member states, aligning them with the economies of the EU-15 across key parameters. The trade integration of CEE countries into the EU was driven by two main factors: trade liberalization and institutional reforms. The trade liberalization measures undertaken by both sides during the 1990s were extensive but

¹¹⁶ Kaufmann, D., Kraay, A. and Matuzzi, M. Governance matters III: Governance indicators for 1996–2002. World Bank Policy Research Working Paper 3106. Washington D.C.: The World Bank, 2003.

did not always lead to the expected growth in regional trade flows. In contrast, institutional improvements in CEE countries were much more limited, particularly in areas such as privatization progress and corruption reduction. Countries that implemented the most significant institutional changes also experienced the highest increases in trade with the EU. Comparing the impact of these two factors, Chepeta A. found that institutional improvements in CEE countries had a significant effect on trade growth, just as much as the elimination of tariff and non-tariff barriers. Moreover, the institutional similarity between countries was identified as an important factor in increasing trade flows between them¹¹⁷.

During the 1993–2003 period, there was significant trade integration between Central and Eastern European (CEE) countries and Eurozone countries, resulting in two main effects. Firstly, from the Eurozone perspective, the share of CEE countries in trade outside the Eurozone almost doubled during this period, making them the third-largest trading partner of the Eurozone countries, following the United Kingdom and the United States. Secondly, from the perspective of CEE countries, Eurozone countries became their most important trading partners. Several factors contributed to this development, including the geographical proximity of CEE countries to the Eurozone, their stable economic growth rates, and the significant economic weight of the Eurozone. Additionally, the removal of trade barriers and accession to the European Union further strengthened trade flows between these two groups of countries¹¹⁸.

Ten years after the 2004 enlargement of the European Union, which included ten predominantly post-socialist countries, a series of studies on the economic consequences of this expansion were conducted. In his research, Hornok S. demonstrated that EU enlargement led to a significant increase in trade¹¹⁹. Egger P. and Pfaffermayr M. conducted an assessment of trade formation and trade diversion effects, focusing particularly on the evolution of trade within and between central and

¹¹⁷ Chepeta A. Trade liberalization and institutional reforms...

¹¹⁸ Schnatz, B., Bussière, M., Fidrmuc, J. Trade integration of Central and Eastern European countries: lessons from a gravity model. Working Paper Series 545. European Central Bank, 2005. <https://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp545.pdf>

¹¹⁹ Hornok, C. Trade-Enhancing EU Enlargement and the Resurgence of East-East Trade. Focus on European Economic Integration. 2010. Vol.10(3). pp. 79–94.

peripheral EU countries. The researchers concluded that EU enlargement did not create any "peripherality" within the EU, as trade within the core tended to grow at a slower pace than trade within the periphery¹²⁰. Grancay M. confirmed that there was an increase in mutual trade among the new EU member states and a growing importance of CEE export markets for the older EU member states¹²¹. Benkovskis K. and Wörz J. demonstrated that while EU enlargement led to higher export prices for the new member states, the quality of exported goods increased even more; the rise in non-price competitiveness fully compensated for the decline in price competitiveness¹²². A study conducted by Curran L. and Zignago S. focused on trade in intermediate goods and allowed researchers to discover that new EU members became an important source of intermediate goods for older member states, and their role in final goods trade also increased¹²³. However, this is not entirely positive, as it increases the dependence of new member states on the EU market, making them more vulnerable to economic crises. Capello R. and Perucca G. examined the interaction between globalization and the integration of CEE countries into the EU, concluding that, on average, greater trade openness led to improved economic performance in these countries¹²⁴.

Since the EU's eastward enlargement in 2004, trade patterns within the European Union and in the new Central and Eastern European (CEE) member states have become more aligned. This convergence is reflected in key indicators such as export and import volumes per capita and productivity levels, which are closely linked to the export baskets of member states. The comparative advantages of both old and new member states have also narrowed significantly. The convergence of trade volumes per capita

¹²⁰ Egger, P., Pfaffermayr, M. The Pure Effects of European Integration on Intra-EU Core and Periphery Trade. *The World Economy*. 2013. Vol. 36(6). pp. 701–712.

¹²¹ Grancay, M. Eastern Enlargement of the European Union – Changes in Trade Structure and its Instability. *Academic Review of Economics and Administration Sciences*. 2013. Vol. 6(2). pp. 75–89.

¹²² Benkovskis, K., Wörz, J. Non-Price Competitiveness Gains of Central, Eastern and Southeastern European Countries in the EU Market. *Focus on European Economic Integration*. 2012. Vol. 3. pp. 27–46.

¹²³ Curran, L., Zignago, S. EU Enlargement and the Evolution of European Production Net-works. *Research in International Business and Finance*. 2012. Vol. 26(2). pp. 240–257.

¹²⁴ Capello, R., Perucca, G. Openness to Globalization and Regional Growth Patterns in CEE Countries: From the EU Accession to the Economic Crisis. *Journal of Common Market Studies*. 2014. Vol. 53(2). pp. 218–236.

and productivity levels in export baskets has been accompanied by economic growth in CEE countries, making this a positive development¹²⁵.

Let us note that at the end of the 1990s, there was no clear trend of convergence, as most countries in the region experienced economic decline during this period. However, between 1995 and 2000, Poland, Slovenia, and the three Baltic states demonstrated real convergence with Western European countries in terms of GDP per capita based on purchasing power parity (PPP). From 2000 to 2007-2008, the entire region witnessed rapid convergence, followed by an accelerated convergence after 2008, during which all three Baltic states improved their relative position before the recession. A slowdown in convergence was characteristic of Bulgaria, Hungary, Romania, and the Czech Republic, while segregation was observed in Croatia and Slovenia (Table 1.3). Thus, we can conclude that trade liberalization contributed to the economic growth of CEE countries, accelerating their convergence in terms of economic development and significantly reducing the gap in GDP per capita.

Table 1.3

GDP per Capita (PPP) as a Percentage of the Average Western European EU Countries (%)¹²⁶

<i>Country</i>	<i>1995</i>	<i>2000</i>	<i>2008</i>	<i>2019</i>
Bulgaria	29,0	19,6	29,8	35,1
Czech Republic	65,3	49,5	58,8	61,0
Estonia	30,1	28,8	48,4	55,7
Croatia	-	33,9	44,0	43,2
Poland	36,4	32,5	38,8	48,6
Latvia	28,4	24,7	41,3	46,2
Lithuania	29,5	25,8	44,0	54,6
Hungary	43,2	36,2	44,0	48,8
Romania	27,3	18,1	35,5	46,2
Slovakia	40,3	34,7	50,0	49,0
Slovenia	63,1	55,4	62,9	58,2

¹²⁵ Grančay M., Šumilo E., Vveinhardt J. 2015. Trade in Central and Eastern European Countries Ten Years after Their EU Accession – Is There Convergence? Society and Economy. 2015. Vol. 37(4). pp. 443-460.

¹²⁶ Polster C. Economic Development and Growth in Central and Eastern Europe. Comparative Economic Research Central and Eastern Europe. 2021. Vol. 24(4). pp. 69-84.

Despite the fact that the initial conditions of the transition period in the CEE countries were quite similar, various political and economic processes during the 1990s influenced the growing disparities between the Central and Eastern European (CEE) countries and the South-Eastern European (SEE) countries in terms of their integration into the EU. Alongside factors such as differences in the quality of human capital and the military conflict that affected countries like Croatia, one of the key distinctions between these countries was the timing of their accession to the Schengen Agreement and the Eurozone¹²⁷.

The coefficient for accession to the Schengen Zone was positive and statistically significant, indicating that the Schengen Agreement accelerated trade, and we can expect the same for Croatia, particularly in the context of its simultaneous accession to both the Eurozone and the Schengen Zone. Furthermore, joining the Eurozone (on January 1, 2023) will enhance confidence in overall economic policy, provide access to new sources of financing and liquidity, and reduce the risks associated with exchange rate fluctuations. Other forms of financial uncertainty, which tend to affect less developed countries more severely during crises, will also diminish. All these factors will contribute to the economy's resilience against future shocks and crises¹²⁸.

Trade policy and national institutions are two crucial determinants of cross-border trade flows. National institutions, along with foreign trade policy instruments, have had a strong and significant impact on the development of trade between CEE countries and the EU. The role of trade liberalization in promoting regional trade integration has been considerably more important compared to the role of institutional reforms. The continued expansion of trade between CEE countries and the EU, comparable in scale to that driven by trade liberalization, indicates the potential for significant growth in trade turnover even after the removal of all political trade barriers. The growth of regional trade volumes between CEE countries and the EU has been most sensitive to restrictions on international trade flows and foreign investments and

¹²⁷ Stojčić N., Vojinić P., Aralica Z. Trade liberalization...

¹²⁸ Basarac Sertić M., Vučković V., Andabaka A. Examining the Effects of Trade Liberalization Using a Gravity Model Approach. *Economics*. 2024. Vol. 18(1). <https://www.degruyter.com/document/doi/10.1515/econ-2022-0061/html>

least affected by government control over wages and prices. The experience of CEE countries demonstrates that at the time of their accession to the EU, the most significant obstacles to increasing exports to the Community's market were corruption and substantial budget subsidies for specific economic sectors.

1.5. International Experience of Implementation of Foreign Trade Strategies

The foreign trade strategy of a state largely depends on economic and socio-political factors and is shaped by both internal dynamics (resource availability, industrial production development, and competitiveness of national companies) and external factors (geopolitical conditions, global threats). Before the COVID-19 pandemic, the primary priorities for companies to secure strategic advantages in foreign markets were innovation, the introduction of new technologies, and bringing the highest-quality products to market. However, after the pandemic, the focus shifted to ensuring the continuity of technological infrastructure in healthcare and education, providing assistance to developing countries, and reducing the technological gap between nations as a means of mitigating social inequality.

The well-known strategy of domestic market protectionism is closely linked to the import substitution trade strategy, which was employed by developing countries in the post-World War II period to ensure rapid industrialization. Industrialization and trade strategies were typically implemented together, evolving into a mixed strategy that combined import substitution measures with industrial development incentives¹²⁹.

The economic development of leading global economies and developing countries, with the exception of England and Hong Kong, took place under conditions of domestic production protection through import substitution policies during the industrialization stage. On the other hand, the "external industrialization" strategy was developed in Denmark and Norway after World War II. From the mid-1950s, a similar strategy, with some variations, was implemented in Southern European countries and

¹²⁹ Adıgüzel Selminaz. Strategies in International Trade. International Journal of Science and Research (IJSR). 2020. Vol. 9 (10). https://www.researchgate.net/publication/344955409_Strategies_in_International_Trade_International_Journal_of_Science_and_Research_IJSR

Japan, and it was consistently applied in Korea, Singapore, and Taiwan from the early 1960s. This strategy was introduced in Israel in 1961 and was also periodically implemented in many Latin American countries, particularly in Brazil and Argentina, starting in 1960¹³⁰.

As noted by H. Milner and D. Yoffie, an increasing number of multinational companies that historically supported the unilateral opening of their domestic markets have publicly advocated for a third type of policy – "strategic" trade policy. This approach involves imposing trade barriers on the domestic market if foreign markets are similarly protected by such barriers. Governments can utilize trade policy tools to stimulate an increase in domestic companies' profits at the expense of foreign firms losing part of their revenue, thereby enhancing national economic welfare.

The implementation of such a model typically occurs in two stages. Initially, the government may introduce an export subsidy for the production of a homogeneous product by a domestic firm. In the second stage, firms in each country decide on the quantity to produce and sell in a third country. The subsidy reduces the costs for the domestic firm and incentivizes it to increase exports regardless of changes in the competitor's export volume. Since domestic and foreign goods are strategic substitutes, the foreign firm is compelled to reduce its output. As the domestic export subsidy increases, the total quantity of exported goods rises, the price decreases, and the profits of the domestic firm grow, while the profits of the foreign company decline. Essentially, this results in a transfer of rent from the foreign firm to the domestic firm, ultimately creating an economy of scale in the national economy and fostering economic growth.

An example of the complexity and multidimensional nature of trade policy is the United States' foreign economic policy, which is aimed at addressing a range of critical issues related to national security, employment, environmental protection, healthcare, immigration, and monetary policy. The importance of foreign trade for the U.S. is driven by several benefits: imports help maintain low prices and increase the variety of goods available to American consumers; exports provide high-paying jobs for

¹³⁰ Mixed Strategy. www.altayli.net/alternatif-sanayilesme-dis-ticaret-stratejileri-ve-24-ocak-kararlari.html

American workers and higher profits for American firms; trade enhances labor productivity and accelerates economic growth; and economic openness indirectly facilitates foreign policy objectives such as democratization, the rule of law, and global development. At the same time, free trade is often considered a major cause of job losses, rising inequality, and worker insecurity¹³¹.

Thus, the United States derives significant economic and political benefits from expanding opportunities for international trade. A focus on free trade within the framework of the WTO would allow the country to maximize these advantages. Accordingly, the United States promotes trade liberalization in two main directions. First, the U.S. participates in multilateral trade agreements as a member of the World Trade Organization. Second, at the regional level, the U.S. has plans to establish the Free Trade Area of the Americas (FTAA), which would include 34 countries in the Western Hemisphere. Additionally, the U.S. has concluded free trade negotiations with Chile and Singapore; signed similar agreements with Morocco, Australia, Bahrain, and countries in Central America and Southern Africa; and proposed an agreement with Middle Eastern nations.

The current U.S. trade strategy regarding regionalism, known as "competitive liberalization," views regionalism and multilateralism as complementary and mutually reinforcing approaches to trade reform¹³². By cooperating with countries willing to liberalize their markets through regional free trade agreements, the United States encourages other nations to undertake additional trade reforms at both regional and multilateral levels. Additionally, regional agreements contribute to increased investment and enhanced productivity in developing economies. In the long term, positive effects such as accelerated economic growth, stability in trade relations, and rising demand are observed.

¹³¹ Drezner, D. W. U.S. Trade Strategy Free Versus Fair. US Council on Foreign Relations. 2006. <https://faculty.fiu.edu/~revellk/pad3034/Drezner.pdf>

¹³² Burfisher M. E. and Zahniser S. Multilateralism and Regionalism: Dual Strategies for Trade Reform <https://www.ers.usda.gov/amber-waves/2003/september/multilateralism-and-regionalism-dual-strategies-for-trade-reform/>

Over the past 50 years, the United States has pursued global trade liberalization and the development of multilateral trade rules based on market principles, driven by both economic and security considerations. The U.S. has often prioritized security concerns over commercial interests. However, as other countries gained competitive advantages and became more equal trading partners, the United States ceased making commercial concessions solely for security purposes. Despite this shift, trade agreements continue to play a crucial role in achieving strategic objectives.

The key components of U.S. foreign trade policy include: (1) establishing trade rules, liberalization, and ensuring compliance with concluded trade agreements regarding market opening and the establishment of trade and investment rules; (2) export promotion and control – government support for exporters, creation of trade missions; licensing and control of strategic exports; (3) trade barriers for protecting the national market – regulation of trade; measures to mitigate the negative effects of imports on U.S. industries, reduce threats to national security, improve the balance of payments, and eliminate "unfair" barriers to U.S. exports; (4) trade preferences – providing duty-free access to U.S. markets for eligible developing countries and goods to stimulate trade and economic growth¹³³.

The U.S. government's understanding of the importance of exports for the country's economic development led to the creation of the Trade Promotion Coordinating Committee to assist exporters and the adoption of the U.S. National Export Strategy in 2023¹³⁴. The National Export Strategy outlines the federal government's trade promotion measures aimed at supporting and creating opportunities for American businesses by expanding and diversifying U.S. exports. The Strategy states that ensuring sustainable economic growth requires increasing U.S. exports, as well as expanding and diversifying the base of exporting enterprises, with a particular focus on small and medium-sized businesses. The National Export Strategy also includes new strategic initiatives to accelerate the recovery of sectors adversely

¹³³ Adıgüzel Selminaz. Strategies in International Trade...

¹³⁴ National Export Strategy – 2023. Trade Promotion Coordinating Committee.
<https://www.trade.gov/national-export-strategy>

affected by the COVID-19 pandemic. In this context, the primary focus is on implementing innovations to facilitate recovery, growth, and enhance the competitiveness of enterprises in the manufacturing sector. Additionally, the U.S. government plans to concentrate on key policy areas to ensure the resilience of supply chains, digital transformation, trade finance, and the development of technical standards.

At the same time, Asian countries employ different strategies for managing foreign trade and participating in the international division of labor. Specifically, countries such as Hong Kong and Singapore have adhered to an export-oriented growth strategy from the very beginning, maintaining a free trade regime. However, countries like Korea, Taiwan, and Japan have followed an export-promotion strategy while maintaining a protectionist import regime for an extended period. By the early 1960s, Japan had eliminated most officially established quantitative import restrictions: the nominal import liberalization ratio (by product) increased from less than 70% in 1960 to approximately 93% in 1964, with a subsequent rise to 97% in 1976. In the early 1970s, Taiwan removed most quantitative import restrictions: the nominal import liberalization ratio (by units) grew from 61.5% in 1970 to 96.5% in 1973. However, in both Japan and Taiwan, imports remained significantly restricted until recently through special laws and other unofficial means¹³⁵.

By the mid-1970s, Korea's industrial production and exports were dominated by consumer goods, whose manufacturing largely depended on imported intermediate and capital goods. Consequently, trade protection primarily involved restricting imports of consumer goods at the expense of final consumers, which was not a significant negative factor for economic growth. However, between 1972 and 1976, the Korean government began emphasizing the promotion of heavy and chemical industries and introduced various tax and financial incentives for these sectors. As a result, by the late 1970s, a broad domestic production base for intermediate and capital goods had emerged. Many of the heavy and chemical industries supported by the government were excessively capital-intensive, and Korea lacked the comparative advantages necessary to compete

¹³⁵ Adıgüzel Selminaz. *Strategies in International Trade...*

successfully with foreign products. Thus, protectionist measures entailed broader restrictions on imports of these capital-intensive intermediate and investment goods¹³⁶.

The various instruments currently used in Argentina's trade regime are the result of previous decisions made either at the national level or through multilateral (bilateral) agreements. Between 1964 and 1988, the combination of instruments used to control imports or tax (promote) exports was complex. However, apart from differences in levels and degrees of transparency, it was similar to the current situation. Additionally, during this period, two experiments with import liberalization were initiated (in 1967 and 1979), but they were later reversed due to significant balance of payments issues and declarations of default¹³⁷.

A key distinguishing feature of the strategic programming of European Union countries is the requirement of EU legislation that all relevant EU policies, including trade policy, contribute to sustainable development. The EU's trade policy aims to ensure economic development based on social justice, respect for human rights, adherence to high labor standards, and high environmental standards. The EU seeks to ensure that trade policy promotes sustainable development through EU trade agreements and special incentives for improving trade and development policies in developing countries¹³⁸.

Regarding the promotion of EU standards and sustainable development, thanks to specific provisions in EU trade agreements, partners such as Canada and Mexico have ratified International Labor Organization (ILO) conventions, offering greater protection to workers. EU trade agreements with other countries are categorized into the following main types: "first-generation" agreements, concluded before 2006, which focus on tariff elimination; "second-generation" agreements, signed with South Korea, Colombia, Peru, Ecuador, Central America, and Canada, which extend to new areas of cooperation, including intellectual property rights, services, and sustainable

¹³⁶ Lane N. Manufacturing Revolutions: Industrial Policy and Industrialization in South Korea. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3890311

¹³⁷ Adıgüzel Selminaz. Strategies in International Trade...

¹³⁸ Towards open and fair world-wide trade. https://european-union.europa.eu/priorities-and-actions/actions-topic/trade_en

development; Deep and Comprehensive Free Trade Areas (DCFTAs), which establish stronger economic ties between the EU and neighboring countries¹³⁹.

Modern EU trade agreements integrate trade rules with the principles of sustainable development, requiring participating countries to: adhere to international labor and environmental standards and treaties; effectively enforce national environmental and labor laws; avoid weakening environmental or labor laws to encourage trade or investment; combat illegal trade in endangered flora and fauna species; promote trade that supports the fight against climate change; encourage practices such as corporate social responsibility. The EU also utilizes its trade agreements to promote stable public procurement and remove barriers to trade and investment in renewable energy sources¹⁴⁰.

The new EU trade policy includes a range of initiatives aimed at enhancing the efficiency and transparency of external trade in line with European values and the Community's development agenda. Specifically, a more effective policy that addresses new global challenges and supports development objectives involves taking into account new economic realities in external trade, such as global value chains, the digital economy, and the growing importance of services. It also includes establishing an expanded partnership with member states, the European Parliament, and stakeholders to improve the implementation of trade and investment agreements. Additionally, it foresees incorporating provisions to support SME trade in future trade agreements.

The expansion of measures to support sustainable development, fair trade while adhering to ethical standards and human rights is achieved through the effective implementation of relevant provisions of free trade agreements and the application of the Generalized Scheme of Preferences, as well as the inclusion of anti-corruption rules in future trade agreements. In the context of globalization, the EU is paying considerable attention to revitalizing multilateral negotiations and developing an open approach to bilateral and regional agreements, including free trade areas, to address

¹³⁹ Implementing and enforcing EU trade agreements. https://policy.trade.ec.europa.eu/enforcement-and-protection/implementing-and-enforcing-eu-trade-agreements_en

¹⁴⁰ Legal provisions of COM (2021) 66 - Trade Policy Review - An Open, Sustainable and Assertive Trade Policy. https://www.eumonitor.eu/9353000/1/i4nvhdhfc8bljza_i9vvik7m1c3gyxp/vlgfmx3uwmzw

global challenges. In light of strengthening the presence of European producers in Asia and the Pacific region, the EU plans to initiate negotiations on a free trade area with Australia and New Zealand, and to start new free trade negotiations with the Philippines and Indonesia to update and improve existing trade conditions with these countries. Additionally, the EU aims to deepen relations with African partners, modernize existing agreements with Turkey, Mexico, and Chile, and enhance the conditions of the Customs Union with Turkey¹⁴¹.

The new EU trade strategy focuses on ensuring that as many people as possible benefit from trade. Consumers already enjoy access to a wide range of products at lower prices thanks to the EU's open trade policy. The new trade agreements planned within the strategy will further expand this access while ensuring consumer safety. The new trade strategy aims to promote job creation in Europe by enhancing the effectiveness of trade agreements in generating economic opportunities. Considering that 90% of future global growth will occur outside Europe, the strategy includes measures to support jobs in Europe, as more than 30 million jobs—nearly one in seven—already depend on exports beyond the EU¹⁴². The completion of negotiations, for instance, with the United States and Japan, as well as the initiation of new negotiations in the Asia-Pacific region and Latin America, will help create more jobs, thereby contributing to economic growth.

The new EU trade strategy aims to facilitate small and medium-sized enterprises (SMEs) in taking advantage of the opportunities provided by trade agreements by offering specific provisions for SME participation in trade, which is expected to contribute to positive economic dynamics in the context of globalization. Given the increasing impact of factors such as technological innovations, the weakening of borders, logistics chains, and Industry 4.0 on economic development, traditional approaches to strategic planning in foreign trade have been replaced by modern approaches.

¹⁴¹ Legal provisions of COM (2021) 66 - Trade Policy Review...

¹⁴² Legal provisions of COM (2021) 66 - Trade Policy Review...

Thus, the modern period of globalization is characterized by an increasing influence of supranational organizations on processes in global trade, as evidenced by the significant rise in the number of bilateral and multilateral agreements signed by states over the past decade. The trade strategies of many countries are focused on trade liberalization and expanding the number of participants in free trade agreements, which positively impacts the reduction or elimination of trade barriers. Free trade agreements signed between states have been one of the most important factors in the rapid growth of global trade volumes. National strategies based on the principles of open trade have a positive impact on the structure and dynamics of foreign trade, fostering development and industrialization.

Conclusions of the Chapter

The essence of international trade lies in the exchange of goods between countries, whereby each country exports surplus production and imports goods that it is unable to produce domestically or whose production is relatively more expensive. Foreign trade positively influences a country's economic development by expanding the national market through the sale of surplus goods to other countries, which, in turn, allows for the acquisition of critically needed imports through foreign currency earnings from exports. Additionally, international trade facilitates the transfer of advanced technologies embedded in equipment and other high-tech products, thereby enhancing labor productivity and increasing production efficiency within the country.

The existence of a relationship between economic development and foreign trade is substantiated in the principles of classical, neoclassical, and modern theories of economic growth and is confirmed by the results of empirical research. An increase in export and import volumes can significantly accelerate a country's economic growth. International trade allows a country to benefit from the adoption of new technologies imported from other nations, which also positively influences economic growth. The relationship between economic development and trade is affected by national trade policies and international trade agreements. In particular, free trade agreements can increase the volume of foreign trade and, by eliminating trade barriers between

countries, foster economic growth among the participating nations. However, the impact of foreign trade on the economy can also be negative, manifesting in excessive import growth, declining domestic prices, and deteriorating competitiveness of national producers, which ultimately leads to slower economic growth.

A country's participation in international trade provides several advantages for the national economy, arising from production specialization and the exchange of goods. The main benefits include improved efficiency in resource utilization, an increase in the standard of living, an enhanced production structure through the development of high-tech industries, expansion of production scales, and economies of scale. Alongside the advantages of international trade, globalization also presents risks and threats to national economies, including job losses in the manufacturing sector of developed economies, environmental degradation, and disruptions in the supply of essential goods. Additionally, significant threats arise directly from imbalances in a country's foreign trade, such as a deteriorating balance of payments, dependence on external markets, reliance on imports, inefficiencies in exports due to a high share of raw materials, and excessive dependence on trade with a limited number of partner countries.

Trade openness results from the removal or significant reduction of restrictions (tariffs, technical requirements, certification rules) on the movement of goods, services, and investments between countries. The principles of international trade theory and empirical research highlight the crucial role of foreign trade in stimulating economic growth through market expansion, productivity enhancement, investment attraction, and technological progress. The key findings of numerous empirical studies indicate that trade openness is a decisive driver of economic growth, with open economies experiencing faster per capita GDP growth compared to closed economies. At the same time, scholars distinguish between trade policy, the reduction of trade barriers, and the increase in export and import volumes, emphasizing the ambiguous impact of trade openness on the economic growth of developing countries. Some research findings point to potential negative effects of trade openness on economic growth, which may be attributed to risks associated with vulnerability to external economic shocks. An optimal combination of openness policies with appropriate regulation enables countries to maximize the benefits of international trade while ensuring sustainable economic growth.

The group of Central and Eastern European (CEE) countries includes post-socialist nations that embarked on the path of European integration following the collapse of the Soviet Union and eventually joined the European Union. Over the past three decades, CEE countries have implemented extensive political, economic, and institutional reforms, introducing trade liberalization policies that have positively influenced their trade integration with the Eurozone and significantly increased trade volumes. Trade liberalization has enhanced the openness of CEE national economies, which, in turn, has contributed to higher productivity levels, increased per capita export and import volumes, and accelerated economic growth. At the same time, these countries have experienced a rapid convergence with Western European nations in terms of GDP per capita (in purchasing power parity), indicating the potential positive impact of trade liberalization on the economies of post-socialist countries. Therefore, studying the experience of CEE countries is a crucial component in analyzing the impact of trade openness on Ukraine's economic growth, particularly as the country has gained candidate status for EU membership.

The study of international experience in strategic trade management has demonstrated a shift among leading global economies from import substitution strategies, which involved active protection of domestic producers, to open trade policies. The latter, by reducing and eliminating trade barriers between countries, positively influences the structure and dynamics of external trade, fostering development and industrialization among participating nations. The trade strategies of leading countries incorporate several fundamental priorities, combining trade liberalization and market openness with the retention of certain trade barriers and export controls on strategic goods and industrial imports to mitigate economic security risks. Significant attention in trade strategies is also given to supporting small and medium-sized enterprises, which often face difficulties in independently promoting their products in foreign markets. A key distinguishing feature of the European Union's new trade strategy is its emphasis on ensuring that all trade participants enter agreements with international partners while adhering to the principles of sustainable development.

CHAPTER 2. METHODOLOGY FOR STUDYING TRADE ASPECTS OF INTEGRATION PROCESSES

(Ivan Mytsenko)

2.1. Conceptual Approaches to Defining the Efficiency of Functioning of Countries' Integration Associations

In the context of globalization, the integration of countries serves as a tool for enhancing the competitiveness of national economies, ensuring resilience to contemporary geopolitical threats, and uniting efforts to address common challenges. Despite a number of negative consequences of a country's participation in an integration association – such as partial loss of sovereignty, deterioration of the sectoral structure of the national economy, rising unemployment, and population migration – the advantages are also significant. These benefits are typically examined through the positive effects of deeper trade relations, increased investments, technology exchange, and accelerated economic growth among member countries. Obolenska T. et al. note that the conclusion of free trade agreements contributes to the stabilization of trade flows, access to new markets, tariff reductions, and increased proportionality and interdependence of the economies of the participating countries. At the same time, based on an analysis of the interim results of the Free Trade Agreement between Ukraine and the EU during 2019–2020, researchers identified key threats to the effectiveness of trade and economic cooperation between Ukraine and the EU. These threats stem from the asymmetry in economic development, particularly in terms of production volumes, solvent demand, investments, and technological disparities in foreign trade¹⁴³. Balezentis A. and Yatsenko O., alongside the advantages of trade integration for national economies, highlight negative consequences such as the deepening of development asymmetries among member countries and the persistence of significant disparities between countries in cases of unequal partnerships¹⁴⁴.

¹⁴³ Obolenska T., Kalenyuk I., Yatsenko O. Formation and implementation of trade integration potential Bull. Kharkiv Natl. Univ. named V. Dokuchaev. Ser.: Econ. Sci. 2020. Vol. 3. pp. 250-263

¹⁴⁴ Balezentis A., Yatsenko O. Asymmetries of trade integration of Ukraine and the EU. International Economic Policy. 2018. Vol. 1 (28). pp. 32-62.

At the same time, research conducted by numerous scholars indicates that countries with less developed economies derive greater positive effects from integration with highly developed nations. The integration benefits for countries with relatively smaller economies include price equalization as a result of removing trade barriers¹⁴⁵; ensuring equal conditions for domestic producers¹⁴⁶; expanding the range of consumer goods available in domestic markets¹⁴⁷; and gaining access to substantial financial resources from a larger partner¹⁴⁸.

To assess the impact of a country's participation in an integration bloc, various economic, statistical, and managerial analysis methods are applied, most of which focus on determining the effectiveness of trade and economic integration among partner countries. In particular, Yordanova V. and Shapor M. use export dynamics forecasting results to evaluate the efficiency of integration processes. Their approach is based on projected macroeconomic indicators (GDP, inflation, unemployment) of partner countries, obtained through growth curve models, which are then used in regression analysis to study the development of integration groupings¹⁴⁹.

Yilmazkuday D. and Yilmazkuday G. applied an econometric model of bilateral trade and demonstrated that regional trade agreements are more beneficial for both partner countries when their economies are larger and more economically similar¹⁵⁰. Similar conclusions were substantiated by T. Melnyk et al. based on empirical and statistical analysis of the medium-term outcomes of deepened trade cooperation between Ukraine and China for the period up to 2019¹⁵¹.

¹⁴⁵ Tobal M. Regulatory Entry Barriers and Trade Department of Economics. UC San Diego, 2011, P. 39.

¹⁴⁶ Nyamtseren, L. Challenges and Opportunities of Small Countries for Integration into the Global Economy, as a Case of Mongolia. *Dresden Discussion Paper in Economics*. 2004. 13/04. Dresden: Dresden University of Technology, 45 p.

¹⁴⁷ Casella, A., Large Countries, Small Countries and the Enlargement of Trade Blocs. Working paper, 5365. Cambridge, MA: National Bureau of Economic Research, 1995. 30 p.

¹⁴⁸ Zhicheng Xu, Yu Zhang. Lightening up Africa: The effects of Chinese aid on the economic development in Africa. *China Economic Quarterly International*. 2022. Vol. 2 (3). pp. 178-189.

¹⁴⁹ Yordanova V., Shapor M. Evaluation of the effectiveness of integration processes of regional integration associations (on EU EXAMPLE, NAFTA, EAEP).

https://www.researchgate.net/publication/352115976_Evaluation_of_the_effectiveness_of_integration_processes_of_regional_integration_associations_on_EU_EXAMPLE_NAFTA_EAEP

¹⁵⁰ Yilmazkuday, D., Yilmazkuday, H. Bilateral versus Multilateral Free Trade Agreements: A Welfare Analysis. *Economics Research Working Paper*, 1. Miami: Florida International University, 2014. 27 p.

¹⁵¹ Melnyk T., Kudyrko L., Pugachevska K., Sevruk I. Promotion of Ukraine's export to China: priorities and institutional framework. *Problems and Perspectives in Management*. 2019. Vol. 17 (3). pp. 508-520.

To assess the effectiveness of trade and economic cooperation, scholars utilize gravity modeling. The traditional gravity model is refined by incorporating new variables. For instance, to account for the level of trade and economic integration between countries, which is typically measured by trade openness, these models often use various indices that characterize the degree of mutual trade openness. In this regard, Slabospyska O. applied a gravity model to analyze the export of engineering products by Ukrainian companies, enhancing it with a three-component trade liberalization index from the Heritage Foundation, which considers tariff protection, the level of corruption at customs, and non-tariff barriers¹⁵². Analyzing mutual trade between Ukraine and the EU in the context of the establishment of a free trade area, N. Rylach enhances the gravity model by incorporating the economic freedom index. This index ranges from 0 (non-free economy) to 10 (maximum free economy) and characterizes the level of economic freedom and free trade¹⁵³.

Thus, a widely used tool for econometric analysis of trade cooperation effectiveness is the gravity model of J. Tinbergen (1966), which is based on the concept of Newtonian gravitational attraction. In the context of bilateral trade studies, this idea is transformed into the hypothesis that foreign trade turnover is directly proportional to the size of the economies involved and inversely proportional to factors representing trade distance between partners¹⁵⁴.

Typically, in constructing the model, the gross domestic product is chosen as an indicator of the size of national economies. Its use for assessing the proportional contribution to the overall outcome of trade cooperation based on the economic power of partners is theoretically convenient. However, the challenge of using gravity modeling to evaluate the impact of trade partners with different levels of economic development on trade volumes is confirmed, among other things, by the results of the

¹⁵² Slabospyska O. Construction of the gravity model of international trade of enterprises of the machine-building complex of Ukraine when forming a strategy on the foreign market. *Bull. Khmelnytskyi Natl. Univ.* 2011. Vol. 2. pp. 237-241.

¹⁵³ Rylach N. The application of the gravity regression model for the analysis of the impact of the creation of a free trade zone between Ukraine and the EU on trade. *Actual Problems of International Relations.* 2011. Vol. 100 (1). pp. 151-161.

¹⁵⁴ Kalyuzhna N., Kudyryko L. Effectiveness of trade and economic integration of asymmetric countries: Assessment methods and tools. *Journal of Economy and Technology.* 2023. Vol. 1. pp. 119-126.

construction of a bilateral foreign trade gravity model by Melnyk T. et al., which in logarithmic form is represented as follows:

$$\ln E_{ij} = \alpha_0 + \alpha_1 \cdot \ln Y_1 + \alpha_2 \cdot \ln Y_2 + \alpha_3 \cdot \ln D_{ij} + \ln \varepsilon, \quad (2.1)$$

where E_{ij} – trade turnover between countries i and j ; Y_1, Y_2 – GDP of countries i and j , calculated at purchasing power parity; D_{ij} – average annual world oil price as a comprehensive characteristic of the "trade distance" between foreign trade partners; $\alpha_0, \alpha_1, \alpha_2, \alpha_3$ – model parameters; ε – statistical abduction¹⁵⁵.

Based on the identified factors, Kaliuzhna N. and Kudyenko L. proposed a gravity model of trade between Ukraine and the EU for the period 1996–2015 and substantiated that the model with the following set of factors would have the best statistical significance:

$$\ln E = c_0 + c_1 \cdot \ln D + c_2 \ln Y_1 \cdot \ln D. \quad (2.2)$$

As seen in Equation 1.2, the researchers proposed a model specification that includes a minimally sufficient number of factors, which do not explicitly incorporate factor Y_2 (EU GDP) in its pure form. Instead, the influence of this factor on the resulting indicator is indirectly accounted for through inter-factor cooperation. Based on the results of the study conducted by the researchers, a model was developed in which trade between Ukraine and the EU is primarily determined by Ukraine's gross domestic product, which exhibits high statistical significance¹⁵⁶.

Researchers also widely use index models, with significant attention given to developing a system of relevant indicators that comprehensively reflect the impact of integration on the economies of partner countries. For example, T. Makkonen, in the context of structuring a composite index to assess the level of regional integration, justified the inclusion of a component that "reflects the development of science, technology, and innovation, which serve as drivers of economic growth, particularly in the processes of integration interaction"¹⁵⁷. For the study of integration processes in the

¹⁵⁵ Melnyk T., Kudyenko L., Pugachevska K., Sevruck I. Promotion of Ukraine's export to China...

¹⁵⁶ Kaliuzhna N., Kudyenko L. Effectiveness of trade and economic integration...

¹⁵⁷ Makkonen T. Measuring cross-border regional integration with composite indicators: The Oresund Integration Index. In book: Emerging Trends in the Development and Application of Composite Indicators (pp.1-19). Ch. 1. Ed. Jeremic V., Radojicic Z., Dobrota M. Publisher: IGI Global, 2016.

African region, S. Gor applied the **African Regional Integration Index**, which includes 16 indicators grouped into five areas (trade integration, productive integration, free movement of people, financial and macroeconomic integration, and regional infrastructure)¹⁵⁸. Stanicková M. and Melecký L. proposed a composite weighted index of regional resilience to assess integration processes in EU regions. According to the researchers, the calculation of this index takes into account the most significant factors, including community ties, human capital and socio-demographic structure, labor market, economic indicators, and innovation, science, and research¹⁵⁹.

Osaulenko O. et al. substantiated the feasibility of using integral indicators to assess the potential for regional integration processes and applied a new scientific and methodological approach that involves the use of an integral indicator of integration process development potential, considering the intensity of internal and external factors influencing integration relations. The researchers developed an integral index of integration process development potential, based on the assumption that there exists a population of integration associations m , whose development level is characterized by a system of parameters defined as follows:

$$X_i = (x_{i1}, x_{i2}, \dots, x_{ij}, \dots, x_{in}), \quad (2.3)$$

where: " i – index of the analyzed integral association ($i = 1, m$), j – a unique index that characterizes integration ties ($j = 1, n$). Thus, ij represents the value of the j index for the integration association i "¹⁶⁰.

The researchers substantiated that the level of development of integration processes is determined, on the one hand, by intra-regional factors that define the scale, depth, and specifics of integration relations within existing regional integration associations. These factors are characterized by intra-regional trade and its share in the total external trade turnover, the share of high-tech exports in total intra-regional

¹⁵⁸ Gor S. The African Regional Integration Index: A Selective Audit, Trade and Development Review. 2017. Vol. 9. pp. 86–98.

¹⁵⁹ Stanicková M., Melecký L. Understanding of resilience in the context of regional development using composite index approach: the case of European Union NUTS-2 regions. Regional Studies, Regional Science. 2018. Vol. 5(1). pp. 231–254.

¹⁶⁰ Osaulenko O., Bulatova O., Zakharova O., Reznikova N. The problem of statistical assessment of the potential for the development of regional integration processes. Statistics in Transition New Series. 2021. Vol. 22 (4). pp. 121-138.

exports, and the GDP per capita index within the integration association. On the other hand, it is determined by the influence of external factors that characterize the position and role of the integration association in global processes, including the share of the integration association in global trade turnover (including high-tech exports), investments, and population. This approach forms the basis of a system of unique indices (Table 2.1).

Table 2.1

Structure of the unique index system¹⁶¹

Intra-regional factors		External factors	
Intra-regional trade (exports) per capita, USD	X_{Intra}	Share of regional trade of the integration association in world trade, %	$X_{Intra S}$
Share of intra-regional trade and its share in total foreign trade turnover, %	ITS	Share of investment of the integration association in the global investment volume, %	FDI_S
Share of ICT in intra-regional exports, %	$X_{Intra ICT}$	GDP share of the integration association in the world GDP, %	GDP_S
Investment per capita index, USD	FDI	The share of the integration association's population in the world's population, %.	$Pops$
GDP of the integration association per capita, USD	GDP	Share of ICT exports of the integration association in global exports, %.	$X_{ICT S}$

To construct the integral indicator, it is necessary to ensure the comparability of all unique parameters; therefore, a standardization procedure is applied, allowing their combination into an integrated index. The calculation of the standardized assessment for a parameter, the increase in the value of which leads to an increase in the integral indicator itself (has a stimulating effect), is conducted using the following formula:

$$P_{ij} = \frac{x_{ij} - x_{min}}{x_{max} - x_{min}}, \quad (2.4)$$

where: x_{ij} – is the value of the unique parameter j for the integration association i , x_{min} , x_{max} - respectively, the minimum and maximum values of the unique parameter j ¹⁶².

¹⁶¹ Osaulenko O., Bulatova O., Zakharova O., Reznikova N. The problem of statistical assessment of the potential...

¹⁶² Osaulenko O., Bulatova O., Zakharova O., Reznikova N. The problem of statistical assessment of the potential...

If an increase in a unique parameter leads to a decrease in the integral indicator (having a **discouraging effect**), the standardized value should be calculated using the following formula:

$$P_{ij} = \frac{x_{max} - x_{ij}}{x_{max} - x_{min}}. \quad (2.5)$$

Additionally, certain unique parameters that describe different aspects of integration relations have unequal impacts on the overall state of integration. Therefore, when constructing the integral indicator for assessing the potential development of integration processes, it is necessary to determine significance coefficients (α_{ij}) for each unique parameter mentioned above.

In scientific research, different types of weighted averages are used to construct an integral indicator, including the arithmetic mean, geometric mean, quadratic mean, and others. According to an analysis of the practical application of various types of means, the weighted geometric mean index is the most suitable form of index when constructing an integral indicator, especially in cases where the monotonic increase of a certain parameter leads to an overall increase in the general indicator¹⁶³. The geometric mean weighted index has the following form:

$$I_i = \prod_{j=1}^n (P_{ij})^{\alpha_j}. \quad (2.6)$$

According to O. Osaulenko et al. the general integral indicator of the potential for the development of the integration process is defined as:

$$IPD_i = \frac{Iint_i + Iext_i}{2}. \quad (2.7)$$

The sub-index characterizing the impact of the intra-regional component of the overall integrated index of integration processes is calculated as follows¹⁶⁴:

$$Iint_i = \sqrt[5]{P_{Xint_i} \cdot P_{ITS_i} \cdot P_{XICT_i} \cdot P_{FDI_i} \cdot P_{GDP_i}}. \quad (2.8)$$

The sub-index characterizing the impact of the external component on the overall integrated indicator of the development of integration processes is calculated as follows¹⁶⁵:

¹⁶³ Osaulenko O., Bulatova O., Zakharova O., Reznikova N. The problem of statistical assessment of the potential...

¹⁶⁴ Osaulenko O., Bulatova O., Zakharova O., Reznikova N. The problem of statistical assessment of the potential...

¹⁶⁵ Osaulenko O., Bulatova O., Zakharova O., Reznikova N. The problem of statistical assessment of the potential...

$$I_{ext_i} = \sqrt[5]{P_{XintS_i} \cdot P_{PopS_i} \cdot P_{XICTS_i} \cdot P_{FDIS_i} \cdot P_{GDPS_i}}. \quad (2.9)$$

The use of the integral indicator for a comprehensive comparative analysis of the potential for integration process development allows for the consideration of the intensity of multiple influencing factors (both internal and external). This, in turn, enables a holistic and quantitative characterization of economic integration processes and helps determine their position in the global economy.

Thus, in our study, we will use the method of calculating the integral indicator to assess the effectiveness of the EU as an integration bloc, determining it for the following key periods: the last enlargement of the EU with Croatia's accession in 2013; the United Kingdom's exit from the EU in 2020; the current stage of the EU-27 functioning. To determine the prerequisites for Ukraine's integration into the EU and to assess the impact of trade as the primary form of cooperation between our country and the integration bloc, we will calculate a gravity model, which will be used to forecast trade turnover between the countries in the short-term perspective.

2.2. Assessment of Impact of Global Value Chains on Economic Growth

The identification of a large number of global value chains by scientists has challenged the traditional use and interpretation of trade statistics and has encouraged the adoption of new data and methods. Traditional trade indicators record the flow of goods and services on a gross basis, meaning that the value of intermediate resources is counted each time they cross a border for further processing. Thus, in a world where intermediate goods cross multiple borders before reaching the final consumer, gross exports may be subject to significant double counting. This can lead to a misleading perception of different countries' contributions to global trade.

To address these issues, researchers and practitioners increasingly rely on the concept of trade in value-added. Within this framework, gross exports are broken down according to the country and industry of origin and destination of the added value. In

other words, value-added is traced across borders and allocated among the countries where it is produced and consumed¹⁶⁶.

According to the definition, global value chains consist of "a series of stages related to the production of goods and services that are sold to consumers, with each stage adding value"¹⁶⁷. A more specific definition of global value chains was proposed by Borin A. and Mancini M., considering trade as "characterized by flows that cross at least two national borders"¹⁶⁸. This approach allows for the separation of trade related to GVCs from direct trade (both being part of gross trade), which instead refers to trade flows crossing only one border (e.g., goods and services that are directly exported for final use or used as raw materials in production and consumed in the first importing country).

Indicators of a country's participation in GVCs allow for measuring the degree of involvement in global production networks and serve as a basis for the fragmentation of the production process. A country's participation in GVCs is typically calculated as the share of GVC-related trade in the country's gross exports.

At the broadest level of disaggregation, individual countries can participate in GVCs through backward and/or forward linkages. Backward participation measures the share of foreign value-added embedded in a country's total gross exports. Forward participation involves determining the share of domestically produced value-added contained in a country's exports, which is then re-exported by the destination country. Countries' participation in GVCs is schematically represented in Figure 2.1. In this example, Country A is the producer of a final product that is exported. To manufacture this export product and ship it to Country B, Country A can either rely on domestic resources and its own value-added or import components from abroad (i.e., use value-added from third countries in the form of raw materials in production). Backward participation consists of the value-added embedded in components that Country A

¹⁶⁶ Cigna S., Gunnella V., Quaglietti L. Global value chains: measurement, trends and drivers. European Central Bank (ECB), Occasional Paper Series. 2022. №289. 57 p.

¹⁶⁷ Antràs P. Conceptual Aspects of Global Value Chains. Policy Research Working Paper Series. 2020. №9114. World Bank, January

¹⁶⁸ Borin A. and Mancini M. Follow the value added: bilateral gross export accounting. Working Paper Series. 2015. №1026. Banca d'Italia, July

imports from foreign partner C. Conversely, forward participation is assessed by calculating the domestic value-added generated directly in Country A (e.g., through labor used in assembling the final product), which is included in the exported good to Country B and then further utilized in the production of export goods to third-country D. GVC participation indicators account for both backward and forward measures; thus, in this example, the total participation indicator for Country A is obtained as the sum of backward and forward trade in value-added (the value-added of intermediate goods used to produce the final good exported from Country B to Country D), expressed as a share of the country's total gross exports.

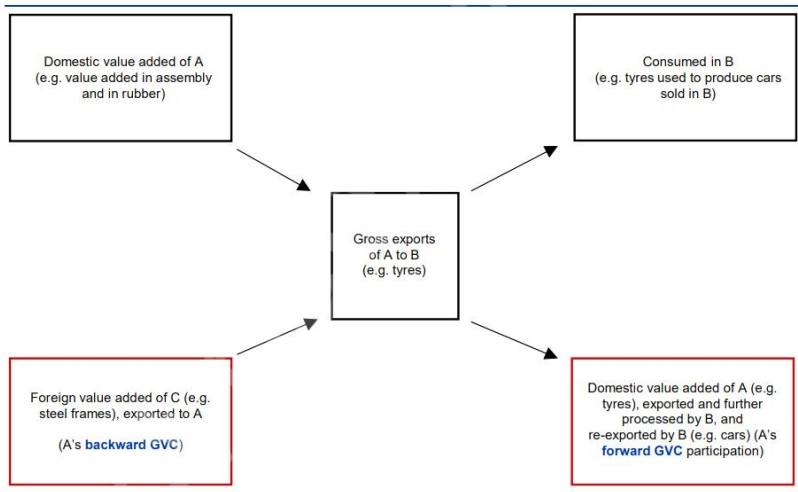


Fig. 2.1. Decomposition of exports of country A to country B by the criterion of origin and destination of value added¹⁶⁹

As one of the key features of global development, the functioning of GVCs closely connects countries and regions worldwide through spatial production networks, fostering global economic growth. The production activities within GVCs facilitate a process in which the production of a product is divided into multiple stages, each completed by different countries. In this process, trade in intermediate goods plays a

¹⁶⁹ Built by: Cigna S., Gunnella V., Quaglietti L. Global value chains..., p. 7

particularly crucial role. It is noteworthy that the volume of trade in intermediate goods accounted for more than 50% and showed a general upward trend, with the exception of a slight decline in 2019. Unlike the fluctuations and downturns in the global economy and trade, the development of trade in intermediate goods continues to show a growth trend. This indicates that trade in intermediate products plays a significant role in international trade, which is also a result of the deep evolution of GVCs. According to the World Bank, if the level of GVC participation continues to increase by 1%, per capita income could rise by more than 1%¹⁷⁰. Thus, researchers have concluded that GVCs contribute to economic growth to some extent. Therefore, a country should actively participate in GVCs to improve its competitive position and benefit from engagement in international cooperation. This makes the study of the impact of global value chains on economic growth particularly relevant. At the same time, GVC activities can enhance spatial correlation and spatial interaction between countries or regions.

Modern scientific research focuses on studying the essence of GVCs and their impact on the global economy and the economic growth of individual countries or regions. In particular, Z. Mao examined the relationship between the economic growth of 63 developed and developing economies and their participation in global value chains, demonstrating that a U-shaped nonlinear GVC model may be more effective than a simple linear GVC model in terms of economic growth in high- and middle-income economies. As a result of the study, the researcher confirmed that "the U-shaped nonlinear model explains that in an economy where GVCs dominated by foreign states decrease, domestic value chains increase to build local value chains, and then GVC participation increases to secure a better position"¹⁷¹. This study indicates that countries with a relatively low level of development should reduce GVCs dominated by foreign companies and then increase the participation of national companies in GVCs to accelerate economic growth.

¹⁷⁰ World Development Report 2020: Trading for Development in the Age of Global Value Chains. World Bank: Washington, DC, USA, 2020

¹⁷¹ Mao Z. Global value chains (GVCs) and economic growth: a nonlinear analysis. *The Singapore Economic Review*. 2022. Vol. 67 (03). pp. 985-1004

As a result of the study on the threshold impact of a country's participation in GVCs and its disaggregated level (forward and backward participation) on economic growth for 62 economies during the period 2000–2018, researchers found that "participation in GVCs positively affects economic growth in countries with higher economic growth in both aggregate and disaggregated analyses, while it is negatively associated with economic growth in countries with lower economic growth"¹⁷². Researchers also confirmed that the growth effects of forward and backward participation have different impacts on economic growth in countries with moderate economic growth. Accordingly, the direction of participation in GVCs is significant in determining economic growth in countries with moderate economic growth.

Alongside its positive impact, global production can also have a negative effect on sustainable economic growth and even create problems for certain countries. For example, contrary to the traditional viewpoint, globalization may lead to an increase in poverty and exacerbate income inequality. This occurs mainly because Asian countries, particularly China, "attracted foreign capital investments due to the availability of a large pool of skilled labor and low wages, which resulted in a decline in global wage levels and deepening poverty"¹⁷³. Scientists have proven that if a country's export products rely heavily on unskilled labor and fail to achieve higher added value through industrial modernization, it becomes difficult for that country to compete effectively in the global market. Consequently, "the country's terms of trade may deteriorate, placing it in a difficult position due to increasing poverty"¹⁷⁴.

At the current stage, the development of the global economy is characterized by deglobalization processes, which manifest as the fragmentation and restructuring of value chains. Some scholars have also noted these trends and conducted research. As a result of these studies, it was established that "an increase in tariffs in the United States will lead to a decline in the volume of bilateral imports and exports between

¹⁷² Podikkalathil J., Ashraf S., Umar Z. Does global value chain participation induce economic growth? Evidence from panel threshold regression. *Applied Economics*. 2022. № 55(1), pp.1-13

¹⁷³ Kaplinsky, R. *Globalization, Poverty and Inequality: Between a Rock and a Hard Place*. Polity Press: Cambridge, UK, 2005

¹⁷⁴ Kaplinsky R., Morris M., Readman J. The globalisation of product markets and immiserising growth: Lessons from the South African furniture industry. *World Dev.* 2002. №30, pp. 1159–1178

China and the United States"¹⁷⁵. Ran C. and Byeongho L. found that the United States' attempt to decouple from China had a significant impact on the supply chain within GVCs, with a greater negative effect on South Korea and China compared to the impact on the United States¹⁷⁶. The outbreak of COVID-19 in 2019 also affected the global production process. Through modeling, researchers found that stagnation in global production would have a negative impact on global GDP growth, particularly in the services sector, which would be difficult to overcome in the short term¹⁷⁷.

According to spatial economics theory, spatial spillovers occur as a result of the interconnection between similar economic activities in different spatial units¹⁷⁸. In this regard, some researchers combined the study of countries' participation in GVCs with the effect of spatial spillovers and used spatial econometric analysis to examine how participation in GVCs influences economic growth. As a result, it was found that "if GVC participation in a country increases, economic development is effectively accelerated both in the local and surrounding regions"¹⁷⁹. Some researchers also divide the spatial diffusion effect into horizontal and vertical spatial channels. This allowed them to conclude that "embedding regional GVCs will lead to indirect spillover effects through horizontal and vertical spillovers, which will stimulate the embedding of adjacent GVCs"¹⁸⁰. A detailed study of horizontal spatial diffusion channels allowed scientists to discover that "the horizontal spatial diffusion channels of a country or region participating in GVCs mainly include export, import, and net knowledge diffusion, and participation in GVCs can promote economic growth through these three channels"¹⁸¹.

¹⁷⁵ Bollen J., Romagosa H.R. Trade Wars: Economic Impacts of Us Tariff Increases and Retaliations: An International Perspective. CPB Background Document. June 2018. URL: <https://www.researchgate.net/publication/328761235>

¹⁷⁶ Ran C., Byeongho L. Economic Effects of US-China Decoupling on Global Value Chain. Korea Int. Commer. Rev. 2021. №37. pp. 261–280

¹⁷⁷ McKibbin, W. The Global Macroeconomic Impacts of COVID-19: Seven Scenarios. Asian Economic Paper. 2021. №20. pp. 1–30; Fernandes, N. Economic Effects of Coronavirus Outbreak (COVID-19) on the World Economy. SSRN Electron. J. 2020

¹⁷⁸ Anselin, L. Local Indicators of Spatial Association-LISA. Geogr. Anal. 2010. №27. pp. 93–115; Liu C., Xin L., Li J., Sun, H. The Impact of Renewable Energy Technology Innovation on Industrial Green Transformation and Upgrading: Beggar Thy Neighbor or Benefiting Thy Neighbor. Sustainability. 2022. №14. 11198

¹⁷⁹ Danni S.U., Shao C. Global Value Chain. Regional Economic Growth and Spatial Spillover. J. Int. Trade. 2017

¹⁸⁰ Ivarsson I. Alvstam C.G. Supplier Upgrading in the Home-furnishing Value Chain: An Empirical Study of IKEA's Sourcing in China and South East Asia. World Development. 2010. №38. pp. 1575–1587

¹⁸¹ Wang, J. Technology spillover in the transnational outsourcing system and technological innovation in the host country. Social Sciences in China. 2013. pp. 108–125

An important component in determining the impact of participation in GVCs on a country's economic growth is the quantitative assessment of the degree of integration of the national economy into global production networks.

Based on empirical research, scientists have developed indicators of length, the degree of upstream and downstream participation in GVCs, and proposed a set of metrics for determining a country's status in GVCs¹⁸². The decomposition method proposed by Wang Z. et al. is the latest representative achievement in the study of global value chains and has enabled scientists to break down the global value chain into 17 specific indicators¹⁸³. The application of GVC decomposition has been expanded from the national level to the sectoral national level and the level of bilateral trade, significantly improving research capabilities and analytical methods for studying GVCs. However, the most commonly used indicators have become the GVC participation index and the GVC position index. The GVC participation index (GVC Participation) is calculated using the following formula:

$$GVC_{Participation} = \frac{IV}{E} + \frac{FV}{E}, \quad (2.10)$$

where IV - indirect domestic value added from the country's total exports, FV - value added from abroad in the country's total exports, E - total exports of the country¹⁸⁴.

Thus, the ratio IV/E characterizes a country's forward participation in GVCs, while the ratio FV/E represents its backward participation. The higher the GVC participation index, the deeper the country is involved in the division of labor within GVCs. However, it is theoretically justified that advancing a country's status within the global value chain (GVC) can better reflect improvements in its comprehensive innovation capacity in management systems, market competitiveness, industry development, and other areas. Compared to merely increasing participation in GVCs,

¹⁸² Fally, T. Production Staging: Measurement and Facts. University of Colorado Boulder. 2012. pp. 155–168; Antras P., Chor D., Fally T., Hillberry R. Measuring the Upstreamness of Production and Trade Flows. Social Science Electronic Publishing: Rochester, NY, USA, 2012

¹⁸³ Wang Z., Wei S.J., Zhu K.F. Quantifying International Production Sharing at the Bilateral and Sector Levels. NBER Working Paper. 2014. 19677

¹⁸⁴ Men K., Sun, H., Kou M. Global Value Chains and Spatial Spillovers of Economic Growth - Based on the Perspective of Participation and Status Index in Global Value Chain. Sustainability. 2022. №14. 15518. <https://doi.org/10.3390/su142315518>

this represents a "qualitative change," indicating that a country takes responsibility for producing intermediate goods with higher technological content and operates at the upper end of the value chain. The formula for calculating a country's GVC status index is as follows:

$$GVC_{Position} = \ln\left(1 + \frac{IV}{E}\right) + \ln\left(1 + \frac{FV}{E}\right). \quad (2.11)$$

Based on the given mathematical relationships (formulas 2.10 and 2.11), a high GVC status index indicates that a country's forward participation in GVCs is greater than its backward participation. If a country holds a higher position in GVC production, it will be more engaged in the production of raw materials, intermediate goods, or product design. The lower the country's GVC status index, the higher its backward participation in GVCs. This implies that the country needs to import a large number of intermediate goods produced in other countries. From the above analysis, it can be concluded that the higher a country or region ranks in the global value chain, the more benefits it can gain from production activities within GVCs, ultimately contributing to long-term economic growth.

To assess economic growth as a dependent variable influenced by a country's participation in GVCs, researchers use indicators such as GDP per capita, GDP level, the share of manufacturing value-added in total GDP, and labor costs per unit of output. Through regression analysis, researchers have found that the relationship between economic growth and traditional trade indicators differs from its dependence on trade indicators within GVCs, as evidenced by the opposite signs of the coefficients¹⁸⁵. This confirmed the different nature of trade within GVCs compared to traditional trade, as well as the fact that they are shaped by different and often opposing factors.

Men K. et al., using the spatial autoregressive model and the spatial Durbin model, examined the impact of the participation of 42 countries in GVCs and their positions within GVCs on economic development from the perspective of spatial effects. The researchers obtained results that led to the conclusion that "improving participation in the global value chain not only has an obvious spillover effect on

¹⁸⁵ Cigna S., Gunnella V., Quaglietti L. Global value chains..., P. 33

domestic economic growth but also exerts a driving influence on the economic development of neighboring countries; a country can gain more benefits from production activities within GVCs, which contributes to long-term economic growth; improving status within GVCs not only plays an important role in stimulating domestic economic growth but also significantly promotes the economic development of neighboring countries through spatial spillover effects"¹⁸⁶.

Thus, based on the results of contemporary research, we will use a functional dependence model to analyze the impact of a country's participation in global value chains on economic growth:

$$Y = f(GVC_part; GVC_posit), \quad (2.12)$$

where Y – economic growth of the country; GVC_part – indicator of the country's participation in the GVCS; GVC_posit – is an indicator of the country's position in the GVC.

The objective of our study is to identify the economic sectors whose participation in global value chains (GVCs) will contribute to Ukraine's European integration process after the end of the war. Accordingly, in the analytical section of the study, it is necessary to assess not only the impact of general indicators of the country's participation in GVCs but also the influence of key economic sectors on changes in economic growth indicators. Therefore, the independent variables should describe both the quantitative and qualitative characteristics of Ukraine's foreign trade.

For conducting regression analysis based on the functional dependence (1.3) we can formulate the econometric equation, where α is the constant term, β_i - are the coefficients to be estimated, and ε_t is the error term:

$$Y_t = \alpha + \beta_1 \cdot GVC_part_t + \beta_2 \cdot GVC_posit_t + \beta_i \cdot (FV/E)_t + \varepsilon_t, \quad (2.13)$$

where Y_t is a vector of dependent variables, including indicators of Ukraine's GDP, GDP per capita, and the index of annual changes in Ukraine's GDP; GVC_part is a vector of indicators of the country's participation in the GVCs (coefficients of direct and reverse participation in the GVCs, indicator of total participation in the GVCs); GVC_posit is an indicator of the country's position in the GVCI; $(FV/E)_t$ is a vector

¹⁸⁶ Men K., Sun, H., Kou M. Global Value Chains and Spatial Spillovers....

of indicators of the share of foreign value added embodied in imported resources in gross exports by economic sectors.

Thus, the methodology of our study is based on the theoretical foundation and empirical evidence of the impact of countries' participation in GVCs on economic growth, as highlighted in scientific publications on this topic. To determine the relationship between Ukraine's economic growth and the participation of national producers in GVCs, our study will apply statistical-correlation analysis, which involves constructing a regression dependency of GDP indicators on changes in indicators of forward, backward, and overall participation in GVCs, the country's position in GVCs, and the share of imported value-added content in the export of key economic sectors. The information base of the study will consist of statistical data for the period 2010–2020, published by the State Statistics Service of Ukraine, as well as the OECD statistical database on trade in gross value-added (TIVA).

2.3. Effectiveness Assessment of Global Value Chains

The functioning of value-added chains is a multifaceted process and phenomenon that not only depends on external and internal factors but also influences the economic development of countries through improvements in the technical level of industrial production, the enhancement of workers' qualifications, and the attraction of foreign investment. Therefore, scientific literature examines not only the impact of these factors on the degree of a country's involvement in global value chains but also the dependence of economic development and other macroeconomic effects on the state of national economy integration into international networks of cooperation and final product manufacturing.

Among the studies that do not focus on determining the determinants of integration within global value chains but are aimed at examining participation in global value-added chains to explain other macroeconomic phenomena, the following can be highlighted. First, attention should be given to research analyzing the relationship between a country's degree of participation in global value chains and the cumulative inflow of foreign direct investment. This study was conducted for OECD

countries and major emerging economies based on data from 2002–2011. Based on regression analysis that accounted for other potential determinants of FDI, the authors concluded that "the higher a country's degree of participation in the global value chain, the greater the cumulative inflow of FDI into that country"¹⁸⁷.

The impact of participation in global value chains on carbon emissions was the subject of a study based on a sample of 62 countries from 1995 to 2001. As a result, researchers identified a nonlinear (inverted U-shaped) relationship between CO₂ emissions and integration into global value chains, expressed as the sum of upstream and downstream participation levels. The shape of this relationship is attributed to several opposing effects. Initially, as participation in global value chains increases, carbon emissions rise. This can be linked to increased economic activity, which leads to higher energy demand and, consequently, greater pollution (scale effect). However, after exceeding a certain level of participation in global value chains (approximately 30% in the conducted analysis), further integration results in a decline in CO₂ emissions. This can be explained by the competition effect, which leads to a reduction in the number of inefficient (more polluting) companies, as well as technological advancements among existing enterprises due to trade liberalization and competition from foreign firms. Moreover, increased participation in trade may contribute to environmental improvements through technology transfer (including so-called "green" technologies) and greater efficiency (technological effect). Results from repeated surveys for subsamples consisting of specific industry sectors indicate that a similar relationship is observed only for certain types of economic activities studied¹⁸⁸.

The relationship between environmental quality and global value chains has also been studied by Chinese researchers, who analyzed the correlation between China's position in the global value chain and the country's energy and environmental efficiency. According to the authors, "countries that possess capital and technological advantages are characterized by their involvement in processes that generate high added value, such as research and development, design, and the production of

¹⁸⁷ Martínez-Galán E., Fontoura M. P. Global Value Chains and Inward Foreign Direct Investment in the 2000s. *The World Economy*. 2019. Vol. 42. pp. 175–196

¹⁸⁸ Wang J., Wan G., Wang C. Participation in GVCs and CO₂ Emissions. *Energy Economics*. 2019. Vol. 84. pp. 1–11.

intermediate goods belonging to the high-tech sector"¹⁸⁹. These types of activities are characterized by low energy consumption and low carbon dioxide emissions. In turn, segments of the global value chain that generate low added value, such as processing and assembly, are associated with high energy intensity and CO₂ emissions. Improving a country's position in global value chains is linked to reducing low-value-added activities (and relocating production facilities to other countries) while increasing the share of high-value-added activities.

Thus, empirical studies have confirmed that participation in global value chains can positively impact environmental conditions and energy efficiency by increasing productivity through export development, the diffusion of technologies from more developed countries (embedded in imported intermediate goods), technology spillover effects, and improved management. Moreover, energy-efficient and environmentally friendly countries are more competitive in international markets, especially given the rise of so-called "green trade barriers," allowing them to secure more advantageous positions in global value chains. Based on research into China's industry from 2003 to 2011, it has been confirmed that there is a "reciprocal relationship between GVC positioning and adopted energy efficiency and environmental indicators: changes in China's position in the global value chain accounted for approximately 35% of the increase in environmental and energy efficiency over the study period"¹⁹⁰.

Scientific literature also examines the relationship between global value chains and economic growth and productivity. Researchers indicate the presence of "consistency between theory and empirical research findings regarding the potential for increased productivity and GDP as a result of integration into global value chains."¹⁹¹ J. Hagemeyer analyzed the determinants of total factor productivity and labor productivity in the new EU member states from 1995 to 2009. The research results indicate a "relationship between productivity and export activity, foreign direct

¹⁸⁹ Liu H., Li J., Long H., Li Z., Le C. Promoting Energy and Environmental Efficiency Within a Positive Feedback Loop: Insights from Global Value Chain. *Energy Policy*. 2018. Vol. 121. pp. 175–184

¹⁹⁰ Liu H., Li J., Long H., Li Z., Le C. Promoting Energy and Environmental Efficiency Within a Positive Feedback Loop: Insights from Global Value Chain. *Energy Policy*. 2018. Vol. 121. pp. 175–184.

¹⁹¹ Beverelli C., Stolzenburg V., Koopman R. B., Neumueller S. Domestic Value Chains as Stepping Stones to Global Value Chain Integration. *The World Economy*. 2019. Vol. 42. pp. 1467–1494

investment, and position in global value chains"¹⁹². Scientists found that "productivity gains were greater in sectors further from final demand and those exporting intermediate goods"¹⁹³. In turn, regarding productivity resulting from foreign direct investment, it was found that "proximity to the beginning of the value chain led to lower growth, while a higher level of participation in global value chains, measured by the share of imported intermediate goods in production, contributed to faster productivity growth"¹⁹⁴.

The microeconomic foundations of the benefits of participating in global value chains were analyzed by P. Montalbano, S. Nenci, and C. Pietrobelli. The study covered companies from Latin American and Caribbean countries, with the database created by combining microeconomic data from the World Bank's Enterprise Surveys in Latin America and the Caribbean with information on the participation of specific industries in global value chains from the TiVA database. The researchers found that "both the participation and position of an industry in global value chains have a positive impact on firm-level productivity"¹⁹⁵. Enterprises in industries that export domestic value-added in the form of intermediate goods used in the exports of other countries exhibit higher productivity than firms operating in industries that rely on foreign-sourced inputs for the production of final export goods. The authors interpret these findings by pointing to the "possibility of productivity gains through integration into global value chains, for example, via learning through technology transfers"¹⁹⁶.

An empirical test of the hypothesis regarding the impact of participation in global value chains on economic growth was conducted by J. Fagerberg et al. The study paid special attention to low-income countries and the determinants of their benefits from participation in global value chains. Covering 125 countries over the period 1997–2013, the researchers' findings indicate that "countries with low absorptive capacity, which determines how they benefit from the global knowledge base, may

¹⁹² Hagemeyer J. Trade and Growth in the New Member States: The Role of Global Value Chains. *Emerging Markets Finance and Trade*. 2018. Vol. 54 (11). pp. 2630–2649.

¹⁹³ Hagemeyer J. Trade and Growth in the New Member States....

¹⁹⁴ Hagemeyer J. Trade and Growth in the New Member States....

¹⁹⁵ Montalbano P., Nenci S., Pietrobelli C. Opening and Linking Up: Firms, GVCs, and Productivity in Latin America. *Small Business Economics*. 2018. Vol. 50(4). pp. 917–935.

¹⁹⁶ Montalbano P., Nenci S., Pietrobelli C. Opening and Linking Up....

experience a slowdown in economic growth as their participation in global value chains increases"¹⁹⁷. The threshold level of absorptive capacity, from which benefits from participation in GVCs can be gained, is comparable to that of the poorest EU countries (e.g., Bulgaria, Romania) or more developed Latin American countries (e.g., Argentina, Chile, Uruguay). This means that "for economies with lower knowledge absorption capacity, increasing participation in global value chains leads to a slowdown in growth rates"¹⁹⁸. A similar effect has also been documented for small countries. Based on the analysis, the authors highlight "the importance of building national innovation systems that can enable countries to benefit from participation in global value chains"¹⁹⁹.

J. Brumm et al. studied the impact of countries' participation in global value chains on the formation of the current account balance. The researchers found that "the impact of the participation indicators used is statistically significant and positive, meaning that a higher degree of participation translates into a larger surplus (or smaller deficit) in the current account, with the trade balance serving as the channel of influence"²⁰⁰. The researchers interpret the obtained result through the lens of the hypothesis of a "temporary technological advantage, which enhances a country's competitiveness and improves the trade balance"²⁰¹.

The consequences of the fragmentation of production processes and countries' participation in global value chains for workers' wages were the subject of a study conducted by A. Parteka and J. Wolszczak-Derlacz. The analysis covered the wages of workers aged 24-65 from ten countries, including six so-called "old" Union members, three new member states, and the United States. The database was created by combining microeconomic data from the Luxembourg Income Study (LIS) with information on the share of foreign value-added in the gross exports of specific industries from the WIOD database. As a result of the calculations, "a statistically

¹⁹⁷ Fagerberg J., Lundvall B. Å., Srholec M. Global Value Chains, National Innovation Systems and Economic Development. *The European Journal of Development Research*. 2018. Vol. 30 (3). pp. 533–556.

¹⁹⁸ Fagerberg J., Lundvall B. Å., Srholec M. Global Value Chains, National Innovation Systems...

¹⁹⁹ Fagerberg J., Lundvall B. Å., Srholec M. Global Value Chains, National Innovation Systems...

²⁰⁰ Brumm J., Geor giadis G., Gräß J., Trottner F. Global Value Chain Participation and Current Account Imbalances. *Journal of International Money and Finance*. 2019. Vol. 97. pp. 111–124.

²⁰¹ Brumm J., Geor giadis G., Gräß J., Trottner F. Global Value Chain Participation...

significant and negative impact of participation in global value chains on wage rates was obtained – an increase in the share of foreign value-added in exports by 1% translated into a decrease in the hourly wage rate by approximately 0.06%²⁰². Based on the regression conducted on subsamples, the authors concluded that "participation in global value chains leads to a decrease in wages for workers from EU-15 countries and an increase in wages in the United States in more demanding professions. Moreover, the wage reduction resulting from increased participation in global value chains in specific industries primarily affects those earning high incomes (at least 50% of the global industry average)"²⁰³.

Using the example of a study on the Belgian manufacturing industry from 2002 to 2010, researchers analyzed the impact of a company's position in the global value chain on wages. It was found that "employees of enterprises producing goods that are further from final demand receive higher wages"²⁰⁴. The research results also indicate that "the benefits of proximity to the beginning of the value chain are unevenly distributed among workers: they affect men much more than women and even more so those who receive high salaries"²⁰⁵.

The research conducted by Díaz-Mora C. et al. examined the impact of participation in global value chains (GVCs) on export volumes. The analysis covered 55 countries based on statistical data from 1998 to 2012. To measure integration into GVCs, the researchers used value-based indicators of participation in the value chain as well as indicators expressed as a percentage of gross exports. The obtained results confirmed that "participation in global value chains reduces the likelihood of export cessation (increases the stability of trade flows), which, according to the authors, is associated with reduced uncertainty (regarding the volume of demand in foreign markets and export-related costs), as well as improved access to information through

²⁰² Parteka A., Wolszczak-Derlacz J. Global Value Chains and Wages: Multi-Country Evidence from Linked Worker-Industry Data. *Open Economies Review*. 2019. Vol. 30 (3). pp. 505–539.

²⁰³ Parteka A., Wolszczak-Derlacz J. Global Value Chains and Wages....

²⁰⁴ Gagliardi N., Mahy B., Rycx F. Upstreamness, Wages and Gender: Equal Benefits for All? *British Journal of Industrial Relations*. 2019. Special Issue. pp. 1–32.

²⁰⁵ Gagliardi N., Mahy B., Rycx F. Upstreamness, Wages and Gender....

linkages between companies in global value chains"²⁰⁶. This effect was stronger in developing countries than in developed ones. It was also confirmed that "the type of participation in global value chains is important for the stability of trade flows"²⁰⁷.

Thus, greater backward participation contributes to export retention, which may be linked to a country's increased productivity through the import of intermediate goods. The advantages of this type of participation in global value chains are more significant for developing countries, for instance, because learning through imports is facilitated in the context of a technological gap. The likelihood of maintaining stable exports for developing countries (or developed countries) increases when the foreign added value in their exports comes from developed countries (or developing countries). Regarding participation in the lower segments of the value chain, it was found that this leads to a reduced probability of export cessation for both developing and developed countries only when the recipient countries are developed economies. This effect was stronger for developing countries. For both forms of participation in global value chains, developing countries are more likely to reduce or cease exports if the origin or destination of the added value is another developing country.

The impact of global value chains on export duration was also studied by K. Türkcan and H. Saygili. Their analysis covered Turkey's machinery exports from 1998 to 2013, using dummy variables representing the export of intermediate goods (parts and components) and vertical trade as measures of participation in global production networks. The researchers found a "higher probability of survival for intermediate goods export flows compared to final goods and vertical trade," and the results of the interaction model estimation also indicated that "the risk of export supply disruption decreases more significantly in the case of vertical trade in intermediate goods than in the case of trade in final goods"²⁰⁸.

The results of the study conducted by D. Córcoles, K. Díaz-Mora, and R. Gandoy on Spanish exports of machinery and transport equipment from 1996 to 2010 also

²⁰⁶ Díaz-Mora C., Gandoy R., Gonzale z-Diaz B. Strengthening the Stability of Exports through GVC Participation: The Who and How Matters. *Journal of Economic Studies*. 2018. Vol. 45 (3). pp. 610–637.

²⁰⁷ Díaz-Mora C., Gandoy R., Gonzale z-Diaz B. Strengthening the Stability of Exports...

²⁰⁸ Türkcan K., Saygili H. Global Production Chains and Export Survival. *Eastern European Economics*. 2019. Vol. 57 (2). pp. 103–129.

indicate "greater stability of intermediate goods exports compared to final goods"²⁰⁹. The researchers proved that "export stability is influenced by factors such as EU membership, export experience, market and product diversification, and the size of the buyer country's economy, with their impact being stronger for trade in parts and components"²¹⁰. Geographical distance and differences in GDP per capita, in turn, led to a higher likelihood of trade discontinuation, with their impact being greater for intermediate goods than for final goods.

Global value chains encompass the entire process of creating a finished product – from the emergence of a new idea and prototype to the export of final consumer goods to various countries worldwide. Global value chains facilitate the connection between national producers and manufacturers from other countries through their participation in international cooperation. According to I. Pavlovska, V. Khaustova, and I. Hubarieva, "such integration enables production on a global scale with the aim of reducing operational costs and increasing efficiency"²¹¹.

In domestic scientific literature, researchers present several arguments confirming the advantages of a country's participation in global value chains; however, such conclusions are not always supported by the results of econometric analysis. According to Cherkas N.I., M.M. Chekh, and Vasylytsia O.B., the integration of the national economy into global value chains leads to an "increase in the country's resource base," as evidenced by the experience of G20 countries, where "30% to 60% of resources come from imported supplies." Additionally, this integration "stimulates the service sector, with service exports accounting for 42% of global value chains in G20 countries"²¹².

Among the advantages of countries' participation in global value chains, Nikishyna O.V. highlights the "increase in profits from trade operations," which is supported by the experience of countries such as "the G20, where these profits doubled

²⁰⁹ Córcoles D., Díaz-Mora C., Gandoy R. Export Survival in Global Production Chains. *The World Economy*. 2015. Vol. 38(10). pp. 1526–1554.

²¹⁰ Córcoles D., Díaz-Mora C., Gandoy R. Export Survival in Global Production Chains. . .

²¹¹ Pavlovska I.H., Khaustova V.Ye., Hubarieva I.O. Measuring the participation of countries in global value chains. *An academic review*. 2022. №2(57). pp. 50-58, P. 52

²¹² Cherkas N.I., Chekh M.M., Vasylytsia O.B. Economic modernization in global value chains. *Business Inform*. 2018. №10. pp. 45–50.

between 2010 and 2020; China, which demonstrated a sixfold increase; India, with a fivefold increase; and Brazil, where profits tripled." Additionally, the researcher emphasizes the "growth in employment, citing the example of Germany, where the number of jobs doubled between 2015 and 2020, reaching 10 million"²¹³.

Yaroshchuk D.O. and Okhrimenko O.O. highlight several effects of a country's participation in global value chains, such as "a reduction in trade costs, which in some cases can reach up to 16%; an increase in market openness due to the reduction of mutual tariff and non-tariff regulations, as these become less beneficial when goods cross borders multiple times; stimulation of mutual investments and overall investment activity; and the encouragement of GDP growth"²¹⁴.

Pavlovskaya I., Khaustova V., and Hubarieva I. supplemented the list of factors arising from a country's deeper participation in global value chains with the following: "an increase in the technological level of developing economies if they strive to expand their share of added value and corresponding investments; stimulation of national efforts in industrial policy; growth in production capacity and workforce qualification; improvement of the investment climate and the abandonment of unproductive competition due to increasing interdependence"²¹⁵.

At the same time, it should be noted that domestic scientific publications primarily focus on methodological approaches to studying global value chains and measuring the degree of integration of different countries into them. Ukraine's level of involvement in global value chains is mostly examined through the assessment of the position of Ukrainian producers in various industries based on indicators such as the import component in sectoral exports and the sector's share in gross exports. However, the impact of Ukraine's degree of integration into global value chains on the development of the domestic manufacturing industry remains insufficiently explored.

Thus, the task of assessing the effects of Ukraine's participation in global value chains, particularly in the industrial sector, is highly relevant. Based on the analysis of

²¹³ Nikishyna O.V. Diagnostics of value-added indicators and logistics costs in the Ukrainian grain and bread market chain. *Economics of the food industry*. 2021. Vol. 13, Issue 2. pp. 9-21. DOI: <https://doi.org/10.15673/ie.v13i2.2035>.

²¹⁴ Yaroshchuk D.O., Okhrimenko O.O. Integration of domestic knowledge-intensive industries into global value chains. *Actual problems of economy and management*. 2020. № 14. <http://ape.fmm.kpi.ua/article/view/190757>

²¹⁵ Pavlovskaya I.H., Khaustova V.Ye., Hubarieva I.O. Measuring the participation of countries in global chains ..., P. 52

foreign scientific publications, we will use multiple linear regression as the primary research method. This approach will allow us to evaluate the dependence of key indicators of the development of the manufacturing industry on the degree of integration of its sectors into global value chains. The functional dependence of our proposed hypothesis is described by the following equation:

$$Y = f(gvcb_share; gvcf_share; gvc_share), \quad (2.14)$$

where Y – the level of development of the processing industry, which is described by indicators of products sold, the amount of investments attracted, costs of innovation, technological upgrades, and the number of employees; $gvcb_share$ - return participation rate, $gvcf_share$ - direct participation rate, gvc_share - overall indicator of participation in global value chains.

Based on the functional equation (2.14), we can formulate an econometric equation, where α is the constant term, β_i are the coefficients to be estimated, and ε_t represents the error term:

$$Y_t = \alpha + \beta_1 \cdot gvcb_share_t + \beta_2 \cdot gvcf_share_t + \beta_3 \cdot gvc_share_t + \varepsilon_t. \quad (2.15)$$

Thus, in our study, we will utilize the theoretical foundation and empirical evidence on the impact of a country's participation in global value chains on key economic development indicators, obtained by foreign researchers for various countries. To determine the relationship between the development of the manufacturing industry and the degree of Ukraine's involvement in global value chains, we will apply statistical correlation analysis, which involves constructing a linear regression model. As the dependent variable, we will use indicators that characterize industrial output, industrial investment, innovation activity, and employment in the industry, while as independent variables, we will use indicators of Ukraine's overall, forward, and backward participation in global value chains. The information base of the study will consist of statistical data on the development of the manufacturing industry published by the State Statistics Service of Ukraine and the National Bank of Ukraine, as well as data from the OECD Trade in Value Added (TiVA) database.

2.4. Methodical Approaches to Assessing the Impact of Trade Openness on Economic Growth

The results of evaluating the impact of trade openness on economic growth, obtained by various researchers, indicate the existence of a positive relationship between these indicators. However, they differ significantly depending on the choice of methodological approaches and the set of variables used. In general, the methodology and selection of indicators for studying the impact of trade openness on economic growth vary, and no unified approach has been established to date. To obtain accurate results in our study, it is necessary to address the issue of selecting appropriate variables and justify the methodology for assessing the impact of trade openness on economic growth, summarizing the methodological approaches presented in scientific publications.

The economy of a country is influenced by numerous factors. Production capacity, areas of expertise, technological development, available natural resources, competitiveness, and the volume of foreign trade are key criteria that determine the level of a country's development. The total revenue generated by a country from exporting goods and services to partner countries, along with the expenditures on importing goods and services from other countries, define its overall foreign trade turnover. It is now widely recognized that foreign trade between countries is one of the most significant factors affecting development and well-being. In this context, an increase in foreign trade volume is considered an important objective both in terms of a country's development and its competitiveness.

As discussed in previous sections, according to economic theory, foreign trade is beneficial for both participating parties. In open economies, the development of foreign trade is analyzed based on information that characterizes the country's trade balance. One of the indicators used for this purpose is the export-to-import coverage ratio²¹⁶. Exports are defined as the sale of goods and services from a country to foreign markets, in other words, the commercial sale of domestically produced, assembled, or finished products to other countries. On the other hand, imports refer to the purchase

²¹⁶ Mikic, M., & Gilbert, J. Trade Statistics in Policymaking. United Nations publication: New York, 2009.

of products manufactured or grown abroad by domestic buyers in exchange for foreign currency. The export-to-import coverage ratio is calculated as the ratio of export volumes to import volumes and indicates the extent to which imports are covered by exports. This indicator can be used to compare trade performance between different countries or to analyze the trade dynamics of a single country over time.

For instance, Demirbilek A. and Civelek M. used the export-to-import coverage ratio to measure trade openness and conducted a study to assess its sensitivity to changes in GDP based on purchasing power parity. The researchers noted that when the trade deficit is measured in national currency or as a ratio to GDP, it becomes difficult to compare values across different countries (or within the same country over time). Therefore, they argued that using the export-to-import coverage ratio might be more appropriate for cross-country comparisons²¹⁷.

Conceptually, trade openness is explained as the degree to which an economy is oriented towards external trade²¹⁸, while in a political sense, it describes a liberal trade policy, such as low tariffs or the absence of trade barriers²¹⁹. Given the simplicity and accessibility of data, researchers use the trade-to-GDP ratio to assess the level of trade openness, which is calculated as the sum of exports and imports divided by a country's real GDP²²⁰. Imports and exports consist of trade in goods and services, and an increase in the trade-to-GDP ratio indicates greater openness of a country to international trade²²¹.

Fujii E. analyzed the essence of trade openness indicators and noted that changes in the trade-to-GDP ratio are primarily driven by the variability of GDP rather than trade itself²²². Gräbner K. et al. presented a similar critique of existing approaches to assessing the relationship between economic growth and trade and proposed

²¹⁷ Demirbilek A., Civelek M. E. The Role of International Trade in the Development of the Countries. *Journal of International Trade, Logistics and Law*. 2022. Vol. 8(2). <https://www.researchgate.net/publication/366294398>.

²¹⁸ Fujii, E. What Does Trade Openness Measure? *Oxford Bulletin of Economics and Statistics*. 2019. Vol. 81(4). pp. 868–888. <https://doi.org/10.1111/obes.12275>

²¹⁹ Winters, L. A. Trade Liberalization and Economic Performance: An Overview. *The Economic Journal*. 2004. Vol. 114(493). pp. 4–21.

²²⁰ Beltekian, D., & Ortiz-Ospina, E. Trade and Globalization. *Our World in Data - 2018*. <https://ourworldindata.org/trade-and-globalization#data-sources>

²²¹ World Bank. World development indicators database. <https://databank.worldbank.org/source/world-development-indicators>

²²² Fujii, E. What Does Trade Openness Measure? CESifo Working Paper Series 6656, CESifo.

distinguishing between "de facto" and "de jure" measures of trade openness²²³. The "de facto" indicator reflects the degree of integration and is an outcome-oriented measure, usually assessed by the trade-to-GDP ratio, while the "de jure" indicator defines how open a country aims to be, referring to its regulatory environment, which is measured using indicators such as tariff rates and licensing regulations²²⁴.

We agree with the above-mentioned experts' observations regarding the limitations of using the trade-to-GDP ratio as an indicator. However, we note that without trade liberalization and the reduction or elimination of tariffs, the volume of exports and imports cannot increase significantly. Therefore, an increase in foreign trade turnover directly indicates an improvement in a country's trade conditions with its partners. Accordingly, we expect trade openness to have a positive impact on economic growth, considering that trade theory views openness as a favorable factor, and numerous studies have identified a positive relationship between these variables.

To define a variable that characterizes a country's economic growth, indicators related to GDP are used. GDP reflects the market value of all final products produced over a certain period. It is a critically important factor in determining a country's economic growth, as it accounts for the entire economic volume. According to its definition, GDP is expressed as the monetary equivalent of all goods and services produced within a country during a specific period, either within its economic unit or in its external economic unit. Another definition considers it as the sum of the value added created within a country. GDP per capita is obtained by dividing the total gross domestic product by the total population of a country. It is often used to determine the standard of living in different countries and to measure their economic well-being. Additionally, it serves as an indicator of the potential average income that citizens may derive from their country's economy²²⁵.

²²³ Gräbner, C., Heimberger, P., Kapeller, J., & Springholz, F. Understanding economic openness: A review of existing measures. *Review of World Economics*. 2021. Vol. 157(1). pp. 87–120.

²²⁴ Gräbner, C., Heimberger, P., Kapeller, J., & Springholz, F. Understanding economic openness....

²²⁵ National Accounts of OECD Countries. Paris: OECD Publishing, 2009

Economic growth is often defined as an increase in a country's production value from one period to another²²⁶ or as a rise in the standard of living over time²²⁷. The variable most commonly used in research to measure economic growth is GDP per capita²²⁸ or the natural logarithm of real GDP per capita²²⁹. To avoid the risk of generating spurious correlation due to the use of a common denominator in multiple variables, scholars recommend using the growth rate of real GDP per capita as the dependent variable²³⁰.

There are numerous studies aimed at clearly examining the impact of exports and imports on economic growth. Wagner J. emphasized that an increase in exports stimulates economic growth by enhancing productivity²³¹. Another study concluded that exports and imports are the main driving forces of Germany's economic development²³². Based on a study covering 126 countries, scientists found a significant relationship between GDP values and export-to-import coverage ratios²³³. Accordingly, we can assume that the export-to-import coverage ratio positively influences GDP per capita in Ukraine and the CEE countries, which are the subject of our study.

Scientists also point out that the level of well-being in a given country is high when it has superior economic indicators that reflect an improvement in quality of life or real national income compared to other countries²³⁴. The comparison of international development levels is based on GDP per capita values in a single currency. GDP values

²²⁶ Nafziger, E. W. Economic development. Cambridge University Press, 2006. <https://doi.org/10.1017/CBO9780511805615>

²²⁷ Jones, C. I. Paul Romer: Ideas, Nonrivalry, and Endogenous Growth. *The Scandinavian Journal of Economics*. 2019. Vol. 121(3). pp. 859–883. <https://doi.org/10.1111/sjoe.12370>

²²⁸ Dao, A. T. Trade Openness and Economic Growth. Mark A. Israel '91 Endowed Summer Research Fund in Economics. 2014. №2. http://digitalcommons.iwu.edu/israel_economics/2

²²⁹ Dollar, D., & Kraay, A. Institutions, trade, and growth. *Journal of Monetary Economics*. 2003. Vol. 50(1). pp. 133–162. [https://doi.org/10.1016/S0304-3932\(02\)00206-4](https://doi.org/10.1016/S0304-3932(02)00206-4)

²³⁰ Cheung J., Ljungqvist Z. The impact of Trade Openness on Economic Growth. A panel data analysis across advanced OECD countries. Stockholm. Institution of Social Sciences, 2021. <https://www.diva-portal.org/smash/get/diva2:1565943/FULLTEXT01.pdf>.

²³¹ Wagner, J. Exports and productivity: A survey of the evidence from firm level data. *The World Economy*. 2007. Vol. 30(1). pp. 60–82.

²³² Bakari, S. Trade and Economic Growth in Germany. MPRA Paper No. 7740, 2017

²³³ Civelek M. E., Özkan A. The Effects of Export Import Coverage Ratio on Economy. *Journal of International Trade, Logistics and Law*. 2021. Vol. 7(1). pp. 90-96

²³⁴ Karaaslan, A., Tuncer, G. The Basic Politics of Government in Fostering International Competitiveness. *Dumlupınar Üniversitesi Sosyal Bilimler Dergisi*. 2010. Vol. 1(26). pp. 23–45

calculated using exchange rates reflect the monetary value of goods and services rather than their quantity or volume. For this reason, instead of the exchange rate, "Purchasing Power Parity" (PPP) is used, which serves as a more detailed exchange rate, allowing for the comparison of the "volume of goods and services" across countries. Purchasing Power Parity (PPP) is defined as the price level of a clearly defined basket of goods and services in different countries. This indicator also provides insight into how much money people in different countries can spend from their incomes to purchase the same set of goods and services. Thus, differences in price levels between countries are eliminated, making it possible to compare real prices and volumes on an international scale²³⁵.

Demirbilek A. and Civelek M. developed a conceptual model to determine the criteria for the relationship between foreign trade and economic growth related to economic well-being. For their research, the scholars used the following indicators: foreign trade volumes, the export-to-import coverage ratio, GDP per capita, and Purchasing Power Parity (PPP) values. Through regression analysis conducted for 93 countries over the period of 2010–2018, they identified a statistically significant positive linear relationship between economic growth indicators and trade openness²³⁶. Thus, the scholars confirmed the positive impact of both the volume of foreign trade and the export-to-import ratio on economic growth, which aligns with a series of previous studies.

Integration into the global market helps a country trade at international prices rather than domestic ones, allowing consumers to purchase cheaper imported goods and exporters to sell their products at higher prices²³⁷. However, an increase in trade volume, particularly the share of exports, may not always be sufficient for a country to ensure economic growth and improve citizens' well-being. Due to high demand in foreign markets, some products may become more expensive in local markets due to supply shortages, thereby reducing citizens' purchasing power. Therefore, the impact

²³⁵ Demirbilek A., Civelek M. E. The Role of International Trade in the Development of the Countries. *Journal of International Trade, Logistics and Law*. 2022. Vol. 8(2). URL: <https://www.researchgate.net/publication/366294398>

²³⁶ Demirbilek A., Civelek M. E. The Role of International Trade...

²³⁷ Heshmati A., Sun P. International Trade and its Effects on Economic Growth in China. *IZA Discussion Papers*. 2010. №5151

of international trade on economic growth and well-being may vary or be limited. Additionally, GDP per capita is not an exhaustive indicator of economic well-being, as it does not allow for an assessment of the actual improvement in living standards and product quality. Although it plays a crucial role in reflecting short-term fluctuations in economic activity, it is necessary for accurately measuring productivity related to economic well-being²³⁸. To address this shortcoming, researchers used purchasing power parity (PPP) per capita, as it is generally considered a better indicator of a country's overall welfare, and found a positive relationship between GDP per capita, which reflects economic growth, and PPP per capita, which represents economic well-being²³⁹.

Thus, to characterize the openness of a country's foreign trade in our study, it is advisable to use indicators calculated based on the volumes of exports and imports (Table 2.2).

Table 2.2

Indicators of foreign trade openness²⁴⁰

Indicator name	Calculation procedure	Criterion of openness
Export quota	$E_q = \frac{\text{Export}}{\text{GDP}} \cdot 100\%$	Over 45%
Import quota	$I_q = \frac{\text{Import}}{\text{GDP}} \cdot 100\%$	Over 45%
Foreign trade quota	$FT_q = \frac{\text{Export} + \text{Import}}{\text{GDP}} \cdot 100\%$	Over 90%
Export-import coverage ratio	$R_{e/i} = \frac{\text{Export}}{\text{Import}} \cdot 100\%$	Over 1,2

At the same time, it should be noted that scientific literature presents different viewpoints regarding the criteria for determining economic openness. For example, Vdovichen A. indicates that a national economy can be considered open if the export

²³⁸ Dynan, K., & Sheiner, L. GDP as a Measure of Economic Well-Being. Hutchins Center Working Paper. 2018. №43.

²³⁹ Demirbilek A., Civelek M. E. The Role of International Trade...

²⁴⁰ Compiled by: Mytsenko I.M., Babets I.H. Transformation of the Management System of Ukraine's Foreign Economic and Investment Security in the Context of Globalization: a monograph. Kropyvnytskyi: CUNTU, Polygraph-Service., 2021. - 464 p.; Vdovichen A. Openness of the national economy and structural changes in world trade. https://www.researchgate.net/publication/331787762_Vidkritist_nacionalnoi_ekonomiki_i_strukturni_zmini_u_svitovij_torgivli

quota and import quota exceed 45%, while the foreign trade quota is greater than 90%²⁴¹. Based on the principles of the theory of national economic security, Babets I. and Mytsenko I. apply a threshold value of 30% for analyzing export and import quotas²⁴², which signifies the attainment of a state of excessive openness in a country's foreign trade when this value is exceeded. Despite the generally accepted normative value of 1 for the export-import coverage ratio, the *"Methodological Recommendations for Calculating the Level of Economic Security of Ukraine"* establish an optimal value of this indicator at 1.2, which mathematically implies the necessity for export volumes to exceed import volumes²⁴³.

To assess the impact of trade openness on economic growth in our study, we will use a conceptual model (Figure 2.2) based on endogenous growth theory. In endogenous growth theory, key factors include investments and human capital, which, from the perspective of our research, are crucial for increasing export and import volumes, enhancing the competitiveness of export products, and stimulating consumer demand in the domestic market.

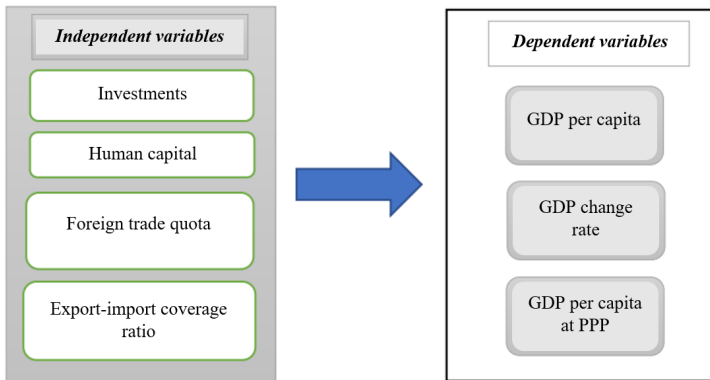


Fig. 2.2. Conceptual model of the impact of foreign trade openness on economic growth

Source: compiled by the author

²⁴¹ Vdovichen A. Openness of the national economy and structural changes in world trade.

https://www.researchgate.net/publication/331787762_Vidkritist_nacionalnoi_ekonomiki_i_strukturni_zmini_u_svitovij_torgivli

²⁴² Mytsenko I.M., Babets I.H. Transformation of the Management System of Ukraine's Foreign Economic and Investment Security in the Context of Globalization: A Monograph. Kropyvnytskyi: CUNTU, Polygraph-Service, 2021. - 464 p.

²⁴³ On approval of the Methodological Recommendations for Calculating the Level of Economic Security of Ukraine. Order of the Ministry of Economic Development and Trade of Ukraine dated October 29, 2013 № 1277. <http://www.me.gov.ua/Documents/List?!lang=ukUA&tag=MetodichniRekomendatsii>

According to the purpose of our study, the presented model will be applied to assess the dependence of economic growth in the CEE countries on the level of openness of their economies and to determine the impact of trade openness on Ukraine's economic growth. To examine the relationship between trade openness and economic growth in these countries, we will use multiple linear regression. In the case of the CEE countries, it is advisable to apply panel data analysis, as we include both a set of countries and time series for the period from 2013 to 2023.

Let us consider the general specification of the linear regression model:

$$y_{it} = \alpha_{it} + \beta_1 \cdot x_{1,it} + \beta_n \cdot X_{n,it} + \varepsilon_{it}, \quad (2.16)$$

where y_{it} is dependent variable, α_i is a unique time- and country-specific constant value, β is a coefficient that shows how much the dependent variable changes when the independent variable changes by each unit, $x_{1,it}$ is primary independent variable, $X_{n,it}$ are independent variables added to control for other n growth determinants, ε_{it} is a regression error, which is determined by factors that cause fluctuations in economic growth that cannot be explained by the included regressors²⁴⁴.

The relationship between economic growth and trade openness can be bidirectional²⁴⁵. Countries with growing income can afford to import more goods and services in areas where they lack comparative advantages, which leads to greater growth in trade openness. To detect this potential reverse causality, researchers include initial conditions in the regression model, described by the one-year lag of GDP per capita. Considering the results of the literature review on the factors influencing economic growth, we can formulate the equation for GDP per capita as a function of growth determinants that vary over time and across countries:

$$\ln Y_{it} = \alpha_0 + \delta \cdot \ln Y_{it-1} + \beta' \ln X_{it} + \varepsilon_{it}, \quad (2.17)$$

where Y_{it} is the real GDP per capita of country i in year t ; Y_{it-1} is the initial GDP per capita; X_{it} is the vector of explanatory variables that vary over time and across

²⁴⁴ Studenmund, A. H. (2017). *Using Econometrics: A Practical Guide*, Global Edition (7th ed.). Upper Saddle River: Pearson. <https://www.vlebooks-com.till.biblextern.sh.se/Vleweb/Product/Index/905471?page=0>

²⁴⁵ Dollar, D., & Kraay, A. Institutions, trade, and growth. *Journal of Monetary Economics*. 2003. Vol. 50(1). pp. 133–162. [https://doi.org/10.1016/S0304-3932\(02\)00206-4](https://doi.org/10.1016/S0304-3932(02)00206-4)

countries (growth determinants) defined according to the extended growth model; ε_{it} is the regression error term.

Based on equation 2.17, the econometric model that estimates the impact of trade openness on economic growth, while accounting for other growth factors, will have the following form:

$$\ln Y_{it} = \beta_0 + \beta_1 \ln Y_{it-1} + \beta_2 \ln Open_{it} + \beta_3 \ln FDI_{it} + \beta_4 \ln Popul_{it} + \varepsilon_{it}, \quad (2.18)$$

where Y_{it-1} is the initial GDP per capita at the beginning of each period, $Open_{it}$ is the level of foreign trade openness, defined as the ratio of foreign trade turnover to GDP, FDI_{it} is the ratio of foreign direct investment to GDP, $Popul_{it}$ is the population growth rate.

Thus, in our study, we will use the multiple linear regression method to determine the dependence of economic growth of countries on the level of trade openness. The dependent variable is described by the dynamics of GDP per capita indicators of the countries, while the independent variables include such factors of economic growth as trade openness, the availability of investments in the economy, and human capital.

2.5. Methodology for Assessing the Balance of Advantages and Threats in a Country's Foreign Trade

The most common approaches to assessing the balance of foreign trade include analyzing the dynamics of a country's trade balance, identifying the most stable commodity groups based on changes in the structural characteristics of exports and imports, as well as the degree of geographical diversification of exports. In particular, Havrylenko N. and Shyrokyi H. used indicators of the commodity structure of foreign trade and its dynamics (the shares of major commodity groups in total exports (imports) and their annual growth rates), as well as the geographical structure of foreign trade (the shares of the largest partner countries in total trade volumes and their annual growth rates, and the dynamics of export and import structures by main partner

countries) to assess the balance of Ukraine's foreign trade²⁴⁶. However, such an approach does not allow for an assessment of the balance between the advantages and threats a country faces from foreign trade.

From the perspective of assessing the advantages and threats of a country's participation in international trade, it is important to maintain a balance between achieving national interests in the foreign trade sector and the priorities of the country's socio-economic development. Yarchuk T., using the concept of "foreign trade interests" – the achievement of which reflects a certain level of international activity efficiency – proposes a system of indicators and their threshold values that can be used to assess the advantages a country gains from participation in international trade (Table 2.3). In particular, indicators of national economic openness characterize the country's ability to benefit from foreign trade through the efficient use of domestic resources and imported intermediate goods, as evidenced by the growth in exports of competitive goods.

Table 2.3

Criteria for achieving national interests in foreign trade²⁴⁷

№	Description of foreign trade interests	Evaluation criteria
1	Balanced structure of foreign trade	economic openness ratio - the ratio of foreign trade turnover to GDP (upward trend), export quota - the ratio of exports to GDP (upward trend)
2	Positive foreign trade balance	export-import coverage ratio (more than 1) import dependence ratio (no more than 15%)
3	Efficiency of the commodity structure of exports	growth of exports of knowledge-intensive, high-tech goods and services (dynamics of growth of high-tech goods in the export structure)
4	Investing in export-oriented industries	positive dynamics of growth in investment in export-oriented industries

The export-to-import coverage ratio is an indicator of foreign trade balance. If this indicator exceeds 1, the foreign trade balance is positive, meaning that the foreign currency earnings from exports are sufficient to purchase critically necessary imported

²⁴⁶ Havrylenko N. M., Shyrokyi H. M. Assessment of the balance of foreign trade of Ukraine. <https://miss.gov.ua/sites/default/files/2021-12/otsinka-zbalansovannosti-zovnishioi-torgivli-ukrainy-1.pdf>

²⁴⁷ Compiled by: Yarchuk T. M. Foreign trade interests and methodological tools for their assessment. Effective economy. 2013. № 11. <http://www.economy.nayka.com.ua/?op=1&z=2725>

goods and services. The level of a country's import dependence is determined by calculating the ratio of import volumes to GDP. This indicator should not exceed 15%, indicating an acceptable volume of imports of goods and services from the perspective of national security²⁴⁸.

To assess the balance between the benefits and risks of foreign trade, it is important to compare the actual values of indicators with their threshold limits. This allows for the development of appropriate tools and measures of state policy aimed at increasing the efficiency of national production and improving the terms of international agreements. In this regard, attention should be paid to the system of relative indicators based on the calculation of the ratios of exports, imports, and GDP, as well as the evaluation criteria proposed by Pyliuta M. (Table 2.4).

Table 2.4

Foreign trade indicators and criteria for their evaluation²⁴⁹

Indicator	Criteria	Explanation
1. Foreign Trade Balance	+	Export-oriented economy
	-	Import-dependent economy
2. Export Ratio	< 35%	Non-export-dependent economy
	> 35%	Export-dependent economy
3. Import Ratio	< 15%	Closed economy, not dependent on imports
	> 15%	Import-dependent economy
4. Terms of Trade Index	< 1	Favorable trade conditions
	> 1	Unfavorable trade conditions
5. Coverage Ratio	> 1	Positive trade balance
	< 1	Negative trade balance

Particular attention should be paid to the study of a country's terms of trade, which are determined using a number of coefficients. An internationally recognized indicator used to assess the impact of foreign trade on the national economy is the real terms of trade (TT) index, which is calculated based on statistical data as the ratio of the export price index to the import price index and is measured as a percentage:

²⁴⁸ Tsyhankova T.M, Petrashkoo L. P., Kalchenko T. V. International trade: Study guide. K.: KNEU., 2001. 488 p.

²⁴⁹ Pyliuta M.Yu. Statistical analysis of the balance of foreign trade of Ukraine. Thesis ... Candidate of Economics, specialty 08.00.10 - Statistics. National Academy of Statistics, Accounting and Audit, Kyiv., 2021. 256 p. P. 77

$$TT = \frac{P_{ex}}{P_{im}}, \quad (2.19)$$

where: P_{ex} is export price index; P_{im} is import price index.

Thus, a value of the indicator exceeding 100% reflects positive development, while values below 100% indicate the opposite. The economic meaning of this indicator lies in its ability to express changes in the purchasing power of exports caused by price changes in the country's foreign trade. For specific use in international statistics, terms of trade are sometimes expressed as the ratio of price developments for final goods relative to prices for raw materials and fuel (the so-called price scissors)²⁵⁰.

However, this indicator, defined in such a way, does not always have sufficient evaluative value, as it does not account for the quantitative differences between exports and imports. For example, it may appear positive in a situation where the market is flooded with cheap dumped imports compared to significantly more valuable but low-volume exports. Therefore, a modified ratio based on the coefficient between the volume of imported and exported goods is used as follows:

$$SR_m = \frac{P_{ex}}{P_{im}} \cdot \frac{V_{ex}}{V_{im}}, \quad (2.20)$$

where: SR_m is modified trading conditions; V_{ex} is physical volume of merchandise exports; V_{im} is physical volume of commodity imports.

Thus, the modified terms of trade indicator equals 1 if the price per kilogram of a given product exported to a certain territory equals the price per kilogram of the same product imported from that territory, and at the same time, the physical volume of exports equals the imported volume. If the "rate of both prices per kilogram is positive in favor of exports, but the exported physical volume is significantly lower than the imported physical volume, the final indicator is adjusted so that the ratio $V_{ex}/V_{im} < 1$ "²⁵¹.

Similarly, the Paasche index allows accounting for price changes in a certain group of goods depending on their volume. It is calculated as "the ratio of the value index to the corresponding Laspeyres average price index, where the value index is

²⁵⁰ Jeníček V., Krepl V. The role of foreign trade and its effects. Agriculture Economic. – Czech, 2009. 55 (5). pp. 211–220, P. 218

²⁵¹ Jeníček V., Krepl V. The role of foreign trade and its effects. Agriculture Economic. – Czech, 2009. 55 (5). pp. 211–220

determined by dividing the export (import) value for a given period by the export (import) value for the base period"²⁵². Thus, price indices calculated using the Paasche approach make it possible to determine how much more expensive (or cheaper) the fixed commodity composition of exports (imports) in the current period is compared to the base period.

As shown above, when assessing the balance of benefits and risks from a country's foreign trade, it is important to compare the actual values of indicators with their normative values. The compliance of a foreign trade indicator with the normative value indicates that the national economy gains advantages from foreign trade, while non-compliance suggests the intensification of respective risks arising from the imbalance between exports and imports. Given the appropriateness of comparing actual foreign trade indicators with established normative values, we will consider the methodological approach to assessing a state's foreign trade security. According to this approach, a system of foreign trade security indicators is used, divided into stimulant indicators (the growth of which strengthens security) and deterrent indicators (the growth of which reduces security)²⁵³. The actual values of the indicators, calculated based on statistical data, are compared with the established threshold values (Table 2.4). Based on this comparison and the identified deviation, conclusions can be drawn regarding the improvement of the security situation if the stimulant indicators are at the threshold level or show an increasing trend, while the deterrent indicators do not exceed the threshold values or demonstrate a downward trend.

Table 2.5

Indicators of foreign trade security of the state and their thresholds²⁵⁴

No	Indicator, unit of measurement	Threshold value
1	Share of the leading partner country in total foreign trade, %	no more than 30
2	Share of high-tech products in goods exports, %	not less than 15
3	Share of high-tech products in goods imports, %	no more than 15
4	Import coverage ratio by exports	not less than 1
5	Export dependency ratio, %	no more than 30
6	Import dependency ratio, %	no more than 30
7	Technological dependency ratio	no more than 1

²⁵² Methodological provisions for calculating indices of average prices, physical volume and terms of trade in foreign trade in goods. https://ukrstat.gov.ua/metod_polog/metod_doc/2005/419/metod.htm

²⁵³ Mytsenko I. M., Babets I. H. Transformation of the Management System of Ukraine's Foreign Economic and Investment Security in the Context of Globalization: A Monograph. Kropyvnytskyi: CUNTU, Polygraph-Service, 2021. 464 p.

²⁵⁴ Compiled on the basis of: Mytsenko I.M., Babets I.H. Transformation of the system of management of foreign economic and investment security of Ukraine...: Security and competitiveness of the Ukrainian economy in the context of globalization: monograph / edited by O.S. Vlasjuk Kyiv: NISS, 2017. 384 p.

It is worth noting that in all the methodological approaches discussed above, the focus is primarily on assessing the overall state of the trade balance and the balance of the commodity structure of exports and imports. At the same time, the geographical diversification of foreign trade is evaluated only when using foreign trade security indicators through the indicator "The share of the leading partner country in the total volume of foreign trade." However, this indicator only identifies the country with which the highest trade turnover was observed, while the level of geographical diversification of trade is not assessed.

In this regard, the methodology for assessing the advantages and risks of foreign trade should include an indicator of the degree of geographical diversification of exports, most commonly represented by the Herfindahl-Hirschman Export Concentration Index (HHI). This indicator is based on the principle of market concentration assessment and is calculated as the sum of the squares of the market share of each firm competing in the market. Applying this approach to assess geographical diversification or export concentration allows the Herfindahl-Hirschman Index to be calculated as the sum of the squares of the shares of a country's exports to each partner country:

$$HHI_j = \sum_{i=1}^N \left(\frac{x_i}{X_j} \right)^2 \quad (2.21)$$

where: « X_i – export volume of country j to partner country i ; X_j – total export volume of country j »²⁵⁵.

The Herfindahl-Hirschman Index (HHI) measures the level of export concentration, which is conceptually opposite to diversification. Therefore, an index value ranging from 0 to 0.15, indicating low export concentration, allows concluding that the export diversification level is high (Figure 2.3). Moreover, an index value close to zero means that geographic diversification is high due to an approximately even distribution of export volumes among a large number of partner countries. The HHI

²⁵⁵ Arranguéz G. & Hinlo J. Export Geographical Diversification and Economic Growth among ASEAN Countries. <https://mpira.ub.uni-muenchen.de/81333/>

increases both with a decrease in the number of a country's trade partners and with an increase in the disparity of export volumes directed to those countries²⁵⁶.

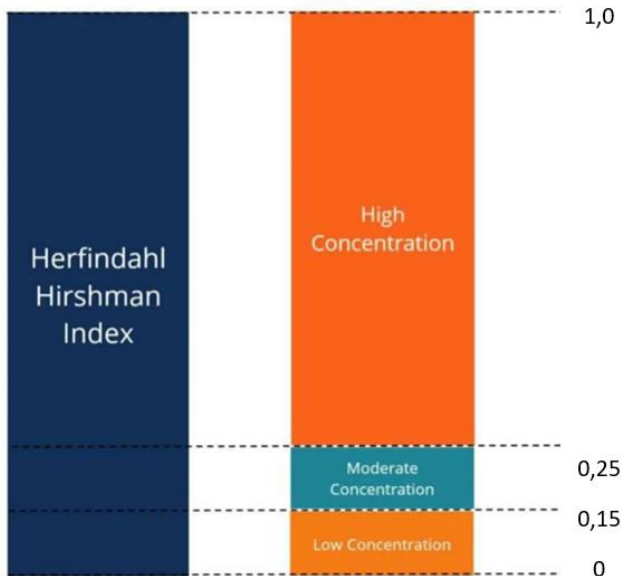


Fig. 2.3. Level of export diversification depending on the value of the Herfindahl-Hirschman index²⁵⁷

Thus, to determine the advantages and risks of foreign trade, it is necessary to calculate and analyze the compliance of the following indicators with their normative values: export (import) quota, export-import coverage ratio, share of high-tech products in the export (import) of goods, terms of trade index, Herfindahl-Hirschman Index, and the share of the largest partner countries in foreign trade turnover. At the same time, to assess the extent of the impact of the identified advantages and risks on the country's economy, it is necessary to evaluate the relationship between economic growth and the dynamics of the above-mentioned indicators.

²⁵⁶ Herfindahl-Hirschman Index. Antitrust Division U. S. Department of Justice. <https://www.justice.gov/atr/herfindahl-hirschman-index>

²⁵⁷ Compiled by: Vipond T. Herfindahl-Hirschman Index (HHI). <https://corporatefinanceinstitute.com/resources/valuation/herfindahl-hirschman-index-hhi/>

Based on the theoretically and empirically proven dependence of a country's economic growth on foreign trade, confirmed by many scholars, the assessment of the impact of advantages and risks of foreign trade on Ukraine's economic growth will be carried out according to the following functional relationship:

$$Y_t = f(X_1, X_2, X_3, X_4, \dots, X_n), \quad (2.22)$$

where Y_t is a vector of economic growth indicators, including GDP volume, GDP per capita, and GDP index relative to the previous year; X_1, X_2, \dots, X_n is indicators characterizing the benefits and threats of foreign trade.

An important component of our research methodology is the assumption that the growing dynamics of stimulant indicators have a positive impact on Ukraine's economic growth, thereby confirming the advantages of foreign trade for the economy. Accordingly, the increase in deterrent indicators has a negative impact on economic growth and confirms the intensification of corresponding risks to economic development.

To confirm or refute the proposed hypothesis, it is necessary to conduct a regression analysis based on the linear dependence described by the following equation:

$$Y = \beta_0 + \beta_1 \cdot x_1 + \dots + \beta_k \cdot x_k + u, \quad (2.23)$$

where Y – dependent explanatory variable, (x_1, x_2, \dots, x_k) – independent explanatory variables, u – random error, the distribution of which is generally determined by independent variables, but whose mathematical expectation is zero.

Thus, at the first stage of our study, it is necessary to calculate the indicators that characterize the advantages and threats of foreign trade for Ukraine's economy using statistical data for the period 2011–2021. Comparing these indicators with the normative values will allow us to make a preliminary conclusion about their dynamics: in the case of a positive change in the stimulatory indicators, we can conclude that the advantages are increasing, while the growth of the destimulatory indicators will indicate the intensification of threats.

At the second stage of our study, we will conduct a regression analysis of the dependence of economic growth on the dynamics of indicators characterizing the advantages and threats of foreign trade. As the dependent variable, we will alternately

use the following indicators: GDP volume, GDP per capita, and the GDP index compared to the previous year. The set of independent variables includes the following foreign trade indicators: export (import) quota, export-import coverage ratio, share of high-tech products in goods export (import), terms of trade index, Herfindahl-Hirschman Index, and the shares of the largest partner countries in foreign trade turnover. The regression analysis will be carried out using the "Statistica 7.0" software, applying the "Multiple Regression" module.

Conclusions of the Chapter

The assessment of the impact of countries' participation in an integration association involves the application of various methods of economic, statistical, and managerial analysis, most of which are aimed at determining the effectiveness of trade and economic integration of partner countries. To assess the functioning of the EU as an integration association, it is advisable to use the integral indicator method by calculating it for the following key periods: the latest EU enlargement in 2013; the United Kingdom's exit from the EU in 2020; and the current stage of the EU-27. In order to determine the prerequisites for Ukraine's integration into the EU and to assess the impact of trade as the main form of cooperation between our country and the integration association, it is advisable to calculate a gravity model and use it to forecast the volume of bilateral trade turnover in the short term.

Modern studies on the impact of international trade on economic development are based on a new approach that allows for accounting of net trade flows between countries, measured in terms of value added. Researchers have proven that there is a relationship between countries' economic growth and their degree of involvement in global value chains (GVCs). Given the varying levels of countries' participation in GVCs, which are determined by their economic development levels, the impact of GVCs on economic growth also differs. It is advisable to determine the relationship between a country's economic growth and the participation of national producers in GVCs using statistical-correlation analysis, which involves building a regression relationship between GDP indicators and changes in the coefficients of forward, backward, and overall GVC participation, the country's position in GVCs, and the share of imported value added in the export of key economic sectors.

Value chain analysis makes it possible to identify the main directions and strategic goals for the development of industrial sectors that have a key impact on the development of the national economy. In this context, an important task is to determine the relationship between the development of the manufacturing industry and the level of the country's involvement in global value chains. This should be carried out using regression analysis, where the dependent variables will include indicators characterizing industrial output, investment in industry, innovation activity, and industrial employment, while the independent variables will be the indicators of total, forward, and backward participation of the country in global value chains.

In order to assess the impact of trade openness on economic growth, our study will use a conceptual model based on endogenous growth theory, where key factors include investment and human capital, which also contribute to increasing the volume of foreign trade and enhancing exporters' competitiveness. Determining the dependence of countries' economic growth on the level of trade openness should be carried out using the multiple linear regression method, with panel data analysis applied for Central and Eastern European (CEE) countries. In the regression model, the dependent variable is represented by the dynamics of GDP per capita, while the independent variables include indicators that, in addition to trade openness, characterize the main determinants of economic growth – investment and human capital.

The methodological approach to assessing the balance of benefits and risks from foreign trade includes two consecutive stages: calculating foreign trade indicators that characterize the benefits and risks for the country's economy and comparing their actual values with normative benchmarks; determining the impact of the calculated foreign trade indicators on the country's economic growth using regression analysis. The list of foreign trade indicators used to identify benefits and risks should include the following: export (import) quota, export-import coverage ratio, share of high-tech products in goods exports (imports), terms of trade index, Herfindahl-Hirschman Index (HHI), and the shares of the largest partner countries in total foreign trade turnover. Economic growth indicators include the volume of GDP at current prices, GDP per capita, and the GDP index compared to the previous year.

CHAPTER 3. PECULIARITIES OF THE FORMATION OF GLOBAL VALUE CHAINS IN THE CONTEXT OF DEEPENING INTEGRATION PROCESSES

(Valerii Mytsenko)

3.1. The Essence and Conceptual Framework for the Formation of Global Value Chains

The emergence of global value chains (GVCs) has changed the picture of world production and globalisation. Although international trade is not a new phenomenon, it is only recently the countries that used to import parts from technologically advanced countries for assembly and sale in the domestic market have become full participants in international production networks, exporting parts, services and goods that are used in the following links, value chains around the world²⁵⁸. The traditional model of trade assumes that a product made in one country is then sold and consumed in another, thus involving two countries (exporter and importer). GVC trade, on the other hand, implies that the same product crosses national borders many times, which implies a greater complexity of both the determinants and consequences of such trade²⁵⁹. It is estimated that about half of world trade is linked to global value chains²⁶⁰.

The concept of the global chain was created as a result of the value chain concept²⁶¹ being applied to production processes that take place on a global scale, and is used to describe increasing fragmentation of production, i.e. its division between different actors and locations²⁶².

The traditional approach to observations in international trade statistics assumes that a ‘portion’ of the value of a final good is counted twice when it crosses a border between countries. As the division of production increases and production chains extend across many countries, statistics based on exports and imports (gross trade)

²⁵⁸ Taglioni D., Winkler D. Making Global Value Chains Work for Development. Trade and Development. World Bank Group, Washington, D.C. 2016, p. 11

²⁵⁹ World Development Report 2020: Trading for Development in the Age of Global Value Chains, Washington, D.C. URL: <http://pubdocs.worldbank.org/en/834031570559525797/Chapter-1.zip>, 23.02.2020, p. 17

²⁶⁰ World Development Report 2020..., p. 19

²⁶¹ Porter M. E. Competitive Advantage: Creating and Sustaining Superior Performance. Free Press. New York. 1985

²⁶² Jones L., Demirkaya M., Bethmann E. Global Value Chain Analysis: Concepts and Approaches, Journal of International Commerce and Economics. April 2019. pp. 1–29, p. 3

become increasingly distorted by overstating trade volumes. The solution to this problem is to measure trade in value added, which is the difference between the gross value of a good and the value of all the inputs required to produce it (Figure 3.1). As can be seen from the figure, gross exports were 210 and value-added exports were 110. According to the traditional approach, country A exported an intermediate good to country B for 100 units, and then the final good produced in country B was exported to country C for 110 units. Looking at this scheme from the perspective of value added measurement, country A exported an intermediate product to country B for 100 units of currency, and then the final good produced in country B was exported to country C for 10 units of currency.

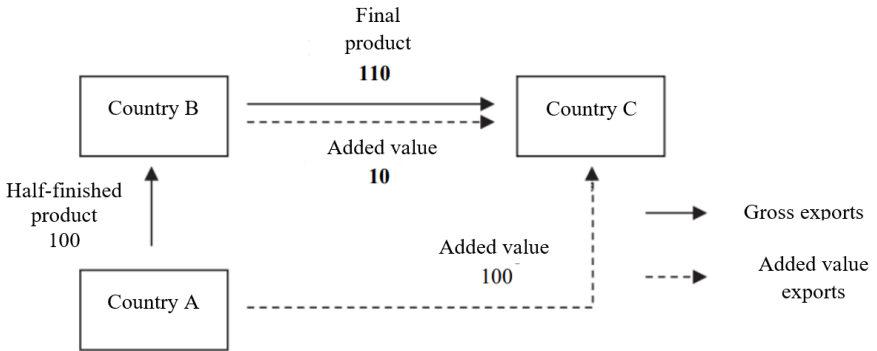


Figure 3.1. Comparison of gross turnover and value added turnover²⁶³

Globally, the double counting problem affects about 28% of trade flows, leading to an overestimation of trade flows that is associated with an overestimation²⁶⁴ of the benefits of trade in the country of the ‘last’ producer of a product and an underestimation of the benefits of supplying intermediate goods used in the production process to countries²⁶⁵.

²⁶³ Built on: Interconnected Economies: Benefiting from Global Value Chains, OECD Publishing, Paris. 2013; Pavlovska I. H., Haustova V. E., Hubarieva I. O. Measuring the participation of countries in global value chains. An academic review. 2022. №2(57). P. 50-58

²⁶⁴ UNCTAD (2013), World Investment Report 2013: Global Value Chains – Investment and Trade for Development, United Nations, Geneva, p. 123

²⁶⁵ UNCTAD (2013), World Investment Report 2013: Global Value Chains – Investment and Trade for Development, United Nations, Geneva, p. 123

According to L. Ambrozyak, various methods are used to measure value added in trade, the simplest of which uses the share of intermediate goods in trade turnover²⁶⁶.

This allows determining the extent to which a given country contributes to value added by being traded, assuming that higher intensity of trade in intermediate goods transforms into a correspondingly higher share of the country in GVC value added²⁶⁷, but does not specify what share of trade is value added. The use of intra-corporate trade data and the use of input-output tables are considered to be more reliable. The possibilities of using the first type of data are limited because only a few countries collect relevant information on intra-corporate trade²⁶⁸. For this reason, international input-output tables are used to estimate value added flows, which allow for a more accurate determination of the share of value added in the exports of certain countries²⁶⁹.

The use of international input-output tables has made it possible to distinguish between domestic and external (imported) value added in trade. Domestic value added is the portion of exports that represents the value of goods produced in a given country (and used for export production). Foreign value added, in turn, is the value of goods produced in other countries that are used to produce goods that are then exported²⁷⁰.

The analysis using international flows tables approach also has its drawbacks, which are caused by factors such as imperfect data related to aggregation. This leads to less accurate data for individual sectors and the need to make certain assumptions about the flows of intermediate goods in bilateral trade²⁷¹. Since an accurate measurement of trade value added would require tracking production process of each product/service, only an approximate measurement of this phenomenon is possible²⁷².

Due to the complexity of production processes and the fact that goods cross borders many times at different stages of the value chain before reaching the country

²⁶⁶ Ambroziak Ł. Wybrane miary wartości dodanej w wymianie handlowej na przykładzie państw Unii Europejskiej, [w:] Mierzenie wartości dodanej w handlu zagranicznym. Nowe koncepcje, metody i wyzwania, E. Kaliszuk (red.), Instytut Badań Rynku, Konsumpcji i Koniunktur, Warszawa, 2013. s. 43–60, p. 77

²⁶⁷ Folfas P. Handel międzynarodowy mierzony wartością brutto oraz wartością dodaną: analiza porównawcza, Oficyna Wydawnicza SGH, Warszawa. 2016, p. 27

²⁶⁸ Ambroziak Ł. Wybrane miary wartości dodanej...

²⁶⁹ Ambroziak Ł. Wybrane miary wartości dodanej..., p. 86

²⁷⁰ UNCTAD (2013), World Investment Report 2013..., p. 126

²⁷¹ World Development Report 2020..., p. 18

²⁷² Folfas P. Handel międzynarodowy mierzony...

of consumption, domestic value added can be divided into²⁷³: - domestic value added that is then absorbed by the importing country; this component of value added is generated by both final goods and intermediate goods; - domestic value added that is re-exported to third countries; it is embodied in intermediate goods that are not directly absorbed by the exporting country; - domestic value added that is re-imported to the country of origin; it is embodied in intermediate goods that were previously exported, returned to the country and used again for export production.

Foreign value added in exports corresponds to the value added in imported intermediate goods. The importance of GVC trade in total trade can be expressed by the share of trade that crosses at least two borders. This category includes: goods exported by a given country that carry value added previously created in another country; they represent a ‘backward’/‘upward’ participation in the value chain (backward), as the imported intermediate goods originated at an earlier stage of the production chain; goods exported by a given country that are not absorbed by the importing country but are part of its exports to other countries; this component represents the country's ‘upstream’/‘downstream’ commitment in the chain (forward), as the exporting country is at an earlier stage of the value chain²⁷⁴.

The literature on this issue uses the following indicators of participation in global value chains: the coefficient of backward participation (*gvc_b_share*), the coefficient of forward participation (*gvc_f_share*), and the total participation rate – their sum. These values can be represented by the following formulas²⁷⁵:

$$gvc_b_{share} = \frac{FVA}{EX}, \quad (3.1)$$

$$gvc_f_{share} = \frac{DVA_E}{EX}, \quad (3.2)$$

$$gvc_{share} = \frac{FVA + DVA_E}{EX}, \quad (3.3)$$

²⁷³ WTO (2015), WTO Trade in Value-Added and Global Value Chains profiles. Explanatory notes, https://www.wto.org/english/res_e/statis_e/miwi_e/Explanatory_Notes_e.pdf, 22.04.2020

²⁷⁴ World Development Report 2020..., p. 18

²⁷⁵ Kersan-Škabić I. The Drivers of Global Value Chain (GVC) Participation in EU Member States. Economic Research-Ekonomska Istraživanja. 2019. Vol. 32(1). pp. 1204–1218

Where: FVA is foreign value added, DVA_E is domestic value added, which is then exported by the importing country to third countries, EX is gross exports.

The first of the above indicators (*gvc_b_share*) expresses the share of foreign value added embodied in imported inputs in the gross exports of a given country. The second indicator, *gvc_f_share*, shows the share of domestic value added in gross exports of a given selling country that is then exported by recipient countries. In other words, it refers to intermediate goods that are further processed in the importing country and exported to third countries²⁷⁶. For both indicators, a higher (lower) value of the indicator means greater (lower) participation of the country in global value chains, where a higher value of the forward participation indicator is associated with a higher importance of the country's production in GVCs, while a higher value of the backward participation indicator means that the country, although actively involved in GVCs, receives only a small part of the value added in the chain²⁷⁷.

The overall participation rate, on the other hand, expresses the share of exports (measured by value added) that crosses national borders at least twice. It is thus a synthetic measure of involvement in GVCs, regardless of its nature (upstream or downstream). The position of a country's participation in GVCs is also an important indicator, which is defined as follows:

$$gvc_{position} = \ln\left(1 + \frac{DVA_E}{EX}\right) - \ln\left(1 + \frac{FVA}{EX}\right). \quad (3.4)$$

The above formula can be equivalently written as follows:

$$gvc_{position} = \ln(1 + gvc_f_share) - \ln(1 + gvc_b_share). \quad (3.5)$$

If a country primarily participates in the early stages of the value chain, then a higher level of forward participation than backward participation should be expected. In other words, domestic value added, which is then included in third country exports,

²⁷⁶ Fernandes A. M., Kee H. L., Winkler D. E. Determinants of Global Value Chain Participation: Cross-Country Evidence. World Bank Policy Research Working Paper. 2020. No. 9197. World Bank Group. Washington, D.C, p. 4

²⁷⁷ Montalbano P., Nenci S., Pietrobelli C. Opening and Linking Up: Firms, GVCs, and Productivity in Latin America. Small Business Economics. 2018. Vol. 50(4), pp. 917–935, p. 920–921

is higher than external value added. On the other hand, specialisation in the last links of the chain will be associated with high imports of intermediate goods, resulting in a higher backward participation rate than forward participation rate. Positive values of *gvc_position* will indicate a higher value of forward participation and thus specialisation in the early stages of the value chain, while negative values will indicate specialisation in the latter stages and thus a higher level of backward participation in the value chain²⁷⁸.

According to the ‘smile curve’ hypothesis, individual links in the value chain differ in terms of their potential for value creation. The greatest added value is created at the knowledge-intensive stages (conceptual, research and development, and design) and at the stages related to post-production services, such as marketing, branding, sales, and after-sales service²⁷⁹. The production phase, on the other hand, is associated with the creation of less value added²⁸⁰.

The differences in value added at the individual stages of the chain are believed to be even larger than shown in Fig. 3.2, i.e., the value added at the production stage is lower, while pre-production and post-production activities are higher²⁸¹. Differences in the amount of value added at different stages of global value chains result in higher profits and wages at the country level due to specialisation in knowledge-intensive activities and lower wages in the case of manufacturing. This leads to an international division of labour, with developed countries engaging in pre- and post-production activities that generate high value added, while developing countries concentrate mainly on production activities with correspondingly lower value added²⁸².

²⁷⁸ Kersan-Škabić I. Assessment of EU Member States’ Positions in Global Value Chains. *Eastern Journal of European Studies*. 2017. Vol. 8. No. 2. pp. 5–24, p. 9–10

²⁷⁹ Mudambi R. Location, Control and Innovation in Knowledge-Intensive Industries. *Journal of Economic Geography*. 2008. Vol. 8(5). pp. 699–725, p. 706

²⁸⁰ Stöllinger R. Testing the Smile Curve: Functional Specialisation in GVCs and Value Creation. *WIIW Working Papers*. 2019. No. 163, Vienna, c. 1; Baldwin R. E., Evenett S. J. Value Creation and Trade in 21st Century Manufacturing. *Journal of Regional Science*. 2015. Vol. 55 (1). pp. 31–50, p. 34–35

²⁸¹ *Interconnected Economies: Benefiting from Global Value Chains*, OECD Publishing, Paris, 2013. p. 214

²⁸² Stöllinger R. Testing the Smile Curve.....

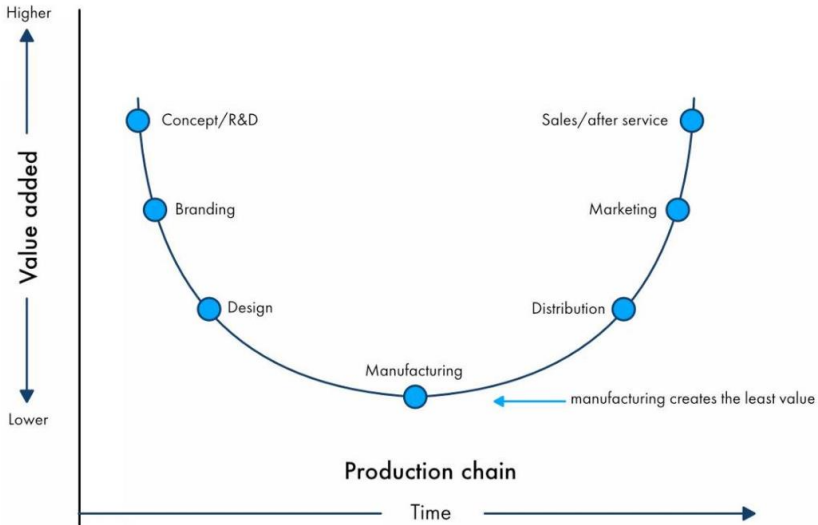


Figure 3.2. Distribution of value added at individual stages of production²⁸³

Value added within the chain is concentrated in technologically advanced activities related to products and services that are difficult to imitate. At the same time, these activities are characterised by higher barriers to entry because they require specialised skills that are difficult to acquire²⁸⁴. In turn, standardised activities characterised by high modularity can be performed by many competing enterprises²⁸⁵. These activities have low barriers to entry, which means that they can be carried out by other companies from countries that offer the most favourable investment conditions²⁸⁶. As a result, the knowledge-based economy achieves higher added value within the GVC²⁸⁷. As R. Mudambi points out, this state of affairs may change due to the catch-up effect, according to which developing countries, still associated with mid-

²⁸³ Built on: Baldwin R. E., Evenett S. J. Value Creation and Trade in 21st Century Manufacturing. *Journal of Regional Science*. 2015. Vol. 55 (1). pp. 31–50., p. 35.

²⁸⁴ Supporting Investment in Knowledge Capital, Growth and Innovation. OECD Publishing: Paris, 2013., p. 216–217

²⁸⁵ Supporting Investment in Knowledge Capital, Growth and Innovation....

²⁸⁶ Geodecki T., Grodzicki M. J. Jak awansować w światowej lidze gospodarczej? Kraje Europy Środkowo-Wschodniej w globalnych łańcuchach wartości. *Zarządzanie Publiczne*. 2015. nr 33(3). pp. 16–40, p. 31

²⁸⁷ Supporting Investment in Knowledge Capital, Growth and Innovation....

chain activities, are making efforts to develop relevant competencies in high value-added activities²⁸⁸.

The values of direct and reverse participation differ for individual economies, e.g. due to the nature of their participation in GVCs. A country that hosts the assembly plants of multinationals that produce final goods for export is characterised by a high level of reverse participation due to the high share of foreign value added that is carried by imported intermediate goods. On the other hand, a country that is primarily a supplier of intermediate goods to the country of assembly has a high level of participation²⁸⁹.

The World Bank has introduced a taxonomy of sectoral specialisations, according to which it divides countries into four main groups²⁹⁰. The first includes countries rich in natural/agricultural resources, which are characterised by relatively high levels of direct participation and low levels of inward participation. This is explained by the fact that they export goods that are further processed in other countries and whose production usually does not require imports. In the second group, an increase in the share of manufactured goods in exports is accompanied by an increase in reverse participation, as exports become dependent on imports. Transition from the first group to the second group is also associated with a decrease in upstream participation, as goods exported by countries in the second group are not subject to further processing (e.g., clothing). Domestic value added exported by third countries (direct participation) is the lowest in the second group. In the third group of countries, the share of industry and services is growing. It has the highest value of the index of reverse participation and an increase in the level of direct participation compared to the second group. The last group, the fourth, which is characterised by involvement in innovation activities, has a higher level of direct participation and, at the same time, a relatively high but lower level of reverse participation than in the third group.

²⁸⁸ Mudambi R. Location, Control and Innovation in Knowledge-Intensive Industries...

²⁸⁹ Kowalski P., Lopez-Gonzalez J., Ragoussis A., Ugarte C. Participation of Developing Countries in Global Value Chains: Implications for Trade and Trade-Related Policies. OECD Trade Policy Papers. 2015. No. 179. OECD Publishing, Paris, p. 14

²⁹⁰ World Development Report 2020..., p. 21-23

Production fragmentation is usually associated with the activities of multinational corporations. This is especially true of vertical investments, which involve locating different stages of production in different countries to minimise production costs²⁹¹. As a result, according to UNCTAD estimates, 80% of international trade is coordinated within the production networks of multinationals, including subsidiaries, non-stockholder regimes, and agreements between parties²⁹².

Multinational corporations are usually engaged in activities with the highest added value (innovation). Other activities, including mass production, are carried out by third-party organisations. This creates an opportunity for companies from developing countries to participate in GVCs. Due to the fragmentation of production processes, access to global markets becomes easier, as the performance of individual, narrowly defined tasks is less complicated²⁹³.

Research and development is considered the least internationalised function of multinationals. Nevertheless, R&D activities are carried out in both developed host countries and developing countries. Moreover, R&D is not only about adapting products and processes to local needs, but is also carried out, for example, to reduce costs or accelerate technology development²⁹⁴. At the same time, it should be emphasised that attracting and benefiting from foreign knowledge-related investment requires a certain initial level of innovation capabilities, which are determined, among other things, by research and development expenditures and the appropriate level of education of the workforce²⁹⁵.

²⁹¹ Cadestin C., De Backer K., Desnoyers-James I., Miroudot S., Ye M., Rigo D. *Multinational Enterprises and Global Value Chains: New Insights on the Trade-Investment Nexus*. OECD Science, Technology and Industry Working Papers. 2018. No. 05. OECD Publishing, Paris, p. 8

²⁹² World Investment Report 2013: *Global Value Chains – Investment and Trade for Development*, United Nations, Geneva, p. 135

²⁹³ Iguchi C. *Inter-organizational Linkages, Global Value Chains and National Innovation Systems: Disconnected Realities in the Philippines / The Local Impact of Globalization in South and Southeast Asia. Offshore Business Processes in Services Industries*, B. Lambregts, N. Beerepoort, R. C. Kloosterman (eds.), Routledge, Oxon and New York. 2016, s. 78–94, p. 80; Rodrik D. *New Technologies, Global Value Chains, and Developing Economies*. NBER Working Paper Series. 2018. No. 25164, Cambridge, p. 2

²⁹⁴ *Transnational Corporations and the Internationalization of R&D*. World Investment Report. United Nations, New York–Geneva. 2005, p. 121, 126–127

²⁹⁵ *Transnational Corporations and the Internationalization of R&D....*

Thus, supplementing the theory of international trade with modern knowledge about participation of different countries in the production of finished goods at different stages of their creation allows for a more accurate assessment of the volume of foreign trade and its quality. The value chain describes a full range of activities required to provide a product or service from the conceptual stage of its development, through intermediate stages of production, to delivery to end consumers. The fragmentation of production processes and the corresponding dispersion of tasks and activities across borders leads to the formation of cross-border production systems, consisting of sequences of chains or networks operating globally, regionally or between two countries.

The problem of global value chains has become the subject of empirical analysis relatively recently. The emergence and development of research on this phenomenon is associated with both the growing importance of global value chains due to progressive globalisation and fragmentation of production processes, and the emergence of databases that allow for the calculation of relevant indicators. In the literature, global value chains are considered in terms of their potential impact on various categories, including economic growth, productivity, foreign direct investment (FDI), wages, environmental quality or export sustainability²⁹⁶. Some studies aim to identify determinants of participation in global value chains²⁹⁷. Another group of studies is those that focus on the analysis of statistical data and show differences between countries in terms of their position or participation in global value chains²⁹⁸.

²⁹⁶ Hagemeyer J. Trade and Growth in the New Member States: The Role of Global Value Chains. *Emerging Markets Finance and Trade*. 2018. Vol. 54 (11). pp. 2630–2649; Martínez-Galán E., Fontoura M. P. Global Value Chains and Inward Foreign Direct Investment in the 2000s. *The World Economy*. 2019. Vol. 42. pp. 175–196; Wang J., Wan G., Wang C. Participation in GVCs and CO₂ Emissions. *Energy Economics*. 2019. Vol. 84. pp. 1–11

²⁹⁷ Tinta A. A. The Determinants of Participation in Global Value Chains: The Case of ECOWAS. *Cogent Economics and Finance*. 2017. Vol. 5. pp. 1–14; Obasaju B. O., Olayiwola W. K., Okodua H., Adekunle B. S. Regional Economic Integration and the Backward Integration of ECOWAS Sub-Region into Global Value Chains. *International Journal of Economic Policy in Emerging Economies*. 2019. Vol. 12 (3). pp. 243–263; Banerjee B., Zeman J. Determinants of Global Value Chain Participation: Cross-Country Analysis. NBS Working Paper. 2020. №1 to Research Department, National Bank of Slovakia

²⁹⁸ Amador J., Cappariello R., Stehrer R. Global Value Chains: A View from the Euro Area. *Asian Economic Journal*. 2015. Vol. 29 (2). pp. 99–120; Cieślak E., Biegańska J., Środa-Murawska S. The Intensification of Foreign Trade in Post-Socialist Countries and Their Role in Global Value Chains. „*Acta Oeconomica*. 2016. Vol. 66 (3). pp. 465–487; Doryń W. Zróżnicowanie krajów pod względem udziału krajowej wartości dodanej w eksporcie. *Wiadomości Statystyczne. The Polish Statistician*. 2019. Vol. 64 (7). pp. 32–47

Although scientific papers containing the results of empirical studies of the determinants of countries' participation in global value chains have appeared in the literature in recent years, scientists continue to actively work on the problems associated with determining the interrelationships between production complexes of countries. The researchers conducted a study based on statistical data for 87 countries in 2012. The results of the analysis allowed identifying three groups of factors that affect a country's participation in global value chains. The first group of factors covered factors over which a given country has no control (distance from markets, natural resources and climate conditions). The second group of factors related to categories that can be shaped by long-term policies (human capital, physical capital, quality of institutions). The third group of factors includes variables that can be influenced by short-term policies, i.e. market access, access to factors of production, wage competitiveness, and logistics efficiency. The study concluded that 'most of the factors examined are determinants of participation in global value chains, with only wages and market access being statistically insignificant'. It also found that 'proximity to markets, efficient logistics and strong institutions are most important for participation in global value chains', while 'the drivers of country integration differ by sector'²⁹⁹.

P. Kowalski et al. empirically tested the determinants of participation in global value chains, analysing countries with different levels of economic development. The study used both a measure of backward participation, which reflects the links at the top of the value chain, and a measure of forward participation, which reflects the links at the bottom of the value chain. Based on the results, the authors concluded that 'structural factors such as market size, industrialisation and location are main determinants of participation in global value chains, but their impact depends on the link in the value chain considered'³⁰⁰. In turn, 'increased industrialisation leads to increased participation in the value chain and its decline, and on the other hand, 'increased distance from large production centres contributes to a decrease in reverse

²⁹⁹ Pathikonda V. G., Farole T. The Capabilities Driving Participation in Global Value Chains. *Journal of International Commerce, Economics and Policy*. 2017. Vol. 8 (1). pp. 1–26, p. 2

³⁰⁰ Kowalski P., Lopez-Gonzalez J., Ragoussis A., Ugarte C. (2015)...

participation'³⁰¹. The researchers also point to the importance of open trade and favourable government policies on foreign direct investment. At the same time, due to the existence of significant differences in the determinants of participation in global value chains depending on the sector of the economy and the level of development of the country, the authors emphasise 'the need for research that takes into account this level of detail'³⁰².

Cheng K. et al. analysed driving forces behind the increase in participation in global value chains, as measured by the overall participation rate. Using information from the TiVA (Trade in Value Added - OECD-WTO) database on 57 Asian economies (1995-2012), the authors came to general conclusion that 'high quality human capital, an efficient institutional environment, higher levels of infrastructure development and lower customs tariffs on intermediate goods contribute to increased participation in global value chains'³⁰³. However, the impact of analysed determinants differed depending on technological progress of the respective manufacturing sector. The quality of education was statistically significant only in the case of high technological development of industries, while education, measured by the number of years of study, was statistically significant in the case of low technological development.

According to Beverelli et al. the determinants of participation in global value chains, identified in the literature as 'structural factors and policies'³⁰⁴, do not sufficiently explain differences in the degree of integration of different countries into global value chains³⁰⁵. Therefore, the authors analysed the impact of a new factor, namely 'domestic value chains (DVCs)'. At the same time, they emphasised that 'it is not possible to determine a priori the sign of relationship between global and domestic value chains, which is the result of both fragmentation costs and supplier switching

³⁰¹ Kowalski P., Lopez-Gonzalez J., Ragoussis A., Ugarte C. (2015)...

³⁰² Kowalski P., Lopez-Gonzalez J., Ragoussis A., Ugarte C. (2015)...

³⁰³ Cheng K., Rehman S., Seneviratne D., Zhang S. Reaping the Benefits from Global Value Chains. IMF Working Paper. 2015. №15/204

³⁰⁴ Kowalski P., Lopez-Gonzalez J., Ragoussis A., Ugarte C. (2015)...

³⁰⁵ Beverelli C., Stolzenburg V., Koopman R. B., Neumueller S. Domestic Value Chains as Stepping Stones to Global Value Chain Integration. *The World Economy*. 2019. Vol. 42. pp. 1467–1494, p. 1468

costs³⁰⁶. A positive relationship is expected for the first type of expenditure, and a negative relationship for the second type of expenditure. The results of 61-country study focusing on backward linkages show that ‘national value chains facilitate further integration into global value chains’ and also indicate that ‘for the GVC-DVC relationship considered, the costs associated with production fragmentation are more important than the costs of switching suppliers’³⁰⁷.

Allard K. et al. conducted a study on the sample of 185 countries in 2007-2011. Based on the results of the study, they found that ‘backward integration within the GVC depends (after controlling for the effects of the level of development and size of the economy) on the level of education expenditure, availability of private sector credit, the rule of law, and the level of tariffs’³⁰⁸. An increase in the first three factors leads to an increase in reverse participation (involvement up the value chain), while the last one leads to a decrease³⁰⁹.

Interesting are the results of the study conducted to determine main factors responsible for the diversity of the European Union countries in terms of the overall level of participation in global value chains (calculated as the sum of the levels of reverse and direct participation in the chain). Kersan-Skabic I. analysed this group of countries both as a whole (EU-28) and with a division into countries belonging to the so-called ‘old’ Union (EU-15) and new EU member states. Based on the results of the study covering 1995-2011, the author identified the most important determinants of participation in global value chains – ‘GDP growth with a certain time lag, foreign direct investment, financial sector development, share of services in GDP, share of high-tech products in exports and wages’³¹⁰ – the impact of which varies depending on the group of countries analysed.

³⁰⁶ Beverelli C., Stolzenburg V., Koopman R. B., Neumueller S. Domestic Value Chains...

³⁰⁷ Beverelli C., Stolzenburg V., Koopman R. B., Neumueller S. Domestic Value Chains...

³⁰⁸ Allard C., Canales-Krijljenko J., Chen W., Gonzalez-Garcia J., Kitsios E., Treviño J. Trade Integration and Global Value Chains in Sub-Saharan Africa. In Pursuit of the Missing Link. International Monetary Fund. Washington DC, 2016

³⁰⁹ Allard C., Canales-Krijljenko J., Chen W., Gonzalez-Garcia J., Kitsios E., Treviño J. Trade Integration and Global Value Chains....

³¹⁰ Kersan-Škabić I. The Drivers of Global Value Chain (GVC) Participation in EU Member States. Economic Research-Ekonomska Istraživanja. 2019. Vol. 32 (1). pp. 1204–1218

The study of the European Union countries, using statistical data for 2000-2011, was also conducted to identify factors responsible for differences in the share of domestic value added in exports between the EU-15 and the new member states (EU-10). The focus was primarily on the importance of investment in intangible assets and foreign direct investment. Some of the findings suggest that ‘research and development expenditure in the enterprise sector, which is a proxy for investment in intangible assets in the study, contributes to an increase in the share of domestic value added in exports for the EU-15, and to a slight decrease in the EU-10’³¹¹. The researcher explains this result by ‘the level of investment in intangible assets in the EU-10 countries, which allows these countries to participate in global value chains, but may not be sufficient to benefit from them in the form of an increase in the share of domestic value added in exports’³¹². With regard to foreign direct investment, the author concludes that ‘an increase in cumulative FDI inflows leads to a decrease in the share of domestic value added in exports in both groups of countries, due to a decrease in demand for domestic content’, and in the case of the new member states, ‘an increase in cumulative FDI outflows leads to an increase in the analysed level of participation in global value chains’³¹³.

A. A. Tinta focused on the countries belonging to the Economic Community of West African States (ECOWAS). The author empirically tested the determinants of reverse participation in global value chains based on data for 1995-2012. Among the factors that influence the level of participation of the studied countries in global value chains, the following were identified: ‘intra-Community trade, level of industrialisation, level of development (GDP per capita), level of duties, foreign direct investment inflows, domestic value added per capita and two indicators reflecting product diversification and degree of specialisation, respectively’³¹⁴. However, the obtained direction of influence of these factors did not always coincide with the

³¹¹ Vrh N. What Drives the Differences in Domestic Value Added in Exports between Old and New EU Member States? *Economic Research-Ekonomska Istraživanja*. 2018. Vol. 31 (1). pp. 645–663

³¹² Vrh N. What Drives the Differences in Domestic Value Added...

³¹³ Vrh N. What Drives the Differences in Domestic Value Added...

³¹⁴ Tinta A. A. The Determinants of Participation in Global Value Chains....

theoretical provisions. For example, the study found a negative impact of GDP per capita, which was associated with low values of this indicator in the analysed group of countries and the existence of a certain threshold level of welfare/development above which the direction of influence changes to positive. The scientists argued that ‘only sufficiently developed countries have the technology to produce/process goods with a large share of foreign added value’³¹⁵.

The researchers conducted a similar analysis on the GVC participation rate of ECOWAS member states in 2007-2012, and its main goal was to determine the impact of regional economic integration on participation in the reverse part of the value chain³¹⁶. In addition to the two indices used to measure integration (considered separately), the degree of industrialisation, tariffs on imported intermediate goods, foreign direct investment, distance from key production centres, distance from national capital and a lagged dependent variable are also used to explain the reverse participation rate. When analysed with the regional integration index preferred by the authors, only the lagged value of the dependent variable was identified as a statistically significant determinant. For the other values, the parameter estimates were statistically insignificant³¹⁷.

In a study based on a sample of 43 countries in 2000-2014, B. Banerjee and J. Zeman analysed the impact of various factors on five indicators of participation in global value chains, including the level of direct and backward linkages. Based on the results, the authors conclude that ‘the size of the economy and openness to foreign direct investment are significant determinants of involvement in global value chains’³¹⁸. They also point out that ‘integration into global value chains is related to the industry and its level of technological progress’, and ‘human capital and institutional

³¹⁵ Tinta A. A. The Determinants of Participation in Global Value Chains....

³¹⁶ Obasaju B. O., Olayiwola W. K., Okodua H., Adekunle B. S. Regional Economic Integration and the Backward Integration of ECOWAS Sub-Region into Global Value Chains. *International Journal of Economic Policy in Emerging Economies*. 2019. Vol. 12 (3). pp. 243–263

³¹⁷ Obasaju B. O., Olayiwola W. K., Okodua H., Adekunle B. S. Regional Economic Integration....

³¹⁸ Banerjee B., Zeman J. Determinants of Global Value Chain Participation: Cross-Country Analysis. NBS Working Paper. 2020. №1. Research Department, National Bank of Slovakia

quality factors' in the study 'were statistically insignificant for all indicators of participation in global value chains used'³¹⁹.

One of the most recent studies of the determinants of participation in global value chains is the 2020 World Bank report. The study, which covered almost 200 countries, formulated key conclusions. In particular, it was confirmed that participation in global value chains depends on 'a country's endowment with production factors, market size, geographic factors, and the quality of institutions'³²⁰. It was found that 'low-skilled labour and foreign capital in the form of foreign direct investment are important for increasing backward participation, while endowment with natural resources helps to increase forward participation in the value chain'³²¹. Regarding market size, it was concluded that 'growth leads to weaker backward linkages and stronger forward linkages, as large countries are less dependent on external markets and imports'. It was also noted that 'improved transport and communication infrastructure can to some extent compensate for a country's remoteness from an industrial centre and thus facilitate its involvement in global value chains'. On the other hand, the quality of institutions was identified as a factor that 'facilitates increased backward linkages to global value chains'³²².

In the national scientific literature, the issues of assessing and analysing the factors that influence a country's participation in global value chains are not sufficiently developed. The importance of technological and investment factors is described in the works of Marushchak N.³²³, Konrad Y. and Melnyk T.³²⁴, Yaroshchuk D. and Okhrimenko O.³²⁵, However, the impact of these factors on the participation of countries in global value chains was not assessed in these publications.

³¹⁹ Banerjee B., Zeman J. Determinants of Global Value Chain Participation....

³²⁰ World Development Report 2020: Trading for Development in the Age of Global Value Chains...

³²¹ World Development Report 2020: Trading for Development in the Age of Global Value Chains...

³²² World Development Report 2020: Trading for Development in the Age of Global Value Chains...

³²³ Marushchak N.V. Global value chains in the context of economic integration of Ukraine. Black Sea Economic Studies. 2017. Issue 24. P. 30-35

³²⁴ Konrad Y.V., Melnyk T.M. Industry of Ukraine in global value chains. Economy and society. 2017. Issue 8. P. 153-159

³²⁵ Yaroshchuk D.O., Okhrimenko O.O. Integration of domestic knowledge-intensive industries into global value chains. Actual problems of economics and management: a collection of scientific papers of young scientists. 2020. Issues 14. <https://ela.kpi.ua/handle/123456789/37685>

Antoniuk L. and Cherkas N. conducted an empirical analysis using panel data for 27 EU countries to assess the impact of key macroeconomic indicators on the value added and competitiveness of the countries studied for the period 2006-2018. The researchers found that the main determinants of value added for the EU-27 countries were ‘strengthening of the currency, reduction of the budget deficit, imports of high-tech products, quality of human capital, reduction of corruption and GDP growth’³²⁶. Based on the results obtained, the researchers identified the following areas of state regulation of the economy to increase added value: ‘balancing the budget, developing human capital, maintaining a stable currency and eliminating corruption’³²⁷.

Thus, the degree of a country's involvement in global value chains depends significantly on both natural resources and the availability of skilled personnel capable of using imported technologies and creating their own innovations. Accordingly, the development of intellectual capital and the improvement of technological level require investment, which has also become an important factor in increasing the added value of manufactured products. On the one hand, these factors are determined by the country's specialisation in the production of certain types of products, and on the other hand, they are shaped by the institutional environment that creates conditions for the development of innovative enterprises and high-tech industries.

3.2. Global Value Chains as a Basis for the Formation of International Production Networks

A characteristic feature of the current stage of globalisation is the acceleration of capital flows, international trade, information exchange and movement of human resources, which has resulted from the processes of internationalisation and production fragmentation. The processes of production fragmentation are increasingly affecting the functioning of the global economy. The internationalisation of production is driven by many factors, the most important of which are lower production costs, development

³²⁶ Antoniuk L., Cherkas N. Global economic networking in the competitive growth of countries. *International economic policy*. 2019. №2(31). P. 82-100, p. 91-92

³²⁷ Antoniuk L., Cherkas N. Global economic networking ...

of telecommunications technologies and lower transport costs. As a result, new trade links are being created and trade in the international economy is growing. More than a quarter of industrial imports are intermediate goods (parts and components).

As a result of active processes of production fragmentation, since the mid-70s of the last century, global production networks and value chains have been formed, which 'include the entire range of transnational production and intermediary operations for the production of goods and services'³²⁸. The theoretical basis for the study of the networking processes of the global economy is formed by representatives of classical and neoclassical theories of international trade, the theory of international competitiveness of countries and is based on the results of studies of global chains of production of goods in cross-border production networks, taking into account the models of industrial reorganisation of leading developed countries³²⁹.

Antoniuk L. and Cherkas N. define global economic networking as 'the process of coordinated interaction of companies in value chains based on the international division of labour and their functional specialisation at different stages of technological processes of production and provision of services in order to increase their international competitiveness'³³⁰. Scientists point out that 'global value chains and production networks coordinate global production, trade and investment as a result of fragmentation of production processes into countries (regions) with dynamic comparative advantages'³³¹.

In the scientific literature, the process of 'networkisation' is defined as 'the reproduction of social product, which is reflected in the increase in the amount of foreign investment, fragmentation of production (division into blocks), the spread of digitalisation of production and management, in production and logistics activities, as well as the creation and further use of decentralised network-type management

³²⁸ Global Value Chain Development Report-2017. International Bank for Reconstruction and Development. The World Bank. 2017. 190 p.

³²⁹ Hernandez V., Pedersen T. Global value chain configuration: A review and research agenda. *Business Research Quarterly*. 2017. № 20(2). Pp. 137–150.

³³⁰ Antoniuk L., Cherkas N. Global economic networking in the competitive growth of countries. *International economic policy*. 2019. №2(31). P. 82-100, p. 85.

³³¹ Horner R., Nadvi K. Global value chains and the rise of the Global South: unpacking twenty-first century polycentric trade. *Global Networks*. 2018. № 18(2). Pp. 207–237.

systems³³². Thus, the development of global production networks contributes to an increase in trade and the growth of trade between countries, which is accompanied by the diffusion of innovations and an increase in investment.

In the early 2000s, scientists began to pay more attention to the study of ‘global production networks’, which are considered the highest level of organisation of international cooperation and cooperative ties between producers from different countries. At the same time, the essence of global production networks is defined as ‘a set of interrelated functions, operations and transactions that result in the production, distribution and consumption of a particular product or service’³³³. Sokolenko S. et al. consider global production networks as ‘organisational platforms through which actors of different regional and national economies compete and cooperate to create, transform and preserve added value through geographically dispersed economic activities’³³⁴.

Another approach to the interpretation of essential characteristics of global production networks is based on the role of transnational corporations (TNCs), which are the dominant actors in the global economy. Very often, these are companies whose revenues exceed GDP of some countries. TNCs operate in many markets, which makes their influence on the markets of their host countries and on the global market as a whole significant. It is multinational corporations that generate most of the world's exports, spending on new technologies and capital flows in the form of foreign direct investment. On the other hand, ‘participation in global networks is a dominant factor in the growth of TNCs’ revenues, as sales of intermediate products through supply chains account for about 50% of global corporate income’³³⁵.

According to the UNCTAD definition, ‘a multinational corporation is a company composed of a parent company and its foreign subsidiaries’. A parent

³³² Ilyashenko K.R. Global networking and value chains in the economic growth of countries. Collection of scientific papers of the ChSTU. Series: Economic Sciences.. 2020. Issue 58. P. 42-51, p. 43.

³³³ Ceglowski J. Assessing export competitiveness through the lens of value added. *The World Economy*. 2017. № 40(2). P. 275–296.

³³⁴ Increasing the competitiveness of the economy of the regions of the West and South of Ukraine through the formation of new production systems (clusters). Results of socio-economic research / ed. S. I. Sokolenko. K. : Logos, 2005

³³⁵ Antoniuk L., Cherkas N. Global economic networking ...

company is defined as a company that ‘controls the assets of companies in countries other than the company's country of origin’. As a rule, such control implies ‘ownership of a certain share of the subsidiary's capital (at least 10% of ordinary shares or voting rights at the general meeting of the company)’. On the other hand, ‘a foreign subsidiary is an enterprise in which an investor resident in another country holds a shareholding that allows him to exercise long-term influence over the management of that company’³³⁶.

A. Zorska defines a transnational corporation as ‘an organisation that coordinates production and trading activities of different divisions in different countries from one centre that makes strategic decisions’³³⁷. A somewhat broader definition of TNCs was formulated by Dicken P., who combined the concept of transnational corporations with a network of links with independent companies³³⁸. Taking this approach into account, we note that a transnational corporation ‘combines and coordinates its own activities, supplemented by the activities of external companies located in different countries, which creates cross-border networks of internal and external relations in different divisions in different countries’³³⁹.

Thus, TNCs are enterprises with a very complex organisational structure, with a wide range of activities and influence, and with enormous economic power. Corporate attributes include sovereignty, organisational complexity, geographical dispersion, knowledge creation power, specialisation, integration and arbitrage power, flexibility, global efficiency and networking.

In the case of TNCs, networking is understood as the possibility of creating a network of mutual relations in the field of information, products or factors with

³³⁶ World Investment Report 2007. Transnational Corporation, Extractive Industries and Development. URL: https://unctad.org/system/files/official-document/wir2007_en.pdf, p. 245.

³³⁷ Zorska, A. *Ku globalizacji? Przemiany w korporacjach transnarodowych i w gospodarce światowej*, Wydawnictwo Naukowe PWN, Warszawa. 2002, p. 50

³³⁸ Dicken, P. *Global Shift: Internationalization of Economic Activity*, Guilford Publications, New York–London. 2003.

³³⁹ Zorska, A. *Korporacje transnarodowe. Przemiany, oddziaływania, wyzwania*. Warszawa: Polskie Wydawnictwo Ekonomiczne, 2007, p. 125–126.

organisational units (e.g. subsidiaries), individuals or enterprises, which can contribute to the corporation's competitiveness, flexibility, innovation and efficiency³⁴⁰.

From the point of view of studying the role of TNCs in the formation of global production networks, the following characteristics of this group of actors are important: 'the ability to coordinate and control various processes and transactions in production networks both within and between countries; taking advantage of geographical differences in the distribution of factors of production (e.g. natural resources or labour) and differences in government policies (e.g. tax rates, subsidies, trade barriers); and the potential for geographical flexibility, i.e. the ability to combine or switch their units and operations between locations on an international or even global scale'³⁴¹.

Thus, multinational corporations operate in many markets and create global structures that manage the production chain from the moment of spending on research and development of new technologies to after-sales services. TNCs are characterised by economic independence and, due to their presence in many different markets, are able to exploit differences in resources and cost of production factors, which contributes to the development of global production networks.

A somewhat different component of global production networks can be considered a 'network enterprise', which is considered as 'a relatively permanent grouping of separate specialised units or enterprises cooperating in accordance with market principles, in which traditional hierarchical management structures have been replaced by horizontal ones based on links between partners existing in different organisational structures and located in different geographical regions'³⁴². Scientists draw attention to the 'possibility of continuous transformation' of networked enterprises, which ensures their flexibility³⁴³.

³⁴⁰ Zorska (2002), c. 50–57; Zorska (2007), p. 126–132

³⁴¹ Dicken, P. *Global Shift: Internationalization of Economic Activity*, Guilford Publications, New York–London, 2003, p. 198.

³⁴² Łobejko, S. *Przedsiębiorstwo sieciowe. Zmiany uwarunkowań i strategii w XXI wieku*. Warszawa: Szkoła Główna Handlowa. Oficyna Wydawnicza, 2010, p. 52.

³⁴³ Jankowiak A. H., Mazurek Sz. *Globalne przedsiębiorstwo sieciowe na przykładzie Li & Fung Group*. Uniwersytet Ekonomiczny w Poznaniu. Zeszyty Naukowe. 2011. Vol. 180. Pp. 68-77.

Another definition emphasises the ‘independence of business network nodes’, understanding network enterprises as a set of ‘legally independent business units implementing various projects coordinated by an integrator company with a distinctive (core, basic) competence’³⁴⁴. The fact that business networks need leaders who perform coordinating functions (the so-called ‘network orchestrators’) is also mentioned by Fung W., Fung W. and Wind Y.: ‘networked enterprises are not bottom-up democracies, although they are sometimes described as such. They are very different from the companies of the past, but those that work well are characterised by strict structure and supervision. Such networked enterprises do not function on their own. They are designed and managed by network orchestrators’³⁴⁵. When describing a networked enterprise, scholars compare the process of its creation to ‘taking the roof off a factory’. The essence of this process is not the global dispersion of sources of supply, i.e. the use of suppliers located anywhere in the world. The essence of a global networked enterprise is ‘dispersed production’, which ‘is not just about sourcing individual elements, but rather about spreading different parts of the production process around the world’³⁴⁶. The network of such an enterprise is the entirety of its business partners (e.g., currently used and potentially available suppliers from around the world). Through the process of ‘network orchestration’, the best possible combination of cooperating companies is created from the set thus defined, acting somewhat like a ‘virtual factory’³⁴⁷.

Most definitions of a corporation are so general that virtually any enterprise that conducts global economic activity through at least several legal entities registered in several countries meets their criteria. The identification of network enterprises is even more difficult, as the business model covered by this term does not actually have to

³⁴⁴ Perechuda K., *Dyfuzyja wiedzy w przedsiębiorstwie sieciowym. Wizualizacja i kompozycje*. Wrocław: Wydawnictwo Akademii Ekonomicznej im. O. Langego we Wrocławiu, 2007, p. 55.

³⁴⁵ Fung, V.K., Fung, W.K., Wind, Y.J. *Konkurowanie w płaskim świecie*. Warszawa: Wyższa Szkoła Przedsiębiorczości i Zarządzania im. Leona Koźmińskiego, 2008, p. 32.

³⁴⁶ Fung, Fung and Wind (2008), p. 28

³⁴⁷ Fung, Fung and Wind (2008), p. 28

relate to a single, formally defined enterprise. The closer to the concept of a 'virtual factory', the more independent entities can create a virtual network enterprise. However, of course, there are also individual enterprises that can be called true network enterprises by using the potential of global business networks.

Thus, the main difference in the characterisation of an international company as a transnational corporation or a network enterprise is not at the formal level, i.e. in the legal status of the entities. The key feature that allows to distinguish between these two concepts is the difference in the quality of relations between the entities that form a TNC and a network enterprise.

No multinational corporation is a homogeneous organisation, although it is sometimes treated as such in economic analysis. Many companies registered in different countries are involved in the day-to-day business processes that take place under the auspices of the corporation. The ownership structure of these entities can be very different. Very often, the co-owners are external partners who are not identified with the corporation's company. The more a TNC is open to cooperation, the more its boundaries are blurred in the form of controlled structures. However, to a greater or lesser extent, all definitions of transnational corporations emphasise the need for a management centre from which the degree of subordination of subsidiaries is assessed.

The essence of a network enterprise is quite different. Such an enterprise can be either a virtual entity (in the sense of the absence of a legal entity) consisting of a whole network of companies that are completely independent in terms of ownership, or a single enterprise operating in the network market and maintaining network relations with other business entities. Thus, the main source of success of a network enterprise is not the value of a single company, but the value of the network of which it is a part, which, in turn, determines the desire to maximise the external value, the value of the company's immediate business environment.

The formation of global networks based on the union of national enterprises and their cooperation with transnational corporations provides additional advantages for the country's economic development compared to a traditional market economy (Table 3.1). As can be seen from the table, the main factors that shape such advantages are the possibility of creating a significant amount of added value and fast delivery of products to other countries.

Table 3.1.

Comparative characteristics of the traditional market economy and the network economy³⁴⁸

Characteristic	Traditional market economy	Network economy
1. Key areas of activity	Free enterprise, perfect competition, predominantly private ownership	Finding different ways to solve problems
2. Product value	Valuable due to unlimited potential of producers, as well as diversity of products and demand	Valuable due to the multiplicity of products
3. Product distribution time	Spreads relatively quickly	Distributed in a relatively short time
4. Pricing	The price is formed by the average price of a product over a certain period of time, also taking into account supply and demand	Price is formed by inversion
5. Influence of intermediaries	Not significant	Insignificant or non-existent
6. Mobility of transactions	Mobility is high due to few bureaucratic procedures	Mobility is high due to direct peer-to-peer relationships
7. Application of innovations	Growth of innovation	Growth of originality and creativity

In studying global production networks, scholars draw attention to the relatively rapid development and transformation of the basic principles of building these networks, which necessitates the substantiation of new theoretical foundations for the

³⁴⁸ Compiled by: Busareva T.H. Network economy as a new form of economic development. Scientific and production journal 'Business Navigator'. World economy and international economic relations. 2018. Issue 4 (47). P. 9-13, p. 10-11; Zyuz D. V. Essence and factors of economic system development. State building.. 2016. № 2. P. 1–12, p. 5–8

organisation and management of elements of global production networks, taking into account their sectoral characteristics. At the end of the last century, the theoretical foundations for the formation of global production networks included three basic categories that are interrelated - value added, embeddedness and hierarchical network management³⁴⁹. Modern approaches to the theoretical explanation of the principles of formation of global production networks focus on the structural development of competitiveness of their participants, which occurs due to 'internal coordination, control, partnership and exchange between companies'³⁵⁰.

Taking into account the evolution of relations between producers, N. Cherkas gives the following definition of a global production network: 'it is an organisational structure consisting of interconnected economic and non-economic entities coordinated by a global lead company and producing goods or services in different geographical regions of the world for global markets'³⁵¹. The latest approaches to the study of the peculiarities of building and functioning of global production networks allow explaining the increase in the competitiveness of companies participating in the networks by such factors as optimisation of the ratio of costs and resource capabilities, compliance with financial discipline, and interaction with institutions at all levels of the production chain.

However, the benefits of participating in global production networks vary from country to country and depend on the degree of involvement of national economies in the production process. As noted by Antoniuk L. and Cherkas N., the largest 'share of world trade in intermediate goods is organised around three powerful regional clusters - East Asia, centred on China; Europe, dominated by supply chains of mainly German companies; and North America, focused on the United States'³⁵². Thus, 'international flows of goods, services, capital and labour remain highly concentrated within a small

³⁴⁹ Cherkas N. Technological Exports and the Dynamics of Ukraine's Economic Growth. *International Economic Policy*. 2006. № 4. P. 5–28.

³⁵⁰ Coe N.M., Yeung H.W.C. *Global production networks: Theorizing economic development in an interconnected world*. Oxford University Press. 2015. 266 p.

³⁵¹ Cherkas N. Transformational impact of Industry 4.0 on global production networks and value chains. *Economics of industry*. 2018. №1(81). P. 5–20

³⁵² Antoniuk L., Cherkas N. *Global economic networking ...*, p. 87

group of leading countries: The top 15 exporting countries account for 63 per cent of total exports of goods, 62 per cent of trade in services and 79 per cent of global foreign direct investment³⁵³.

Countries that are leaders in the production and export of goods transfer innovations and new technological developments to countries that are directly included in their production networks, exercising strict control over the observance of intellectual property rights and the use of technologies. Accordingly, new technologies have long remained inaccessible to countries that specialise in the production of raw material-intensive and low-tech goods or assemble final products from imported components. Thus, a significant number of countries with low economic development remain outside global production networks.

Summing up, we note that the development of transnational corporations and network enterprises on the scale of the world economy has led to the formation of global production networks, a characteristic feature of which is the establishment of production of goods in different regions of the world under the auspices of a global company and the supply of these goods to global markets. The functioning of global production networks ensures an increase in the competitiveness of companies included in production chains through optimisation of the ratio of costs and opportunities, financial discipline, effective management and interaction with institutions at all levels of the production chain.

The theory of global production networks is conceptually based on the fragmentation of production of goods and highly organised interaction between enterprises included in international production chains. At the same time, basic category for studying the processes taking place in global production networks is the added value that is created, transformed and sold through the functioning of global value chains. Accordingly, the involvement of the national economy in global value chains and the level of its network interaction with other countries reflects the degree

³⁵³ West J. Getting Better Value Out of Global Value Chains/ In Asian Century... on a Knifeedge. Palgrave Macmillan, Singapore. 2018. P. 91–123.

of the country's inclusion in global production networks and the prospects for strengthening its competitive position in international markets.

The global value chain methodology was based on the following: economic theory of transaction costs³⁵⁴, the concept of 'immersion' of economic activity in social relations in the field of organisational sociology³⁵⁵, the theory of substitution of vertical integration by social and spatial proximity, which is found in regional economics, economic geography and strategic management³⁵⁶ and the theory of company competence in strategic management³⁵⁷.

The scientific literature lacks a single definition of the concept of global value chains. The concept of global value chains is closely related to concepts such as supply chains or commodity chains, which have been used quite often to describe phenomena related to the vertical and horizontal international division of labour. According to the World Bank's approach, global value chains are defined as 'all the processes required to produce a given good or service - from concept, through the supply of raw materials, various elements, subassemblies, services, to the assembly of finished products and delivery to end users, including post-use disposal'³⁵⁸.

As defined by the World Trade Organisation, the term 'global value chains' best describes the concept of increasing interconnectedness of production processes in many countries, each specialising in the production of certain stages of a product³⁵⁹.

Although the term 'global value chains' implies linearity, they are often multidimensional (Figure 3.3). Raw materials and intermediate goods (materials, components, etc.) from different countries are required to produce the final product. A very important element is also services, which connect global value chains in a

³⁵⁴ Williamson O., *The economic institutions of capitalism: firms, markets, relational contracting*, Macmillan, London, 1985

³⁵⁵ Granovetter M., *Economic action and social structure: the problem of embeddedness*. *American Journal of Sociology*. 1985. №91. pp. 81–510.

³⁵⁶ Storper M. *The resurgence of regional economies, ten years later: the region as a nexus of untraded dependencies*. *European Urban and Regional Studies*. 1995. №2 (03). Pp. 191–221.

³⁵⁷ Sanchez R., Heene A. *The new strategic management: organizations, competition and competence*. New York: John Wiley & Sons, 2004.

³⁵⁸ Cattaneo O., Gereffi G., Staritz C. (eds.). *Global Value Chains in a Postcrisis World: A Development Perspective*. The World Bank. Washington DC, 2010, p. 3

³⁵⁹ *World Trade Report 2013. Factors shaping the future of world trade*. World Trade Organization, 2013, p.

distributed product development process. At the same time, services themselves can also be fragmented (e.g. through outsourcing and offshoring), creating their own geographically dispersed global value chains³⁶⁰.

A global commodity chain consists of networked businesses focused on the production of a commodity or product that connects households, businesses, and countries in the global economy. The individual processes or segments of a commodity chain can be represented by graphical boxes or links that are connected together in a network. Each subsequent link in the commodity chain is associated with the acquisition and/or organisation of resources (e.g. raw materials or semi-finished products), labour (and its provision), transport, distribution and consumption.

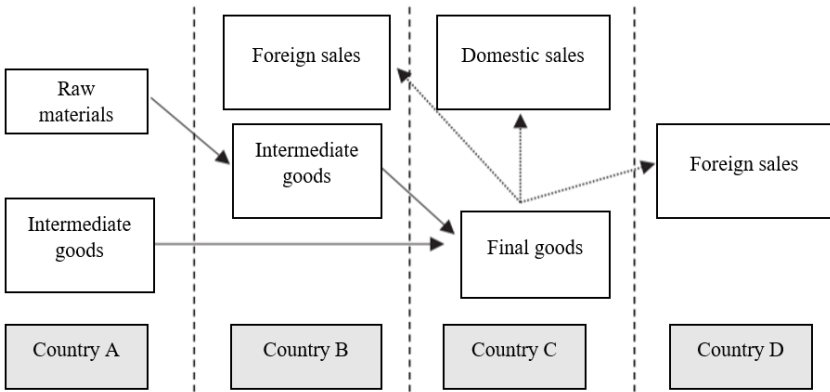


Figure 3.3. Multidimensional links in global value chains³⁶¹

The commodity chain analysis shows how production, distribution and consumption are shaped by social relations (including organisations), which are characterised by successive stages of acquisition, processing, distribution, marketing and consumption of resources. The approach based on global commodity chains allows explaining those patterns of modern development ‘that are not covered by previous

³⁶⁰ Nessel K. Internacjonalizacja usług z perspektywy globalnych łańcuchów wartości. Co mówią liczby? Studia Ekonomiczne. Zeszyty Naukowe Uniwersytetu Ekonomicznego w Katowicach. 2015. № 226. P. 95-108, p. 97

³⁶¹ Built according to: Nacewska-Twardowska A. Partycypacja Polski w globalnych łańcuchach wartości. Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu. 2017. № 498. P. 222-231

paradigms' and allows 'adequately creating macro-micro linkages between processes that are usually discretely characterised by global, national and local units of analysis'³⁶².

Global value chains, as the basis for the formation of global production networks, operate in international institutional environment and interact with ancillary sectors of economic activity, which involves the use of such critical resources as skilled human capital, high-quality infrastructure, sufficient capital investment, and a developed service sector (Figure 3.4). The management of global value chains involves the creation of a flexible management structure that 'forms the hierarchy of participants and the way of attracting financial, material resources and human capital into the system of relations between transnational business entities, which includes market, modular, relative, closed and hierarchical types of management'³⁶³. Accordingly, the high level of organisation of value chains contributes to their transformation into global production networks, where the management role of the parent company of a TNC in coordinating the effective interaction of economic and non-economic actors that simultaneously cooperate and compete with each other in the process of creating added value and selling products on global markets is growing.

³⁶² Gereffi G., Humprey J., Sturgeon T., The governance of global value chains, *Review of International Political Economy*. 2005. №12 (01). p. 78–104

³⁶³ Global Value Chain Development Report. International Bank for Reconstruction and Development. The World Bank. 2017. 190 p.

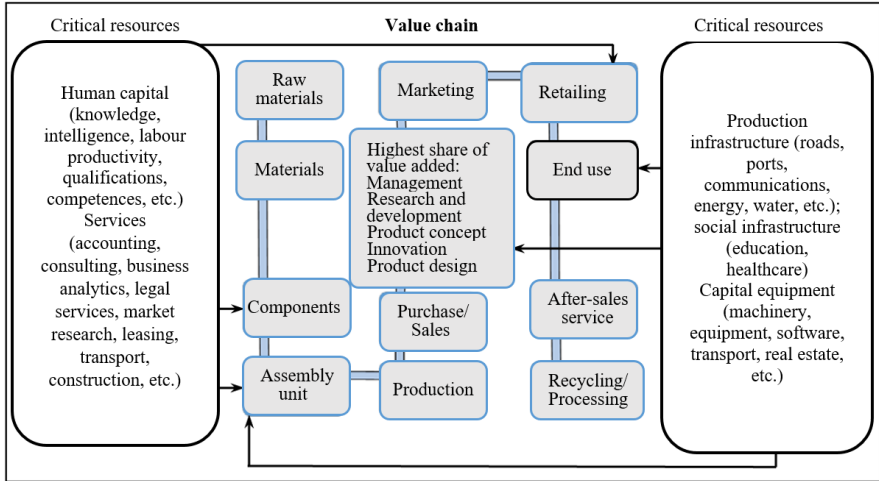


Fig. 3.4. Key components of the production value chain³⁶⁴

Since globalisation involves both manufacturing and trading companies, it means that there are global producer-initiated and buyer-initiated chains of goods in the international economy³⁶⁵. In producer-initiated supply chains, a large multinational producer (e.g. General Motors or IBM) plays a central role in coordinating internal and external production networks (including backward and forward linkages). These chains are typical of capital-intensive and technology-intensive industries, such as automotive, aviation, computer, semiconductor and heavy machinery. Buyer-initiated supply chains refer to those industries where large retailers (e.g. Wal-Mart or Tesco), branded 'factory-free' manufacturers (e.g. Nike or Reebok) and branded manufacturers that ship parts for assembly abroad and re-export finished products to the domestic market (e.g. Levi Strauss & Co.) play a key role in building multifunctional production in various exporting countries, usually with much less developed economies. This type of trade-based industrialisation has become popular in consumer goods industries that are labour-intensive, such as clothing, footwear, toys, household appliances, consumer

³⁶⁴ Antoniuk L., Cherkas N. Global economic networking ..., p. 86

³⁶⁵ Sturgeon T. J. From commodity chains to value chains: Interdisciplinary theory building in an age of globalization. // Bair J. (ed.). Frontiers of commodity chain research. Stanford: Stanford University Press, 2008, pp. 110–136.

electronics and various handicrafts. Production is typically carried out by multi-level networks of contractors from less developed economies who manufacture finished products for the foreign buyer.

In the scientific literature, the essence of the concept of global value chains is explained with the help of a U-shaped curve that describes the nonlinear process of value addition at different stages of production and is called the ‘smiling curve’. Such a graphical representation of the process of value creation in the production of a certain product is due to the fact that less value is created as a result of the production or assembly of finished products than at the previous stages, which include research, experimental work, innovation, and at the subsequent stages, which include logistics, marketing and after-sales service (Figure 3.5). The difference in value added at these stages of production is explained by differences in the labour intensity and knowledge intensity of the work performed: ‘at the stage of production (assembly) of the product, the company makes profits mainly due to manual labour, while higher added value is created at the stages with a predominance of mental labour’³⁶⁶.

The parent companies of multinational corporations, which are the centres of research and development of new products and distribute final products, are based in countries with a high level of development. Thus, developed economies generate higher added value than developing countries, where direct production (assembly) of the product is concentrated. That is why companies seek to move up the value chain and move from the stages of tangible production to the creation of intangible assets that have higher added value.

³⁶⁶ Zakharchenko V.I. Integration of the industrial complex of Ukraine into the world industrial system. A strategic panorama. 2004. № 3. P. 124–132.

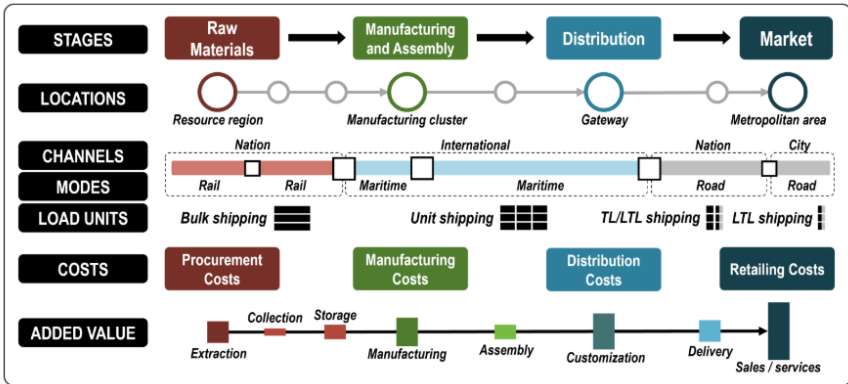


Figure 3.5. Distribution of value added at individual stages of production³⁶⁷

In 2000, John Humprey and Hubert Schmitz presented a typology of four forms of economic activity organisation that describe relationships in global industries that connect suppliers with leading companies³⁶⁸. The authors base their empirical typology on a combination of two independent variables: product definition and supplier error risk acceptance. By product definition, the authors mean the process of interpreting market needs, creating a product concept, and translating this concept into product design and sketches. In this sense, in technology-intensive industries, product definition usually involves the development of new technologies and production processes. In other industries, product definition is linked to product design, branding and marketing.

According to the above-mentioned scholars, global value chains can take the form of a market, networks, quasi-hierarchy or hierarchy. Organisational forms outside the market are associated with the difficulties and costs of monitoring and supervising value chains by leading companies. Therefore, they arise in situations where lead companies anticipate a high risk associated with unreliable suppliers. This risk increases with the diversification of competences. The lower the competence of the

³⁶⁷ Mikhailenko N. A. Integration of the production chain - a modern feature of the structure of world commodity markets URL : www.nbu.gov.ua/Articles/KultNar/knp80/.../knp80_103-106.pdf.

³⁶⁸ Humprey J., Schmitz H. Governance and upgrading: linking industrial cluster and value chain research, Institute of Development Studies (IDS). Working Paper No. 120. Sussex: University of Sussex, 2000

supplier, the more the form of the global chain organisation moves away from the market and towards hierarchy. Global value chains take on a purely market-based form, where the buyer and supplier do not have to cooperate in defining the product. The buyer's risk here is low because either the buyer's requirements are easy to meet or the supplier has sufficient competence to meet the buyer's requirements.

In 2005, Gary Gereffi, John Humphrey and Timothy Sturgeon proposed a more comprehensive typology of organisational forms of global value chains than the one presented above³⁶⁹. As in the previously agreed typology, the authors agree that the organisational forms of global value chains vary from market to hierarchy, with network forms in between. However, their typology is more developed by dividing the network form of organisation into three types: modular network, linked network and supported network.

This typology is based on possible combinations of three independent variables derived from empirical research: transaction complexity, the degree to which transactions can be codified, and supplier competence. Transaction complexity refers to the degree of complexity of the knowledge required to carry out a particular transaction, in particular through product and process specifications. The degree of transaction codification is the degree of codification of the knowledge required to perform the transaction. Knowledge is codified, for example, through the use of technical standards, process standards related to quality, labour or environmental impact. The higher the degree of codification of the required knowledge, the more efficiently and without additional investment in transactions it can be transferred. Supplier competencies refer to the competencies of current and potential suppliers required to perform a particular transaction. If these three variables can take only two values – low and high – then there are eight combinations of these variables, five of which can be identified empirically. The forms of organisation of activities in global value chains that correspond to specific values of the variables are schematically presented in Table 3.2.

³⁶⁹ Gereffi G., Humphrey J., Sturgeon T., The governance of global value chains. *Review of International Political Economy*. 2005. №12 (01), p. 78–104

Table 3.2

Forms of organisation of global value chains and their dynamics³⁷⁰

Governance type	Complexity of transactions	Ability to codify transactions	Capabilities in the supply-base
Market	Low	High	High
Modular	① High ②↑	High ④↓	High
Relational	↓ High	③↑ Low ↓	High ⑥↓
Captive	High	High	Low
Hierarchy	High	Low	Low

When the knowledge associated with product specification is relatively simple and can be easily codified, and suppliers have the competence required to produce the desired products, specific assets will not be accumulated and a market-based form of chain is to be expected. In this situation, global buyers respond to the specifications and prices set by suppliers. When the complexity of the knowledge associated with a product specification increases but can still be codified relatively easily, the value chain may take the form of a modular network. This is the case when the architecture of the complex product itself is modular, and technical standards simplify transactions by reducing the diversity of components and unifying their specifications. The third condition for chain modularity is that suppliers have sufficiently high competencies that allow them to supply complete kits and modules that are then used to assemble the final products by the buyer.

When the knowledge associated with the product specification is complex and cannot be codified, but suppliers have the necessary competencies to produce the desired products, then the chain is expected to take the form of a relational network. This is because complex tacit knowledge is exchanged between supplier and buyer, and highly competent suppliers provide a strong motivation for the buyer to outsource to gain access to additional competencies. The mutual dependence that arises in this way can be regulated by reputation, social and spatial proximity, family or ethnic ties, etc. When the complexity of the product specification is high and the ability to codify

³⁷⁰ Gereffi G., Humphrey J., Sturgeon A., The governance of global value chains..., p. 90

it is high, but the supplier's capabilities are low, the form of value chain organisation moves towards a slave network. This is because the low competence of the supplier combined with the high complexity of the product specification requires significant intervention and control by the global buyer. This situation leads to transactional dependence, as buyers want to 'tie' suppliers to themselves to prevent others from benefiting from their efforts. Suppliers, on the other hand, become 'slaves' to buyers, as changing partners means costs they cannot bear.

When products are complex, but their specifications are difficult to codify and competent suppliers cannot be found, then the buyer is forced to develop and manufacture the products himself. In this case, we are dealing with vertical integration (hierarchy). This form of value chain organisation is dominant when it is necessary to share tacit knowledge between individual links in the chain and control resources, including intellectual property. It allows for efficient management of complex networks of inputs and outputs.

The described typology of forms of organisation of global value chains takes into account their dynamics. In addition, the organisational forms of global value chains are not monolithic. In a particular industry, place and time, the organisational form at one stage of the chain may differ from the organisational form at another stage. The analytically derived dynamics of the organisational forms of global value chains is confirmed by empirical observations. First, the complexity of the transaction may increase. This happens when buyers want more complex products and services from their supplier base. The chain will then move away from a market-based form to a modular or relational network, depending on the degree of knowledge codification. Increased complexity of product and/or process specifications may simultaneously lead to a decrease in the effective competence level of suppliers, when their existing competences cannot meet the new requirements. The chain may then take the form of a subordinate network (trajectory 1 in Table 3.2). On the other hand, in the opposite situation, when the knowledge required for transactions becomes less complex, the degree of codification may increase. In this case, the network form of the chain may evolve to a purely market-based relationship (trajectory 2).

Secondly, the degree of codification of the knowledge required to conclude a transaction may change. On the one hand, over time, new technical and quality standards for production, operation or environmental protection that did not exist before may emerge. In this case, the chain in the form of a relational network can take the form of a modular network (trajectory 3). On the other hand, the emergence of new technologies may render existing standards obsolete, and hence reduce the degree of codification of knowledge required for operations. The modular chain may then evolve into a relational network and even – if the asset specificity problem is severe – into a hierarchy (trajectory 4).

Third, supplier competencies change over time. On the one hand, suppliers' competences may increase as a result of their learning process. The chain can then transform from a subordinate network to a relational or modular network, depending on the accompanying degree of knowledge codification (trajectory 5). On the other hand, the competence of suppliers decreases when the buyer introduces new suppliers into the chain and/or new technologies emerge and/or the buyer increases its requirements for existing suppliers. In this case, the chain in the form of a modular or relational network will turn into a subordinate chain (trajectory 6).

This typology takes into account the dynamics of the transformation of organisational forms of global value chains. As suppliers' competencies improve and become more popular, they can assume (at least partially) responsibility for product definition. In addition, as supplier competence develops, buyer risk due to their mistakes decreases. When the losses become less than the costs of coordinating the chain, its organisational form shifts from hierarchy to network.

3.3. Current trends in the development of global production networks

Over the past 40 years, global value chains (GVCs) have become the dominant production paradigm. Improvements in information and transport technologies, coupled with the reduction of trade barriers since the 1980s, have encouraged firms to divide production into tasks and stages performed in different countries. As a result, the value of traded intermediate goods has doubled globally and now accounts for more

than 50% of world trade. One of the consequences of this is that the growth rate of world trade has outpaced the growth rate of world GDP, growing twice as fast between 1995 and 2010. Multinational enterprises (transnational corporations and network companies) have become important players in GVCs. They operate as networks and carry out different stages of production through their subsidiaries or through independent suppliers, i.e. on an intra-company basis or on an international basis.

Increased vertical integration has important macroeconomic implications. Participation in GVCs allows countries to specialise in areas of comparative advantage, contributing to productivity growth and maintaining wages and incomes. At the same time, increased vertical integration can lead to increased interconnectedness between countries, contributing to faster and larger transmission of shocks. GVCs are also important in the context of price formation. High production linkages lead to high synchronisation between consumer and producer prices across countries. In addition, global economic conditions become important for domestic inflation due to high production linkages.

After more than 20 years of continuous growth, the pace of country integration into GVCs has slowed globally. Growth was halted by the global financial crisis, and although the recovery was swift, participation in GVCs began to decline again globally in 2011 (Figure 2.1). The slowdown in GFL participation was widespread across many countries and sectors. After the global financial crisis, a number of countries significantly reduced their participation in GVCs. The decline in GVC integration has been particularly pronounced in emerging market economies, including China, and to a lesser extent in advanced economies outside the euro area. In contrast, most euro area countries maintained stable participation in global supply chains. The decline was also widespread across all sectors of the economy, with commodities and manufacturing sectors suffering the largest declines. In contrast, countries' participation in GVCs in the services sector was relatively more resilient.

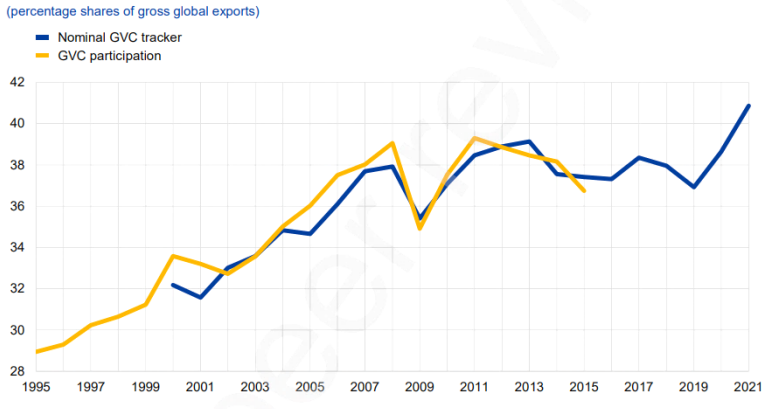


Figure 3.6. Dynamics of participation of countries in global value chains in 1995-2021.³⁷¹

The slowdown in integration after the global financial crisis partly reflects changes in the sectoral structure of gross exports. Participation in GVCs is typically expressed as the ratio of GVC-related trade (covering both backward and forward linkages) to total gross exports. Thus, global changes in GVC participation may be driven by the development of production fragmentation across countries and sectors, as well as by changes in the geographical and sectoral structure of gross exports. The latter may reflect the fact that countries and sectors with structurally low GVC intensity have increased their share in world trade over time. Separating out the relative contributions of these two factors to the global decline in GVC participation, it can be seen that from a geographical perspective, both the early rise and the decline in global GVC participation since 2008 have been entirely driven by changes in GVC intensity across countries (Figure 3.7). In contrast, a sectoral approach shows that half of the decline since 2008 is due to a shift in the composition of gross exports, which has been shifted towards industries with structurally low production fragmentation, such as tourism, transport, financial services and construction.

³⁷¹ Cigna S., Gunnella V., Quaglietti L. Global value chains... , p. 11

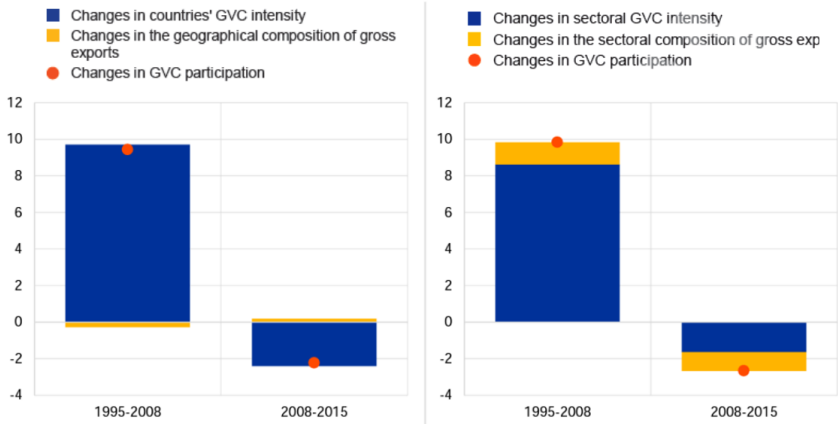


Figure 3.7. Contribution of geographical and sectoral components to changes in global participation in GVCs (%)³⁷²

Overall, supply chains have retained a strong regional component over time, especially in Europe and Asia. Figure 2.3 shows the participation of different regions in GVCs, distinguishing between the contribution of regional and extra-regional trade (Figure 3.8). In Europe and Asia, and to a lesser extent in North America, participation in GVCs has largely increased due to stronger supply linkages within the region, while Latin America has become integrated into GVCs by strengthening its links with partners in other countries and regions of the world. Since 2011, regional linkages within GVCs have weakened somewhat in Asia and Latin America, while they have remained largely unchanged in other regions. In general, supply chains remain clustered at the regional level, especially in Europe and Asia, where most supply linkages take place within the region. For the USMCA (formerly NAFTA) countries, almost half of the imported intermediate products included in gross exports originate from this zone. In contrast, extra-regional linkages are more common in Latin America. This phenomenon applies to both multinationals and local companies, which have equally moved production to their region.

³⁷² Cigna S., Gunnella V., Quaglietti L. Global value chains... , p. 13

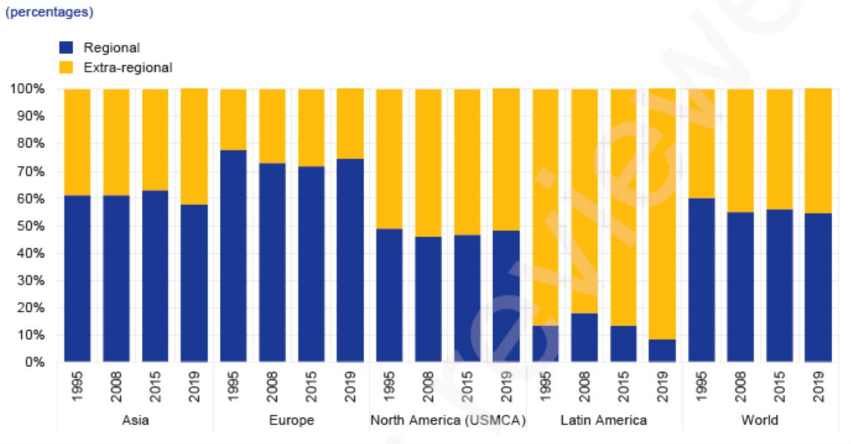


Figure 3.8. Contributions of regional and extra-regional trade to GVC participation³⁷³

Multinationals play a key role in the cross-border organisation of production and a country's participation in GVCs. Multinational corporations emerged as a model for organising production, allowing firms to benefit from lower trade and coordination costs and to relocate production to countries where it is more efficient. Today, domestic and foreign multinational corporations account for more than one-third of global production. Their activities are particularly prevalent in exports (65%) and trade related to GVCs (imports of intermediate inputs, 41%)³⁷⁴. Compared to domestic firms, foreign multinationals have a much higher involvement in GVCs, especially in emerging markets and the euro area. Compared to domestic companies, foreign affiliates of TNCs rely more on feedback. This reflects the fact that the offshore activities of multinationals depend on foreign intermediate inputs and are often linked to processing activities in the host country. The presence of foreign TNCs is positively related to foreign value added coming from the country where they are located. This emphasises the strong links of foreign affiliates with their parent companies abroad within GVCs.

³⁷³ Cigna S., Gunnella V., Quaglietti L. Global value chains... , p. 14

³⁷⁴ Cigna S., Gunnella V., Quaglietti L. Global value chains... , p. 14

Market access, vertical integration, and lower taxes drive the location choices of TNCs. The theoretical literature on foreign direct investment (FDI) indicates that multinationals act on the basis of market access (horizontal integration), efficiency (vertical integration), or a combination of the two (integrated integration)³⁷⁵. Recently, the focus has shifted to the relationship between TNCs' activities and tax avoidance, with countries with low tax pressure and lax regulation gaining importance as host countries³⁷⁶. In terms of countries, foreign TNCs are predominant and growing in developing countries that have integrated into European production chains (mainly Eastern European countries), as well as in so-called 'conduit' countries (i.e. countries that act as intermediate destinations for offshore centres) or countries with favourable corporate tax regimes. In the latter, including Luxembourg and Malta, the production of multinational enterprises is heavily dependent on foreign value added, while in countries where branches are engaged in processing, the value added of the host country is much more prominent³⁷⁷.

The COVID-19 pandemic has hit supply chains particularly hard, but trade in HLPFs has recovered quickly in the second half of 2020. During the pandemic, trade in GVCs declined relatively less than trade in final goods, with a sharp decline in trade in intermediate goods in the first quarter of 2020. This was the result of a significant decline in production in China. As China began to recover in the second quarter, trade in intermediate goods also rebounded, cushioning the global slowdown. In contrast, trade declined more sharply in other sectors of the global economy, particularly in the energy sector, contributing significantly to the overall decline in global trade. Participation in GVCs expanded further in the first half of 2021, as trade in intermediate goods grew at a steady pace³⁷⁸, possibly reflecting restocking driven by the recovery from the pandemic.

³⁷⁵ Grossman G., Helpman, E. and Szeidl A. Optimal integration strategies for the multinational firm. *Journal of International Economics*. 2006. Vol. 70(1). pp. 216-238

³⁷⁶ Garcia-Bernardo J., Fichtner J., Takes F.W. and Heemskerk E.M. Uncovering Offshore Financial Centers: Conduits and Sinks in the Global Corporate Ownership Network. *Nature Scientific Reports*. 2017. Vol. 7 (1). pp. 1-10.

³⁷⁷ Cigna S., Gunnella V., Quaglietti L. Global value chains... , p. 15

³⁷⁸ Exports of intermediate goods gain momentum in Q2 with 47% year-on-year increase. World Trade Organization, 3 November 2021

The coronavirus outbreak in China has had a negative impact on production in European countries. European industry is very well integrated into global value chains through which intermediate goods and services are traded (according to the OECD, this accounts for about two-thirds of global trade). Thus, Europe benefits from open and global trade, but is also vulnerable to developments that originate outside its borders.

China's exports have declined significantly due to restrictions imposed in connection with the coronavirus pandemic. This has resulted in direct costs for the European economy as a result of the cessation or reduction in the supply of relevant goods from China to Europe. However, trade links between Europe and China are not only direct, but may also involve third countries: for example, car parts coming from China to Europe may first pass through one or possibly more countries. Therefore, the termination or reduction of this trade has also created indirect costs.

Economists estimate that the overall direct and indirect losses from the disruption of global value chains between Europe and China have been substantial (Figure 3.9). These losses are measured as a percentage of the total revenue of affected firms in each EU country. The largest losses were observed in Hungary, where companies' dependence on direct and indirect revenues from China is about 7.5% of their total annual revenue³⁷⁹.

³⁷⁹ Demertzis M., Masllorens G. The cost of coronavirus in terms of interrupted global value chains. <https://www.bruegel.org/blog-post/cost-coronavirus-terms-interrupted-global-value-chains>.

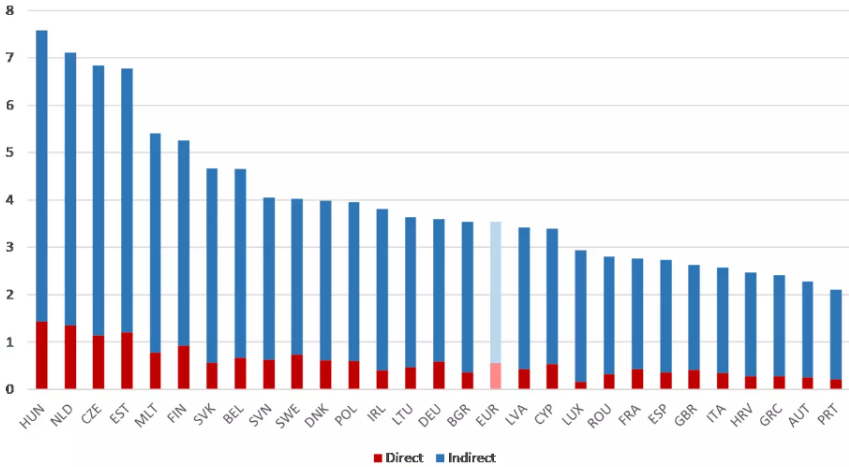


Figure 3.9. The cost of Chinese intermediate products in European production (% of gross production value)³⁸⁰

Smaller countries in Eastern and Northern Europe are also among the most affected economies. However, this negative impact has been largely indirect, reflecting the degree of their integration with German supply chains. The implications for the Netherlands include the ‘Rotterdam effect’ of re-exports and thus conceal the true domestic dependence of the Netherlands. About 3.5% of the gross output of the affected EU companies was based on intermediate goods of Chinese origin.

The disruption of intermediate goods supply chains has also had negative effects across different sectors of the economy. Table 3.3 shows the share of intermediate goods in six sectors in the EU that originate from the same six sectors in China. As can be seen from the table, there are major links even between different sectors. For example, 2.2% of EU agriculture gross output is produced using Chinese inputs; 0.27% of EU manufacturing gross output uses products from the Chinese mining sector. The EU27 manufacturing sector has the highest dependence on all Chinese intermediate goods, especially manufacturing products (4.39%).

³⁸⁰ Demertzis M., Masllorens G. The cost of coronavirus...

Table 3.3

China's cross-sectoral contributions to the EU-27 economy, % of gross value of production³⁸¹

China	EU-27					
	Agriculture	Extractive industry	Processing industry	Construction	Trade and transport	Other services
Agriculture	0,29	0,18	0,50	0,31	0,16	0,12
Extractive industry	0,14	0,10	0,27	0,18	0,09	0,07
Processing industry	2,23	1,59	4,39	2,84	1,43	1,11
Construction	0,11	0,08	0,20	0,15	0,08	0,06
Trade and transport	0,33	0,25	0,58	0,39	0,29	0,18
Other services	0,38	0,34	0,68	0,49	0,41	0,39

According to Table 3.3, the EU manufacturing sector is the most integrated into Chinese value chains, with values higher than for the whole economy (Figure 3.9). More than 9% of Hungary's gross output is accounted for by Chinese production. Overall, computers and electronics are the most exposed sector to China, as they are in 20 of the 27 EU countries, while textiles are the second most exposed sector in Europe and the most exposed in Finland, Spain, France, and Denmark. The automotive industry in Germany has much weaker links with China in terms of input costs. However, despite the lower cost, spare parts imported from China remain vital and therefore interruptions in their supply threaten the production of finished products. In addition, the automotive industry relies on just-in-time production, where parts are not stored but are delivered on a continuous basis. If the supply is interrupted, there is no backup stock that can be used to maintain the pace of the production process.

Over the past few years, economic cooperation between countries has declined, driven by challenges such as the COVID-19 pandemic and the war in Ukraine. The impact of these factors has shown that the global economy is vulnerable to external shocks, which to some extent has reduced the benefits of countries' participation in global supply chains.

³⁸¹ Demertzis M., Masllorens G. The cost of coronavirus...

The COVID-19 pandemic and the full-scale invasion of Ukraine by Russian troops have severely disrupted global production networks. Medical supplies such as masks, protective gloves and ventilators were in short supply in 2020. In 2021, the supply of other goods, including wood, containers and microchips, decreased significantly, leading to shortages. Starting in 2022, European countries faced a problem with energy supplies, particularly oil and gas. In turn, this imbalance between supply and demand has led to a general rise in prices. In the European Union, inflation was already at 2.9% in 2021, even before the war in Ukraine, and in September 2022, prices rose by 10.9% year-on-year³⁸².

Such supply chain disruptions have led companies and governments to question the benefits of their participation in GVCs. However, the researchers note that ‘such conclusions are unwarranted, as the shortages were caused by strong growth in demand for medical devices in 2020 and the overall increase in demand that accompanied the global recovery in 2021’³⁸³ (for example, EU imports increased by 29% in 2021³⁸⁴ and exceeded pre-pandemic levels). However, the impact of global challenges has demonstrated that global value chains are not as resilient as previously thought.

Although the efficiency of production within GVCs is theoretically and empirically proven, it is debatable whether the benefits of deepening and expanding international specialisation in global supply chains outweigh the associated risks and instability. At the same time, some of the supply chain issues caused by the pandemic have proven to be temporary. This is confirmed by the recovery of Chinese exports of medical products, the functioning of the SPS in the electronics or machinery industry during the COVID-19 crisis (albeit on a smaller scale), and the relative resilience of the GVCs in the food industry. A study of the experience of the GVCs during and after the pandemic shows that ‘in several cases, GVCs helped countries to reduce demand

³⁸² Annual inflation more than tripled in the EU in 2022. <https://ec.europa.eu/eurostat/web/products-eurostat-news/w/DDN-20230309-2>

³⁸³ Sandkamp A. Reshoring by Decree? The Effects of Decoupling Europe from Global Value Chains. <https://www.intereconomics.eu/contents/year/2022/number/6/article/reshoring-by-decree-the-effects-of-decoupling-europe-from-global-value-chains.html>

³⁸⁴ EU27 (from 2020) trade by SITC product group. Eurostat.

https://ec.europa.eu/eurostat/databrowser/view/EXT_ST_EU27_2020SITC/default/table

pressure on essential goods, and the shortage of face masks, for example, was solved by China, which increased its production to supply countries in need³⁸⁵.

To summarise, the specifics of countries' participation in GVCs in times of crisis and economic instability remain insufficiently studied, as network ties in global supply chains differ in resilience and ability to adapt to external shocks in different countries and industries. At the same time, a country's participation in GVCs is not only a channel for transmitting the negative impact of various global factors, but also a source of opportunities for the national economy, including increasing the efficiency of domestic production by taking advantage of specialisation and international division of labour. In the context of globalisation, a return to localised production, which will increase security of supply and reduce uncertainty for consumers and businesses, will in turn increase dependence on national production, which will limit the ability to absorb domestic shocks.

3.4. Effective Functioning of Global Value Chains in the Face of Increasing Threats

The rapid globalisation of value chains - broadly defined as the increasing share of imported intermediate goods and services in production – has increased productivity and enhanced the participation of low-income countries in international trade³⁸⁶). However, as integration into global value chains deepens, domestic production may be exposed to external shocks arising from the creation of dependence on a small number of key players³⁸⁷. Particular concerns arise from dependencies in strategic value chains that are crucial to providing basic human needs such as food and health, or that are critical materials for a wide range of the following industries, such as raw materials and semiconductors.

³⁸⁵ Global Value Chains: Efficiency and Risks in the Context of COVID-19. OECD 2021. https://read.oecd-ilibrary.org/view/?ref=1060_1060357-mi890957m9&title=Global-value-chains-Efficiency-and-risks-in-the-context-of-COVID-19

³⁸⁶ Interconnected Economies: Benefiting from Global Value Chains. OECD Publishing: Paris, 2013. URL: <https://doi.org/10.1787/9789264189560-en>

³⁸⁷ Fostering economic resilience in a world of open and integrated markets, <https://www.oecd.org/newsroom/OECD-G7-Report-Fostering-Economic-Resilience-in-aWorld-of-Open-and-Integrated-Markets.pdf>

The policy debate on whether the benefits of international specialisation in global value chains (GVCs) outweigh the associated risks of shock transmission has intensified following the COVID-19 outbreak and the resulting supply chain disruptions for some manufacturing and healthcare products. There are even questions about whether governments should use policy instruments to ‘re-localise’ GVCs³⁸⁸.

While competition based on comparative advantage (e.g. resource endowments and possession of technology or know-how) determines the specialisation of countries and shapes the geographical structure of GVCs, the subsequent organisation of production in GVCs often becomes highly concentrated. Global value chains are dominated by a small number of firms that both import and export products. According to a World Bank report, ‘the concentration of trade in a few importing and exporting firms is extreme. Bilateral traders make up on average about 15% of all trading firms in the sample of countries, but they account for almost 80% of total trade’³⁸⁹. This concentration, if associated with anti-competitive behaviour, can potentially undermine initial efficiency gains. In general, concentration tends to increase instability.

Supply chains that are characterised by low supplier or buyer diversity can indeed increase the likelihood of supply disruptions and increase the propagation of external shocks. For example, for some parts of linear telephone equipment, three quarters of the world's supply comes from three countries: China, Vietnam and Korea. Firms at the bottom of the chain that rely on these specific inputs have little room to switch to new sources of supply in the event of a shortage, at least in the short term. Concentration of suppliers reduces the scope for diversification from a supplier that faces disruptions in the supply of components. Similarly, dependence on a small number of customers can be a source of instability for suppliers. In this case, a demand shock in the destination market cannot be buffered and can have serious consequences for companies operating in that market. However, concentration is often also a

³⁸⁸ Global Value Chains: Efficiency and Risks in the Context of COVID-19. OECD 2021. https://read.oecd-ilibrary.org/view/?ref=1060_1060357-mi890957m9&title=Global-value-chains-Efficiency-and-risks-in-the-context-of-COVID-19.

³⁸⁹ World Development Report 2020: Trading for Development in the Age of Global Value Chains. World Bank, Washington, DC.

manifestation of comparative advantage, specialisation and economies of scale, and it is therefore difficult to predict the likely wider effects of the policy instruments and incentives used to promote it.

In many markets, exports tend to be concentrated in a few supplier countries. Import destinations, on the other hand, tend to be more diverse. Focusing on product groups, computers and telephones show the highest degree of concentration in the global export market. On average, 79% of the market share of computer products is accounted for by just five countries, and the top five countries account for 75% of global phone exports³⁹⁰. In general, the difference in export versus import concentration is smaller for intermediate goods, highlighting an important characteristic of global value chains - relatively few GVCs rely on a few producing countries. This is further supported by the finding that the supply of intermediate goods is less concentrated than that of final goods, indicating that potential problems may arise further down the value chain.

While concentration indicators calculated from detailed trade data can provide a fairly accurate indication of exposure to shocks and bottlenecks, they are based on gross trade figures and do not take into account a key characteristic of GVCs: only a portion of value is added by the exporter - the rest comes from other GVC participants, often located abroad. Generally, a relatively higher share of external value added from foreign input suppliers (the so-called 'backward' linkages of GVCs) may indicate a greater vulnerability to external supply shocks affecting suppliers of raw materials and intermediate inputs. Conversely, a greater dependence of a country's exports on demand from foreign countries (so-called 'direct' GVC linkages) may imply a greater exposure to demand shocks from end users or distribution services abroad.

Connectivity to global markets allows smaller economies to reach a larger customer base, but they are also more exposed to demand shocks in GVCs than larger economies. This is especially true for manufacturers in Central and Eastern Europe that contribute to the European automotive industry, or Irish firms that supply the global IT

³⁹⁰ Global Value Chains: Efficiency and Risks in the Context of COVID-19. OECD 2021., p. 5

market. These economies export between 60% and 80% of the total value added produced domestically³⁹¹.

The vulnerability of a national economy to external supply shocks is also higher for smaller countries where production is more dependent on foreign inputs. The European Union, the United States, China, and other Asian countries provide a large share of foreign inputs used in production around the world. However, the key suppliers of foreign inputs to manufacturing (potential sources of shocks) are relatively more evenly distributed than those in the business services sector, where intermediate services tend to come mainly from Europe and the United States, so the dependence on Asia is less³⁹².

Moving from the country to the global level, the researchers note that some countries and industries may have more systemic effects due to their position in the global production network, as measured by the GVC's 'degree of centrality' indicator³⁹³. According to this approach, countries or industries are central if they are closely linked to other major centres, and conversely, they are peripheral if they exhibit weaker trade linkages. Due to their central position in global production networks, central countries or industries become particularly influential suppliers or customers in GVCs, and thus they can play a key role in transmitting shocks.

Since the mid-2000s, China's centrality as a major production centre in several sectors has increased significantly, both as an exporter and importer of value added. In some sectors, China shows the highest degree of centrality in 2016 and the largest increase in centrality since the mid-2000s (Figure 3.10). Computer and electronics manufacturing has also undergone a major shift, with the core of the network shifting from the United States and Korea to China, which is now the central buyer and supplier of inputs across the industry. Germany and the United States have formed the world's two largest centres for the production of cars, trailers and semi-trailers.

³⁹¹ Global Value Chains: Efficiency and Risks in the Context of COVID-19. OECD 2021., p.7

³⁹² Global Value Chains: Efficiency and Risks in the Context of COVID-19. OECD 2021., p.7

³⁹³ Criscuolo C. and J. Timmis. GVCS and centrality: Mapping key hubs, spokes and the periphery. OECD Productivity Working Papers. 2018. №12. OECD Publishing, Paris. URL: <https://dx.doi.org/10.1787/d4a9bd6f-en>

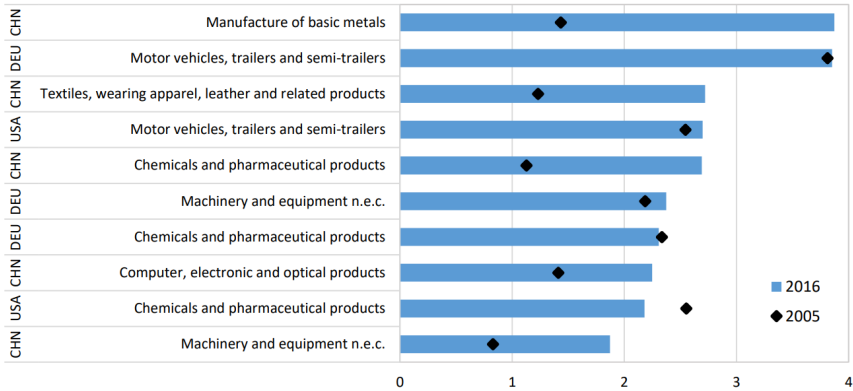


Fig. 3.10. Countries - the largest central hubs in global value chains³⁹⁴

High industry reliance on participation in GVCs usually implies higher risk when upstream suppliers and/or downstream buyers are geographically highly concentrated. This is because when upstream supply or downstream demand is highly geographically concentrated, there are few alternative suppliers or buyers in the event of a critical situation. In other words, the geographical concentration of suppliers and/or buyers can lead to points of ‘delayed delivery’ that will disrupt the chain for a while. For example, semiconductor production is concentrated in Chinese Taipei. This means that ‘a local shock to semiconductor production due to geopolitical events or a natural disaster could disrupt the entire global value chain in the respective industries’³⁹⁵.

Some industries at the bottom of the global chain are both highly dependent on foreign inputs and are significantly affected by the geographical concentration of suppliers. This influence is measured by the indicator ‘foreign input reliance (FIR)’, which, as a measure of dependence at the beginning of production (on suppliers), increases both with the amount of foreign inputs used in domestic production and the

³⁹⁴ Global Value Chains: Efficiency and Risks in the Context of COVID-19... , p. 9

³⁹⁵ Haramboure, A. et al. Vulnerabilities in the semiconductor supply chain. OECD Science, Technology and Industry Working Papers. 2023. URL: <https://www.oecd.org/publications/vulnerabilities-in-the-semiconductor-supply-chain-6bed616f-en.htm>.

number of times inputs cross borders before use³⁹⁶. For example, the automotive industry has one of the highest FIR scores in the sample and receives inputs from industries where the average market share of the top five producers is around 65% (including automotive and basic metals). This suggests that the automotive industry may be among the industries most affected by disruptions in the supply of components from a single country of origin. Other industries with an increased risk of dependence on supply disruptions include information and communications technology, electronics, machine building, and basic metals.

At the same time, mining and metallurgy are the most dependent on foreign buyers and are among the industries where buyers are concentrated in a particular geographic region. In fact, mining and metals are heavily dependent on purchases of their products from industries that are heavily concentrated in China and the United States, such as oil refining, construction and automotive. The chemical industry in the countries and industries that are purchasers is also highly exposed to demand shocks arising in global value chains. Although the information and communications technology (ICT) and electronics industry is not among the industry's most dependent on foreign buyers, it is nevertheless 'highly vulnerable to demand shocks due to the very high concentration of buyers, especially in China and the United States'³⁹⁷. This means that positive demand shocks in major markets could exacerbate supply disruptions and lead to product shortages.

Over the past few years, China has become a key point of 'supply chain delay' for production processes in the GVC. The products of China's ICT and electronics, metallurgy and chemical industries serve as a source of materials and components for a wide range of industries and countries at the bottom of the GVC. Only the German chemicals industry plays a similar role as a single point of 'delayed supply'³⁹⁸. China

³⁹⁶ Schwellnus C., Haramboure A., Samek L., Pechansky R. C. and Cadestin C. Global value chain dependencies under the magnifying glass. https://www.oecd-ilibrary.org/science-and-technology/global-value-chain-dependencies-under-the-magnifying-glass_b2489065-en, c. 5

³⁹⁷ Schwellnus C., Haramboure A., Samek L., Pechansky R. C. and Cadestin C. Global value chain dependencies....

³⁹⁸ Schwellnus C., Haramboure A., Samek L., Pechansky R. C. and Cadestin C. Global value chain dependencies....

also plays a dominant role as an end buyer of manufactured goods. Many Chinese manufacturing industries, including ICT and electronics, basic metals, and chemicals, also act as focal points in the formation of GVCs. This suggests that China's manufacturing industry plays an important role in both the upstream and downstream stages of production, with supply disruptions posing a risk to both buyers and suppliers who are upstream in GVCs.

In addition to the Chinese manufacturing industry, the Chinese construction industry also plays a prominent role as the final buyer of production inputs from abroad, especially from chemical and metallurgical enterprises. In contrast to the leading production points, the US automotive industry, the machine building industry and the German automotive industry are among the important production points. In fact, the German automotive industry is 'a major European manufacturing industry and one of the top three global low and 15 global high value chain production points'³⁹⁹.

The German automotive industry is central to both national and international markets. In 2019, motor vehicles accounted for around 4.5% of the value added in Germany⁴⁰⁰. In addition, it is the largest manufacturing industry in Europe, one of the top 20 globally, and has a strong competitive position in terms of both the supply of finished products and the demand for intermediate goods and services. Around 20% of the German automotive industry's output in 2019 was made up of imported intermediate materials, and the same proportion is used as intermediate inputs in regional and global value chains⁴⁰¹. The geographical composition of the German automotive industry's first suppliers differs from that of its subsequent customers. As in many other manufacturing industries around the world, China plays a key role as both a supplier and a customer. However, the German automotive industry is less dependent on countries outside the European Union higher up the GVC, with China, the United Kingdom and the United States being the largest buyers of German

³⁹⁹ Schwellnus C., Haramboure A., Samek L., Pechansky R. C. and Cadestin C. Global value chain dependencies....

⁴⁰⁰ Schwellnus C., Haramboure A., Samek L., Pechansky R. C. and Cadestin C. Global value chain dependencies....

⁴⁰¹ Schwellnus C., Haramboure A., Samek L., Pechansky R. C. and Cadestin C. Global value chain dependencies....

automotive inputs⁴⁰². Overall, this suggests that the adverse impact of demand shocks in countries outside the European Union, especially China and the United States, could have significant consequences for the German automotive industry. At the same time, a disruption in German supply could have a negative impact not only on European customers, but also on customers in countries outside the EU.

The SARS-CoV-2 pandemic has exposed the fragility of value chains, both global value chains in general and domestic value chains in particular. With regard to the former, the shock of the pandemic and related quarantines in March 2020 caused a sharp shock to global value chains. Consumers in high-income countries who had initially reduced their spending on unnecessary goods due to the financial uncertainty associated with the lockdown began spending money again on purchasing these unnecessary goods when vaccines became available, causing the global trade infrastructure to shift from handling a relatively evenly distributed flow of goods over time to a significant flow of such goods, and then to a sharply increased flow of such goods, far exceeding pre-pandemic levels. For example, ‘the cost of shipping a container from China to the United States has more than quadrupled in less than a year’⁴⁰³. The shock to global trade flows caused by the pandemic has disrupted value chains, causing delays in deliveries, and it will take several years to return to pre-pandemic levels and restore normal delivery times and prices.

The resilience of agri-food value chains during the pandemic has been mixed. On the one hand, the lower segments (e.g. grocery stores and restaurants) have adapted extremely well to the so-called new normal, quickly re-profiling their operations to meet the significantly increased demand for food delivery. On the other hand, there have been significant disruptions in certain value chains (e.g., the meat value chain in the United States) as a result of increased COVID-19 cases in certain food processing plants, which have led to the shutdown of entire plants, resulting in shortages of certain

⁴⁰² Schwellnus C., Haramboure A., Samek L., Pechansky R. C. and Cadestin C. Global value chain dependencies. ...

⁴⁰³ Bellemare M. F., Bloem J. R., Lim S. Producers, consumers, and value chains in low- and middle-income countries. <https://doi.org/10.1016/bs.hesagr.2022.03.005>. <https://www.sciencedirect.com/topics/economics-econometrics-and-finance/global-value-chains>

foods. Similarly, consumer hoarding of certain goods, both food (e.g. bottled water) and non-food (e.g. toilet paper), during the initial phase of the quarantine also exposed weaknesses in value chains⁴⁰⁴.

Thus, in the face of escalating global threats, the functioning of the GVCs depends mainly on intra-regional and/or OECD ties, which limits geopolitical risk. Nevertheless, a significant share of the risk to the functioning of the GVCs in OECD countries comes from non-OECD countries. This means that supply disruptions to GVCs in non-OECD economies, including due to geopolitical events, could have significant upstream impacts. Dependence on imported inputs tends to be higher in industries that produce final consumption goods, such as motor vehicles and transport equipment, ICT and electronics. In contrast, industries that produce intermediate goods, such as mining and basic metals, tend to be more dependent on external markets.

3.5. Key Trends in the Participation of Countries in Global Value Chains

Global value chains have a positive impact on the economies of developing countries, as they make it easier for them to diversify their trade and shift from commodity production to higher value-added manufactured goods. The World Investment Report reflects the trends in foreign direct investment and multinational enterprises over the past 30 years, of which international manufacturing has seen 20 years of rapid growth, followed by 10 years of stagnation (Figure 3.11). Cross-border investment flows in physical productive assets stopped growing in the 2010s, trade growth slowed and trade within GVCs declined. The crisis caused by the COVID-19 pandemic adds to the existing challenges to the international production system arising from the new industrial revolution, rising economic nationalism, and the imperative of sustainable development. The decade to 2030 is likely to be a decade of transformation for international production.

Trends in trade and investment unfold in three key dimensions of international production: the degree of fragmentation and length of value chains (from short to long), the geographical distribution of value added (from concentrated to distributed), and the

⁴⁰⁴ Bellemare M. F., Bloem J. R., Lim S. Producers, consumers, and value chains...

governance choices of MNCs, which determine the prevalence of international trade versus FDI. Several archetypal configurations can be identified that cover industries that together account for the lion's share of global trade and investment. They include capital- and labour-intensive primary sector industries; high- and low-tech industries with GVC intensity; geographically dispersed processing and hub industries; and high and low value-added services industries.

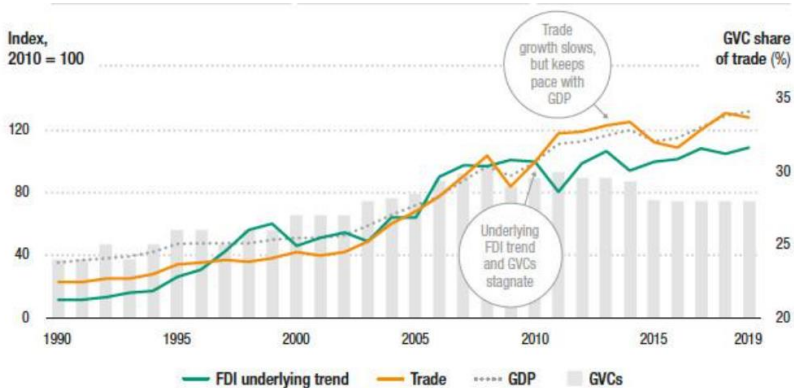


Fig. 3.11. Dynamics of international production indicators in the long term⁴⁰⁵

The impact of technology, policy and sustainability trends on international manufacturing is multifaceted. Sometimes they reinforce each other, and sometimes they push in opposite directions; also in different ways in different industries and regions. Depending on the starting point of individual industries - their archetypal international production configuration – they tend to favour one of four trajectories: reshoring, diversification, regionalisation, copying.

Reshoring (the return of production branches from abroad to the company's country of origin) will lead to shorter, less fragmented value chains and higher geographical concentration of value added. This will primarily affect high-tech industries that require participation in GVCs. The consequences of this trajectory are

⁴⁰⁵ Zhan J., Casella B., Santos-Paulino A., Bolwijn R. Global value chain transformation to 2030: Overall direction and policy implications. <https://cepr.org/voxeu/columns/global-value-chain-transformation-2030-overall-direction-and-policy-implications>

an increase in the amount of investment withdrawn from the economy and a reduction in accumulated FDI.

Diversification will lead to a wider spread of economic activities. This will primarily affect services and manufacturing sectors with intensive participation in the GVCs. This trajectory will increase opportunities for new actors (farms and companies) to participate in GVCs, but its reliance on supply chain digitalisation will make these GVCs better managed.

Regionalisation will reduce the physical length but not the fragmentation of supply chains. The geographical distribution of value added will increase. This trajectory will affect regional processing industries, some GVC-intensive industries and even the primary sector.

Copying will lead to shorter value chains and a rearrangement of production stages, as well as more geographically distributed activities but a higher concentration of value added, which will be especially relevant for hub and spoke processing industries.

Positive effects for the economy arise from the fragmentation of the production process so that different stages can be performed in different countries. Prior to the formation of GVCs, a country had to master the production of an entire industrial product in order to export it, which was costly. With value chains, a country can specialise in one or more activities in which it has a comparative advantage. Active participation in GVCs has allowed China to nominally export high-tech products, even though its role has been largely to assemble finished goods. Production unbundling began in developed economies in response to competition and lower logistics costs, and then went global as large emerging economies increased their openness to.

For example, in the period 1995-2020, China's domestic value added in the production of computer, electronic and optical products embodied in foreign exports increased from 2% to 4% of gross exports (Figure 3.12). In the United States, on the contrary, there was a decline in this indicator from 4-5% in 1995-2000 to 3% in 2015-2020, which is largely due to the relocation of part of the production of these products to other countries. In particular, the investment and transfer of relevant semiconductor manufacturing technologies to Taiwanese enterprises has contributed to the greater

involvement of Taiwan's high-tech industry in global value chains. This is evidenced by the growth of domestic value added in the production of computer, electronic and optical products in Taiwan, embodied in foreign exports, from 4% to 9%.

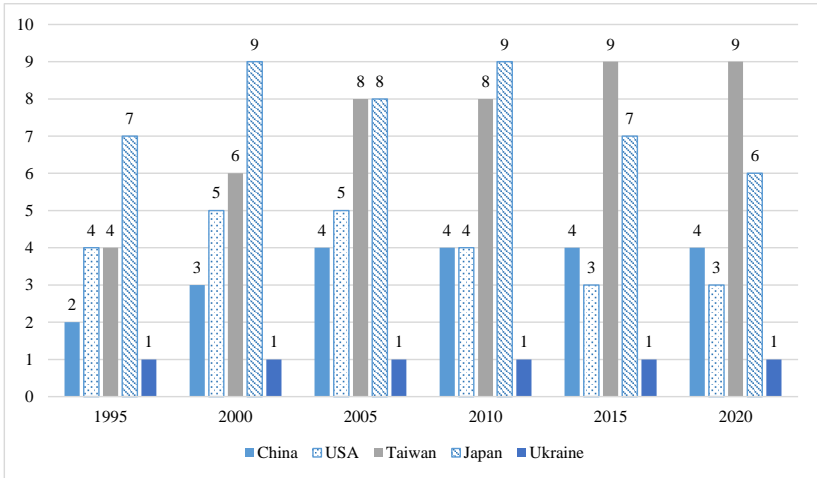


Fig. 3.12. Domestic value added in the production of computer, electronic and optical products embodied in foreign exports as a share of gross exports, %⁴⁰⁶

Japan retains a high position as a central point in the electronics value chain, with the share of domestic value added in the production of computer, electronic and optical products embodied in foreign exports fluctuating between 8-9% of gross exports during the study period. Although this figure for Japan decreased to 6% in 2020, the country remains among the leaders in this industry. In Ukraine, this indicator was at the same level during the study period and amounted to 1%, which indicates the unchanged level of involvement of domestic enterprises producing computer, electronic and optical products in GVCs.

The global value chain of China's exports of electrical and optical equipment - a category that includes smartphones, tablets and cameras - reflects the country's significant role. In Fig. 3.13, the vertical axis shows labour costs per hour as a measure of value added, while the horizontal axis shows the stages of the production process,

⁴⁰⁶ Compiled by the author on data: Trade in Value Added (TiVA) Principal Indicators: 2022 preliminary version. https://stats.oecd.org/Index.aspx?DataSetCode=TIVA_2022_C1

starting with high-value design and financial inputs from developed economies, followed by sophisticated parts such as computer chips from Japan, the United States, South Korea and Taiwan Province of China. China adds value at the end of the chain by manufacturing some simple parts and assembling them. China also has many so-called backward linkages with domestic sectors such as metal and plastic production that contribute to the production process prior to assembly. Finally, at the end of the chain are high-cost inputs, which consist mainly of services such as marketing, as products are sold in the United States, Europe and Japan. In the case of exports of these products to the United States, China creates almost half of the value added⁴⁰⁷. A large share of the country's value added has provided jobs for a large number of low-skilled workers, contributing to economic growth and poverty reduction. Thus, the production process gap has allowed many labour-intensive activities to take hold in China, increasing the country's ability to exploit its comparative advantage.

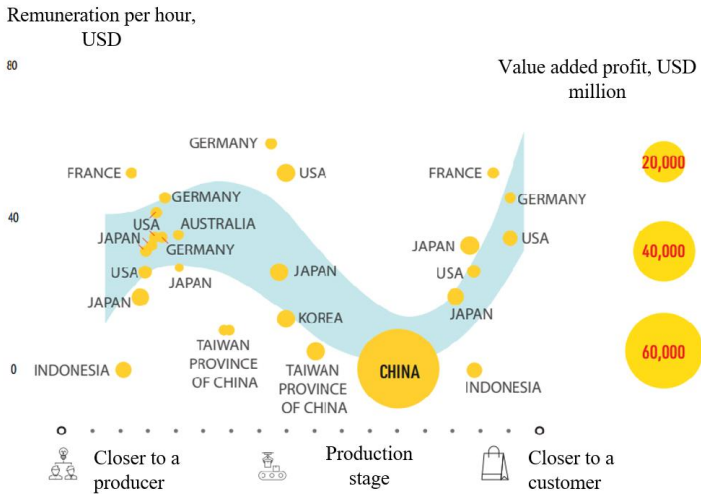


Figure 3.13. China's share in exports of electrical and optical equipment⁴⁰⁸

⁴⁰⁷ Dollar D. Value chains transform manufacturing—and distort the globalization debate. <https://www.imf.org/en/Publications/fandd/issues/2019/06/global-value-chains-transforming-manufacturing-dollar>

⁴⁰⁸ Global Value Chain Development Report 2019: Technological Innovation, Supply Chain Trade and Workers in a Globalized World. <https://www.worldbank.org/en/topic/trade/publication/global-value-chain-development-report-2019>

Vietnam is another emerging market economy deeply involved in global value chains. Following market reforms and the opening up of global trade starting in the late 1980s, Vietnam attracted significant investment from foreign companies such as Korea's Samsung, which were looking for a low-cost location for labour-intensive assembly. This contributed to the active integration of Vietnamese electronics companies into global value chains. Thus, for Vietnam, the share of domestic value added in the production of computer, electronic and optical products embodied in foreign exports in gross exports increased from 1% in 1995 to 3% in 2016.

An analysis of the production chain shows that there are large backward linkages, meaning that many firms sell to exporters but are not exporters themselves. For example, 'in 2012, about 5 million Vietnamese worked for enterprises that produced for export; the number of people employed by firms that sell to exporters was much higher, at 7 million'⁴⁰⁹. These linkages have important policy implications. While emerging economies maintain higher barriers to imports than advanced economies, they recognise that their exporters need access to the best imported inputs if they are to be competitive globally. Many are addressing this issue by creating special economic zones where exporters have duty-free access to imported parts, such as Shenzhen, China.

Similarly, to the case of computers, electronic equipment, and optical devices, we can identify the countries that served as central points in GVCs in other industries. To do this, we use the share of domestic value added in the production of products embodied in foreign exports in gross exports (%). As shown in Table 3.4, in 2020, the largest concentration of intermediate goods suppliers was observed in the production of basic metals and finished metal products, transport equipment, and prepared foods. Ukraine is also among the main players involved in the formation of GVCs in these industries. Thus, the share of domestic value added in the production of products

⁴⁰⁹ Dollar D. Value chains transform manufacturing...

embodied in foreign exports for the Ukrainian food industry was 2% of gross exports, for metallurgical products - 3%, and for transport equipment - 2%.

Table 3.4

Countries - focal points in GVCs in 2020 by industry sector⁴¹⁰

Food, beverages, tobacco	Textiles, clothing	Wood and paper products	Chemical and pharmaceutical products	Basic metals and finished metal products	Machinery and equipment	Transport equipment
Argentina 3%	Pakistan 3 %	Estonia 2 %	Belgium 3 %	Australia 5 %	Australia 2%	Austria 4 %
Cameroon 4 %	Cambodia 3%	Latvia 2%	Netherlands 3%	Chile 7%	Austria 2%	Romania 5 %
Côte d'Ivoire 7%	Laos 2%	Cameroon 1%	Norway 3 %	Iceland 4%	Finland 2%	Czech Republic 6%
Laos 3%	China 1%	Sweden 1%	Brunei 4%	Ukraine 3%	Germany 2%	Germany 4%
Ukraine 2%	Italy 1%	Norway 1%	Saudi Arabia 4%	Kazakhstan 5%	Japan 2%	Slovakia 5%

To a lesser extent, this concentration is evident in GVCs producing textiles and clothing, wood and paper products, chemicals and pharmaceuticals, and non-electric machinery and equipment. It should be noted that in the textile and clothing industry, international cooperation in terms of intermediate goods supplies has decreased over the past 10 years, while exports of finished goods have increased. For example, in 2000, Pakistan was one of the main focal points in the GVCs of textiles and clothing, and the share of domestic value added in the production of these products embodied in foreign exports was 7% of the country's gross exports. However, in 2020, this figure decreased to 3%.

The growth of global value chains also benefits developed economies, which tend to focus on high value-added activities such as advanced technology, financial services, complex manufacturing components, and marketing and service. At the same time, it should be noted that there are negative consequences for developed countries from the development of GVCs. Studies have shown that 'the United States has lost middle-skilled manufacturing jobs due to trade with China and economies that contribute to its value chain, while gaining jobs in high-skilled manufacturing and

⁴¹⁰ Compiled by the author based on data from: Trade in Value Added (TiVA)

services, leaving total employment almost unchanged⁴¹¹. The wages of workers with higher education in the United States tended to increase, while workers without higher education experienced a decline in wages.

In the period 1995-2015, as developing countries opened up to expand trade links and value chains, developed economies saw an increase in high- and low-skilled jobs and a decline in the employment of middle-skilled workers. This was not the result of trade alone; technological transformation was also a significant factor in these changes. Production operations performed by workers with average skills and involving routine, repetitive tasks were the easiest to either automate or relocate to lower-wage countries, allowing employers to cut costs. The activities that remained in developed economies were more technologically advanced and highly skilled.

Thus, the functioning of global value chains has led to a number of positive effects for countries regardless of their level of development. Developing countries, as well as market economies that have achieved even moderate success, have experienced significant economic growth and poverty reduction. For highly developed countries, the effects have been similar: integration and innovation drive changes in employment and wages, boosting some industries while disrupting others. However, the use of protectionist measures to slow or stop these changes is considered ineffective, as closing the domestic market cuts off the country from the dynamic global economy, and partial protection will benefit some firms at the expense of other firms, while harming consumers. Given the complexity of modern value chains, it is impossible to develop trade policies that are aimed at solving specific problems of a particular geographical region or enterprises in a particular industry. In this regard, the best solution is to use instruments that will facilitate the adaptation of the economy to participate in GVCs, as production development and sectoral job allocation will occur naturally.

Conclusions to the chapter

The concept of global value chains is inseparable from the processes of production fragmentation taking place in the modern economy, which results in its individual stages being located in different countries. Therefore, in the light of current

⁴¹¹ Dollar D. Value chains transform manufacturing....

knowledge, it is believed that the value chain describes the full range of activities required to provide a product or service from the concept stage, through intermediate production stages, to delivery to end consumers. The fragmentation of production processes and the corresponding dispersion of tasks and activities internationally leads to the formation of cross-border production systems, consisting of sequences of chains or networks operating globally, regionally or between two countries.

Deepening international cooperation, the development of transnational corporations and their transformation into network enterprises, while increasing the fragmentation of production, have created the basis for the formation of global production networks. A characteristic feature of a global production network, as an organisational platform for setting up the production of goods in different regions of the world, is the coordination of all processes by a global company and the supply of these goods to global markets. The functioning of global production networks increases the competitiveness of companies involved in production chains by optimising the ratio of costs and opportunities, financial discipline, effective management and interaction with institutions at all levels of the production chain.

Global production networks are formed through the creation of value chains, which encompass all the processes by which technology is combined with material resources and labour, and then the processed resources are combined into finished products for marketing and distribution. The links in the chain differ in terms of the level of added value, as the production or assembly of finished products generates less added value than the previous stages (research, experimental work, innovation) and the subsequent stages (logistics, marketing, after-sales service). Global value chains take the form of networks, where buyer and supplier are equal partners in cooperation and work together to create a product by combining their complementary competences. In such chains, buyer risk is minimised by the high level of competence of the supplier, and high competence facilitates cooperation in the network and preserves the interdependence of the participants.

The last decade has shown the importance of countries' integration into global value chains, while also demonstrating their vulnerability to global financial crises and external shocks. As a result of negative factors, many countries are reducing their participation in global value chains, in particular emerging market economies, including China. Most EU countries maintained stable participation in global supply

chains despite significant production losses due to the suspension or reduction of intermediate goods from China during the coronavirus pandemic. The decline in participation in GVCs was also observed across all sectors of the economy, with commodities and manufacturing sectors being more vulnerable than services.

A country's participation in global value chains has many advantages for the national economy, as enterprises can effectively use the opportunities of international cooperation. However, in the context of escalating global threats and geopolitical challenges, national enterprises may be negatively affected by external shocks arising from disruptions in the supply of materials and components. In today's environment, deeper integration within the GVCs also means that some countries and industries may be more vulnerable to supply and demand shocks than others. First of all, small open economies are the most sensitive to such risks, as they tend to use external resources more and supply a larger share of their output to foreign markets. Large economies such as the United States, Germany and China play a central role in GVCs, both as suppliers and consumers of inputs and outputs, and shocks to these economies can have systemic implications.

Positive effects for the economy from participation in global value chains arise from the fragmentation of the production process, as a result of which different stages of production are carried out in different countries. This creates central points for the production of intermediate products that are exported to other countries, where they are used in the production of goods exported to third countries. The highest concentration of such intermediate production is characterised by the production of computer, electronic and optical products, with countries such as Taiwan, Japan, China and the United States playing the role of central points. Ukraine has not become a central point in this industry, but is involved in GVCs, as evidenced by the share of domestic value added in the production of computer, electronic and optical products embodied in foreign exports, which is 1% of gross exports. A high concentration of intermediate goods suppliers was observed in the production of basic metals and finished metal products, transport equipment, and finished food products. A lower level of production fragmentation is observed in GVCs in such industries as textiles and clothing, wood and paper products, chemicals and pharmaceuticals, and non-electric machinery and equipment.

CHAPTER 4. UKRAINE'S PARTICIPATION IN GLOBAL PRODUCTION NETWORKS AND THE PROCESS OF EUROPEAN INTEGRATION

(Valerii Mytsenko)

4.1. Degree of Ukraine's involvement in global value chains

One of the most important indicators of the national economy's involvement in global value chains is the share of domestic value added in Ukraine's gross exports. Despite the fact that Ukraine's gross exports and domestic value added did not increase significantly in 2020 compared to 2010 (by 7.5% and 16.6%, respectively), there was a significant increase in the share of the national component in gross exports from 70.3% to 76.3% (Figure 4.1). A similar trend was observed in EU countries that are larger and economically strong. For example, Germany is characterised by a higher level of domestic value added in exports, i.e. above the EU average. An analysis of changes in the index of domestic value added in exports indicates an increase in the share in global value chains, although this share largely depends on the size of the country's economy and its openness. In the case of EU countries that import and export on the basis of a common trade policy, the main factor determining their share in global value chains is their size, which is associated with a high level of economic development.

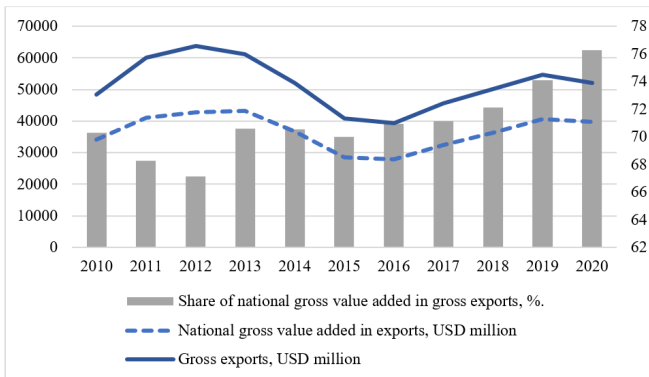


Figure 4.1: Dynamics of the share of national gross value added in Ukraine's exports in 2010-2020⁴¹²

⁴¹² Built by the author based on data from: Trade in Value Added (TiVA) Principal Indicators....

The second way to determine participation in global value chains - the calculation of participation ratios in global value chains - involves the identification of three components that simultaneously describe the level of participation in the chain. Using the data published on the OECD platform (TIVA), we will calculate these coefficients for the period 2010-2020 (data for 2021-2022 are not yet available).

Inverse participation, or 'upstream', also known as an indicator of a country's vertical specialisation, is the share of foreign value added in gross exports. It allows us to estimate how important imports are for a given country's exports, and the higher this indicator is, the stronger this relationship is. The results of calculating the reverse participation ratio for Ukraine show that the dependence of the Ukrainian economy on imports has decreased, as the value of the ratio fell from 29.71% in 2010 to 23.7% in 2020 (Table 4.1). Thus, less than a third of Ukraine's exports consisted of previously imported components. The highest level of Ukraine's dependence on imports of intermediate goods used as components of exports was observed in 2012, when the reverse participation ratio was 32.88%. After Russia's annexation of Crimea and occupation of parts of Donetsk and Luhansk regions, the Ukrainian economy lost some of its industrial production capacity, and the level of Ukraine's return participation in global value chains decreased.

The next indicator we calculated is the direct participation ratio ('downstream'), which characterises the indirect share of domestic value added in partner exports and determines the role of value added created in Ukraine in the exports of other countries. According to our calculations, there has been an increase in the direct participation of Ukrainian producers in the creation of export goods in partner countries, as evidenced by the growth of the direct participation ratio from 21% in 2010 to 22% in 2020.

Table 4.1

Indicators of Ukraine's participation in global value chains⁴¹³
in 2010-2020

Year	Return participation rate, %	Direct participation rate, %	Overall rate of participation in the GVCs, %	The country's position in the GVCs
	gvcb_share	gvcf_share	gvc_share	gvc_position
2010	29,71	21,00	50,71	-0,33
2011	31,74	22,00	53,74	-0,35
2012	32,88	19,00	51,88	-0,53
2013	29,40	20,00	49,40	-0,37
2014	29,44	21,00	50,44	-0,32
2015	30,00	20,00	50,00	-0,39
2016	29,06	20,00	49,06	-0,36
2017	28,88	22,00	50,88	-0,26
2018	27,88	23,00	50,88	-0,19
2019	25,87	23,00	48,87	-0,11
2020	23,70	22,00	45,70	-0,07

The total participation in global value chains is calculated as the sum of external value added in exports and domestic value added indirectly exported by trading partners. The higher the ratio, the greater the country's share in the value chain. Our calculations show that there was a decrease in the value of Ukraine's overall participation in global value chains – from 50.71% in 2010 to 45.7% in 2020. Accordingly, during the period under review, there was a decline in the integration of the Ukrainian economy into global value chains. To a large extent, this situation is due to the fact that many industrial enterprises have lost their ties with Russian companies and, accordingly, their part of the Russian market, and entering new markets requires time to find partners, additional costs for modernising industrial facilities and promoting products.

We have also assessed Ukraine's position in global value chains, which allows us to determine which stages of production (initial or final) the country specialises in. The country's position in the early stages of the production chain is evidenced by a high positive value of the index of position in global value chains. In 2010-2016, Ukraine's

⁴¹³ Built by the author based on data from: Trade in Value Added (TiVA) Principal Indicators....

reverse participation rate was high, indicating significant imports of intermediate goods and the country's specialisation in the final stages of production, as the index of position in global value chains had a negative value, which increased from -0.33 in 2010 to -0.36 in 2016 (see Table 4.1).

Since 2017, there has been a gradual decline in Ukraine's position in global value chains to -0.07 in 2020, although the index remains negative. In addition, the global supply chain position index illustrates how production fragmentation has affected Ukraine's trade exchange. During the period under review, the negative position decreased, indicating an increase in imports of materials and semi-finished products while exports of finished goods increased.

To study the sectoral peculiarities of Ukraine's participation in global value chains, we will use the provisions characterising the degree of balance between exports and imports of the respective product groups: 'in a balanced economy, the upper limit of the industry's share in exports of goods should not exceed 27.2%; according to the import component in exports, industries can be divided into two groups according to the country's place in the value chain: if the indicator does not exceed 50%, the industry is integrated into the GVC at the beginning ('Downstreamness'); if the indicator exceeds 50%, the industry is integrated into the GVC at the end ('Upstreamness')'⁴¹⁴.

In 2010, the highest share of imports in Ukraine's exports was observed for basic metals and finished metal products, as evidenced by the highest value of the share of foreign value added embodied in imported inputs in gross exports (46.47%). At the same time, the share of metallurgical products in merchandise exports was also the highest among the main industries and amounted to 33.7% (Table 4.2). According to the above theoretical provisions, we can conclude that the metallurgical industry in 2010 had a relatively high content of imported components with a high share of its products in exports of goods. Accordingly, the metallurgical industry was substantially integrated into global value chains, Ukrainian metallurgical products were in demand

⁴¹⁴ Giovannetti G., Marvasi E., Positioning and Internalization in Global Value Chains: The Case of Tuscan Firms. 2016. 20 p., c. 3–4

both in foreign and domestic markets, and the components of these products were mainly of domestic origin.

In 2020, the share of metallurgical products in exports almost halved, while the share of imported components in the industry's exports decreased by $\frac{1}{4}$. At the same time, according to our calculations, the share of final products in the industry's exports decreased from 5.5% in 2010 to 4.5% in 2020. This situation indicates that the metallurgical industry is gradually losing its priority for the Ukrainian economy in terms of its role as an export-oriented industry.

Table 4.2

Dynamics of the import component in exports and the share in exports of goods by industries of Ukraine in 2010-2020⁴¹⁵

Industry sectors	Share of foreign value added embodied in imported inputs in gross exports, %		Share of the industry's products in exports of goods, %	
	2010	2020	2010	2020
Food, beverages, tobacco	24,70	25,01	5,0	6,8
Textiles, clothing	15,76	25,74	1,4	1,6
Wood and paper products	34,02	32,05	1,8	0,8
Chemicals and pharmaceuticals	46,00	37,29	6,8	4,1
Basic metals and fabricated metal products	46,47	34,27	33,7	18,4
Computers, electronic and electrical equipment	30,25	35,12	4,9	5,2
Machinery and equipment	30,66	33,26	6,1	4,22
Vehicles	31,68	33,39	6,3	1,6

The chemicals and pharmaceuticals industry was characterised by a relatively high share of foreign value added embodied in imported inputs in gross exports, which has slightly decreased over the past 10 years. At the same time, the share of chemical and pharmaceutical products in exports did not exceed 10% and decreased in 2020. This ratio of the import component in the industry's exports to its share in merchandise exports indicates a significant dependence of chemical and pharmaceutical production on the supply of imported components, which is largely due to the low technological

⁴¹⁵ Built by the author based on data from: Trade in Value Added....; Commodity structure of Ukraine's foreign trade in 2010. State Statistics Service of Ukraine.

https://www.ukrstat.gov.ua/operativ/operativ2010/zd/tsztt/tsztt_u/tsztt1210_u.htm; Commodity structure of Ukraine's foreign trade in 2020 State Statistics Service of Ukraine.

https://www.ukrstat.gov.ua/operativ/operativ2020/zd/tsztt/tsztt_u/arh_tsztt2020_u.html

level of domestic enterprises. Given that the production of pharmaceutical products is a high-tech industry, the decline in the share of these goods in exports indicates a negative trend for Ukraine's economic development. Despite these difficulties, it is worth noting that the share of final products in exports of chemical and pharmaceutical goods has increased from 19.5% in 2010 to 22.7% in 2020, which indicates that their competitiveness in foreign markets is strengthening.

During the period under review, the share of foreign value added embodied in imported inputs in gross exports of computers, electronic and electrical equipment increased by almost 5 percentage points (p.p.). At the same time, the share of these products in exports also increased, indicating that Ukraine's computer, electronic and electrical equipment industry was more integrated into global value chains in 2020 compared to 2010. At the same time, the share of final products in exports slightly decreased over the same period (from 40.5% to 35.3%), which shows a slight shift towards participation in the initial stages of GVCs, indicating an increasing role of Ukrainian enterprises not only as assemblers of final products for sale in the domestic market, but also as developers and manufacturers of components used by foreign partners.

In the production of non-electric machinery and equipment and in the production of vehicles, the share of foreign value added embodied in imported inputs in gross exports in 2020 was higher than in 2010 and exceeded 33%, indicating an increasing role of imported components in the functioning of these industries. However, the share of machine building products in exports decreased from 6.1% in 2010 to 4.22% in 2020, and the share of vehicles from 6.3% to 1.6%, respectively. The dynamics of the indicators under consideration confirms that enterprises producing non-electric machinery and equipment, like those producing vehicles, are technologically dependent on the supply of imported components, but their products are mainly oriented towards the domestic market. However, there is a gradual transition of vehicle manufacturing enterprises to the initial stages of the GVC, as the share of final products in exports decreased from 60% to 58.7% during the study period. On the other hand, the share of final products in exports of non-electric machinery and equipment

increased from 49.5% in 2010 to 58.3% in 2020, indicating a greater involvement of producers in the upper parts of the value chain.

The period under study also saw an increase in the import dependence of Ukraine's textile industry, as evidenced by the growth in the share of foreign value added embodied in imported inputs in gross exports of textiles and clothing from 15.76% in 2010 to 25.74% in 2020 (see Table 4.2). At the same time, it should be noted that although the share of these products in exports increased from 1.4% to 1.6%, the share of final products in exports decreased slightly (from 87.5% in 2010 to 77.6% in 2020). Thus, the increase in the import component of textile and clothing production has helped to improve the competitive position of the industry's enterprises mainly in the domestic market, and their products continue to be oriented towards domestic consumers.

The dependence of the Ukrainian woodworking industry on imports of inputs for the manufacture of wood and paper products has decreased, as evidenced by the decrease in the share of foreign value added embodied in imported inputs in gross exports from 34% in 2010 to 32% in 2020. At the same time, the share of wood and paper products in Ukraine's exports of goods more than halved over the period under review, from 1.8% to 0.8%. At the same time, the share of final products in woodworking exports decreased from 14.4% to 12.8%. This means that the woodworking industry is increasingly focused on the domestic market.

Thus, the study showed that among the main industries that export goods from Ukraine, the most dependent on imported components for the production of export goods are the chemical and pharmaceutical industries, the metallurgical industry, and the production of computers, electronic devices, and optical devices. In the case of chemicals, pharmaceuticals, and metallurgy, this dependence has slightly decreased over the past 10 years, while in the case of computers, electronic devices, and optical instruments, import dependence has increased. The least dependent on imports of inputs used in the production of export goods are enterprises producing food, textiles and clothing.

4.2. Comparative Analysis of Ukraine's and EU Countries' Integration into Global Value Chains

We will compare the degree of involvement of Ukraine and the EU countries in the GVCF by the indicators of overall, direct and reciprocal participation. At the same time, we will separately consider the new EU member states and the EU-15 countries. A comparative analysis of Ukraine's and the new EU member states' involvement in global value chains will reveal the differences and similarities between our country and the countries, most of which were socialist and belonged to the Warsaw Pact 10-15 years ago.

The degree of involvement of the new EU member states in global value chains, measured by the overall GVC participation rate, has changed significantly between 1995 and 2020. Thus, in 1995, Malta, Estonia and Slovakia were the most integrated into the global production system among the new EU member states, as evidenced by the highest rate of total participation in GVCs, which was 58%, 52% and 51%, respectively (Figure 4.2). In 2020, the composition of the group of leaders changed slightly. Along with an increase in the level of involvement in the SPS in Malta and Slovakia to 69% and 66%, respectively, there was a significant increase in this indicator for Cyprus (from 40% to 64%), Hungary (from 39% to 64%) and the Czech Republic (from 42% to 59%).

In turn, the economies of Croatia, Poland, and Romania were the least involved in global value chains in 1995, with a total participation rate of 31%, 32%, and 34%, respectively. In 2020, the overall participation rate of these countries increased significantly: for Croatia - up to 43%, for Poland – up to 52%, for Romania – up to 47%. Despite this, the economies of Croatia and Romania continue to be the least integrated into GVCs, with a total participation rate of 43% and 47% in 2020, respectively. Latvia was also among the least integrated countries in 2020, with a total participation rate of 46%.

The degree of Ukraine's involvement in GVCs decreased from 47% to 46% over the period under study, indicating a weakening of its integration into global production networks. In 1995, Ukraine was ahead of most of the new EU member states in terms

of overall participation, behind only Malta, Estonia, and Slovakia. However, in 2020, the level of Ukraine's involvement in GVCs was the same as in Latvia and exceeded only Croatia.

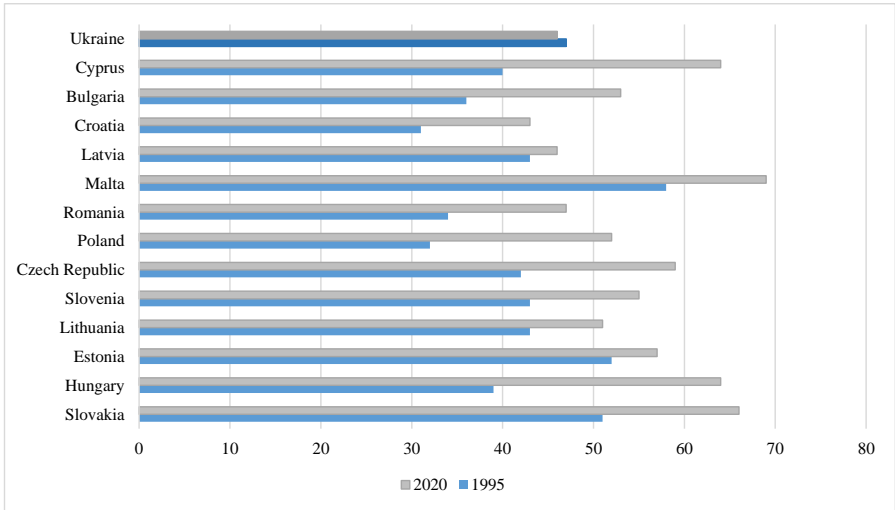


Figure 4.2. Comparison of Ukraine and the new EU member states in terms of total participation in GVCs in 1995 and 2020⁴¹⁶

Among the EU-15 countries, Luxembourg, Belgium, and Ireland were the most highly integrated into the world production and trade system in 1995 (Figure 4.3). Our calculated participation rate for Luxembourg was 59%, for Belgium – 50%, and for Ireland – 45%. As can be seen from the figure, all the countries under consideration are characterised by an increase in the level of involvement in GVCs in 2020. Luxembourg and Belgium continue to be the countries with the highest level of integration into GVCs, with the overall participation rate of 76% and 57%, respectively. It should be noted that the group of leaders was joined by countries with a total participation rate of 56% (Austria, Greece and Ireland). Ukraine's position in

⁴¹⁶ Calculated and built by the author based on: Trade in Value Added (TiVA) Principal Indicators: 2022 preliminary version. https://stats.oecd.org/Index.aspx?DataSetCode=TIVA_2022_C1

terms of total participation in GVCs in 1995 was at the level of such countries as Ireland and Belgium, exceeding this indicator for all EU-15 countries except Luxembourg.

Among the EU-15 countries, the lowest overall level of participation in the GVCs in 1995 was recorded in Greece (27%), and slightly higher values were recorded in Italy (31%), the UK (33%), Germany, France and Spain (34% each). In turn, in 2020, Italy and the United Kingdom were at the bottom of the ranking with a score of less than 42%, while Greece joined the group of leaders. Unlike the EU-15 countries, Ukraine's level of integration into global production networks decreased in 2020, but remained higher than in the UK, Italy, Spain, Germany, and France.

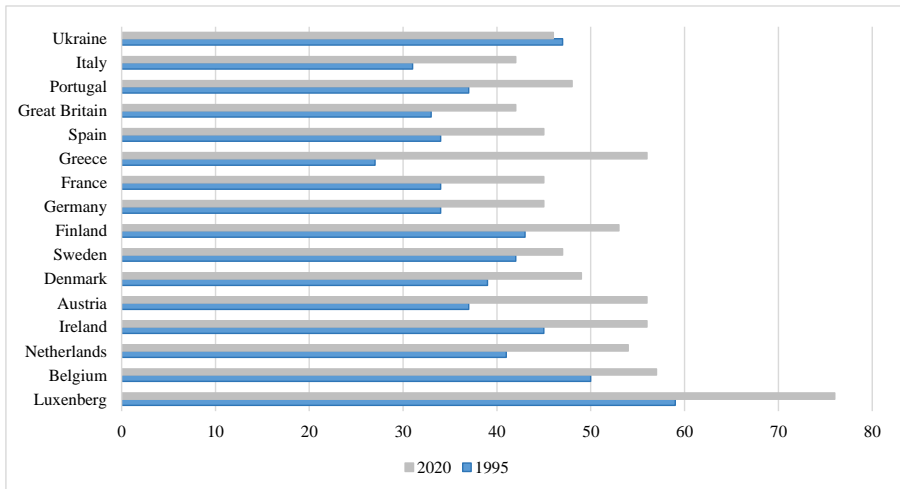


Figure 4.3. Comparison of Ukraine and the EU-15 countries by total participation in GVCs in 1995 and 2020⁴¹⁷

The measure of total participation of economies in global value chains that we have analysed combines supply and demand. It reflects an economy's involvement in GVCs both as a recipient of foreign value added used for their own exports and as a supplier of domestic value added contained in intermediate products or services used in other countries' exports. An analysis of the respective levels of participation shows

⁴¹⁷ Calculated and built by the author based on: Trade in Value Added (TiVA)...

that small economies such as Luxembourg, Slovakia, Belgium, Hungary or the Netherlands are more integrated into the global production and trade system than larger economies. This may be due to the fact that small countries are usually more dependent on imports than larger countries that do not need as many imported inputs, as they can obtain more from the domestic market for intermediate goods⁴¹⁸. The literature on this issue indicates that, in general, the larger the country, the lower the share of foreign value added in exports⁴¹⁹.

For a more detailed analysis, let's compare the positions of Ukraine, the EU-15 and the new EU member states in terms of the backward integration rate in global value chains in 1995 and 2020. As for the new member states, Malta had the highest backward integration rate in both 1995 and 2020, with an increase from 50% to 60% (Figure 4.4). In addition to Malta, the countries with the highest degree of backward integration in the value chain in 2020 also included Cyprus (49%), Slovakia (48%), and Hungary (48%). As a rule, a high value of the backward integration indicator means that a country is at the end of the value chain, i.e. it is a recipient of foreign intermediate goods that are used mainly for the production of final goods intended for export.

In 2020, Ukraine's reverse participation in global value chains was at the same level as in Croatia, Latvia, and Romania. The value of the coefficient of reverse participation in GVCs for our country decreased from 30% in 1995 to 24% in 2020, which indicates that the Ukrainian economy has 'moved' closer to the beginning of the value chain and, accordingly, reduced exports of finished final goods.

⁴¹⁸ Interconnected Economies: Benefiting from Global Value Chains. OECD Publishing, Paris, 2013

⁴¹⁹ Ahmad, Nadim, Norihiko Yamano, and Zhi Wang. 2013. A Three Stage Reconciliation Method to Construct Time Series International Input-output Database. In: Trade in Value-Added: Developing New Measures of Cross-Border Trade, Aaditya Mattoo, Zhi Wang, and Shang-Jin Wei, eds. London: Centre for Economic Policy Research; and Washington, DC: World Bank

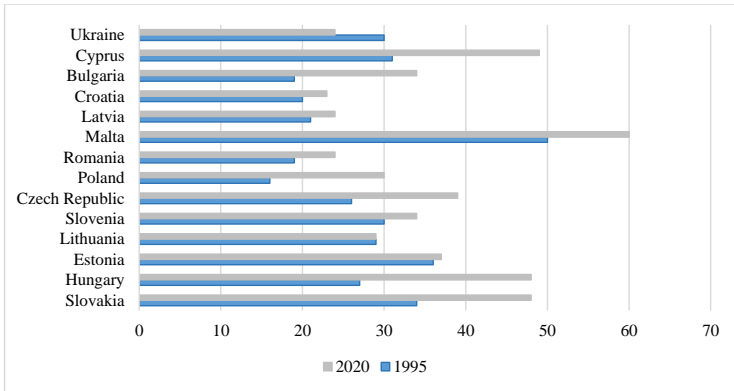


Figure 4.4. Comparison of Ukraine and the new EU member states by the rate of reverse participation in the GVCs in 1995 and 2020⁴²⁰

At the same time, among the new EU member states in 2020, the lowest levels of direct participation in GVCs were recorded for Malta - 9%, Cyprus - 15%, and Hungary - 16% (Figure 4.5). Thus, these economies were relatively weakly connected at the beginning of the value chain and, at the same time, strongly connected backwards. This suggests that these countries were closer to the end than to the beginning of the value chain in 2020.

In turn, a high value of direct participation for Ukraine indicates that the economy is at the beginning of the value chain, i.e. it is a supplier of goods that are then processed and exported by other countries. Ukraine's direct participation ratio in GVCs increased from 17% in 1995 to 22% in 2020, which confirms our earlier conclusion that the economy is shifting closer to the beginning of the supply chain. In terms of this coefficient, Ukraine exceeded the indicators of most of the new EU member states and was on a par with Latvia, Lithuania, and Poland. Only Romania had the highest value of direct participation in GVCs in 2020.

⁴²⁰ Calculated and built by the author based on: Trade in Value Added....

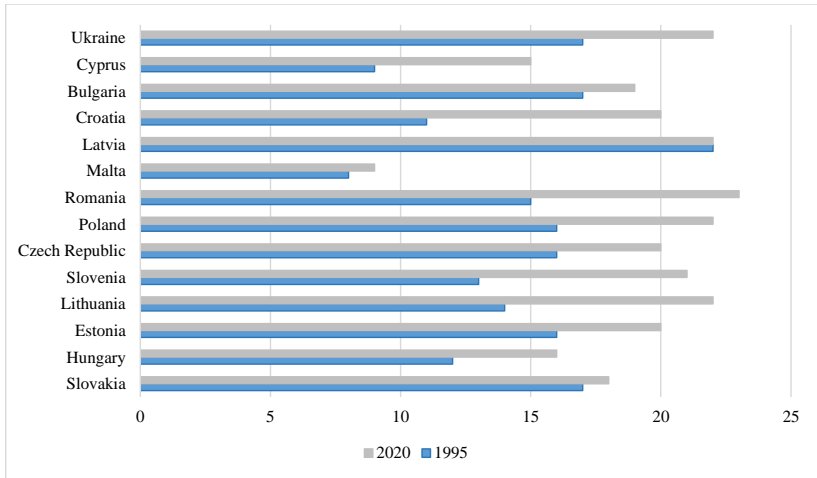


Figure 4.5. Comparison of Ukraine and the new EU member states by the ratio of direct participation in GVCs in 1995 and 2020⁴²¹

Based on Fig. 4.6, it can also be concluded that the economies of Croatia, Latvia and Romania, as well as Ukraine, were the least connected in the reverse direction in the value chain in 2020, with reverse participation rates of 23-24%, respectively. These countries are also characterised by the lowest overall level of participation in GVCs. In turn, the data already partially discussed in Fig. 2.8, allow us to identify the countries among the new EU member states that are most integrated at the front end of the value chain. In 2020, these were: Malta (9%), Cyprus (15%), Hungary (16%) and Slovakia (18%).

In general, all EU-28 countries (see Figures 4.2- 4.5) are dominated by backward linkages in the value chain. This means that these countries receive more of the foreign value added used in their exports than they do the suppliers of domestic value added contained in other countries' exports.

The largest dependence is evident in the case of Luxembourg, Malta, Cyprus and Hungary, for which the difference between the discussed indicators reaches 54

⁴²¹ Calculated and built by the author based on: Trade in Value Added....

percentage points (p.p.), 51 p.p., 34 p.p. and 32 p.p., respectively. It is worth mentioning here that the upstream links in the value chain, which are relatively weak in the group of countries analysed, are stronger, for example, in countries rich in natural resources, such as Norway. In such countries, on the other hand, lower participation rates are registered back down the chain, as the extraction of raw materials is usually associated with a lower share of intermediate goods in the production process⁴²².

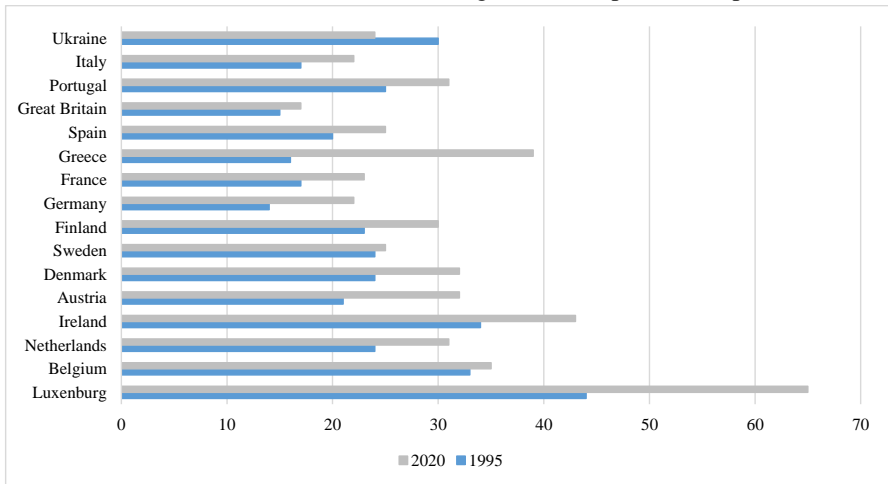


Figure 4.6. Comparison of Ukraine and the EU-15 countries by the coefficient of reverse participation in the GVCs in 1995 and 2020⁴²³

Based on the analysis of the data for the EU-15 countries shown in Fig. 2.9, it can be concluded that in 2020, the leaders in terms of inclusion at the end of the value chain were Luxembourg, Ireland, Greece and Belgium, with reverse participation rates of 65%, 43%, 39% and 35%, respectively. In turn, the lowest values of the analysed indicator, below 30%, were recorded in Sweden and Spain (25% each), France (23%), Germany (22%) and the UK (17%). In terms of reverse participation (24%), Ukraine

⁴²² Interconnected Economies: Benefiting from Global Value Chains. OECD Publishing, Paris, 2013, c. 25

⁴²³ Calculated and built by the author based on: Trade in Value Added....

is integrated into the GVCs at the beginning of the chain in a similar way to these countries.

The histogram in Fig. 4.7 shows that among the countries with the highest degree of integration at the beginning of the value chain in 2020, with a direct participation rate exceeding 20%, were the UK (25%), Austria (24%), the Netherlands (23%), Finland (23%), Germany (23%) and France (22%). Ukraine also belongs to the group of countries that are integrated at the beginning of the value chain. The lowest value of the indicator was recorded for the Luxembourg economy, which was only 11%. At the same time, this is one of the lowest levels of inclusion in the front end of the value chain recorded in 2020 across the EU-28 (the lowest value was recorded for Malta at 9%). Relatively low values were observed for Ireland (13%), Denmark, Greece and Portugal (17% each), but their direct participation rates were slightly different from the average.

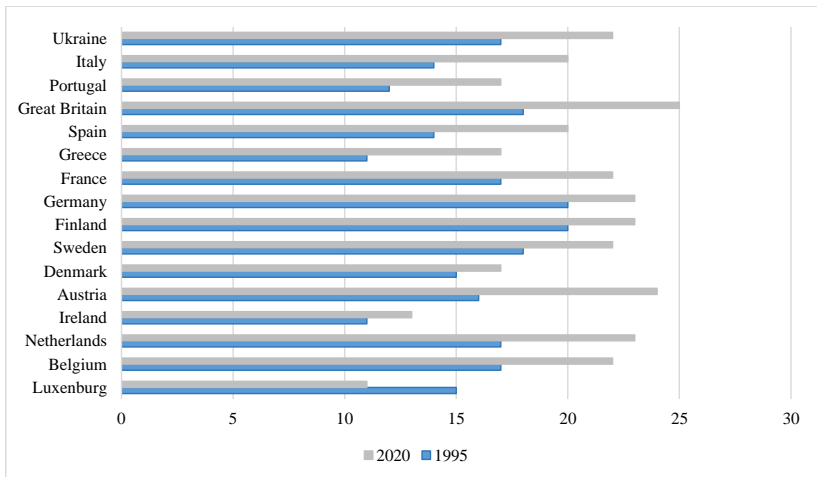


Figure 4.7. Comparison of Ukraine and the EU-15 countries by the ratio of direct participation in GVCs in 1995 and 2020⁴²⁴

As in the case of the new member states, the EU-15 countries are characterised by relatively weak upstream linkages and strong downstream linkages, which means that their economies are closer to the end of the value chain than the beginning. Taking

⁴²⁴ Calculated and built by the author based on: Trade in Value Added....

into account the above data, this position was most typical for Malta and Luxembourg. In 2020, these countries had the lowest levels of direct participation (9% and 11%, respectively) among all EU-28 countries and one of the highest levels of reverse participation (60% and 65%).

Given the above information on changes in the participation of EU countries in GVCs between 1995 and 2020 (Figures 2.7-2.10), it can be concluded that the increase in integration with the global production and trade system observed in most EU countries was mainly due to the strengthening of backward linkages in the value chain. In 26 of the 28 EU countries analysed, the level of backward linkages increased, and the increase was much greater than the increase in the level of forward linkages. The largest growth in the share of foreign value added in gross exports occurred in such new EU member states as Hungary (21 p.p.), Cyprus (18 p.p.), Bulgaria (15 p.p.), Poland and Slovakia (14 p.p. each), and the Czech Republic (13 p.p.). Among the EU-15 countries, the most dynamic growth of this indicator was observed in Greece (23 percentage points), Luxembourg (21 percentage points) and Austria (11 percentage points). At the same time, the growth in the strength of linkages to the front end of the value chain in no country exceeded 10 percentage points. The highest rate was recorded in Croatia (9 p.p.), Lithuania, Slovenia, and Romania (8 p.p. each), and among the EU-15 countries - in Austria (8 p.p.) and the United Kingdom (7 p.p.). Between 1995 and 2020, Lithuania's backward linkage participation in the value chain remained unchanged, while Ukraine's participation decreased by 6 pp. On the other hand, the advanced level of participation decreased in Luxembourg (by 4 percentage points), remained unchanged in Latvia, and increased by 5 percentage points in Ukraine.

It is worth noting that while many of the economies analysed have seen an increase in GRB integration both up and down the value chain, in the case of some countries, the increase in one of the indicators of GRB participation analysed was accompanied by a decrease in the other. For example, in Luxembourg, the strength of backward linkages in the value chain increased by 21 percentage points, while the strength of upward linkages decreased by 4 percentage points, while in Latvia, the backward participation rate increased by 3 percentage points, while the forward

participation rate remained unchanged. This indicates that the economies of these countries have been moving towards the bottom of the global value chain over the period under study. A similar conclusion can be drawn, for example, for Slovakia, where the share of external value added in gross exports increased by 14 percentage points, while the strength of upstream linkages changed only slightly by 1 percentage point. None of the EU countries experienced a decrease in the rate of reverse participation in GVCs during the period under study, with only Lithuania experiencing an increase in the rate of direct participation by 8 pp, while the level of reverse participation remained unchanged. The dynamics of Ukraine's participation in the GVCs differed significantly from the EU countries. In Ukraine, there was a decrease in the level of reverse participation and an increase in the level of direct participation, which indicates that our country has moved to the beginning of the global value chain.

4.3. Factors Determining the Participation of Ukrainian Industry in GVCs

Global value chains, which include companies from different countries connected by mutual relations and flows of goods and information, play a key role in the modern economy. In the era of globalisation and growing global trade, they are increasingly influencing both the global economy and the economies of the countries involved in these chains. On the other hand, the degree of involvement and the place of a country in GVCs increasingly depends on the available resource potential, the efficiency of the use of natural and human resources, and changes in the macroeconomic environment. The close ties between economies create favourable opportunities for further development, but also bring challenges as a result of increased competition. Building competitiveness in GVCs requires strengthening those factors of production that are difficult to realise elsewhere, making it unlikely that this production will be relocated abroad.

The analysis of scientific literature conducted in Section 3 has shown that important determinants of a country's participation in global value chains include the availability of skilled labour, domestic and foreign investment, the technological level of enterprises and their ability to develop and implement new technologies for the

production of new or improved products. Based on the results of studies of the participation of different countries in GVCs, according to which these factors of production had different effects on the participation of countries in international cooperation, depending on their level of development, we will put forward several hypotheses and test them on the example of Ukraine.

The first hypothesis: the degree of integration of Ukraine in global value chains is determined by the number of employees employed in industry, the level of innovation of industrial enterprises, and the volume of investments in the development of industrial enterprises.

The second hypothesis: the content of foreign gross value added in Ukraine's exports depends on the number of people employed in industry, the technical level of industrial enterprises and their ability to innovate, and the amount of investment attracted by industrial enterprises.

The third hypothesis: the volume of national gross value added in Ukraine's exports depends on employment in the industrial complex; innovation activity of industrial enterprises and their technological upgrading; and the sufficiency of investment resources for the development of industrial enterprises.

To test the formulated hypotheses, we will use correlation-statistical analysis and build linear regression models using the computer program 'Statistica 7.0'.

In order to confirm or refute the first hypothesis, we will conduct a regression analysis, using the coefficient of reverse participation, direct participation and the overall indicator of Ukraine's participation in global value chains as the dependent variable, which we calculated and presented in Table 4.3.

The independent variables are:

1) indicators characterising the employment of the able-bodied population in industry (X_1 - number of people employed in industry, thousand people; X_2 - share of industrial employees in the total number of employed, %);

2) indicators characterising innovation activity and the ability to technologically upgrade production facilities (X_3 - the share of sold innovative products (goods, services) in the total volume of sold products (goods, services) of industrial enterprises,

%; X_4 - the number of types of innovative products (goods, services) introduced in the reporting year, units; X_5 - the share of the number of industrial enterprises that introduced innovations (products and/or technological processes) in the total number of industrial enterprises, %; X_6 - expenditures on research and development, USD million; X_7 - share of expenditures on research and development in GDP, %);

3) indicators characterising the volume of investment in the processing industry (X_8 - FDI in the processing industry, million USD; X_9 - capital investment in the industry, million USD). USD; X_9 - capital investments in the industry, USD million. USD).

Table 4.3

Statistical data characterising human, innovation and investment determinants of Ukraine's participation in GVCs⁴²⁵

Year	Value of the independent variable								
	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9
2010	3461,5	18,0	3,8	2408	11,5	1022,3	0,75	90,2	6984,2
2011	3 352,7	17,4	3,8	3238	12,8	1069,5	0,65	125,5	9890,2
2012	3236,7	16,8	3,3	3403	13,6	1179,0	0,67	134,3	11464,1
2013	3170,0	16,4	3,3	3138	13,6	1282,7	0,70	147,4	12212,0
2014	2898,2	16,0	2,5	3661	12,1	798,6	0,60	171,2	7259,4
2015	2573,9	15,7	1,4	3136	15,2	503,8	0,55	131,5	4013,6
2016	2494,8	15,3	1,1	4139	16,6	451,3	0,48	108,7	4608,8
2017	2440,6	15,1	0,7	2387	14,3	503,2	0,45	117,1	5389,2
2018	2426,0	14,8	0,8	3843	15,6	616,7	0,47	122,5	7349,1
2019	2461,5	14,8	1,3	2148	13,8	667,7	0,43	106,6	9837,3
2020	2358,6	14,8	1,9	4066	14,9	631,4	0,41	77,8	6696,5

According to the results of the regression analysis, we found a weak correlation ($R=0.615$) between Ukraine's GVCB reverse participation ratio (*gvc_b_share*) and the volume of FDI that flowed into the manufacturing industry annually (Table 4.4). The

⁴²⁵ Compiled by the author based on data: Employed population by type of economic activity in 2010-2021, State Statistics Service of Ukraine. https://www.ukrstat.gov.ua/operativ/menu/menu_u/rp.htm; Implementation of innovations at industrial enterprises (2000-2020). State Statistics Service of Ukraine. www.ukrstat.gov.ua; Expenditures on innovation by industrial enterprises by areas of innovation activity (2000-2020). State Statistics Service of Ukraine. www.ukrstat.gov.ua; Expenditures on research and development by type of work (2010-2020). State Statistics Service of Ukraine. www.ukrstat.gov.ua; Capital investments by types of economic activity of industry (2010-2021). State Statistics Service of Ukraine. https://www.ukrstat.gov.ua/operativ/menu/menu_u/ioz_19.htm; Direct investment (equity capital) in the economy of Ukraine by type of economic activity. State Statistics Service of Ukraine. https://www.ukrstat.gov.ua/operativ/menu/menu_u/zed.htm

relationship between the dependent and independent variables is direct: a 1% increase in FDI in manufacturing results in a 0.251% increase in the GVCB reverse participation ratio, *ceteris paribus*. The coefficient of determination ($R^2=0.378$) shows that the change in the coefficient of Ukraine's reverse participation in the GVCs depended only on FDI inflows in manufacturing, and 62.2% on other factors. The relationship between the variables is not very tight, but the regression results are acceptable, as the calculated value of the Fisher's criterion exceeds its tabulated value, and the statistical error rate did not exceed 5%.

The relationship between the indicator of Ukraine's direct participation in GVCs and the share of R&D expenditures in GDP is even weaker than the relationship discussed above, as evidenced by the low value of the correlation coefficient ($R=0.567$). The relationship between these indicators is inverse: a 1% increase in the independent variable causes a 0.166% decrease in the dependent variable, *ceteris paribus*. The coefficient of determination shows that the change in the value of the indicator of direct participation in GVCs is only 32.1% dependent on the share of R&D expenditures in GDP. The relationship between the variables is not tight, as evidenced by the low calculated value of the Fisher's criterion. At the same time, the level of statistical error does not exceed 10%, which is acceptable.

A more significant relationship ($R=0.762$) was found between the overall indicator of Ukraine's participation in GVCs and such factors as the share of industrial employees in the total number of employed and the share of sold innovative products in the total volume of sold products of industrial enterprises. At the same time, the relationship between the dependent variable and the share of employees of industrial enterprises in the total number of employed was direct: an increase in the independent variable by 1% ensured an increase in the overall rate of participation in GVCs by 0.798%, *ceteris paribus*. The relationship between the dependent variable and the share of innovative products in the total volume of sales of industrial enterprises was inverse: a 1% increase in the independent variable resulted in a 0.058% decrease in the dependent variable, *ceteris paribus*. The coefficient of determination indicates that the overall indicator of Ukraine's participation in GVCs depends on changes in the share

of employees of industrial enterprises in the total number of employed and the share of innovative products in the total volume of industrial enterprises' sales by 58.1%, and on other factors by 41.9%. The level of statistical error does not exceed 10%, which indicates the acceptability of the results.

Table 4.4

The impact of the main factors of industrial production on Ukraine's participation in GVCs in 2010-2021⁴²⁶

Factor attributes	Dependent variable		
	<i>gvcb_share</i>	<i>gvcf_share</i>	<i>gvc_share</i>
Number of observations	11	11	11
Constant value	2,159*** (0,514)	2,951*** (0,051)	1,741** (0,686)
X_8	0,251** (0,107)	-	-
X_7	-	-0,166* (0,080)	-
X_2	-	-	0,798** (0,253)
X_3	-	-	-0,058* (0,027)
R	0,615	0,567	0,762
R ²	0,378	0,321	0,581
F- criterion	F(1,9)=5,478	F(1,9)=4,272	F(2,8)=5,556

* - statistical error rate 10%; ** - statistical error rate 5%;

*** - statistical error rate 1%.

The regression analysis revealed no correlation between the coefficient of Ukraine's indirect participation in GVCs and indicators characterising the employment of the working-age population in industry and the innovative activity of industrial enterprises, as well as the volume of capital investment in industry. According to our calculations, there is no correlation between the coefficient of Ukraine's direct participation in GVCs and indicators characterising employment of the working population in industry and investment in industry, as well as indicators of the share of innovative products in the total volume of industrial sales, the number of innovative products introduced, the share of innovative enterprises in the total number of industrial enterprises, and the cost of research and development. The overall indicator of Ukraine's participation in GVCs was not affected by the dynamics of such indicators

⁴²⁶ Calculated by the author

as the number of people employed in industry, the number of innovative products introduced in the reporting year, the share of innovative enterprises in the total number of industrial enterprises, research and development expenditures, the share of research expenditures, FDI in the manufacturing industry, and capital investments in industry.

Thus, the main factor behind Ukraine's reverse participation in GVCs in 2010-2020 was foreign direct investment in the manufacturing industry, while direct participation in GVCs was determined with a relatively high error by changes in the share of R&D expenditures in GDP. The main determinants of Ukraine's overall participation in GVCs in the period under study were the share of employees of industrial enterprises in the total number of employed, as well as the share of innovative products in the total volume of industrial products sold.

The main indicator used to assess Ukraine's participation in global value chains is the foreign gross value added in exports, which shows the extent to which imported intermediate goods are used by domestic industry to produce exports. In order to further test our hypotheses, we will conduct a regression analysis, where we will alternately use the indicators of foreign gross value added in exports and national gross value added (GVA) in exports as the dependent variable (Table 4.5). As independent variables, we will use indicators characterising employment in industry, innovation and R&D activities of industrial enterprises, and the volume of domestic and foreign investments attracted by industrial enterprises.

Table 4.5

Dynamics of foreign and national gross value added in Ukraine's exports in 2010-2020⁴²⁷

Year	The share of foreign gross value added in Ukraine's exports, USD million	National gross value added in exports, USD million
	<i>For_comp</i>	<i>Nat_comp</i>
2010	14387	34039
2011	19109	41096
2012	20985	42836
2013	17967	43150
2014	15355	36810
2015	12246	28578
2016	11406	27848
2017	13189	32472
2018	14010	36240
2019	14142	40519
2020	12333	39708

⁴²⁷ Compiled by the author based on data from: Trade in Value Added....

The results of the regression analysis revealed a strong link between the content of foreign GVA in Ukraine's exports and indicators of industrial employment, as evidenced by the high value of the correlation coefficient (Table 4.6). The relationship between the volume of foreign GVA in exports and the number of people employed in industry was direct: a 1% increase in the independent variable led to a 3.727% increase in the dependent variable, *ceteris paribus*. At the same time, the relationship between the volume of foreign GVA in exports and the share of industrial employees in the total number of employed was inverse: an increase in the independent variable by 1% resulted in a decrease in the dependent variable by 6.032%, *ceteris paribus*. The coefficient of determination shows that during the period under study, the volume of foreign GVA in Ukraine's exports depended on changes in industrial employment by 84.5% and other factors by 15.5%. The calculated value of the Fisher's criterion exceeds its tabulated value ($F(2,8)=21.897$), which indicates the tightness of the relationship between the dependent and independent variables. The statistical error in calculating the constant value was 13%, but the error in calculating the coefficients for the independent variables was less than 1%. Taking into account high values of the correlation and determination coefficients, Fisher's criterion, and the low error rate for the coefficients on independent variables, the results of the calculations can be considered acceptable.

At the same time, the relationship between the volume of foreign GVA in exports and the share of industrial employees in the total number of employed was inverse: an increase in the independent variable by 1% resulted in a decrease in the dependent variable by 6.032%, *ceteris paribus*. The coefficient of determination shows that during the period under study, the volume of foreign GVA in Ukraine's exports depended on changes in industrial employment by 84.5% and other factors by 15.5%. The calculated value of the Fisher's criterion exceeds its tabulated value ($F(2,8)=21.897$), which indicates the tightness of the relationship between the dependent and independent variables. The statistical error in calculating the constant value was 13%, but the error in calculating the coefficients for the independent variables was less than 1%. Given the high values of the correlation and determination coefficients, Fisher's criterion, and

the low error rate for the coefficients on independent variables, the results of the calculations can be considered acceptable.

Table 4.6

Dependence of foreign and national GVA in Ukraine's exports on changes in industrial production factors in 2010-2021⁴²⁸

Factor attributes	Dependent variable	
	<i>For_comp</i>	<i>Nat_comp</i>
Number of observations	11	11
Constant value	-3,271 (1,969)	5,084*** (0,208)
X ₁	3,727*** (0,766)	-
X ₂	-6,032*** (1,652)	-
X ₈	-	0,093*** (0,023)
X ₇	-	-0,804*** (0,038)
X ₆	-	0,677*** (0,021)
R	0,919	0,996
R ²	0,845	0,993
F-критерій	F(2,8)=21,897	F(3,7)=359,35

* - statistical error rate 10%; ** - statistical error rate 5%;

*** statistical error rate 1%.

As can be seen from Table 4.6, the study revealed a strong significant relationship ($R=0.919$) between the share of national GVA in Ukraine's exports and foreign direct investment in manufacturing (X_8), the share of R&D expenditure in GDP (X_7), and R&D expenditure (X_6). The relationship between the dependent variable and the volume of FDI in manufacturing was direct: a 1% increase in the independent variable contributed to a 0.093% increase in the share of national GVA in exports.

An inverse relationship was found between the dependent variable and the share of R&D expenditures in GDP: a 1% increase in the independent variable resulted in a 0.804% decrease in the dependent variable, *ceteris paribus*. In our opinion, this relationship between these variables is due to the fact that the vast majority of R&D expenditures are directed to the research sector, where basic research and experimental

⁴²⁸ Calculated by the author

work is carried out, while the industry sector receives almost no funds for the introduction of new technologies. Consequently, in the absence of links between innovation developers and industrial enterprises, the transfer of technologies needed by industry does not take place. Consequently, the domestic R&D sector is not currently a stimulating factor for increasing Ukraine's national GVA in exports.

A direct relationship characterises the dependence of the content of national GVA in exports on changes in R&D expenditures of enterprises: a 1% increase in the independent variable contributed to a 0.677% increase in the dependent variable, *ceteris paribus*. Thus, an increase in R&D expenditures in the industry sector of the economy has a positive impact on the international competitiveness of domestic products.

The high value of the coefficient of determination shows that the share of national GVA in Ukraine's exports depended by 99.3% on changes in the volume of FDI attracted to the manufacturing industry, the share of R&D expenditures in GDP, and R&D expenditures by enterprises, and only by 0.7% on other factors. The tightness of the relationship between the dependent and independent variables is confirmed by the high calculated value of the Fisher's criterion ($F(3,7)=359.35$). The statistical error of the regression does not exceed 1%, which indicates the statistical significance of the results.

There was no correlation between the share of national GVA in Ukraine's exports and the employment of the working-age population in industry, the volume of capital investment in industry, as well as the share of innovative products in the total volume of industrial sales, the number of innovative products introduced, and the share of industrial enterprises that introduced innovations in the total number of industrial enterprises.

Thus, according to the results of our study, the main determinants of the volume of foreign GVA in Ukraine's exports in 2010-2020 were the indicators of employment of the working-age population in industry. The content of national GVA in Ukraine's exports during this period was determined by changes in foreign direct investment in the manufacturing industry, the share of R&D expenditures in GDP, and R&D expenditures.

4.4. The Relationship Between Ukraine's Economic Growth and Participation in the International Production Networks

The level of involvement of Ukraine's economy in global value chains has significantly decreased over the past 10 years, as evidenced by the decline in total participation in GVCs from 50.7% in 2010 to 45.7% in 2020. In this regard, it is important to determine the impact of the main indicators of Ukraine's participation in GVCs on economic growth. A comparison of the dynamics of GDP, as the main indicator of economic growth, and the dynamics of gross exports shows that the periods of growth and decline in their values generally coincide (Figure 4.8). Thus, in 2011 and 2012, GDP grew annually by 19.9% and 7.6%, while gross exports grew by 24.3% and 6%, respectively. In 2017-2018, a similar increase in these indicators was also observed: GDP grew by 20.1% and 15.6% year-on-year, while annual export growth rates were 16.3% and 10%, respectively. The periods of decline in these indicators also coincided, in particular, in 2014-2015, GDP declined by an average of 29.5% annually, and gross exports by 18.2%. Thus, we can state that there is a correlation between the dynamics of GDP and Ukraine's exports.

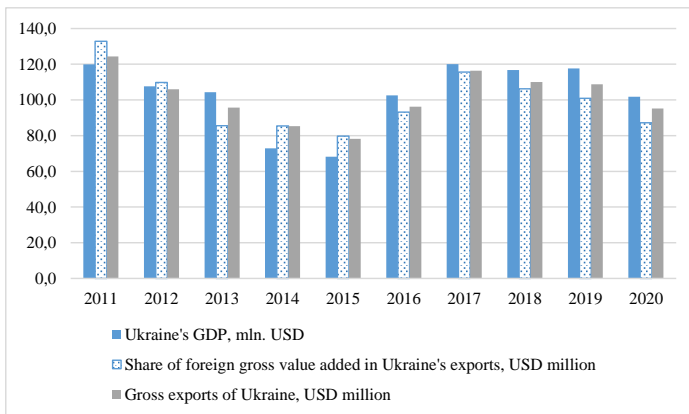


Figure 4.8. Growth rates of GDP, exports and foreign gross value added in Ukraine's exports in 2010-2020, % to the previous year⁴²⁹

⁴²⁹ Calculated and plotted by the author based on: Trade in Value Added; Gross domestic product (1990-2021) with revised balance of payments data.

https://www.ukrstat.gov.ua/operativ/operativ2020/vvp/vvp_rik/arh_vvp_rik_90-18u.htm

At the same time, as can be seen from Fig. 4.8, the dynamics of the foreign gross value added in Ukraine's exports is somewhat different from the dynamics of GDP and gross exports. In particular, the growth rate of foreign gross value added in Ukraine's exports in 2011-2012 was higher, and in 2018-2019 it was much lower than for GDP and gross exports. In addition, it should be noted that in 2013 and 2020, which are characterised by the onset of economic crises, the rate of decline in the content of foreign gross value added in Ukraine's exports was more significant than the rate of decline in GDP and gross exports. Accordingly, a more detailed analysis is needed to identify the relationship between these indicators.

As explained in Section 2.3, to determine the impact of Ukraine's participation in the GVCs on economic growth, it is advisable to conduct a regression analysis using GDP, GDP per capita, and the GDP index as the dependent variable (Table 4.7).

Table 4.7

Economic growth in Ukraine in 2010-2020⁴³⁰

Years	GDP, mln USD	GDP per capita, UAH	GDP index, % y-o-y
	<i>GDP</i>	<i>GDP_pc</i>	<i>Index_GDP</i>
2010	136109,2	23600,0	104,1
2011	163315,4	28488,0	105,5
2012	175803,4	32002,0	100,2
2013	183378,9	33473,0	100,0
2014	133578,7	36904,0	93,4
2015	91050,5	46413,0	90,2
2016	93360,7	55899,0	102,4
2017	112118,3	70170,0	102,4
2018	130893,4	84228,0	103,5
2019	153916,3	94633,0	103,2
2020	156603,3	101138,0	96,2

As independent variables, we use the coefficients of Ukraine's reverse, direct and total participation in global value chains, as well as indicators of gross exports and foreign value added in Ukraine's exports (Table 4.8). As the table shows, over the period 2010-2020, there was a decrease in the coefficient of reverse participation in

⁴³⁰ Compiled by the author based on the data: Gross domestic product (1990-2021)...

GVCs, which indicates a decrease in the dependence of the Ukrainian economy on imports of intermediate goods used to manufacture export goods. Ukraine's dependence on imports of intermediate goods was highest in 2012, when the reverse participation ratio was 32.8%. As a result of the annexation of Crimea by Russia and the outbreak of hostilities in Donbas, a significant part of Ukraine's industrial potential was lost, which led to a decrease in reverse participation in GVCs.

The coefficient of Ukraine's direct participation in GVCs, which characterises the indirect share of domestic value added in partners' exports and determines the role of Ukrainian value added in other countries' exports, increased from 21% in 2010 to 22% in 2020. Thus, during the study period, there was a slight increase in the direct participation of Ukrainian enterprises in the production of export goods in partner countries. The overall indicator of participation in global value chains, calculated as the sum of external value added in exports and domestic value added indirectly exported by trading partners, indicates a decrease in the degree of Ukraine's integration into GVCs.

Table 4.8

Indicators of Ukraine's participation in the GVCS in 2010-2020⁴³¹

Year	The share of foreign gross value added in Ukraine's exports, USD million	Gross exports, USD million	Reverse participation rate, %.	Direct participation ratio, %.	Total participation rate in the GVCs, %.
	<i>FVA_exp</i>	<i>Export</i>	<i>GVC_part_b</i>	<i>GVC_part_f</i>	<i>GVC_part</i>
2010	14387	48426	29,71	21,00	50,71
2011	19109	60204	31,74	22,00	53,74
2012	20985	63821	32,88	19,00	51,88
2013	17967	61117	29,40	20,00	49,40
2014	15355	52164	29,44	21,00	50,44
2015	12246	40824	30,00	20,00	50,00
2016	11406	39254	29,06	20,00	49,06
2017	13189	45661	28,88	22,00	50,88
2018	14010	50250	27,88	23,00	50,88
2019	14142	54661	25,87	23,00	48,87
2020	12333	52041	23,70	22,00	45,70

To conduct the regression analysis, we calculated the natural logarithms of the data presented in Tables 4.7 - 4.8. As a result of the regression analysis, we found a

⁴³¹ Calculated by the author on the basis of: Trade in Value Added...

strong relationship between Ukraine's GDP and the indicators of foreign gross value added in exports and Ukraine's gross exports, as evidenced by the high value of the correlation coefficient (Table 4.9). The relationship between Ukraine's GDP and the change in the volume of foreign GVA in exports was inverse: a 1% increase in the independent variable caused a 0.505% decrease in the dependent variable, *ceteris paribus*. At the same time, the impact of gross exports on Ukraine's GDP was direct and more significant: a 1% increase in the independent variable resulted in a 2.012% increase in the dependent variable, *ceteris paribus*. The coefficient of determination shows that during the period under study, Ukraine's GDP was 96.8% dependent on changes in the content of foreign gross value added in exports and gross exports, and only 3.2% dependent on other factors. The calculated value of the Fisher's criterion exceeds its tabulated value ($F(2,8)=122.38$), which confirms the existence of a close relationship between the dependent and independent variables. The statistical error of the regression did not exceed 5%, which indicates the statistical significance of the calculations.

The regression analysis revealed no statistically significant relationship between Ukraine's GDP and the indicators characterising Ukraine's indirect, direct and overall participation in the GVCs.

Table 4.9

Dependence of economic growth on participation
of Ukraine's economic growth in the GVCs in 2010-2020⁴³²

Factor attributes	Dependent variable	
	<i>GDP</i>	<i>GDP_pc</i>
Number of observations	11	11
Constant value	-5,143*** (1,101)	26,351*** (3,733)
<i>FVA_exp</i>	-0,505** (0,168)	-
<i>Export</i>	2,012*** (0,209)	-
<i>GVC_part_b</i>	-	-4,625*** (1,110)
R	0,984	0,811
R ²	0,968	0,658
F- criterion	F(2,8)=122,38	F(1,9)=17,36

* - statistical error rate 10%; ** - statistical error rate 5%;

*** - statistical error rate 1%.

⁴³² Calculated by the author

A somewhat weaker relationship ($R=0.811$) was found between GDP per capita and Ukraine's reverse GVC ratio. The relationship between the dependent and independent variables is inverse: a 1% increase in the reverse participation rate results in a 4.625% decrease in GDP per capita, *ceteris paribus*. The value of the coefficient of determination is relatively low and shows that the change in GDP per capita by 65.8% depended on the dynamics of the share of foreign value added embodied in imported resources in Ukraine's gross exports. The calculated value of the Fisher's criterion exceeded its tabulated value, which indicates the tightness of the relationship between the dependent and independent variables. The level of statistical error did not exceed 1%, so the results of the regression analysis are statistically significant.

At the same time, the results of the calculations did not confirm the existence of a statistically significant relationship between GDP per capita and the coefficients of Ukraine's direct and total participation in GVCs, as well as indicators of gross exports and the content of foreign gross value added in Ukraine's exports. Also, the regression analysis revealed no correlation between Ukraine's GDP index and all the indicators of the country's participation in global value chains in 2010-2020.

As shown above, according to the regression analysis, there is a strong inverse relationship between Ukraine's GDP and the content of foreign gross value added in Ukrainian exports. In view of this, we believe it is advisable to conduct an additional study of the impact of the involvement of key industries in global value chains on Ukraine's economic growth. To this end, we will conduct a regression analysis of the dependence of GDP, GDP per capita, and GDP index on the share of foreign value added embodied in imported inputs in gross exports of food products, textiles and clothing, wood and paper products, chemicals and pharmaceuticals, basic metals and fabricated metal products, computers, electronic and electrical equipment, non-electrical machinery and equipment, and vehicles (Table 4.10).

Table 4.10

The share of foreign value added embodied in imported inputs in gross exports of industrial products of Ukraine in 2010-2020, %⁴³³

Year	Food, beverages, tobacco	Textiles, clothing	Wood and paper products	Chemical and pharmaceutical products	Basic metals and finished metal products	Computers, electronic and electrical equipment	Machinery and equipment	Vehicles
	<i>X1</i>	<i>X2</i>	<i>X3</i>	<i>X4</i>	<i>X5</i>	<i>X6</i>	<i>X7</i>	<i>X8</i>
2010	24,7	15,8	34,0	46,0	46,5	30,2	30,7	31,7
2011	26,4	18,4	37,4	48,0	48,3	34,4	34,8	36,4
2012	29,7	23,6	41,1	48,6	50,0	39,4	39,1	36,4
2013	29,0	22,3	39,9	47,1	49,4	39,5	36,1	30,9
2014	28,2	22,9	38,1	43,6	45,8	38,1	35,9	31,8
2015	27,7	25,0	38,3	44,2	47,2	39,3	37,2	34,6
2016	28,5	26,5	37,9	42,0	43,6	38,4	35,7	34,5
2017	29,1	27,8	37,2	42,6	42,1	37,3	35,2	33,3
2018	28,5	27,9	36,7	41,5	38,6	36,5	34,0	34,4
2019	28,2	27,4	34,4	40,2	36,2	35,1	32,9	33,1
2020	25,0	25,7	32,0	37,3	34,3	35,1	33,3	33,4

The regression analysis revealed a strong direct ($R=0.990$) relationship between Ukraine's GDP per capita and changes in the share of foreign value added in exports of textiles and clothing: a 1% increase in the independent variable led to a 2.45% increase in the dependent variable, *ceteris paribus* (Table 4.11). At the same time, an inverse relationship was found between GDP per capita and the share of foreign value added in exports of wood and paper products: a 1% increase in the independent variable led to a 3.744% decrease in the dependent variable, *ceteris paribus*. Thus, the negative impact of foreign value added in exports of wood and paper products on Ukraine's economic growth was stronger than the positive impact of foreign value added in exports of textile and clothing. The coefficient of determination indicates that GDP per capita was 98.2% dependent on the import content of exports of textiles and clothing and wood and paper products, and only 1.8% dependent on other factors. The calculated value of Fisher's criterion significantly exceeded its tabulated value, which

⁴³³ Calculated by the author on the basis of: Trade in Value Added...

confirms the tightness of the relationship between the dependent and independent variables. The level of statistical error in the regression did not exceed 1%, which indicates the statistical significance of the results.

Table 4.11

Dependence of Ukraine's economic growth on the participation of industries in GVCs in 2010-2020⁴³⁴

Factor attributes	Dependent variable	
	<i>GDP_pc</i>	<i>GDP_pc</i>
Number of observations	11	11
Constant value	16,568*** (1,262)	17,134*** (1,714)
<i>X2</i>	2,450*** (0,134)	-
<i>X3</i>	-3,744*** (0,335)	-
<i>X5</i>	-	-3,999*** (0,283)
<i>X6</i>	-	2,432*** (0,454)
R	0,990	0,980
R ²	0,982	0,962
F- criterion	F(2,8)=219,05	F(2,8)=101,48

* - statistical error rate 10%; ** - statistical error rate 5%; *** statistical error rate 1%.

The regression analysis also revealed a somewhat weaker, but still quite strong (R=0.980) relationship between GDP per capita and the shares of foreign value added in exports of basic metals and finished metal products, computers, electronic and electrical equipment. At the same time, the relationship between GDP per capita and the import component of exports of basic metals and finished metal products was inverse: a 1% increase in the independent variable caused a 3.999% decrease in the dependent variable, *ceteris paribus*. At the same time, the relationship between GDP per capita and the import component of exports of computers, electronic and electrical equipment was direct: a 1% increase in the independent variable resulted in a 2.432% increase in the dependent variable, *ceteris paribus*. The coefficient of determination shows that Ukraine's GDP per capita depended by 96.2% on the imported component

⁴³⁴ Calculated by the author

in exports of basic metals and finished metal products, computers, electronic and electrical equipment, and only by 3.8% on other factors. The calculated value of the Fisher's criterion significantly exceeds its tabulated value, which confirms the tightness of the relationship between the dependent and independent variables. The level of statistical error of the regression did not exceed 1%, which indicates the statistical significance of the results.

The regression analysis revealed no statistically significant correlation between Ukraine's economic growth indicators (GDP and GDP index) and the foreign GVA content in exports of Ukrainian products from the main manufacturing industries. There is also no statistically significant relationship between GDP per capita and the share of foreign content in exports of products from such industries as food, chemicals and pharmaceuticals, machinery and equipment, and vehicles.

The study showed that the impact of Ukraine's participation in global value chains on economic growth is manifested through the dependence of GDP on the foreign content of GVA in exports, as well as through the impact of the coefficient of reverse participation in GVCs on changes in GDP per capita. The largest negative impact of the growth in the share of foreign value added in exports of wood and paper products and basic metals and fabricated metal products on GDP per capita was the growth in the share of foreign value added in exports. The positive impact of the share of foreign value added in exports of textiles and clothing, computers, electronic and electrical equipment on GDP per capita was somewhat smaller. Thus, the results of the study confirmed the negative role of exports of products with a high raw material content on Ukraine's economic growth in 2010-2020.

4.5. Prospects for Ukraine's Participation in Global Value Chains in the Post-war Economic Recovery

Along with the benefits of countries' participation in global production networks, there are significant risks of external shocks being transmitted to national economies during global crises caused by various global factors (financial, armed conflicts, pandemics). In this regard, European governments are actively searching for optimal

scenarios for economic development while preserving the benefits of participation in international cooperation. At the same time, an urgent task remains to reduce the impact of external shocks that arose during the coronavirus pandemic and the full-scale invasion of Ukraine by Russian troops, which was reflected in disruptions in the links between links in global value chains.

One of the main ways to increase the resilience of global value chains to external shocks is to shift production back into the national economy. This is expected to not only increase resilience, but also reduce dependence on systemic competitors such as China⁴³⁵. In general, four scenarios are considered for the EU's decoupling from global value chains, with different impacts on trade and welfare. The first scenario considers a unilateral decoupling of the EU from the rest of the world, with the aim of reducing imports and shifting production back to EU countries. The second scenario envisages mutual decoupling, which means explicit restrictions not only on imports from the EU but also on exports. Against the backdrop of increasing dependence on China, the third scenario is only the EU's mutual decoupling from China, and the fourth scenario involves the EU, the US and its allies' mutual decoupling from Russia⁴³⁶.

The results of modelling conducted by scientists⁴³⁷ have shown that the transfer of production back to the EU will lead to a decline in living standards due to lower incomes. In addition to political effects, secession could have a positive impact in terms of increasing the resilience of the European economy. A return to autarky would protect the EU economy from the impact of crises in third countries, such as the pandemic lockdown in China or the ban on Russian gas exports. However, it would also make the European economy more vulnerable to internal risks (e.g., floods in Germany or the forced closure of nuclear power plants in France). In such cases, international trade has traditionally played the role of insurance, as the necessary goods can be imported in a crisis. A return to autarky would deprive the EU of such opportunities.

⁴³⁵ Felbermayr, G., A. Sandkamp, H. Mahlkow and S. Gans. Decoupling Europe. Kiel Policy Brief. 2021. №153

⁴³⁶ Sandkamp A. Reshoring by Decree? The Effects of Decoupling Europe from Global Value Chains. <https://www.intereconomics.eu/contents/year/2022/number/6/article/reshoring-by-decree-the-effects-of-decoupling-europe-from-global-value-chains.html>

⁴³⁷ Felbermayr, G., A. Sandkamp, H. Mahlkow and S. Gans. Decoupling Europe...

Bilateral disengagement with Russia may be politically feasible. However, instead of a general resumption of production, diversification is considered a better strategy to reduce dependence. Sourcing intermediate goods from different regions of the world would strengthen the resilience of the EU economy while preserving the benefits of international trade. This diversification can be facilitated by the European Commission by expanding international cooperation. In particular, trade agreements would help reduce trade barriers, for example through mutual recognition of standards, and thus make it easier for European companies to increase the number of source countries. Similarly, investment agreements can reduce risks and thus encourage investment in new production facilities abroad. In addition, funds earmarked for international investment projects in the context of the EU's Global Gateway initiative⁴³⁸, can be used to invest in energy or raw material production projects that will ensure the supply of critical raw materials and energy for the European economy.

In addition to diversification, additional ways to increase resilience include improving warehousing and strategic reserves at the EU level⁴³⁹. Improved refining systems are particularly important as the production of certain raw materials can never be relocated to the EU due to the lack of suitable deposits in the Member States. At the same time, the latest recycling technologies will contribute to improving environmental friendliness and reducing carbon emissions. Finally, modern technologies such as 3D printing can accelerate the obsolescence of certain complex manufacturing processes and thus contribute to shorter supply chains and thus increase their sustainability⁴⁴⁰.

For Ukraine, openness of international trade with the EU is an important factor of economic development and one of the tools for solving economic problems on the way to European integration. After the entry into force of the EU-Ukraine Association Agreement and the introduction of a free trade regime between our country and the EU member states, trade turnover between the two countries doubled from USD 27.4

⁴³⁸ European Commission. Global Gateway. https://ec.europa.eu/info/strategy/priorities-2019-2024/stronger-europe-world/global-gateway_en

⁴³⁹ Felbermayr, G., A. Sandkamp, H. Mahlkow and S. Gans. Supply chains in the post-Corona era. IFW study for the Mechanical Engineering Industry Association. 2020

⁴⁴⁰ Sandkamp A. Reshoring by Decree? The Effects of Decoupling Europe...

billion in 2015 to USD 55.4 billion in 2016. In 2015, the trade turnover between the two countries doubled from USD 27.4 billion to USD 55.7 billion. In 2021, the trade turnover between the two countries will double from USD 27.4 billion in 2015 to USD 55.7 billion in 2021 (Figure 4.9).

At the same time, the annual growth rate of exports exceeded the growth rate of imports. For example, in 2011-2021, the average annual growth rate of exports was 109.2%, while the growth rate of imports was 105.9%. Between 2015 and 2021, exports increased by 111.8% and imports by 96.2%. This trend had a positive impact on the balance of mutual trade and helped reduce the negative balance from -USD 5,775.5 million in 2010 to -USD 21.5 million in 2021. USD in 2010 to -2161.3 million in 2021. In 2021, the negative balance will be reduced to USD 2,161.3 million.

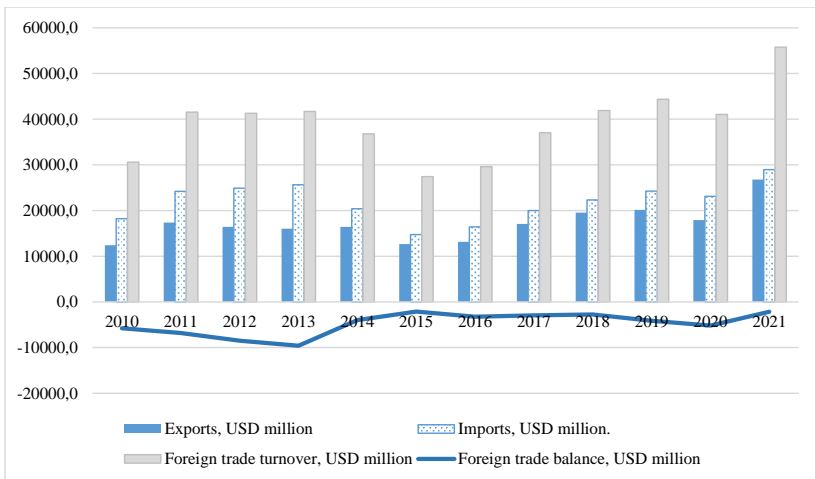


Figure 4.9. Dynamics of Ukraine's foreign trade with the EU in 2010-2021⁴⁴¹

From the perspective of Ukraine's inclusion in global value chains, it is important to analyse the commodity structure of foreign trade with the EU. Ukraine's exports of goods were dominated by products with a high content of raw materials: non-precious metals and products made from them; ores, slag and ash; fats and oils of animal or

⁴⁴¹ Built by the author based on data: Dynamics of the geographical structure of foreign trade in goods in 1996-2021. <https://www.ukrstat.gov.ua/>

vegetable origin; cereals, seeds and fruits of oilseeds (Figure 4.10). Moreover, during the period of the EU-Ukraine Association Agreement, the share of exports of certain commodity groups of raw materials has increased. For example, in 2021, the share of ore, slag, and ash in exports increased by 3.8ppt compared to 2015, and the share of fats and oils of animal or vegetable origin increased by 3.6ppt, respectively. At the same time, over the same period, the share of goods with a higher degree of processing, on the contrary, decreased - machinery, equipment and mechanisms, electrical equipment by 1.9 pp, and finished food products by 1.8 pp.

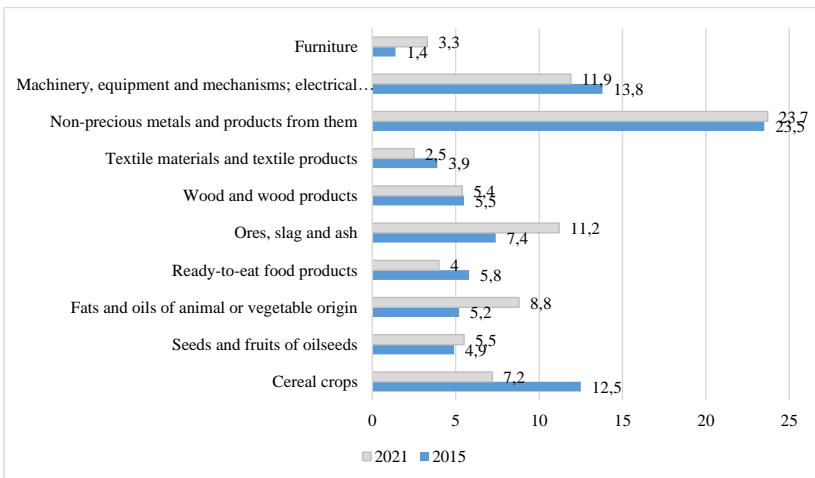


Fig. 4.10. Dynamics of the structure of exports of goods from Ukraine to the EU countries in 2015 and 2021, % of total⁴⁴²

In 2021, imports of goods from the EU to Ukraine were dominated by products with a high level of added value (Figure 4.11). The largest share of imports was machinery, equipment and mechanisms, electrical equipment (20.3%) and land transport, aircraft, and floating craft (12.2%). The share of these goods in Ukraine's imports has increased since the main provisions of the EU-Ukraine Free Trade Agreement came into force. In 2021, compared to 2015, the share of machinery,

⁴⁴² Compiled by the author based on data: Cooperation between Ukraine and the EU countries in 2015. Statistical collection. Kyiv: State Statistics Service of Ukraine, 2016. 195 p., pp. 30-38; Commodity structure of foreign trade with the EU countries in 2021. <https://www.ukrstat.gov.ua>

equipment and mechanisms, electrical equipment increased by 2.9 pp, and vehicles by 6.6 pp, respectively. There was also an increase in the share of finished food products in imports from 5.1% to 7.8% (by 2.7ppt) and pharmaceuticals from 6.4% to 7.0% (by 0.6ppt). At the same time, there was a significant decrease in the share of mineral fuels, oil and its distillation products in imports - from 22.2% in 2015 to 11% in 2021.

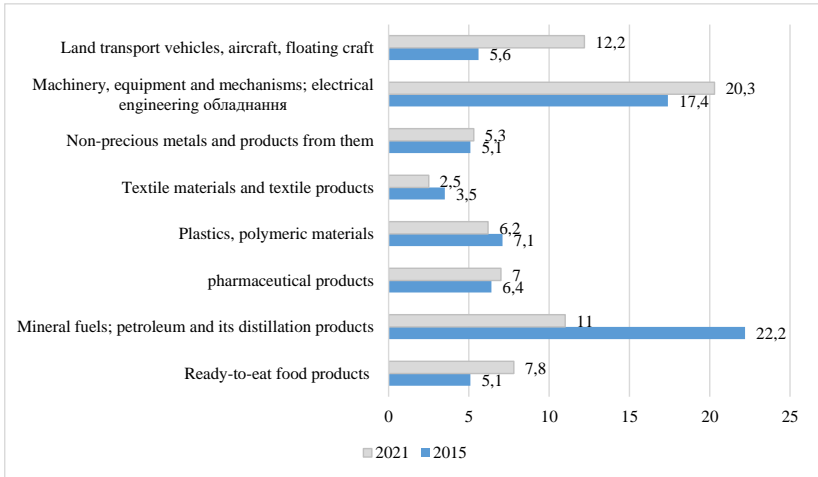


Fig. 4.11. Dynamics of the structure of imports of goods from the EU to Ukraine in 2015 and 2021, % of total⁴⁴³

Ukraine's largest trading partners are Poland, Germany, and Italy. In 2021, the share of Poland in Ukraine's exports to the EU was the largest, accounting for 19.5%, while the shares of Italy and Germany were slightly lower, at 12.9% and 10.7%, respectively. Imports of goods to Ukraine were dominated by Germany, which accounted for 21.7% of all goods imported from the EU in 2021, while Poland and Italy accounted for 17.1% and 9.2%, respectively.

The countries that use Ukrainian value added to produce export goods the most are Poland and Germany, whose leading position has remained unchanged since 2015 (Table 4.12). According to our estimates, in 2020, 4.25% of Ukrainian exports were

⁴⁴³ Built by the author based on data: Cooperation between Ukraine and the EU in 2015...., pp. 30-38; Commodity structure of foreign trade with the EU in 2021. <https://www.ukrstat.gov.ua>

Ukrainian value added used in Polish export production, while the share of value added in Ukrainian exports destined for export production in Germany was slightly lower at 4.16%. Italy was in third place (1.29%), followed by France (1.13%), which in 2021 increased imports of Ukrainian goods by 51% compared to the previous year. As can be seen from the table, during the period under study, Hungary, Austria, and the Netherlands slightly reduced imports of Ukrainian value added for the production of their export products, while the Czech Republic and Lithuania increased them.

Table 4.12

EU countries that use Ukrainian value added in the production of export goods the most⁴⁴⁴

Country	Ukrainian value added, USD million		Share of value added in Ukraine's exports, %.	
	2015	2020	2015	2020
Poland	1477	2093	3,87	4,25
Germany	1479	2046	3,88	4,16
Italy	410	638	1,07	1,29
France	427	554	1,12	1,13
Hungary	385	396	1,00	0,81
Austria	325	392	0,85	0,79
Czech Republic	220	384	0,57	0,78
Lithuania	142	338	0,37	0,69
Netherlands	210	239	0,55	0,48

Using the TiVA data, it is also advisable to analyse the inverse relationship of foreign value added. In particular, if Ukraine is a partner of a given EU country participating in GVCs in the form of a direct link, it is necessary to check the importance of our country in this regard, i.e. to determine what part of its exports this country directs to create value in Ukrainian exports. Our calculations show that the economies of Germany, Poland, and Lithuania are leading the list of Ukraine's main partner countries (Table 4.13). However, the list of leading countries in 2020 has changed somewhat compared to 2015. Thus, while Germany and Poland remain the permanent leaders of the top three countries, in 2021 Lithuania moved to third place,

⁴⁴⁴ Calculated by the author on the basis of [Direct domestic value added content of exports. https://stats.oecd.org/OECDStat_Metadata/ShowMetadata.aspx?Dataset=TIVA_2022_C1&Coords=%5bVAR%5d.%5bEXGR_DDC%5d&ShowOnWeb=true&Lang=e

as the share of Lithuanian value added in Ukraine's exports more than doubled, and Hungary moved to 4th place. The share of value added imported from the Czech Republic, Italy, and France for the production of Ukrainian exports also increased significantly during the study period.

Table 4.13

Share of foreign value added in Ukrainian exports by country of origin of value added⁴⁴⁵

Country	Volume of foreign added value, mln USD		Share of foreign value added in Ukraine's exports from EU countries, %.	
	2015	2020	2015	2020
Germany	753	1157	2,12	2,71
Poland	810	1332	1,97	2,35
Lithuania	158	513	0,41	1,04
Hungary	373	465	0,98	0,94
Czech Republic	207	368	0,54	0,75
Italy	215	357	0,56	0,72
France	309	325	0,54	0,66
Austria	159	209	0,42	0,43
Netherlands	146	173	0,38	0,35

The application of the methodology for assessing international trade based on the definition of added value allowed us to determine Ukraine's place in value chains with EU countries. The results of the assessment of the sources of value added in Ukrainian exports clearly indicate that in 2015-2020, the role of value added by European companies in Ukrainian exports increased. Therefore, it can be concluded that Ukrainian exports are increasingly dependent on value added generated abroad, particularly in the EU. In our opinion, international corporations whose branches in Ukraine use imported resources in the form of raw materials or components play an important role in this regard.

The growing importance of external value added originating in the EU in Ukrainian exports means that the share of domestic value added in exports is decreasing. From an economic policy perspective, on the one hand, an increase in

⁴⁴⁵ Calculated by the author on the basis of: Presents the foreign value added embodied in the exports by domestic industry in country. https://stats.oecd.org/Index.aspx?DataSetCode=TIVA_2022_C1

domestic value added in Ukraine's exports is an important factor in economic growth, as only this part of exports is included in the value added in the national economy and affects GDP. On the other hand, from the perspective of the need to intensify our country's European integration process, Ukraine's growing participation in the EU's global value chains indicates an increase in the competitiveness of the Ukrainian economy.

Thus, the sectors in which Ukraine is an active participant in GVCs are important for partners from the most developed EU countries. Therefore, the cost factor is not the only or even the most important factor in the process of choosing business partners. And for Ukraine, especially after gaining the status of an EU candidate country, it is important to ensure a quick reorientation from the Russian market to the markets of European countries. The level of ties in the GVCs differs by industry sector. Accordingly, Ukraine needs to develop cooperation with EU countries in sectors of the economy where higher national value added will be created. Therefore, we believe that it is promising for the Ukrainian economy to be included in the upper levels of the GVCs that are typical for industrial sectors, including, in particular, automotive, computer equipment, electronic and optical equipment, and machinery and equipment. It is also important to expand the production and export of products with a higher level of domestic value added, which will allow the transition from the lower links of the GVCs to the upper links of the value chains. In other words, it is advisable to introduce new technologies and increase the production of higher value-added products in such sectors as agriculture and mining.

Russia's full-scale military aggression against Ukraine has caused external shocks to the EU economies not only because of their dependence on Russian energy supplies, but also because of a significant disruption in the logistics of intermediate goods from Ukraine, which are usually used to manufacture finished products by European companies. In particular, as it turned out after the Russian invasion of Ukraine, the EU's economy is dependent on supplies of agricultural products from Ukraine, especially vegetable oil. In the trade of this commodity, European food producers have close ties with Ukraine within the framework of the GVCs.

As shown above, the share of fats and oils of animal and vegetable origin in Ukraine's exports to the EU has almost doubled over the past five years. In addition to oil, Ukraine is one of the main suppliers to the European market of other intermediate goods, such as cereals, seeds and fruits of oilseeds, which are used for the production of finished food products or other intermediate products within the GVCs. Accordingly, as a result of disruption of supply of these products, there is a high probability of a decrease in the volume of production of final products by European manufacturers due to lack of raw materials, increase in prices for both raw materials and finished products. Obviously, the increase in oil prices will affect not only the functioning of agricultural enterprises that grow oilseeds or produce oil. The impact will also be felt by manufacturers of food products using oil, the cosmetics industry, and, to some extent, pharmaceutical companies. However, consumers will bear the brunt of the price increase.

Reducing oil supplies from Ukraine will help strengthen the positions of competitors from Turkey, the Netherlands and Hungary, and will encourage companies to switch to rapeseed, soybean and other oils, which will increase the participation of producers of other types of oils in GVCs. Thus, taking into account the sectoral peculiarities of countries' participation in global value chains is important in determining the areas of deepening Ukraine's cooperation with the EU and as an important factor in ensuring economic growth in our country after the war.

Our research has shown that EU economies are deepening their ties with Ukraine through global value chains. In order to support the Ukrainian economy during the war, the European Parliament and Council approved the extension for another year (until June 2024⁴⁴⁶) of the rules and regulations introduced on 4 June 2022 under the Regulation of the European Parliament and of the Council on Temporary Measures for the Liberalisation of EU Trade with Ukraine, which provide for the elimination of tariffs in the EU-Ukraine Association Agreement. Thus, the terms of trade of Ukrainian

⁴⁴⁶ Ukraine: Council adopts renewal of temporary trade liberalisation and other trade concessions. Council of the EU. Press release, 25 May 2023. <https://www.consilium.europa.eu/en/press/press-releases/2023/05/25/ukraine-council-adopts-renewal-of-temporary-trade-liberalisation-and-other-trade-concessions>

exporters with EU member states have improved due to the suspension: ‘the application of duties on industrial products, the application of the system of input prices for fruits and vegetables; all tariff quotas for agricultural products; anti-dumping duties on imports of goods originating in Ukraine; application of global safeguard measures against Ukrainian goods’⁴⁴⁷.

The introduction of these measures could have a positive effect on the Ukrainian economy by increasing agricultural exports, as the abolition of quotas would allow the sale of large volumes of agricultural products that have been fully used up free of duty. For example, in 2021, Ukraine fully used all quotas for duty-free supplies to the EU of honey, apple and grape juice, barley groats and flour, as well as canned tomatoes, processed starch, processed cereal products, eggs and poultry meat⁴⁴⁸.

In 2021, agricultural products accounted for the largest share in Ukraine's exports of goods to the EU (28.6%), dominated by products of plant origin (14.3%) and fats and oils of animal and vegetable origin (8.8%). The growth rates of exports in these product groups were relatively high and amounted to 122.3% and 135.3% in 2021 compared to 2020⁴⁴⁹, which allowed us to predict a further increase in exports of these goods.

However, the European Union's decision to cancel duties on Ukrainian goods only created additional obstacles for agricultural exports from Ukraine to the EU. The conflict situation arose as a result of the sale of a significant portion of grain in the EU, which was supposed to transit through the territory of European countries, including Poland. As Ukrainian grain was cheaper and was purchased for feed production, Polish farmers suffered significant losses. In this regard, Poland imposed a ban on imports of almost all agricultural products from Ukraine. This decision was unfair, if only because, thanks to the supply of cheap Ukrainian wheat, Polish farmers increased their meat exports by 37% in 2022 compared to 2021 (to €9.6 billion), and dairy exports

⁴⁴⁷ EU cancels duties on Ukrainian goods. https://export.gov.ua/news/3876-ies_skasuvav_mita_na_ukrainski_tovari

⁴⁴⁸ Molodan V. Ukraine increased exports of agricultural products to the EU by almost 30%: what we sell.

<https://delo.ua/uk/agro/ukrayina-maize-na-30-zbilsila-eksport-agroprodukciji-do-ies-shho-prodajemo-392965>

⁴⁴⁹ Commodity structure of foreign trade with the EU in 2021. <https://ukrstat.gov.ua/>

also increased by 37% (to €3.6 billion)⁴⁵⁰. Following Poland, Bulgaria, Slovakia and Hungary also imposed a ban on the import of Ukrainian agricultural products, but this ban concerned only wheat.

To resolve this crisis, the European Commission has decided to temporarily ban imports of Ukrainian wheat, corn, rapeseed and sunflower to such EU countries as Bulgaria, Hungary, Poland, Romania and Slovakia⁴⁵¹. Instead, these countries resumed the transit of Ukrainian agricultural products and imports of all other types of agricultural products that they had previously banned. Consequently, Ukrainian exporters were unable to take full advantage of the abolition of duties on agricultural products to the EU, including Poland, which is the most important market for our country. This situation has confirmed the existence of high risks for the Ukrainian economy if it continues to specialise in the export of agricultural raw materials.

In this regard, in the context of the post-war economic recovery, the problem of changing the commodity structure of exports by increasing the number of products with a higher degree of processing is becoming more urgent, which, in turn, will facilitate the movement to higher levels of the GVC. According to the Recovery Plan for Ukraine proposed by the Ukrainian government in 2022, to ensure annual economic growth of 7%, it is necessary to attract investments of USD 750 billion to implement 850 projects over 17 years. The plan calls for USD 750 billion to implement 850 projects under 17 national programmes⁴⁵².

Ukraine's Recovery Plan is scheduled to be implemented until 2032 in three stages, the first of which was completed in 2022 and included National Programmes that required urgent funding of USD 60-65 billion. The first stage was completed in 2012 and included National Programmes that required urgent funding of USD 60-65 billion in the areas of defence and security, competitive access to capital, and macrofinancial stability. The second stage, over 2023-2025, envisages attracting USD

⁴⁵⁰ Radchenko H. Ukraine's path to the EU will not be easy - the grain crisis has confirmed this. <https://forbes.ua/money/shlyakh-ukraini-do-es-bude-neprostim-zernova-kriza-tse-pidtvordila-rozvyazati-problemu-mozhe-depozitna-sistema-dlya-zerna-vvazhae-gennadiy-radchenko-18042023-13132>

⁴⁵¹ Panchenko Y. Small agrarian blockade. Explaining the consequences of the EU decision that eased the Polish ban. <https://www.eurointegration.com.ua/articles/2023/05/3/7160872/>

⁴⁵² Ukraine's recovery plan. <https://recovery.gov.ua/>

300 billion. The second stage will involve attracting USD 300 billion to implement national programmes in the following areas: 'security and defence; energy security and transition to green energy; ensuring competitive access to capital; macro-financial stability; development of high value-added sectors of the economy; logistics and communication; modernisation of regions and housing construction'⁴⁵³. At the third stage, in the period 2026-2032, funding in the amount of USD 400 billion is envisaged for the modernisation of the Ukrainian economy. This will be allocated in the amount of USD 400 billion under national programmes aimed at strengthening energy security and ensuring the development of green energy, developing high value-added sectors of the economy, building logistics networks and transport links, modernising regions and housing, and creating modern social infrastructure⁴⁵⁴.

From the perspective of improving the position of Ukrainian producers in global value chains in the process of European integration, the National Programme for Integration into the EU is important, with the main objective of facilitating access of Ukrainian producers to the markets of the seven largest EU member states and a part of the measures already funded. At the same time, it should be noted that the implementation of this programme should take into account the possibility of maximising the use of the duty-free regime for exports of industrial products from Ukraine to the EU in 2023-2024. This would allow for an increase in exports of chemicals, polymeric materials and plastics, textiles and textile products, machinery and equipment.

However, given the extent of physical destruction of a significant part of Ukraine's industrial potential by Russian aggressors, we should not expect a significant increase in exports of machinery and equipment, including electric machines, which are high-tech goods, in the short term, as despite the cancellation of duties, demand in the EU for Ukrainian products is not increasing due to their insufficient technological level.

⁴⁵³ Zaika B. 'Lugano Declaration'. The Cabinet of Ministers presented a \$750bn plan to restore Ukraine. <https://biz.liga.net/ua/ekonomika/all/article/deklaratsiya-lugano-pravitelstvo-predstavilo-plan-po-vosstanovleniyu-ukrainy-na-750-mlrd>

⁴⁵⁴ Zaika B. 'Lugano Declaration'

In view of this, we believe that an important component of the Recovery Plan is the implementation of projects under the National Programme aimed at developing sectors of the economy that produce high value-added products. According to the Recovery Plan, such projects include the development of machine-building enterprises and the restoration of agricultural processing enterprises by attracting funding in the amount of USD 50 billion by the end of the year. The plan is to raise USD 50 billion by the end of 2032⁴⁵⁵. It should be noted that the third phase of the Recovery Plan envisages the involvement of mainly foreign investors, who will start actively investing in the Ukrainian economy only after the war is over. Thus, in the short term, Ukraine should establish transport logistics and take full advantage of the duty-free regime for exporting Ukrainian goods to the EU, which will primarily help to increase exports of agricultural products with a higher level of processing to the European market.

Given the situation with the embargo imposed by Bulgaria, Slovenia, Poland, Hungary and Romania on imports of major grain products and seeds from Ukraine, despite the continuation of the duty-free regime, Ukrainian farmers need to increase their capacity to process these raw materials into finished products. This will be in line with the priority of the Recovery Plan of Ukraine to increase exports of products with a higher degree of processing. Svyrydenko emphasises that exporters should move from exporting agricultural raw materials (cereals and oilseeds) to exporting processed products (flour and oil), which will increase the efficiency of export operations by reducing the volume of raw materials that require higher transport costs compared to semi-finished or finished products⁴⁵⁶. Thus, exports of agricultural products with a higher level of added value will increase foreign exchange earnings for the country and improve the position of Ukrainian enterprises in the GVCs.

Exports of industrial products with a higher level of added value and high-tech goods will not grow in the short term, as such changes require significant investments in the structural adjustment of the Ukrainian economy. The technological

⁴⁵⁵ Ukraine's recovery plan. <https://recovery.gov.ua/>

⁴⁵⁶ Svyrydenko Y. How will Ukraine recover??
<https://www.pravda.com.ua/columns/2022/04/21/7341214/>

backwardness of domestic manufacturing enterprises is the most important factor affecting the quality structure of Ukraine's exports. Accordingly, the low level of national value added in industrial goods or the production of intermediate goods causes domestic enterprises to be included in the lower links of global value chains.

In view of this, during the post-war economic recovery of Ukraine, along with the reconstruction of housing and infrastructure, it is necessary to implement projects to modernise existing or build modern industrial enterprises in line with the challenges of Industry 4.0, which will help accelerate structural changes in the economy and ensure the development of high-tech industries as a basis for the involvement of Ukrainian enterprises in the higher levels of global value chains. We believe that the development of the military-industrial complex is a particularly promising area, which will allow Ukraine not only to join the top ranks of the GLCI, but also to strengthen our country's defence potential in the face of a permanent threat from Russia. From this point of view, it is advisable to conclude agreements with the EU countries, according to which 'the transfer of military technologies and the placement of production facilities in Ukraine that will replenish the fleet of military equipment of European countries in accordance with NATO standards' will be ensured⁴⁵⁷.

The restructuring of the Ukrainian industry requires significant financial resources, and with insufficient investment, the pace of modernisation of the industrial complex will be slow. The Recovery Plan of Ukraine provides only USD 50 billion for the implementation of national programmes aimed at developing high value-added sectors of the economy. This is 6.7% of the total amount (USD 750 billion). This amount of investment may not be sufficient for the development of the processing industry in the post-war period, which will form the basis for the implementation of infrastructure reconstruction projects, as enterprises need to increase production for construction, technical equipment of newly built enterprises, and the military-industrial complex. Therefore, an important task is to deepen cooperation with European

⁴⁵⁷ Shavaliuk L. What to consider when preparing a new 'Marshall Plan' for Ukraine.

<https://hvylya.net/uk/analytics/253171-shcho-potribno-vrahuvati-gotuyuchi-noviy-plan-marshalla-dlya-ukraïini>

companies that are willing to invest in joint ventures in Ukraine or open their own branches for the production of medium and high-tech products after the active phase of hostilities is over.

The Vice Prime Minister for Economy, Yulia Svyrydenko, identified partnership with the EU, in particular in the area of technology transfer and creation of competitive conditions for access to capital, as the main instruments for implementing the Reconstruction Plan of Ukraine⁴⁵⁸. Following the signing of the EU-Ukraine Association Agreement, domestic intermediate goods producers have deepened their ties with European companies that use Ukrainian products to manufacture export goods.

Ukraine's exports of goods to the EU are dominated by non-precious metals and products made from them, mainly ferrous metals, which are considered low-value-added raw materials. Ukraine also exports iron ore, which accounted for about 10% of its merchandise exports to the EU in 2021. However, given the significant negative impact of the growing share of foreign value added in exports of basic metals and finished metal products on Ukraine's economic growth, it is advisable for Ukrainian companies to gradually reduce their exports of raw materials.

From this point of view, we believe that increasing the processing of iron ore into metal and its use in domestic production of machine building products is a promising direction for domestic producers to move from the lower to the upper links of the GVC in the post-war economic recovery. This will significantly increase the efficiency of export operations, as the added value of iron ore is much lower compared to electric machines (for comparison, ore is exported for USD 500-1000 per tonne, while the cost of electric machines is USD 15-20 thousand per tonne⁴⁵⁹). However, the practical implementation of this direction depends on state support for the restoration and development of domestic metallurgical and machine-building enterprises. As a result of the hostilities, most metallurgical enterprises were destroyed, which significantly reduced the industry's export potential due to the inability to produce the

⁴⁵⁸ Svyrydenko Y. How will Ukraine recover? <https://www.pravda.com.ua/columns/2022/04/21/7341214/>

⁴⁵⁹ Svyrydenko Y. How will Ukraine recover?

full range of products. However, in the context of an objective decline in exports of metallurgical products, it is important to ensure domestic demand for these products, which are the basis for manufacturing machine-building products.

At the same time, the positive impact of the share of foreign added value in exports of textiles and clothing, computers, electronic and electrical equipment on Ukraine's economic growth, as identified by us, allows us to reasonably consider the development of these industries as promising for deepening Ukraine's participation in the GVCs and cooperation with the EU. Thus, the National Programme for the Development of High Value Added Sectors should include investment projects for the modernisation and technical upgrading of textile industry and electronic and instrumentation engineering enterprises in the Recovery Plan of Ukraine.

Conclusions to the chapter

The results of calculating the indicators of Ukraine's participation in global value chains showed that in the period 2010-2020, the Ukrainian economy decreased its dependence on imports of components and parts used in the production of export goods. According to our calculations, there was an increase in the direct participation of Ukrainian producers in the creation of export goods in partner countries, as evidenced by the growth of the direct participation ratio. There was a decrease in the value of the overall indicator of Ukraine's participation in global value chains, which indicates a decrease in the level of integration of the Ukrainian economy into global value chains. During the period under review, the GVC position index was negative, although it decreased significantly, indicating significant imports of intermediate goods and the country's specialisation in the final stages of production. However, the results of the analysis of the main indicators of participation of Ukrainian industries in GVCs showed a gradual shift towards participation in the initial stages of the chain from the production of computers, electronic and electrical equipment.

The results of the regression analysis confirmed the first hypothesis regarding the dependence of Ukraine's reverse participation in the GVCs in 2010-2020 on the volume of foreign direct investment in the manufacturing industry, the weak influence

of the share of R&D expenditures in GDP on the degree of direct participation in the GVCs, as well as the influence of the share of industrial employees in the total number of employed and the share of innovative products in the total volume of industrial products sold on the degree of Ukraine's overall participation in the GVCs in the period under review. The second hypothesis about the impact of employment of the working-age population in industry on the volume of foreign gross value added in Ukraine's exports in 2010-2020 was partially confirmed. At the same time, there was no impact of indicators of innovation activity of industrial enterprises, the volume of FDI in the processing industry and capital investment in industry on the content of foreign gross value added in Ukraine's exports. The results of the regression analysis confirmed the third hypothesis regarding the dependence of the content of national GVA in Ukraine's exports in 2010-2020 on the dynamics of foreign direct investment in the manufacturing industry, the share of R&D expenditures in GDP, and R&D expenditures.

An analysis of the data on the participation of the EU-28 countries in global value chains for 1995-2020 shows that over this period, all the economies under study have strengthened their integration into the global production and trade system. The new member states have become more involved in the process of production fragmentation, which can be attributed to the inflow of foreign direct investment. Among the countries considered, Luxembourg, Slovakia, Malta, Hungary, and Cyprus were the most involved in GVCs, as evidenced by the high value of the overall participation rate in 2020 (over 60%). In contrast, Ukraine was characterised by a slight downward trend in overall participation in GVCs, which was at an average level. During the period under review, 27 EU countries strengthened their value chain backward linkages, with the strongest trends in Greece, Hungary, Cyprus and Luxembourg. In Ukraine, the trend was the opposite, as evidenced by a significant decline in the GVC backward linkage ratio. In turn, an increase in integration with GPPs up the value chain was recorded in 26 countries, with Croatia, Romania, Slovenia, Lithuania and Austria leading the way.

The study showed that the current state of Ukraine's involvement in global value chains has a predominantly negative impact on economic growth. This is manifested through the inverse dependence of GDP on the foreign content of GVA in exports, as well as the negative impact of the coefficient of reverse participation in GVCs on the change in GDP per capita. A significant negative impact of the growth in the share of foreign value added in exports of wood and paper products and basic metals and finished metal products on GDP per capita was identified. The positive impact of the share of foreign value added in exports of textiles and clothing, computers, electronic and electrical equipment on GDP per capita was somewhat smaller. Thus, the inclusion of the Ukrainian economy in the early stages of global value chains had a negative impact on Ukraine's economic growth in 2010-2020.

After the signing of the Association Agreement between Ukraine and the EU and the launch of the free trade area, the share of foreign value added originating from EU countries in Ukrainian exports increased, which in turn indicates a decrease in the share of domestic value added in Ukrainian exports. Thus, an important task is to increase domestic value added in Ukraine's exports, since only this part of exports is included in the value added that forms GDP. On the other hand, in the context of European integration, Ukraine's growing participation in global value chains of EU countries is a positive trend and indicates an increase in the competitiveness of the Ukrainian economy and the importance of domestic enterprises for partners from developed European countries. At the same time, Ukraine needs to develop cooperation with EU countries in sectors of the economy where higher added value is created. Therefore, we believe that it is promising for the Ukrainian economy to be included in the upper levels of the HTSS, which are typical for industrial sectors, including, in particular, automotive, computer equipment, electronic and optical equipment, and machinery and equipment. Accordingly, it is important to expand the production and export of products with a higher level of domestic value added, which will allow the transition from the lower to the upper links of the value chain.

The basis of the post-war economic recovery should be the processing industry of Ukraine, which will ensure that domestic demand for basic consumer goods is met

and will contribute to increasing export efficiency. Given the complications of Ukraine's trade with a number of EU countries in agricultural products, the expansion of production capacities for processing agricultural raw materials into finished food or products with a higher level of processing is a promising area for domestic enterprises to move from the lower to the upper levels of global value chains. Given the significant share of metallurgical products in Ukraine's exports to the EU, the post-war economic recovery of Ukraine is making it more important to shift from metal exports to exports of finished metal products or machine-building products. This will reduce the negative impact on economic growth from the participation of metallurgical enterprises in the lower parts of the GVCs and increase export efficiency. For the successful implementation of these areas of development of the manufacturing industry, the Post-War Economic Recovery Plan for Ukraine should include additional institutional and financial mechanisms to support the development and technological modernisation of these industries.

CHAPTER 5. TRANSFORMATION OF TRADE OPENNESS AND BALANCE OF UKRAINE IN THE PROCESS OF INTEGRATION INTO THE EU

(Iryna Babets)

5.1. Comparative Analysis of Foreign Trade Openness of Ukraine and Central and Eastern European Countries

The Central and Eastern European (CEE) countries differ significantly in their foreign trade indicators. Considerable differences are also observed between the CEE countries and Ukraine, which is due to both the size of their national economies and the structure of their exports and imports. Among the CEE countries, Poland holds the leading position in terms of foreign trade volumes, with exports amounting to USD 381.5 billion and imports to USD 370 billion in 2023 (Table 5.1). The corresponding indicators for the Czech Republic, which ranks second, were 49.3% and 60.5% lower compared to Poland. Hungary ranked third in 2023 for both export and import volumes, which were almost 2.4 times lower than those of Poland. Despite Ukraine's export and import volumes being 10.6 and 5.8 times smaller than Poland's, they exceed those of the Baltic countries and Croatia.

The highest export growth rates in 2023 compared to 2015 were recorded in Slovenia, indicating an increase in export deliveries of goods by 128.7%. Croatia ranked second with a 92.6% increase, followed by Poland with a 91.6% rise. Among the CEE countries, Estonia showed the lowest export growth rate at 53.2%. Meanwhile, Ukraine's export of goods decreased by 5.5% over the analyzed period, primarily due to significant annual declines caused by the military actions in 2022-2023, which resulted in reductions of 35.1% and 18.3%, respectively.

In terms of import growth rates, Slovenia also led among the CEE countries, with its imports increasing by 139.6% in 2023 compared to 2015. Croatia also demonstrated significant growth, with import volumes more than doubling. The increase in goods imports to Poland and Romania was almost identical, amounting to 188%. In Ukraine, the volume of goods imports grew by 69.3% in 2023 compared to 2015, which was similar to the growth rate in Hungary. The lowest import growth was

recorded in Slovakia, where the volume of imported goods increased by 55.9% in 2023 compared to 2015.

Table 5.1

Dynamics of Foreign Trade Indicators of Ukraine and CEE in 2015 and 2023.

Country	Exports, mln USD		Imports, mln USD		Trade balance, mln USD		Rate of change in exports, %	Rate of change in imports, %
	2015	2023	2015	2023	2015	2023	2023/2015	2023/2015
Bulgaria	25371	47854	29205	53551	-3834	-5697	188,6	183,4
Croatia	12925	24894	20571	43181	-7646	-18287	192,6	209,9
Czech Republic	157878	255450	141364	230599	16514	24851	161,8	163,1
Estonia	12836	19669	14521	22963	-1685	-3294	153,2	158,1
Hungary	98524	160955	91973	155966	6551	4989	163,4	169,6
Latvia	12286	22446	14719	27114	-2433	-4668	182,7	184,2
Lithuania	25392	42639	28154	48436	-2762	-5797	167,9	172,0
Poland	199124	381517	196473	370076	2651	11441	191,6	188,4
Romania	60595	100612	69824	131912	-9229	-31300	166,0	188,9
Slovakia	75146	117316	72837	113532	2309	3784	156,1	155,9
Slovenia	31929	73034	29815	71445	2114	1589	228,7	239,6
Ukraine	38127	36040	37517	63527	610	-27487	94,5	169,3

Source: compiled and calculated based on data⁴⁶⁰

The largest positive trade balance in 2015 and 2023 was recorded in the Czech Republic, increasing by 50.5% over this period. Poland also maintained a positive trade balance, though in 2023 it was more than twice as low as that of the Czech Republic. At the same time, Poland's trade balance increased 4.3 times over the analyzed period. Hungary, Slovakia, and Slovenia also had positive trade balances, though somewhat smaller. Ukraine's trade balance shifted from positive to negative during the period under review, amounting to almost USD 27.5 billion in 2023, which was lower only than Romania's figure of USD 31.3 billion.

Comparing countries based on export and import volumes does not allow for identifying the most open national economies, as they differ in GDP size. As shown in Figure 5.1, Poland had the largest economy among the studied countries, with its GDP in 2023 being 1.7 times higher than in 2015. Romania, which lagged behind the Czech

⁴⁶⁰ Merchandise exports by product group. World Trade Organization. <https://stats.wto.org/>; Merchandise imports by product group. World Trade Organization. <https://stats.wto.org/>

Republic in terms of export and import volumes, surpassed it in GDP and ranked second after Poland. Romania's GDP growth rate during the analyzed period was higher than Poland's, as evidenced by a 1.97-fold increase in 2023 compared to 2015. The Czech Republic ranked third among the studied countries in terms of GDP in 2023, also showing high growth (175.9% relative to 2015). Ukraine lagged behind Poland, Romania, the Czech Republic, and Hungary in terms of GDP but outperformed all other CEE countries, also demonstrating relatively high growth in 2023 compared to 2015 (196%). However, when comparing the studied countries by GDP per capita (PPP), Ukraine had the lowest figure, amounting to USD 18,007.5 in 2023, while the highest values among CEE countries were recorded in Slovenia (USD 54,947.5) and the Czech Republic (USD 53,816.8), with the lowest in Bulgaria (USD 38,689.5).

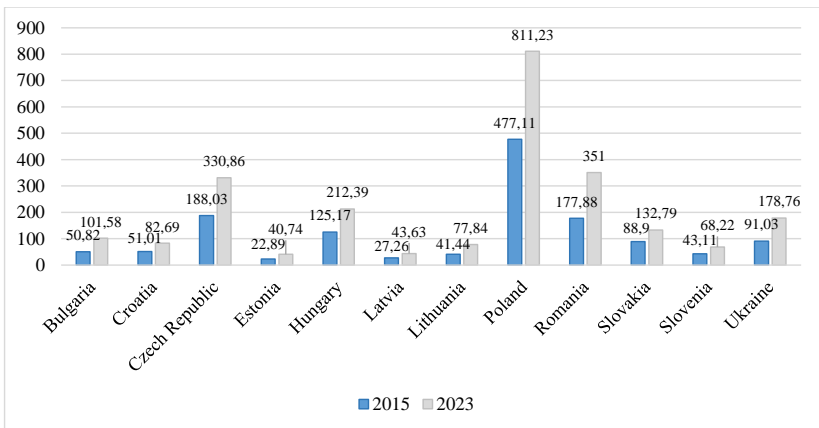


Figure 5.1. GDP Dynamics of CEE Countries and Ukraine in 2015 and 2023, USD billion

Source: compiled by the author based on data⁴⁶¹

For the purpose of comparing Ukraine with the CEE countries in terms of foreign trade openness, we use the data presented in Table 5.1 and Figure 5.1 to calculate the export and import quotas, the foreign trade quota, and the export-import coverage ratio.

⁴⁶¹ GDP (current US\$). World Bank national accounts data, and OECD National Accounts data files. <https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations>

According to our calculations, Slovenia had the most open economy in 2023, as evidenced by the highest indicators of foreign trade openness (Table 5.2). Slovenia's export quota increased by 32.99 percentage points (p.p.) in 2023 compared to 2015, the import quota grew by 35.57 p.p., and the foreign trade quota increased almost 1.5 times over this period. At the same time, the export-import coverage ratio remained relatively stable and met the benchmark value (1.0), although it was lower than the optimal value (1.2).

Таблица 5.2

Dynamics of Foreign Trade Openness Indicators of Ukraine and CEE Countries
in 2015 and 2023

Country	Export quota, %		Import quota, %.		Foreign trade free quota, %.		Export-import coverage ratio	
	2015	2023	2015	2023	2015	2023	2015	2023
Bulgaria	49,92	47,11	57,47	52,72	107,39	99,83	0,87	0,89
Croatia	25,34	30,11	40,33	52,22	65,67	82,33	0,63	0,58
Czech Republic	83,96	77,21	75,18	69,70	159,15	146,90	1,12	1,11
Estonia	56,08	48,28	63,44	56,36	119,52	104,64	0,88	0,86
Hungary	78,71	75,78	73,48	73,43	152,19	149,22	1,07	1,03
Latvia	45,07	51,45	53,99	62,15	99,06	113,59	0,83	0,83
Lithuania	61,27	54,78	67,94	62,23	129,21	117,00	0,90	0,88
Poland	41,74	47,03	41,18	45,62	82,92	92,65	1,01	1,03
Romania	34,07	28,66	39,25	37,58	73,32	66,25	0,87	0,76
Slovakia	84,53	88,35	81,93	85,50	166,46	173,84	1,03	1,03
Slovenia	74,06	107,06	69,16	104,73	143,22	211,78	1,07	1,02
Ukraine	41,88	20,16	41,21	35,54	83,10	55,70	1,02	0,57

Source: compiled and calculated based on data⁴⁶²

The second place in terms of foreign trade openness in 2023 was held by Slovakia, although the values of both the export and import quotas did not exceed 100%, and the growth of these indicators was insignificant compared to Slovenia. Slovakia's foreign trade quota in 2023 was 7.4 p.p. higher than in 2015 but did not surpass 200%. Hungary ranked third in terms of foreign trade openness in 2023; however, it is worth noting a slight decrease in openness indicators such as the export quota (by 2.93 p.p.) and the foreign trade quota (by 2.97 p.p.).

⁴⁶² Merchandise exports by product group...

A more pronounced trend of decreasing trade openness was observed in the Czech Republic, which ranked fourth in 2023. The Czech Republic's export quota decreased by 6.76 p.p. compared to 2015, while the import and foreign trade quotas declined by 5.48 and 12.24 p.p., respectively. At the same time, the Czech Republic's export-import coverage ratio was the closest to the optimal value, reaching 1.11 in 2023.

Thus, the economies of Slovenia, Slovakia, Hungary, and the Czech Republic are characterized by a high level of trade openness. According to trade openness criteria, other CEE countries that can also be considered open economies include Bulgaria, Estonia, Latvia, Lithuania, and Poland. In Croatia, only the import quota exceeded the threshold (45%), while the export quota was 15 p.p. below the threshold, and the foreign trade quota was 7.67 p.p. below 90%. Therefore, Croatia's economy is characterized by a low level of openness. The least open economy among the CEE countries in 2023 was Romania, as its export, import, and foreign trade quotas were significantly below the established thresholds, and the export-import coverage ratio dropped to 0.76, failing to meet the standard value.

Ukraine's economy is the least open compared to the CEE countries, with the level of openness significantly decreasing between 2015 and 2023. Specifically, Ukraine's export quota in 2023 decreased by 21.72 p.p. compared to 2015 and was 24.8 p.p. below the established threshold. The import quota decreased by 5.68 p.p. during the period and was 9.46 p.p. below the threshold, while the foreign trade quota dropped by 27.4 p.p. and 34.3 p.p., respectively. The export-import coverage ratio in Ukraine decreased 1.8 times compared to 2015 and was twice lower than the optimal value in 2023, indicating an imbalance in foreign trade.

The comparison of Ukraine with the CEE countries leads to the conclusion that Ukraine has the lowest level of foreign trade openness and the greatest imbalance between exports and imports. However, the comparison results do not make it possible to determine the degree of similarity between Ukraine's foreign trade and that of the CEE countries with a relatively low level of economic openness. Therefore, it is necessary to conduct an additional study using cluster analysis based on the following

closest to the cluster center. First and foremost, the main common feature of the Group I countries, indicating the highest level of foreign trade openness, is the highest value of the export quota, ranging from 75% for Hungary to 107% for Slovenia. The import openness of these economies was slightly lower compared to export dependence, ranging from 69.7% in the Czech Republic to 104.7% in Slovenia. Additionally, the countries in this group demonstrate the highest values of the foreign trade quota, varying from the lowest in the Czech Republic (146.9%) to the highest in Slovenia (211.8%). The export-import coverage ratio in the countries of this group meets the normative value, slightly exceeding it.

Table 5.3

Grouping of countries by level of foreign trade openness in 2023.

Cluster number	Country	Euclidean distance to the center of the cluster	Common features characterizing the level of foreign trade openness
I	Czech Republic	0,049667	- the highest export, import and foreign trade quota indicators; - the value of the export-import coverage ratio exceeds 1.0
	Hungary	0,053758	
	Slovakia	0,143230	
	Slovenia	0,048442	
II	Estonia	0,013141	- high export, import and foreign trade quotas; - the value of the export-import coverage ratio at the level of 0.82-0.88
	Latvia	0,038331	
	Lithuania	0,026551	
III	Bulgaria	0,085732	- relatively low export, import and foreign trade quotas; - the highest export and import growth rates
	Croatia	0,062754	
	Poland	0,060441	
	Romania	0,086035	
IV	Ukraine	0,000	- the lowest export, import and foreign trade quotas; - the lowest value of the export-import coverage ratio; - the lowest export growth rates; - high growth rates of imports

Source: calculated by the author

The group of countries with a high level of foreign trade openness based on 2023 indicators includes Estonia, Latvia, and Lithuania. Among the countries of Group II, Estonia is closest to the cluster center, as the Euclidean distance is the smallest at 0.013141 (Table 5.3). Latvia and Lithuania are also relatively close to the cluster

center. Therefore, the main foreign trade indicators common to all three countries characterize this group. The values of the export and import quotas exceed 45%, indicating a high level of economic openness in these countries. The foreign trade quota of these countries significantly exceeded the threshold value (90%) and ranged from 104% in Estonia to 117% in Lithuania. At the same time, the export-import coverage ratio for the countries in this group was below the normative value and ranged from 0.82 to 0.88.

The group of countries with a moderate level of foreign trade openness includes Bulgaria, Croatia, Poland, and Romania, with Poland being the closest to the cluster center. The moderate level of trade openness in Group III countries is due to a slight exceeding of the export and import quota threshold (45%) or even lower values of these indicators for certain countries. Specifically, Poland's export quota was 47%, and its import quota was 45.6%, while in Romania, these values were 28.7% and 37.6%, respectively. The foreign trade quota slightly exceeded the normative value in Poland (92.6%) and Bulgaria (99.8%), while it was lower in Croatia (82.3%) and Romania (66.2%). A distinctive feature of the countries in this group is the highest export and import growth rates among the studied countries. In 2023, the largest growth in export and import volumes was observed in Croatia, amounting to 192.6% and 209.9%, respectively, compared to 2015. Meanwhile, for Poland – the cluster center – these figures were slightly lower, at 191.6% for exports and 188.3% for imports.

According to our calculations, Ukraine should be considered a separate group characterized by a low level of foreign trade openness. Compared to the CEE countries, Ukraine has the lowest values of export quota (20.1%), import quota (35.5%), and foreign trade quota (55.7%). The export-to-import coverage ratio was 0.57, significantly lower than both the normative and optimal values, and the lowest among the analyzed countries. Along with the lowest export growth rate (94.5%), Ukraine experienced a high import growth rate (169.3%).

5.2. Main determinants of Ukraine's trade openness in the context of European integration

The increase in the level of trade openness mainly occurs due to improved institutional conditions for trade with other countries by reducing trade barriers and restrictions, which enhances enterprises' access to foreign markets. Another important factor influencing foreign trade openness is the capacity of national enterprises to increase the production volume of goods that are exported and competitive in foreign markets. Accordingly, we will analyze the determinants of Ukraine's foreign trade openness along the outlined directions.

In order to create favorable conditions for exporters and facilitate their access to foreign markets, Ukraine actively uses such an institutional tool as signing free trade agreements with individual countries or integration unions. These agreements provide for the liberalization of trade in industrial and agricultural products and services, as well as the effective resolution of problems and disputes between the participating countries. As a result of implementing such agreements, foreign trade turnover increases, scientific, technical, and investment cooperation deepens, which, in turn, also ensures the production of more technologically advanced and innovative export-oriented products.

From the perspective of intensifying the European integration process and deepening trade cooperation with European countries, the most important institutional instrument is the Association Agreement between Ukraine and the EU, signed in 2014. The main component of this document is the Deep and Comprehensive Free Trade Area (DCFTA, Chapter IV of the Association Agreement), which has been implemented since 2016. The key provisions of the DCFTA are aimed at strengthening economic and trade relations, ensuring Ukraine's gradual integration into the EU single market, and supporting Ukraine's transition to a functioning market economy. Due to its truly deep and comprehensive nature, the DCFTA and its implementation represent an important initial step on the path toward Ukraine's full integration into the EU single market. In this context, it is necessary to take a closer look at Ukraine's current access to the EU single market.

The goal of the DCFTA is the elimination of 99.1% of tariffs for Ukraine and 98.1% for the EU. The implementation of the free trade area provisions regarding goods is set to take place over a transitional period of 10 years, until 2026. Providing for asymmetric tariff liberalization, the transitional periods for removing barriers were shorter on the EU side than on Ukraine's side.

Immediately after the DCFTA entered into force, EU tariffs on industrial goods exported from Ukraine were eliminated for 94.7% of tariff lines. For certain goods, duties were eliminated after transitional periods: for mineral products – in 2019; chemical substances, wood products, footwear, and copper products – in 2021; fertilizers, aluminum products, automobiles, and most vehicles – in 2023. Thus, starting from 2024, the DCFTA does not envisage any tariffs on industrial products from the EU side regarding Ukraine. On Ukraine's side, an immediate preferential regime was granted for only 49.2% of industrial imports from the EU. After a seven-year transitional period, the share of EU imports liberalized by Ukraine increased to 96%. For example, Ukraine applied gradual liberalization regarding the import of certain minerals (until 2023), organic chemicals (until 2019), fertilizers (until 2019), rubber tires (until 2021), leather products (until 2021), and textile products such as headwear (until 2019). The automotive sector provides for the longest transitional periods – until 2026⁴⁶³.

The European Union reduced tariffs on agricultural food products in almost all categories: 82.2% of the relevant tariffs were eliminated upon the entry into force of the DCFTA, and 1.2% were reduced to zero over a transitional period of up to seven years. However, the EU applies an entry price system or tariff quotas for the remaining tariff lines, including many important commodity positions in Ukrainian exports. Tariff quotas are applied to grain, beef, pork, lamb and poultry meat, sugar, eggs, certain dairy products, some vegetables and fruit juices, ethanol, and cigarettes.

Ukraine eliminated about 88.5% of tariff lines on agricultural products imported from EU countries. Around 8.7% of tariffs on agricultural food products are subject to limited linear reductions of 20-60% over a period of 5-10 years (for example, on dairy

⁴⁶³ Akhvediani T., Movchan V. The Impact of Ukraine's Accession on the EU's Economy...

products, eggs, sugar, animal oils and fats). After this transitional period, a residual tariff will apply. Additionally, tariff quotas are applied to 2.8% of tariff lines on agri-food products (including certain types of meat and sugar).

However, the gradual process of trade regime liberalization between Ukraine and the EU was replaced by full market liberalization on the EU side due to the full-scale invasion of Ukraine by Russian forces. The EU temporarily fully opened its market to Ukrainian goods to support the Ukrainian economy and facilitate Ukrainian exports. On June 4, 2022, the EU fully liberalized imports of goods from Ukraine by introducing autonomous trade measures, which are extended annually. However, by September 2023, these measures were suspended for the import of wheat, corn, rapeseed, and sunflower seeds. The Commission pointed to logistical bottlenecks, such as transport corridors and limited grain storage capacity before the harvest season in the five Member States receiving Ukrainian exports (Bulgaria, Hungary, Poland, Romania, and Slovakia)⁴⁶⁴.

The full liberalization of trade under the autonomous trade measures mainly helped maintain trade between the EU and Ukraine at the pre-war level of 2021. The value of EU exports to Ukraine increased and further contributed to the EU's positive trade balance with Ukraine. The removal of all import duties, tariff quotas, and trade defense measures for imports from Ukraine did not lead to sharp changes in the value of imports of key commodity categories from Ukraine. Imports of sunflower oil, corn, soybean oil, wood, and rapeseed mostly returned to pre-war levels. Moreover, there were no significant changes in the share of Ukrainian imports compared to imports from non-EU countries. The most noticeable growth was observed in corn imports, where Ukraine's share in EU imports from third countries increased from 51% in the second quarter of 2021 to 67% during the same period in 2023⁴⁶⁵. It should be noted that under the most favored nation regime, the import duty on corn supplied from

⁴⁶⁴ EU Extends Trade Benefits for Ukraine. European Commission, 5 June 2023. https://ec.europa.eu/commission/presscorner/detail/en/ip_23_3059

⁴⁶⁵ EU Trade with Ukraine – Latest Developments. Eurostat. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=EU_trade_with_Ukraine_-_latest_developments

Ukraine is zero; therefore, the access of this product to the EU market has hardly changed due to the cancellation of the tariff rate.

As already mentioned, although the DCFTA envisaged the elimination of most tariffs on Ukrainian goods and granted Ukrainian exporters full access to the European market by 2026, as a result of Russia's full-scale invasion of Ukraine, the EU has already fully liberalized its market for Ukrainian goods by introducing autonomous trade measures. If these measures are suspended, the EU will still gradually eliminate the remaining tariffs to grant Ukraine full access to the single market. For industrial goods, this will mean reducing the remaining 5.3% of tariffs on the EU side (according to the current autonomous trade measures, all tariffs on imports from Ukraine are suspended) and less than 1% on the Ukrainian side⁴⁶⁶. This should have a stimulating effect on the export of industrial goods from the EU, considering that Ukraine will maintain overall demand for these goods, especially after the war, including for the purposes of reconstruction and recovery of Ukraine.

The full liberalization of trade in agricultural products would require the elimination of the remaining tariffs on approximately 16.6% of tariff lines by the EU and 11.5% by Ukraine. Full integration into the EU single market would also mean the removal of tariff quotas. In this case, the elimination of tariff quotas would have a greater impact than the elimination of tariff lines, since Ukraine holds strong competitive positions in the trade of agricultural products subject to tariff quotas, including grain (according to the current autonomous trade measures, all tariffs on imports from Ukraine are suspended).

At the same time, despite significant trade liberalization measures, Ukraine's share accounts for about 1% of the EU's total goods trade⁴⁶⁷. Thus, the temporary full liberalization of trade with Ukraine, which grants it full access to the EU market, did not lead to significant changes in EU imports, but it may affect markets in several EU Member States bordering Ukraine. As noted above, Bulgaria, Hungary, Poland,

⁴⁶⁶ The levels of Ukraine's import duty rates to be applied in 2024 to imports of goods originating in the EU. https://www.mdoffice.com.ua/ua/a5NewsDic.getNews?dat=15112023&num_c=834793

⁴⁶⁷ Ukraine: EU Trade Relations with Ukraine. Facts, Figures and Latest Developments. European Commission. https://policy.trade.ec.europa.eu/eu-trade-relationships-country-and-region/countries-and-regions/ukraine_en

Romania, and Slovakia have faced logistical challenges such as road traffic and a lack of storage capacity for Ukrainian agricultural products. Another major issue has been complaints and discontent from local farmers in some EU countries who are unable to compete with Ukrainian grain producers. This problem led to bans on the import of several agricultural products from Ukraine and political disputes between Ukraine, Poland, Slovakia, and Hungary in the run-up to the Polish elections in October 2023. In December 2023, the Polish Minister of Agriculture proposed restricting Ukrainian agricultural producers' access to the Polish market for 20 years after accession to the EU (i.e., likely until 2050), underscoring the scale and political significance of the issue⁴⁶⁸. Experts point out that such restrictions would significantly worsen Ukraine's trade conditions with the EU compared to the current DCFTA regime. Therefore, these issues must be addressed as quickly as possible by introducing time-limited temporary measures on the import of certain products into specific countries until a balance is found between overall economic efficiency and its distribution among consumers and producers in the EU Member States most sensitive to this issue⁴⁶⁹.

Alongside measures to improve trade conditions and liberalize the trade regime with partner countries, important factors in increasing the level of openness of foreign trade are the ability of national enterprises to produce high-quality goods and to export a greater volume of products that are competitive in foreign markets. To characterize these factors, it is necessary to analyze the structure of Ukraine's exports and the dynamics of trade in key goods in order to compare them with the dynamics of production volumes of the respective products.

In 2023, Ukraine's merchandise exports were dominated by agricultural products, which accounted for 51.8% of total exports. Within this category, grains represented 23% of merchandise exports, animal or vegetable fats and oils made up 15.6%, and oil seeds and oleaginous fruits comprised 7.8%. The share of base metals and articles thereof amounted to 10.8% of merchandise exports from Ukraine, including 7.3% for ferrous metals and 2.4% for articles made from ferrous metals. The

⁴⁶⁸ Polish Official Aims to Close Country's Agricultural Market for Ukraine for 20 Years After Its EU Accession. <https://www.pravda.com.ua/eng/news/2023/12/17/7433415/>

⁴⁶⁹ Akhvediani T., Movchan V. The Impact of Ukraine's Accession on the EU's Economy...

share of prepared foodstuffs was somewhat lower, totaling 9% of merchandise exports. Based on the results of the analysis of Ukraine's export commodity structure in 2023, we will now characterize the dynamics of exports of key product groups during 2015-2023 (see Fig. 5.3).

First and foremost, during the study period, there was a significant decline in the export volumes of base metals and articles thereof – from USD 9.4 billion in 2015 to USD 3.9 billion in 2023, representing a 58.6% decrease. The most substantial reduction in the export of metallurgical products occurred as a result of the full-scale invasion of Ukraine by Russian forces in 2022, when export volumes dropped by nearly 2.7 times compared to 2021. In 2023, a further decline in exports in this product category was observed – down by 34.8% relative to 2022.

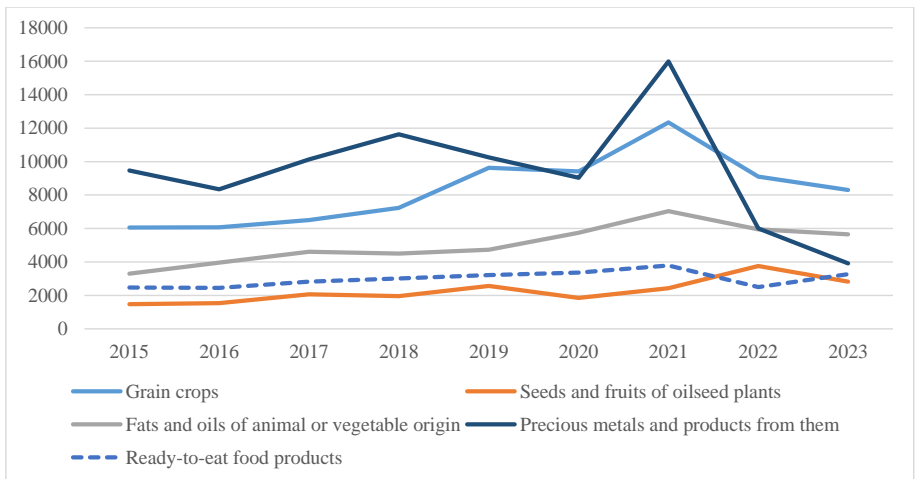


Figure 5.3. Dynamics of exports of major goods from Ukraine in 2015-2023, USD million

Source: compiled by the author based on data⁴⁷⁰

At the same time, there was an increase in the export of cereals – from USD 6 billion in 2015 to USD 8.3 billion in 2023 (by 37.1%). The highest export value of cereals was recorded in 2021, amounting to USD 12.3 billion, but in 2022 and 2023

⁴⁷⁰ Commodity structure of Ukraine's foreign trade in 2023. <https://www.ukrstat.gov.ua/>

there was a decline of 26% and 8.8% respectively compared to the previous year. During 2015-2023, the export of animal and vegetable fats and oils increased by 71.2% (from USD 3.3 billion to USD 5.6 billion), and the decline in export volumes of this product category during the war occurred more gradually compared to the goods mentioned above. In 2022, the export of animal and vegetable fats and oils decreased by 15.5% compared to 2021, and in 2023 – by 5% relative to 2022.

The export dynamics of oilseed crops and fruits followed a somewhat different trend. Over the period 2015–2023, exports of this category increased by 91.1% (from USD 1.47 billion to USD 2.82 billion). It is worth noting that in 2022, exports rose by 54.3% compared to 2021, which can be explained by farmers' efforts to quickly export this raw material to avoid the risk of loss under wartime conditions. In turn, this led to a decline in the production of vegetable oil in 2022 and a reduction in its export, as discussed above. However, in 2023, the export of oilseed crops and fruits decreased by 24.9% compared to 2022, as enterprises adapted to operating under wartime conditions and more of this raw material began to be processed within Ukraine.

The export dynamics of processed food products is also of particular interest. Over the study period, food exports increased by 32.5% (from USD 2.47 billion in 2015 to USD 3.27 billion in 2023). Although exports of these products declined in 2022 by 34.1% compared to 2021, in 2023 this was the only product group (among the main export categories) for which exports increased – by 31% compared to 2022. Therefore, the export dynamics of raw materials proved to be less resilient to the crisis effects of martial law than the export of higher value-added goods, such as processed food product.

Analyzing the production potential that ensures the export capacity of the above-mentioned economic sectors, attention should be paid to agriculture, whose products dominate Ukraine's goods exports. During 2015-2023, the production of grain crops slightly decreased – from 60.1 million tons to 59.8 million tons, or by 0.6%. The highest production volume was recorded in 2021 (86 million tons). However, as a result of the full-scale war, 37.4% less grain was produced in 2022, amounting to 53.8 million

tons, while in 2023 the production of these crops increased by almost 11% compared to the previous year. Over the study period, sunflower seed production increased by 14.1% – from 11.2 million tons to 12.8 million tons. The decline in production of this crop in 2022 was somewhat smaller compared to grain crops and amounted to 30.9%, while in 2023 production increased by 12.6% compared to 2022. Thus, Ukraine's agricultural sector demonstrated the ability to recover its operations during wartime, even under prolonged exposure to risks and threats.

The dynamics of metallurgical production during 2015-2023 were generally positive, as evidenced by the increase in sales volumes from UAH 278.5 billion to UAH 354.9 billion. At the same time, it should be noted that the maximum value of sold metallurgical products amounted to UAH 679.5 billion in 2021, while in the first year of the full-scale war, sales volumes decreased by 50.3%. In 2023, metallurgical products were sold in volumes only 5% higher than in the previous year. This indicates a significant decline in the export potential of the metallurgical sector under wartime conditions due to the occupation by Russian forces of the regions where most of the sector's enterprises are located.

In the context of Ukraine's capacity to increase exports of high value-added goods, it is worth noting the growing potential of the food industry. The volume of food product sales increased by 23.5% in the long term – from UAH 398 billion in 2015 to UAH 889.6 billion in 2023. The decline in production of these goods in 2022 was relatively minor, as sales fell by only 14.4% compared to the previous year. However, already in 2023, the volume of food product sales increased by 23.4%.

Thus, under the conditions of full-scale war, the development of Ukraine's foreign trade is influenced by favorable institutional factors which, through the elimination of trade tariffs and quantitative restrictions within the framework of the free trade area with the EU, ensure the growth of export and import volumes, thereby directly increasing the openness of the national economy. And although the overall export volumes of Ukrainian goods declined during 2022-2023, access to the common European market mitigated this negative trend. The greatest potential for export growth

under martial law lies in agriculture and the production of food products, particularly animal and vegetable fats and oils, while the export potential of the metallurgical industry has significantly declined.

5.3. The Impact of Foreign Trade Openness on Economic Growth in CEE Countries and Ukraine

The most important economic goal of the Central and Eastern European countries in the process of their European integration and after attaining EU membership has been to raise the standard of living to the level of Western European countries. Following a long period of socialist development and inefficient economic performance, this objective required a coordinated macroeconomic and structural policy aimed at achieving high growth rates while adequately addressing the challenges associated with such a rapid narrowing of the economic, technological, and social gap with developed countries. The accession of the CEE countries to the EU provided them with advantages in the form of enhanced competitive positions, increased volumes of foreign trade, implementation of institutional reforms, and integration into the financial system of the Community.

In recent decades, economic growth in the CEE countries has differed from trends in developing countries in several respects. Between 1996 and 2006, there was relatively rapid growth in production output despite a significant decline in the size of the labor force. Another distinctive feature of the CEE economies, particularly in the Baltic states, was the resolution of insufficient domestic savings through the attraction of foreign investment. However, the increase in accumulated capital had only a limited impact on the pace of economic growth⁴⁷¹. At the same time, the acceleration of growth rates over the past ten years indicates the possibility of narrowing the gap between the CEE countries and developed countries at "two speeds," as evidenced by the experience

⁴⁷¹ Schadler S., Mody A., Abiad A., and Leigh D. Growth in the Central and Eastern European countries of the European Union. Occasional papers, 252. Washington, D.C.: International Monetary Fund, 2006

of the Baltic states, which have significantly outpaced the Czech Republic, Hungary, Poland, Slovakia, and Slovenia in terms of economic growth rates⁴⁷².

The pace of economic growth and recovery in the CEE countries during the transition period was higher because reforms were implemented rapidly. The fastest economic reforms occurred in those CEE countries that were geographically closest to Western Europe or those that were economically more developed at the time of the fall of communism or at the beginning of the transition to a market economy. Gaining candidate status and the prospect of joining the EU became a key factor that contributed to accelerating the reform process⁴⁷³. Although GDP per capita at PPP in 2023 for most CEE countries remains lower compared to such EU countries as Germany (69,338 USD), Luxembourg (143,341 USD), or the Netherlands (78,215 USD), the value of this indicator has increased significantly over the study period. Among the CEE countries, the highest GDP per capita (at PPP) values in 2023 were recorded in Slovenia, the Czech Republic, and Lithuania (Table 5.4), while the highest average annual growth rates of this indicator during the study period were observed in Romania (110.5%), Bulgaria (109.8%), and Croatia (108.9%).

In recent years, growth in most CEE countries has exceeded the average for developing countries, with Estonia, Latvia, and Lithuania ranking among the top five emerging markets. The analysis of CEE development is complicated by the inability to directly assess the impact of such factors as: the process of economic recovery following a sharp decline in output due to the implementation of transformational reforms aimed at transitioning to a market economy; the adoption of common EU policies and institutional changes that strengthened growth potential; and global conditions, which, on the one hand, support economic development through foreign investment inflows into these countries, but on the other hand, have brought about global crises (such as the 2008 financial crisis and the 2020 pandemic), which

⁴⁷² Ibid.

⁴⁷³ Fischer, S., and R. Sahay. The Transition Economies after ten Years. <https://www.nber.org/papers/w7664>

negatively affected economic growth and necessitated the development and implementation of new structural policy instruments to accelerate economic recovery.

Table 5.4

Dynamics of GDP per capita (PPP) in CEE countries in 2016-2023, USD.

Country	Years								
	2015	2016	2017	2018	2019	2020	2021	2022	2023
Bulgaria	18384	20064	21455	23004	25526	25735	29405	35463	38689
Croatia	23460	25427	27391	29156	32329	30688	37232	42399	45909
Czech Republic	33899	36097	38824	41143	44859	43922	48418	51701	53816
Estonia	29175	31312	33821	36410	39843	40045	44652	47941	48992
Hungary	26798	27941	29496	31908	35152	35029	38648	43577	45942
Latvia	24972	26721	28673	30877	33294	33733	36777	41106	42501
Lithuania	28834	30925	33761	36376	40577	41168	46410	50997	51877
Poland	26822	28165	29958	32027	35487	36322	40462	46720	49464
Romania	21622	23903	26940	29566	33549	34293	37969	42973	47903
Slovakia	30054	29737	30142	31369	33943	35001	37790	41057	44650
Slovenia	31628	33936	36507	38971	42748	42040	46502	51281	54947

Source: compiled by the author based on data⁴⁷⁴

In recent years, many researchers have focused on the role of international trade as a driver of growth, but the causal relationship between trade openness and economic growth in CEE countries remains insufficiently explored. Using indicators of external trade openness and economic growth (GDP, GDP per capita in PPP terms) for the CEE countries, we will conduct a panel data regression analysis for the period 2015-2023.

As a result of the regression analysis, a weak relationship was found between the external trade openness indicators of CEE countries and their GDP in current prices, as indicated by the relatively low correlation coefficient ($R = 0.659$). According to our calculations, the dependence of GDP on changes in the import quota of CEE countries was inverse: a 1% increase in the import-to-GDP ratio resulted in a decrease in GDP by 82.743%, *ceteris paribus* (Table 5.5). At the same time, the relationship between GDP and the ratio of foreign trade turnover to GDP was direct: a 1% increase in the independent variable contributed to an 80.467% increase in the dependent variable, all

⁴⁷⁴ GDP per capita, PPP (current international \$). International Comparison Program, World Bank. World Development Indicators database, World Bank. Eurostat-OECD PPP Programme. <https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD?locations>

other things being equal. The change in the export-import coverage ratio had an inverse effect on GDP in CEE countries: a 1% increase in the independent variable led to a 32.777% decrease in the dependent variable, *ceteris paribus*. The relationship between the dependent and independent variables was not strong, as indicated by the low coefficient of determination ($R^2 = 0.435$), which suggests that during 2015-2023, GDP growth in CEE countries was determined by trade openness only by 43.5%, while 56.5% depended on other factors not included in the regression model. The regression error was less than 1%, and the value of the Fisher coefficient exceeded its critical value, indicating the statistical significance of the results obtained.

Table 5.5

Regression Analysis of the Impact of Foreign Trade Openness on Economic Growth in CEE Countries in 2015-2023

Factor features	Dependent variable	
	<i>GDP</i>	<i>GDP_pc</i>
Number of observations	88	88
Intercept	-41,404*** (12,820)	0,171 (0,229)
<i>GDP_pc_{t-1}</i>	-	0,980*** (0,023)
<i>Exp/GDP</i>	-	-0,075** (0,036)
<i>Imp/GDP</i>	-82,743*** (18,886)	0,099 (0,052)
<i>Trade/GDP</i>	80,467*** (18,812)	-
<i>Exp/Imp</i>	-32,777*** (8,486)	-
R	0,659	0,978
R ²	0,435	0,960
F- criterion	F(3,84)=21,572	F(3,84)=673,15

* - statistical error rate (p-level) $\leq 10\%$; ** - statistical error rate (p-level) $\leq 5\%$;

*** - statistical error rate (p-level) $\leq 1\%$.

Source: calculated by the author

According to the results of the panel regression, a strong dependence of GDP per capita in the CEE countries on the change in this indicator in the previous period, as well as on export and import quotas, was identified. The relationship between the dependent and independent variables is strong ($R = 0.978$), and the change in GDP per

capita (in PPP terms) was determined by trade openness indicators by 96%, as indicated by the value of the coefficient of determination. The relationship between GDP per capita (GDP_pc) and its value in the previous period (GDP_pct-1) was direct: a 1% increase in the independent variable resulted in a 0.980% increase in the dependent variable. The change in the export quota had an inverse effect on GDP per capita in the CEE countries: a 1% increase in the independent variable led to a 0.075% decrease in the dependent variable. At the same time, the dynamics of the import quota had a positive impact on GDP per capita: a 1% increase in the independent variable resulted in a 0.099% increase in the dependent variable, all other conditions being equal. The standard error of the coefficients for the independent variable and the import quota exceeded 5%; however, the standard error for the other indicators did not exceed 5%, and the calculated value of the Fisher criterion significantly exceeded the critical value, which allows us to consider the obtained results statistically significant.

Analyzing our models, it should be noted that trade openness has a significant impact on economic growth, which means that the development of the CEE countries is closely linked to trade relations with other countries, aligning with the findings of Awokuse T.⁴⁷⁵ Our result is also consistent with the conclusions of Fischer S. and Sahay R., who argue that there is a correlation between the pace of economic growth and the speed of reforms, considering the fact that the main CEE countries that implemented economic reforms were geographically closer to Western Europe, had experienced less communist influence, and were more economically developed at the beginning of the 1990s⁴⁷⁶. Thus, the period after 2005 turned out to be more stable and marked by substantially implemented reforms, compared to countries such as Romania, where consistent GDP growth has been recorded over the past 10 years.

The third panel regression model was constructed by us to identify the relationship between indicators of economic growth and indicators of the openness of the national economies of the CEE countries, which, in addition to foreign trade, also included the share of FDI in GDP (Table 5.6) and population growth rates (Table 5.7).

⁴⁷⁵ Awokuse, T. O. Causality between Exports, imports, and Economic Growth: Evidence from Transition Economies. *Economics Letters*. 2007. Vol. 94 (3). pp. 389-395.

⁴⁷⁶ Fischer, S., and R. Sahay. The Transition Economies after ten Years. <https://www.nber.org/papers/w7664>

Table 5.6

Dynamics of the share of foreign direct investment in GDP
in CEE countries in 2015-2022

Country	Years							
	2015	2016	2017	2018	2019	2020	2021	2022
Bulgaria	4,37	2,76	3,38	2,73	3,22	5,11	2,97	3,56
Croatia	0,07	0,83	0,80	2,13	6,41	2,17	6,78	5,01
Czech Republic	0,9	5,53	5,14	3,34	4,26	3,46	4,57	3,62
Estonia	-3,13	3,85	6,45	4,02	9,88	11,98	20,27	4,32
Hungary	-4,21	54,18	-8,48	-40,09	60,03	106,57	17,40	-5,77
Latvia	2,98	1,19	3,90	1,23	3,26	2,76	9,38	2,84
Lithuania	2,5	2,74	2,90	2,42	6,27	7,91	4,45	1,05
Poland	3,27	3,78	2,29	3,26	2,96	3,19	5,31	5,36
Romania	2,43	3,37	2,83	3,02	2,93	1,43	4,11	3,82
Slovakia	1,71	5,27	4,42	2,12	2,16	-1,07	2,29	3,51
Slovenia	4,01	3,23	2,46	2,84	3,96	0,94	3,59	3,63

Source: compiled by the author based on data⁴⁷⁷

As a result of the calculations carried out, no statistically significant relationship was confirmed between the indicators of economic growth and the ratio of FDI to GDP in the CEE countries. This is consistent with other studies which argue that FDI generally stimulates domestic investment rather than directly increasing GDP volumes⁴⁷⁸. In addition, Z. Szkorupova asserts that FDI has had a negative impact on the economic development of CEE countries, especially following the large wave of privatization in the 1990s⁴⁷⁹.

Considering the combined impact of both factors (labor and capital), we found that population growth and foreign direct investment in the CEE countries did not have a statistically significant effect on economic growth.

⁴⁷⁷ Foreign Direct Investment 1960-2024. <https://www.macrotrends.net/global-metrics/countries>

⁴⁷⁸ Tang, S., Selvanathan E., and S. Selvanathan. Foreign Direct Investment, Domestic Investment and Economic Growth in China: A Time Series Analysis. *The World Economy*. 2008. Vol. 31 (10). pp. 1292–1309

⁴⁷⁹ Szkorupová, Z. Relationship between Foreign Direct Investment and Domestic Investment in Selected Countries of Central and Eastern Europe. *Procedia Economics and Finance*. 2015. Vol. 23. pp. 1017–1022.

Table 5.7

Dynamics of population growth in CEE countries in 2015-2023

Country	Years							
	2016	2017	2018	2019	2020	2021	2022	2023
Bulgaria	-0,7	-0,7	-0,7	-0,7	-0,6	-0,8	-6,2	-0,5
Croatia	-0,7	-1,2	-0,9	-0,6	-0,4	-4,3	-0,6	-0,1
Czech Republic	0,2	0,3	0,3	0,4	0,2	-1,8	1,6	1,9
Estonia	0	0,1	0,3	0,4	0,2	0,1	1,3	1,3
Hungary	-0,3	-0,3	-0,1	0	-0,2	-0,4	-0,7	-0,6
Latvia	-0,9	-0,9	-0,8	-0,7	-0,7	-0,8	-0,3	0,1
Lithuania	-1,3	-1,4	-1	-0,3	0	0,2	1,1	1,4
Poland	0	0	0	0	-0,2	-0,4	-2,5	-0,4
Romania	-0,6	-0,6	-0,6	-0,5	-0,6	-0,7	-0,4	0
Slovakia	0,1	0,2	0,1	0,1	0,1	-0,2	-0,3	-0,1
Slovenia	0,1	0,1	0,4	0,7	0,7	0,3	0,2	0,4

Source: compiled by the author based on data⁴⁸⁰

The results of the conducted study showed that the economic growth of CEE countries in 2015–2022 depended not on the volume of FDI, but on the mobilization of financial resources from national investors in those types of economic activities that best met the strategic needs of economic development. The absence of an impact from population growth on economic growth in CEE countries can be explained by the low level of workforce qualification and the emigration of skilled workers, which has been characteristic of most CEE countries in recent decades⁴⁸¹. As a result of the panel regression (Table 5.5), we have demonstrated that the economic growth of CEE countries was mainly driven by international trade.

Thus, the analysis conducted has shown that trade openness has a significant positive impact on economic growth, meaning that the development of CEE countries is closely linked to trade relations with other countries. The strategic directions for accelerating economic growth in the CEE countries should be determined primarily based on the results obtained. First and foremost, these countries should revise their mechanisms for attracting FDI, as this factor did not serve as a driver of economic growth during the period 2015-2023. In this regard, scholars suggest that CEE countries should find ways to improve the efficiency of the economic environment for foreign investments (or external growth operations such as cross-border mergers and acquisitions

⁴⁸⁰ Population growth (annual %). <https://data.worldbank.org/indicator/SP.POP.GROW>

⁴⁸¹ Gorodzeisky, A., and M. Semyonov. 2017. Labor Force Participation, unemployment and Occupational Attainment among Immigrants in West European Countries. PLoS ONE. Vol. 12 (5). e0176856.

or greenfield investments)⁴⁸². To this end, it is necessary to introduce an income-based taxation system, as it would ensure a more equitable distribution of the tax burden, as opposed to the consumption-based taxation system, which is primarily founded on value-added tax. Secondly, a more stable legislative system would have a positive impact on the economy, since frequent changes in regulatory documents harm entrepreneurship, reduce revenues to the state and local budgets, and complicate fiscal planning.

The governments of CEE countries should also take into account the factors that positively influence economic growth, namely trade openness and domestic investment. Thus, regional trade agreements should be encouraged to stimulate the free movement of goods and services across the external borders of EU countries. In addition, host countries must create an environment that facilitates the positive impact of FDI on the national economy. Investment promotion policies targeting domestic companies can also contribute to attracting foreign investors.

Post-socialist CEE countries were granted membership in the European Union as a guarantee that the economic reforms initiated after the fall of communist regimes would not be reversed. Although these countries have already established functional market economies, their economic systems still do not match those of developed European countries. To accelerate economic growth through economic openness, CEE countries need to take measures to improve the quality of human capital, ensure economic stability, and further liberalize market relations in order to enhance the effectiveness of attracting long-term domestic or foreign investment.

In terms of economic openness indicators, Ukraine significantly differs from the CEE countries. As demonstrated above, the level of Ukraine's foreign trade openness was considerably lower than that of the CEE countries, and in recent years, there has been a substantial decline in the export quota, import quota, and foreign trade quota. Particularly sharp reductions in indicators characterizing economic openness occurred in 2022-2023 due to a significant decrease in foreign trade volumes caused by the full-scale invasion of Ukraine by Russian forces. In order to determine how these changes in the level of Ukraine's trade openness affected its economic growth indicators, we will carry out an analysis using multiple linear regression.

⁴⁸² Bostan, I., Toma, C., Aevovae, G., Robu, I. B., Mardiros, D. N., & Topliceanu, Ștefan C. Effects of Internal and External Factors on Economic Growth in Emerging Economies: Evidence from CEE Countries. *Eastern European Economics*. 2022. Vol. 61(1). pp. 66–85. <https://www.tandfonline.com/doi/full/10.1080/00128775.2022.2109489#references-Section>

Based on the methodological approaches used in studies by foreign scholars, we will determine the set of dependent and independent variables that will ensure accurate analytical results. As dependent variables, we will sequentially use GDP at current prices and GDP per capita (in PPP terms). The vector of independent variables reflecting the level of trade openness includes the export quota, import quota, and foreign trade quota (Table 5.8). In addition, to account for income growth from the previous period, we include an independent variable representing the impact of lagged GDP per capita in PPP terms by one year (*GDP_pct-1*). According to the classical approach to evaluating economic growth based on the production function, we will also incorporate indicators such as the share of foreign direct investment in GDP and the population growth rate, which characterize the availability of capital and labor resources in the economy, respectively.

Table 5.8

Input data for the regression analysis of the impact of foreign trade openness on Ukraine's economic growth

Year	Dependent variables		Independent variables					
	GDP, billion USD	GDP per capita at PPP, USD	GDPt-1 per capita at PPP, USD	E/GDP, %	I/GDP, %	TOT/GDP, %	Share of FDI in GDP, %	Population growth rate, %
	<i>GDP</i>	<i>GDP_pc</i>	<i>GDP_pc,-1</i>	<i>E/GDP</i>	<i>I/GDP</i>	<i>Trade/GDP</i>	<i>FDI</i>	<i>Population</i>
2013	190,5	11056,5	9681,5	33,77	40,30	74,08	2,37	-0,2
2014	133,5	10664,6	11056,5	40,37	40,77	81,14	0,63	-0,5
2015	91,03	10064,8	10664,6	41,88	41,21	83,09	-0,22	-0,2
2016	93,36	11012,0	10064,8	38,94	42,04	80,98	4,42	-0,3
2017	112,09	11686,9	11012	38,59	44,25	82,85	3,28	-0,4
2018	130,89	12708,8	11686,9	36,16	43,69	79,85	3,8	-0,4
2019	153,88	14380,9	12708,8	32,52	39,51	72,03	3,77	-0,5
2020	156,62	15716,8	14380,9	31,41	34,69	66,10	0,19	-0,6
2021	199,77	18040,3	15716,8	34,07	36,46	70,53	3,98	-0,8
2022	161,99	16080,2	18040,3	27,24	34,13	61,37	0,15	-14,3
2023	178,76	18007,5	16080,2	20,16	35,53	55,69	1,73	-2,7

Source: compiled by the author based on data⁴⁸³

⁴⁸³ Merchandise exports; Merchandise imports; GDP (current US\$). World Bank ; Ukraine Foreign Direct Investment. <https://www.macrotrends.net/global-metrics/countries/UKR/ukraine/foreign-direct-investment> Population growth (annual %). <https://data.worldbank.org/indicator/SP.POP.GROW>

According to the first model obtained from the regression analysis, Ukraine's GDP in 2013-2023 was inversely related to the change in the foreign trade quota: a 1% increase in the independent variable led to a 0.706% decrease in the dependent variable (Table 3.6). However, the relationship between the variables was not very strong, as indicated by the relatively moderate value of the correlation coefficient ($R = 0.706$). The coefficient of determination shows that Ukraine's GDP at current prices was only 49.9% dependent on changes in the foreign trade quota, while the remaining 50.1% was influenced by other factors not included in the regression model. At the same time, the analysis did not reveal any statistically significant influence on Ukraine's GDP from the other independent variables – lagged GDP per capita, export and import quotas, the share of FDI in GDP, and the population growth rate. The calculated value of the F-statistic slightly exceeded its critical value, indicating a weak relationship between the dependent and independent variable. The margin of error for the constant term exceeded 10%, and the error in estimating the coefficient of the independent factor variable was about 1.5%. Overall, the regression results can be considered statistically acceptable, but in our view, this model is not suitable for short-term economic growth forecasting.

The second model obtained from the regression analysis is more adequate and statistically significant. According to this model, there is a strong and substantial correlation ($R = 0.998$) between GDP per capita based on PPP and the following variables: lagged GDP per capita (PPP), foreign trade quota, share of FDI in GDP, and population growth rate. The influence of the foreign trade quota on GDP per capita (PPP) was inverse: a 1% increase in the independent variable led to a 0.34% decrease in the dependent variable. Although the negative impact of the foreign trade quota on economic growth in the second model was twice as small compared to the first model, the result regarding the direction of the relationship is consistent with the previous one.

At the same time, it should be noted that, according to the second model, the most significant factor influencing Ukraine's economic growth was the change in GDP per capita in the previous year: a 1% increase in this independent variable led to a 0.978% increase in the dependent variable. This result confirms the economic theory's

assertion on the importance of increasing per capita income as a source of capital accumulation and a driver of economic development.

Positive factors of Ukraine's economic growth during 2013-2023 also included foreign capital and human resources. This is evidenced by the direct relationship between GDP per capita (in PPP terms) and the dynamics of the share of FDI in GDP and the population growth rate: a 1% increase in each of these independent variables led to an increase in the dependent variable by 0.209% and 0.407%, respectively.

Table 5.9

Regression analysis of the impact of foreign trade openness on Ukraine's economic growth in 2013-2023

Factor features	Dependent variable	
	<i>GDP</i>	<i>GDP_pc</i>
Number of observations	11	11
Intercept	0,000 (0,224)	0,022 (0,022)
<i>GDP_pc_{t-1}</i>	-	0,978*** (0,049)
<i>Trade/GDP</i>	-0,706** (0,235)	-0,340*** (0,052)
<i>FDI</i>	-	0,209*** (0,024)
<i>Popul</i>	-	0,407*** (0,033)
R	0,706	0,998
R ²	0,499	0,997
F-criterion	F(1,9)=8,969	F(4,5)=423,08

* - statistical error rate (p-level) $\leq 10\%$; ** - statistical error rate (p-level) $\leq 5\%$;

*** - statistical error rate (p-level) $\leq 1\%$.

Source: calculated by the author

The results of the second model did not reveal a statistically significant impact of the export and import quotas on Ukraine's GDP per capita in PPP terms during 2013-2023. The coefficient of determination shows that 99.7% of Ukraine's GDP per capita in PPP depended on changes in the previous year's GDP per capita, the foreign trade quota, the share of foreign direct investment in GDP, and the population growth rate, and only 0.3% was influenced by other factors not included in the regression model. The calculated value of the F-statistic was significantly higher than the critical value,

indicating a strong relationship between the dependent and independent variables. The estimation error for the constant exceeded 10%, while the errors for the coefficients of the independent variables were below 1%, which confirms the statistical significance of the obtained results.

According to our second model, the equation for forecasting Ukraine's economic growth based on GDP per capita in PPP terms over the next three years is as follows:

$$GDP_{pc}=0,022+0,978\cdot(GDP_{pc,t-1})-0,340\cdot(Trade/GDP)+0,209\cdot FDI+0,407\cdot Popul. \quad (5.1)$$

The indicator of GDP at current prices is a component in the calculation of the foreign trade quota and the share of foreign direct investment in GDP. Therefore, the first stage of our forecasting will involve calculating the projected values of Ukraine's GDP for 2024-2026 using the trend extrapolation method based on the time series for 2013-2023. According to our calculations, the dynamics of Ukraine's GDP may follow an optimistic scenario (based on a second-order polynomial function) or a pessimistic scenario (based on an exponential function) (Fig. 5.4). The probability of the optimistic scenario being realized is higher ($R^2 = 0.4819$) compared to the pessimistic scenario ($R^2 = 0.2247$). Under the optimistic development scenario, Ukraine's GDP at current prices may amount to USD 230.766 billion in 2024, USD 263.317 billion in 2025, and USD 300.108 billion in 2026. If the pessimistic scenario is realized, Ukraine's GDP at current prices will amount to USD 177.189 billion in 2024, USD 184.033 billion in 2025, and USD 191.142 billion in 2026.

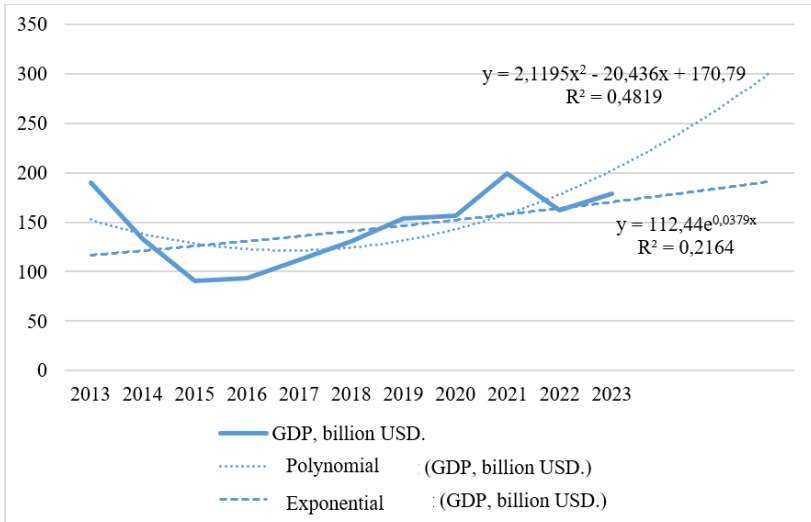


Fig. 5.4. Dynamics and forecast of Ukraine's GDP in actual prices in 2013-2026.

Source: compiled by the author

To forecast the foreign trade quota indicator, it is necessary to calculate the projected values of exports and imports as components of the projected foreign trade turnover. As a result of building trends for 2013-2023 and extrapolating them for the next three years, we obtained forecasted trends for changes in Ukraine's exports and imports for 2024-2026 (Fig. 5.5). According to our forecast, the growth rate of imports is expected to be higher than that of exports. This aligns with the current dynamics of these indicators in the first half of 2024: according to the State Statistics Service of Ukraine, the export growth rate was 100.3%, while the import growth rate amounted to 109% compared to the same period of the previous year⁴⁸⁴.

According to the second-order polynomial function, the projected import volumes of Ukraine will amount to USD 77,044 million in 2024, USD 85,776 million in 2025, and USD 95,733 million in 2026. The calculation of projected export indicators based on the power function allows us to expect an increase to USD 43,938

⁴⁸⁴ Commodity structure of foreign trade in the first half of 2024. <https://www.ukrstat.gov.ua/>

million in 2024, followed by a decrease in 2025–2026 to USD 43,651 million and USD 43,386 million, respectively. Thus, Ukraine's foreign trade turnover, calculated as the sum of projected export and import values, will amount to USD 120,982 million in 2024, USD 129,427 million in 2025, and USD 139,119 million in 2026.

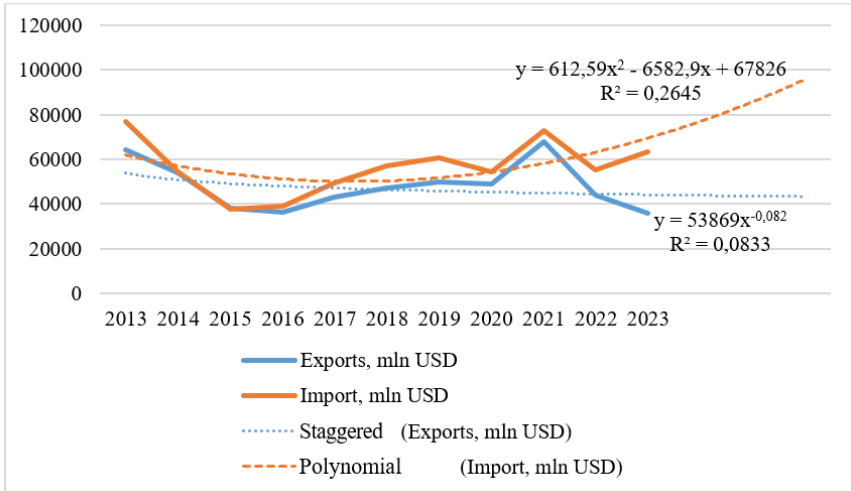


Fig. 5.5. Dynamics and forecast of Ukraine's exports and imports of goods in 2013-2026.

Source: compiled by the author

Using our projected data for Ukraine's GDP in current prices and the volume of foreign trade turnover, we calculate the forecast values of the foreign trade quota. According to the optimistic scenario, the foreign trade quota is expected to decrease from 52.4% in 2024 to 49.1% in 2025 and to 46.4% in 2026. Under the pessimistic scenario, the foreign trade quota may increase from 68.3% in 2024 to 70.3% in 2025 and 72.8% in 2026.

To forecast the share of foreign direct investment (FDI) in Ukraine's GDP, we construct a projected trend of FDI inflows into the economy (Figure 5.6). The dynamics of FDI inflows into Ukraine are characterized by significant fluctuations, which complicates the forecasting process and prevents the development of a trend with a

high probability of realization. However, taking into account the positive growth trend of FDI from USD 1,152 million in 2022 to USD 4,247 million in 2023, according to data from the Ministry of Finance of Ukraine⁴⁸⁵, we apply a growing trend based on a linear function. According to our calculations, the projected volume of FDI inflows in 2024 will amount to USD 3,914.5 million, in 2025 – USD 4,059.5 million, and in 2026 – USD 4,204.6 million.

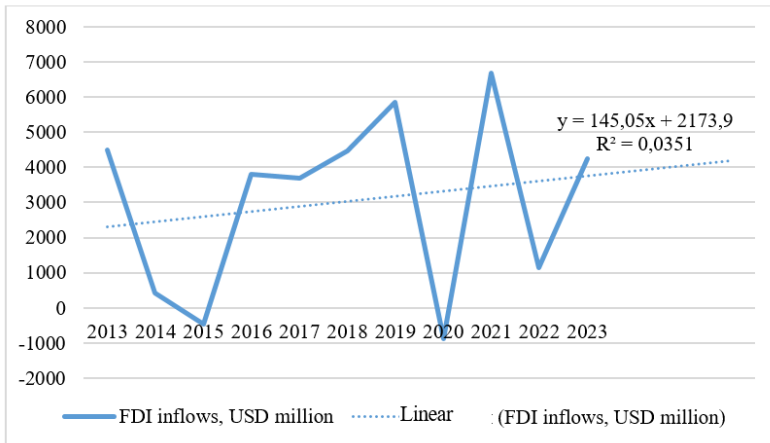


Fig. 5.6. Dynamics and forecast of FDI inflows into the Ukrainian economy in 2013-2026.

Source: compiled by the author

Using these projected FDI values and the forecasted GDP figures for Ukraine under the optimistic and pessimistic scenarios, we calculate the corresponding shares of FDI in GDP. According to the optimistic scenario, in which GDP growth is significant, the FDI-to-GDP ratio will amount to 1.7% in 2024, 1.54% in 2025, and 1.4% in 2026. Under the pessimistic scenario of GDP change in Ukraine, the share of FDI in GDP will be somewhat higher at – the level of 2.2% for 2024–2026.

To forecast the population growth rate, we use the IMF experts' estimates, according to which the population of Ukraine decreased to 33.2 million people in 2023,

⁴⁸⁵ Foreign direct investment in Ukraine from 2002 to 2024. <https://index.minfin.com.ua/ua/economy/fdi/>

while a gradual increase in population is expected in the short term: to 33.4 million in 2024, 34.3 million in 2025, and 35.1 million in 2026⁴⁸⁶. Based on this data, we calculate the population growth rates relative to the previous year and obtain the following values: 0.6% in 2024, 2.7% in 2025, and 2.3% in 2026.

Using the functional relationship (5.1) obtained from the regression analysis, as well as the forecast values of the trade openness ratio, the share of foreign direct investment in GDP, and the population growth rate, we will calculate the optimistic and pessimistic forecasts for the change in Ukraine's GDP per capita in PPP terms as an indicator characterizing economic growth (Table 5.10).

Table 5.10

Results of forecasting Ukraine's economic growth in 2024-2026

Year	GDP per capita at PPP, USD	GDPt-1 per capita at PPP, USD	Foreign trade quota, %	Share of FDI in GDP, %	Population growth rate, %
<i>Optimistic forecast</i>					
2024	17592,13	18007,5	52,42	1,69	0,60
2025	17189,83	17592,13	49,15	1,54	2,69
2026	16797,16	17189,83	46,35	1,40	2,33
<i>Pessimistic forecast</i>					
2024	17588,85	18007,5	68,27	2,21	0,60
2025	17179,56	17588,85	70,32	2,20	2,69
2026	16778,29	17179,56	72,78	2,19	2,33

Source: calculated by the author

According to the results of our calculations, a decline in Ukraine's economic growth is expected during 2024-2026 under both the optimistic and pessimistic scenarios. As shown in Table 5.10, under the optimistic scenario, GDP per capita in PPP terms in 2024 will decrease by 2.3% compared to 2023 and amount to USD 17,592.13. In the following years, the annual rate of decline in this indicator will be 2.28%, with its value amounting to USD 17,189.83 in 2025 and USD 16,797.16 in 2026. According to the pessimistic forecast, GDP per capita in PPP terms in 2024 will decrease by 2.32% compared to 2023 and amount to USD 17,588.85. In the following years, the annual rate of decline in this indicator will be slightly higher compared to

⁴⁸⁶ Population to grow in Ukraine by 2028 - IMF forecast. <https://suspinle.media/725865-v-ukraini-do-2028-roku-zroste-kilkist-naseleenna-prognoz-mvf/>

the optimistic forecast, at 2.33%, with its value decreasing to USD 17,189.83 in 2025 and to USD 16,797.16 in 2026.

Thus, the results of the study confirmed the dependence of Ukraine's economic growth on the level of openness of foreign trade, inflow of foreign direct investment, changes in population size, and the GDP of the previous period. At the same time, the relationship between GDP per capita in PPP terms and the foreign trade quota was inverse, indicating a negative impact of trade openness on Ukraine's economic growth. Meanwhile, the dynamics of the share of foreign direct investment in GDP and population growth rates had a positive effect on Ukraine's economic growth, which is consistent with the Cobb-Douglas production function and R. Solow's model. The optimistic and pessimistic scenarios of changes in Ukraine's GDP per capita in PPP terms, developed on the basis of regression analysis, suggest that during 2024–2026 this indicator will decline annually by 2.28% and 2.33%, respectively.

5.4. Assessment of the Balance of Ukraine's Foreign Trade

The overall level of balance in foreign trade is assessed using a range of indicators that make it possible to characterize the state of the trade balance, the openness of the national economy, and the terms of trade. The assessment of trade balance based on the indicators of trade balance surplus and the export-to-import coverage ratio is the most common approach and is used to describe the relationship between exports and imports in terms of the sufficiency of foreign exchange earnings to cover critical imports.

According to our calculations, Ukraine's foreign trade balance was predominantly negative during 2011-2023 (Figure 5.7), with the exception of 2015, when the balance became positive (\$610.7 million) as a result of exports declining at a slower pace than imports due to the crisis situation caused by the military actions in Donetsk and Luhansk regions, the annexation of Crimea, and a significant reduction in trade with Russia. As shown in the figure, during economic crises, Ukraine's negative trade balance tended to decrease. For example, in 2014 it decreased by \$13,139.1 million compared to 2013 and amounted to -\$527 million, while in 2020, due to

COVID-19 pandemic-related lockdowns, the negative trade balance almost halved compared to 2019 and amounted to $-\$5,144.3$ million. However, during the war, when Ukraine's export volumes significantly declined due to the blockade of maritime logistics and imports decreased at a slower rate, the negative foreign trade balance increased to $\$11,160$ million in 2022 and to $\$27,384$ million in 2023.

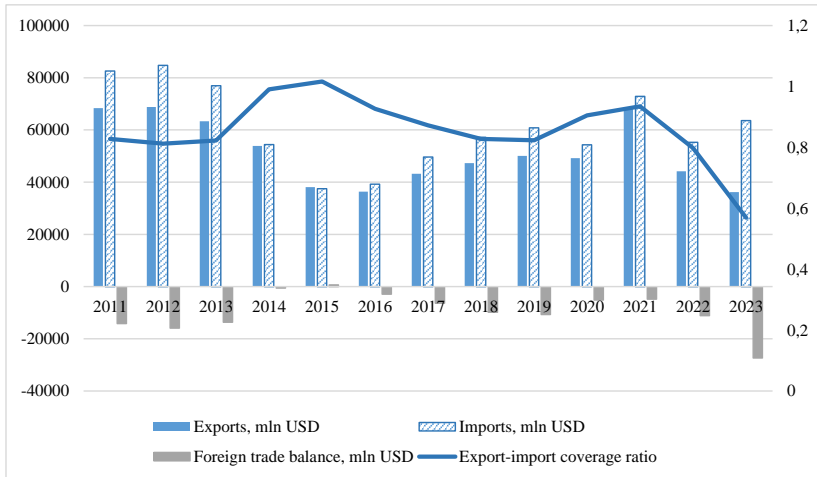


Fig. 5.7. Dynamics of Ukraine's export and import balance indicators in 2011-2023

Source: compiled and calculated by the author based on data⁴⁸⁷

During periods of economic crisis, due to an improved balance between exports and imports, the export-to-import coverage ratio – which is traditionally below one – increased. For example, in 2014, the export coverage ratio rose to 0.99 compared to 0.82 in 2013, and in 2015, the surplus of exports over imports led to an increase in the ratio to 1.01, which was the highest value of this indicator during the study period. During the pandemic, the growth of the export coverage ratio was somewhat slower: its value increased from 0.82 in 2019 to 0.9 and 0.93 in 2020 and 2021, respectively.

⁴⁸⁷ Dynamics of the geographical structure of foreign trade in goods. State Statistics Service of Ukraine. https://ukrstat.gov.ua/operativ/menu/menu_u/zed.htm

A significant deterioration in the export coverage ratio was observed in 2022–2023, amounting to 0.79 and 0.56, respectively.

The analysis of the dynamics of export and import balance indicators generally indicates a persistent imbalance in foreign trade. However, it is worth noting that during 2020–2021, the situation slightly improved due to the fact that in 2020, exports decreased by 1.7% while imports fell by 11% compared to 2019. In 2021, the annual growth rate of exports (138.4%) exceeded the growth rate of imports (134%).

As discussed above, the Ukrainian economy is characterized by a high level of openness, as evidenced by the export and import quota values, which exceeded 40% in 2021. The overall level of economic openness, which we calculated as the ratio of foreign trade turnover to GDP, slightly decreased – from 89.2% in 2011 to 88.1% in 2021. However, a more detailed examination of the dynamics of economic openness by its components reveals two main trends. Firstly, during the study period, Ukraine's export dependence increased, as the export quota – calculated as the ratio of export volume to GDP – rose from 40.4% to 42.6%. The lowest export quota values were observed in 2022–2023, amounting to 27.2% and 20.1%, respectively, which was due to a more significant decrease in export volumes compared to the rate of GDP decline. Secondly, during the period from 2011 to 2023, Ukraine's import dependence decreased, as evidenced by the decline in the import quota, calculated as the ratio of import volumes to GDP, from 48.8% to 35.5%. The lowest level of import dependence in Ukraine was recorded in 2022 (34.1%) as a result of a 24.1% decrease in imports compared to 2021, while GDP simultaneously declined by 18.9%.

Thus, over the study period, Ukraine's economy was characterized by a high level of openness with a slight decrease, a reduction in export and import dependence, especially during the 2022-2023 period. Overall, such dynamics of economic openness indicators indicate a slight improvement in the balance of Ukraine's foreign trade during 2011-2021 and some imbalance during the full-scale invasion by Russian forces, as the export quota was significantly lower than the import quota.

At the same time, given the significant changes in the level of economic openness and indicators of export and import dependence, it is important to additionally analyze the terms of trade, which are assessed using the Laspeyres index, the Paasche index, and the quantitative and price indices of the terms of trade. These indicators make it possible to determine “the extent to which a country gains (or loses) due to changes in the prices (or quantity) of goods in foreign trade with a particular country (or countries) over a given period of time”⁴⁸⁸.

During the period under study, there was a decline in Ukraine's export volume index from 106% in 2011 to 93.4% in 2021, or by 12.6 percentage points (p.p.), indicating a reduction in the quantity of exported goods. At the same time, the import volume index decreased by only 5.2 p.p. – from 112.8% to 107.6%, respectively (Table 5.11). A particularly significant drop in the export volume index was observed in 2020-2021 due to the slowdown of economic activity in many countries around the world caused by the introduction of lockdown measures to prevent the spread of the COVID-19 pandemic. Therefore, we can conclude that trade conditions deteriorated in terms of volume imbalance due to a faster decline in exports compared to imports.

During 2011-2021, fluctuations in the export price index were observed, with a significant decline in 2014-2016. However, over the long term, there was an increase in both export and import prices, with export prices growing at a faster rate than import prices. Specifically, the export price index rose from 125.6% in 2011 to 148.2% in 2021, or by 22.6 percentage points, while the import price index increased by only 4 percentage points (from 120.6% in 2011 to 124.6% in 2021). The highest increase in export prices was recorded in 2021 (48.2% compared to the previous year), which was largely due to the rise in global prices for agricultural products that account for nearly half of Ukraine's total goods exports. Meanwhile, import prices increased by only 24.6% in 2021 compared to 2020.

⁴⁸⁸ Methodological provisions for calculating indices of average prices, physical volume and terms of trade in foreign trade in goods. https://ukrstat.gov.ua/metod_polog/metod_doc/2005/419/metod.htm

Table 5.11

Ukraine's terms of trade indices in 2011-2023.

Year	Physical volume index (Laspeyres)		Price index (Paasche)		Trading Conditions Index	
	Export	Import	Export	Import	Quantitative	Price
2011	106,0	112,8	125,6	120,6	94,0	104,1
2012	102,6	93,4	98,1	110,2	109,8	89,0
2013	92,2	89,6	101,0	101,3	102,9	99,8
2014	92,1	74,4	94,8	98,3	123,8	96,4
2015	86,0	76,7	82,3	89,8	112,1	91,6
2016	99,1	108,6	96,2	96,4	91,3	99,8
2017	102,7	110,9	115,9	114,0	92,6	101,7
2018	97,9	102,6	111,8	112,3	95,5	99,5
2019	105,7	106,1	100,1	100,2	99,6	99,9
2020	94,0	89,4	104,6	99,6	105,2	105,0
2021	93,4	107,6	148,2	124,6	86,8	119,0
2022	59,9	55,3	108,2	137,3	108,4	78,9
2023	95,2	106,7	86,1	107,7	89,3	79,9

Source: compiled by the author based on data⁴⁸⁹

Based on the analysis of the dynamics of trade volume indices and price indices, we can characterize the changes that occurred in Ukraine's terms of trade over the period 2011-2023. As shown in Table 5.11, in the short term, quantitative trade conditions improved, as the index of quantitative terms of trade in 2022 was 21.6 p.p. higher compared to 2021. At the same time, price terms of trade deteriorated, as the corresponding index decreased by 40.1 p.p. over the same period. In contrast, in 2023, the quantitative terms of trade worsened, as indicated by a 19.1 p.p. decline compared to 2022, while the price terms of trade slightly improved, with the index increasing by only 1 p.p. Therefore, we can conclude that in the short term, Ukraine's terms of trade have deteriorated due to a significant decline in export revenues, which did not allow for an increase in imported goods compared to 2022. Thus, the prices of export goods were lower than those of imported goods; accordingly, in the case of an increase in the aggregate price of imports compared to the aggregate price of exports per unit of exported goods, it was not possible to import a larger quantity of products.

⁴⁸⁹ Indices of physical volume, average prices and terms of trade in Ukraine's foreign trade in goods. https://ukrstat.gov.ua/operativ/operativ2021/zd/in_fiz/arh_in_fiz_21_u.htm

In the long term, alongside a more significant decline in the physical volume of exports compared to the physical volume of imports, there was a considerable deterioration in the dynamics of export prices amid rising prices for imported goods. This largely determined the overall worsening of Ukraine's terms of trade in 2023 compared to 2011, as evidenced by a substantial decrease in the price terms of trade index compared to a slight decrease in the quantity terms of trade index over the same period. Thus, the quantitative decline in exports from Ukraine, combined with slower growth in export prices and relatively faster growth in import prices, led to a deterioration in the terms of trade due to the loss of price advantages from foreign trade for the national economy.

Summarizing the results of the conducted study on the general indicators of the degree of external trade balance, it should be noted that during 2011-2023, the threats from foreign trade outweighed the advantages (Table 5.12). This was due to the fact that most indicators of the degree of external trade balance did not meet the established normative values.

Table 5.12

Dynamics of general indicators of balancing benefits and threats from Ukraine's foreign trade in 2011-2023

Indicator	Normative value	Actual value		Compliance with the regulatory value	Advantage (+) Threat (-)
		2011	2023		
Foreign trade balance, mln USD	Positive, upwardly biased	-14214,0	-27384	Not applicable	-
Export-import coverage ratio	No less than 1,0	0,83	0,56	Not applicable	-
Export quota, %	No more than 35	40,4	20,1	Applicable	+
Import quota, %	No more than 35	48,8	35,5	Not applicable	-
Trading Conditions Index	No more than 1,0	1,04	0,79	Not applicable	-

Source: compiled by the author on the basis of own calculations

As shown in Table 5.12, despite some improvement in export and import quotas, there has been a significant deterioration in other indicators of the balance of foreign trade, with actual values falling short of the normative benchmarks. In particular, the negative trade balance of Ukraine has nearly doubled over the study period. Accordingly, the export-to-import coverage ratio, which did not exceed 1, further declined. The value of imports was almost 1.8 times higher than that of exports, indicating that foreign currency expenditures exceeded revenues, which additionally worsens the country's balance of payments. In this regard, we conclude that Ukraine derives fewer benefits from foreign trade compared to the risks that arise due to such a trade imbalance between exports and imports.

The indicators of Ukraine's economic openness during the study period also did not meet the normative values. At the same time, the export quota increased by 2.2 p.p., indicating growing risks associated with the increasing export dependence of the national economy. The import quota in 2021 decreased by 3.2 p.p. compared to 2011, but the actual value of this indicator was three times higher than the established normative value. Therefore, it can be concluded that the risks arising from the export and import dependence of the economy outweigh the benefits of Ukraine's foreign trade, with import dependence being stronger than export dependence.

Alongside the indicators of the overall balance of Ukraine's foreign trade, it is appropriate to analyze the indicators of geographical diversification and the commodity structure of trade, as well as to assess the conformity of their actual values with normative benchmarks. Given that the dynamics of these indicators can have either a negative or positive impact on the economy, it is essential to examine the trends in their changes.

Overall, in 2023, the majority of Ukraine's exports were directed to the EU-27 countries, which accounted for 64.6% of Ukrainian export goods. A somewhat smaller share of Ukraine's total goods exports went to Asian countries – 24.4%. Other European countries received 4.1% of Ukraine's goods exports, Africa accounted for 4.6%, and the share of the Americas was the smallest at 2.1%. Compared to 2011, the share of the EU-27 countries increased by 40.5 p.p., the share of Asian countries

decreased by 2.35 p.p., the share of African countries decreased by 1.27 p.p., and the share of other European countries increased by 1.3 p.p. This redistribution occurred due to a decrease in the share of other countries in Ukraine's exports – from 42.2% in 2011 to 2.3% in 2023 – since, starting from 2019, exports to CIS countries are no longer reported separately in statistical data. Moreover, Ukraine's trade with the CIS member countries, which are now included in the respective groups of European and Asian countries, has significantly declined in recent years.

The dynamics of the geographical structure of imports were characterized by a comparatively smaller increase in the share of EU-27 countries, which rose from 29.3% in 2011 to 51.1% in 2023 (an increase of 21.8 p.p.), indicating that the Ukrainian economy gained additional advantages as a result of the implementation of the EU-Ukraine Association Agreement. The share of imports from other European countries increased from 3.5% in 2011 to 21.2% in 2021 but then declined to 4.6% in 2023. The share of Asian countries in Ukraine's total imports grew from 16.1% to 36.6% over the period 2011–2023. The share of African countries in the import of goods to Ukraine remains small and stands at 1.1%, while the share of the Americas increased from 4.7% to 6.4% over the same period. This structure of Ukraine's foreign trade shows that both exporters and importers focus their activities on the markets of European countries, which are geographically close, as well as on Asian markets, where raw materials are mainly exported and finished goods are imported. These products are cheaper compared to European ones (electronics and other high-tech goods), which is due to the lower cost of labor.

During the period from 2011 to 2023, the share of Ukraine's ten largest partner countries in exports increased from 58.7% to 62.3% (Table 5.13), which may indicate a decline in the geographical diversification of exports. A particularly notable decrease was observed in the share of the key trading partner (which until 2018 was Russia), dropping from 28.9% to 11.8%. In 2019, Poland became Ukraine's leading export market with a 6.6% share of total exports, and since 2020, China has become Ukraine's largest trading partner, accounting for 11.8% of exports in 2021. Countries such as Turkey, Italy, the Netherlands, Germany, and Hungary have also become important

markets, with increased exports of goods from Ukraine. Conversely, the share of exports to Belarus and India declined, and exports to russia ceased altogether.

Table 5.13

Share of the 10 largest destination countries for Ukrainian exports in 2011-2023

2011		2021		2023	
Country	Share in Ukraine's exports, %	Country	Share in Ukraine's exports, %	Country	Share in Ukraine's exports, %
1. russia	28,9	1. China	11,8	Poland	13,1
2. Turkey	5,5	2. Poland	7,7	Romania	10,4
3. Italy	4,4	3. Turkey	6,1	China	6,6
4. Poland	4,1	4. Italy	5,1	Turkey	6,5
5. India	3,3	5. russia	5,0	Germany	5,6
6. China	3,2	6. Germany	4,2	Spain	5,5
7. Belarus	2,8	7. India	3,7	Italy	4,2
8. Germany	2,6	8. Netherlands	3,3	Netherlands	4,1
9. Egypt	2,0	9. Egypt	2,9	Hungary	3,3
10. Hungary	1,9	10. Spain	2,5	Egypt	3,0
Total	58,7	Total	52,3	Total	62,3

Source: calculated by the author based on data⁴⁹⁰

Significant changes in the geographical structure of Ukrainian exports occurred as a result of the intensification of the European integration process: the granting of autonomous trade preferences to Ukraine by the European Union from April 23, 2014, and the entry into force of the EU-Ukraine Deep and Comprehensive Free Trade Area Agreement in 2016. Trade liberalization with the EU enabled competitive Ukrainian producers to reorient toward the European market after the loss of the russian market following the outbreak of military actions in Donbas and the annexation of Crimea by russia. During 2011-2021, the share of EU countries in Ukrainian exports increased from 25.4% to 39.4%. In order to support the Ukrainian economy under the conditions of a full-scale war, the European Parliament temporarily abolished tariffs and quotas on supplies of goods from Ukraine to the EU in June 2022, which also significantly

⁴⁹⁰ Geographical structure of Ukraine's foreign trade in goods.
https://ukrstat.gov.ua/operativ/operativ2021/zd/ztt/ztt_u/arh_ztt2021.html

improved trade conditions and contributed to the increase in the share of the EU in Ukrainian exports to over 60%.

To determine the degree of geographical balance in Ukraine's foreign trade, we will use two indicators: the share of the leading partner country in the total volume of foreign trade; and the Herfindahl-Hirschman Index (HHI) of export concentration. According to our calculations, the share of the leading partner country in Ukraine's foreign trade turnover decreased from 32.4% in 2011 to 11.4% in 2023 as a result of the gradual replacement of the Russian export market with the Polish market. As shown above, the share of Ukrainian exports to Poland steadily increased over the study period (Table 5.13). As a result of the escalation of Russia's trade war against Ukrainian producers prior to 2013 and the onset of Russia's latent military aggression in eastern Ukraine, Russia's share in Ukraine's foreign trade turnover significantly declined – to 11.24% in 2018 (Figure 5.8). From 2019 to 2021, China was Ukraine's leading foreign trade partner, and since 2022, it has been Poland. Comparing the actual share of the leading partner country in foreign trade turnover with the benchmark level of 30%, we can conclude that the level of diversification in the geographical structure of foreign trade has improved.

This conclusion is supported by the dynamics of the Herfindahl-Hirschman Index, the value of which decreased from 0.099 in 2011 to 0.039 in 2021 and slightly increased in 2022-2023 (to 0.053). The long-term decline in export concentration occurred as a result of a more even distribution of the export flow of Ukrainian goods among trading partners, due to the redistribution of exports previously supplied to Russia during 2011-2018 to other countries, particularly the European Union. However, it is worth noting that throughout the study period, the Herfindahl-Hirschman Index did not exceed the upper limit of the range that defines exports as highly diversified (from 0 to 0.15).

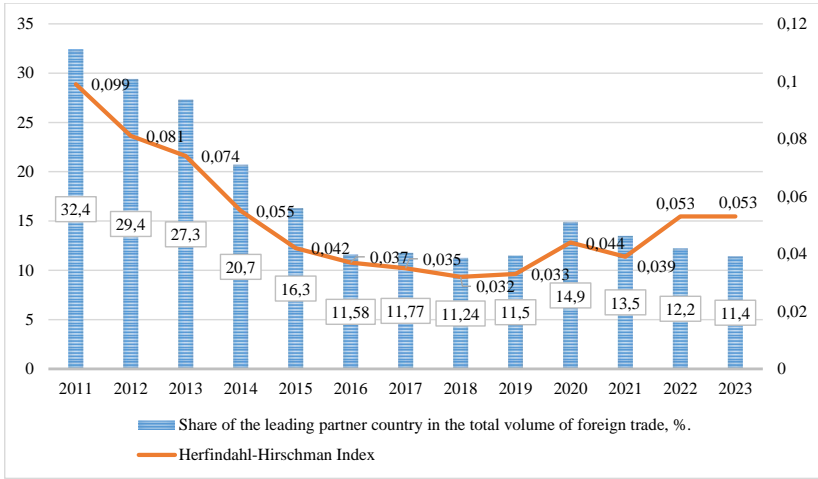


Fig. 5.8. Dynamics of indicators of geographical diversification of Ukraine's foreign trade in 2011-2023

Source: compiled and calculated by the author based on data⁴⁹¹

Alongside the geographical structure of foreign trade, important indicators used to characterize the balance of exports and imports of goods are the indicators of commodity structure and their dynamics. Overall, the commodity structure of Ukraine's foreign trade is dominated by raw materials and products with a low level of processing. The main commodity groups in Ukraine's exports during the study period were base metals and products made from them, as well as products of plant origin. It is worth noting that the export dynamics of these particular goods reflect significant changes that have occurred in the commodity structure of Ukrainian exports. Thus, during the period from 2011 to 2023, the share of base metals and products made from them decreased by 21.5 percentage points, while the share of products of plant origin increased by 24.3 percentage points (Table 5.14). The trade balance for these commodity groups remained positive throughout the entire study period. In 2021, the largest trade surplus was recorded in products of plant origin, having increased nearly fourfold compared to 2011, while the surplus in trade of base metals and products made

⁴⁹¹ Geographical structure of Ukraine's foreign trade in goods....

from them decreased by 29.1%. In 2023, the positive trade balance in products of plant origin declined by 28.4% compared to 2022, and the surplus in trade of base metals and products made from them fell by 77.6%, respectively.

Table 5.14

Dynamics of Ukraine's foreign trade structure in 2011-2023

Year	Export		Import		Foreign trade balance, mln USD	Export-import coverage ratio
	mln USD	% to the total volume	mln USD	% to the total volume		
Products of plant origin						
2011	5531,9	8,1	1815,9	2,2	3716,0	3,0
2021	15538,0	22,8	2129,6	2,9	13408,7	7,3
2023	11716,7	32,4	2112,9	3,3	9603,8	5,5
Precious metals and products from them						
2011	22100,9	32,3	5697,1	6,9	16403,8	3,9
2021	15992,5	23,5	4368,9	6,0	11623,6	3,7
2023	3916,3	10,8	1308,7	5,3	2607,6	3,0
Mineral products						
2011	10259,7	15,0	30029,5	36,4	-19769,8	0,3
2021	8414,3	12,4	14969,6	20,5	-6555,3	0,6
2023	2415,0	6,7	10633,2	16,7	-8218,2	0,2
Fats and oils of animal or vegetable origin						
2011	3396,4	5,0	468,7	0,6	2927,7	7,2
2021	7037,2	10,3	444,0	0,6	6593,2	15,8
2023	5649,1	15,6	247,2	0,4	5401,8	22,8
Machinery, equipment and mechanisms; electrical equipment						
2011	6758,9	9,9	12795,1	15,5	-6036,2	0,5
2021	5272,7	7,7	14201,7	19,5	-8929,0	0,4
2023	2621,5	7,2	11258,3	17,7	-8636,8	0,2
Prepared food products						
2011	2939,1	4,3	3026,7	3,7	-87,6	1,0
2021	3788,9	5,6	3575,9	4,9	213,0	1,1
2023	3271,7	9,0	3252,4	5,1	19,3	1,0

Source: calculated by the author according to the State Statistics Service of Ukraine⁴⁹²

It should be noted that the export-to-import coverage ratio in trade of products of plant origin more than doubled and significantly exceeded the benchmark value in

⁴⁹² Commodity structure of Ukraine's foreign trade in 2011.

https://ukrstat.gov.ua/operativ/operativ2011/zd/tsztt/tsztt_u/tsztt1211_u.htm; Commodity structure of Ukraine's foreign trade in 2021. https://ukrstat.gov.ua/operativ/operativ2021/zd/tsztt/tsztt_u/arh_tsztt2021_u.html;

Commodity structure of foreign trade in 2023.

https://www.ukrstat.gov.ua/operativ/operativ2023/zd/tsztt/arhstztt2023_u.html

2021. The export-to-import coverage ratio in trade of base metals and products made from them slightly decreased (by 0.2 percentage points), yet remained three times higher than the benchmark level. This indicates a significant dependence of the Ukrainian economy on the export of these goods, which poses a number of risks arising from market and price fluctuations in the global markets for grain crops and metal products.

Significant changes also occurred in the export of animal or vegetable fats and oils. In 2023, the export volume of these products nearly doubled compared to 2011, and their share in total exports rose to 15.6%. At the same time, the import of animal or vegetable fats and oils decreased, which led to a nearly twofold increase in the positive trade balance for these products. Accordingly, the export-to-import coverage ratio in trade of animal or vegetable fats and oils grew to 22.8, indicating that producers of these goods are the most dependent on export markets compared to other commodity groups.

The trade balance in mineral products slightly improved as a result of a twofold decrease in import volumes in 2021 compared to 2011, which contributed to the reduction of the trade deficit and an increase in the export-to-import coverage ratio. These changes were mainly due to a decrease in imports of fuel and petroleum products from USD 28,605.3 million (or 34.6% of imports) in 2011 to USD 14,330.3 million (or 19.7% of imports) in 2021. However, in 2023, a more significant reduction in export volumes (-71.3%) compared to the decline in imports (-28.9%) relative to 2021 led to an increase in the trade deficit in mineral products and a decrease in the export-to-import coverage ratio to 0.2.

A significant deterioration of the trade imbalance was observed in the trade of machinery and equipment. The export volumes of these products and their share in total goods exports in 2021 were lower compared to 2011, while import volumes and their share in total imports increased. As a result of this export and import dynamic, the negative trade balance in machinery and equipment grew by 47.9% over the study period. Accordingly, the export-to-import coverage ratio in the trade of machinery and equipment decreased to 0.4, indicating a significant deterioration in its value relative

to the benchmark. In 2023, exports of machinery and equipment decreased twofold compared to 2021, while imports declined by 20.7%, resulting in a slight reduction of the negative trade balance, but the export-to-import coverage ratio dropped to 0.2. This situation is alarming, as machinery and equipment belong to medium- and high-tech products, have a high level of added value, and their export not only ensures high efficiency of foreign trade but also positively influences the country's economic growth.

As shown in Table 5.14, during 2011-2023, trade in processed food products was the most balanced, as evidenced by the alignment of the actual export-to-import coverage ratio with the benchmark value. In 2021, a slight improvement in the balance of foreign trade in processed food products was observed due to positive export and import dynamics, with export growth rates exceeding those of import compared to 2011. However, under wartime conditions, the trade balance in food products somewhat deteriorated in 2023 due to a decrease in exports (by 13.6%) and imports (by 9%), which led to a significant reduction in the positive trade balance, although the export-to-import coverage ratio still met the safety criteria.

In the context of global competition, the most important factor in strengthening a country's competitive position in the international market is trade in products with a high level of added value – namely, high-tech products. This category includes the following groups of goods: pharmaceutical products; electrical machinery; aircraft; optical and photographic instruments and devices. Accordingly, the key indicators of foreign trade balance include the share of high-tech goods in exports and imports, as well as the technological dependence ratio, which is calculated as the ratio of imports to exports of high-tech products.

According to our calculations, during 2011-2023, the share of high-tech goods in Ukraine's exports decreased from 5.9% to 5.7%, while the share of high-tech goods in imports increased from 11.7% to 16.2% (Figure 5.9). The overall trade balance in high-tech goods in 2021 was negative, amounting to USD -7,412.2 million, and in 2023, this figure increased to USD -8,238.1 million. The greatest imbalance in 2023 was observed in the trade of electrical machinery, with the largest negative balance

(USD -4,293.6 million). A somewhat smaller deficit was recorded in the trade of pharmaceutical products (USD -1,863.2 million).

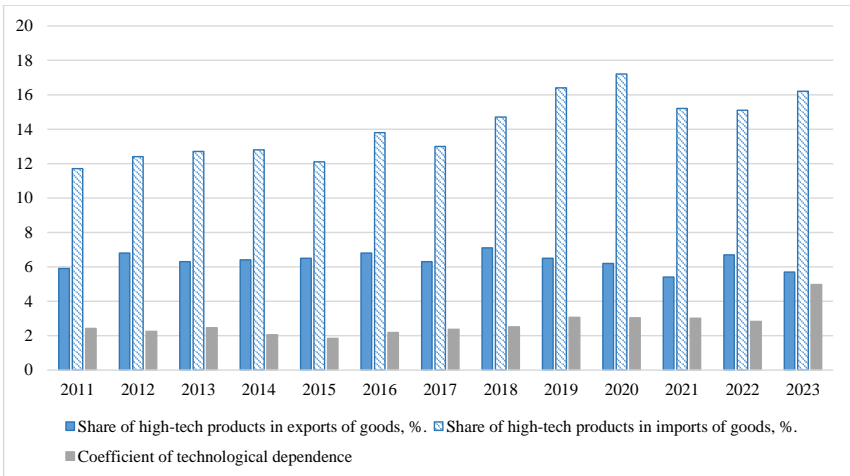


Fig. 5.9. Dynamics of indicators of balance of Ukraine's foreign trade in high-tech goods in 2011-2023

Source: calculated by the author according to the State Statistics Service of Ukraine⁴⁹³

During the study period, the volume of high-tech product exports decreased by 48% (from USD 3,984.3 million in 2011 to USD 2,071.9 million in 2023). At the same time, imports of high-tech products increased by 6.8% (from USD 9,650.1 million to USD 10,310 million, respectively). This export and import dynamic intensified the imbalance in Ukraine's foreign trade in high-tech goods, resulting in an increase in the technological dependence ratio from 2.4 to 4.97. Thus, during 2011-2023, Ukraine's economy became increasingly dependent on imports of high-tech products, indicating the worsening of not only external but also internal risks associated with the gradual

⁴⁹³ Commodity structure of Ukraine's foreign trade in 2011.

https://ukrstat.gov.ua/operativ/operativ2011/zd/tsztt/tsztt_u/tsztt1211_u.htm; Commodity structure of Ukraine's

foreign trade in 2021 https://ukrstat.gov.ua/operativ/operativ2021/zd/tsztt/tsztt_u/arh_tszt2021_u.html;

Commodity structure of foreign trade in 2023.

https://www.ukrstat.gov.ua/operativ/operativ2023/zd/tsztt/arh_tszt2023_u.html.

loss of the domestic industry's capacity to produce pharmaceutical products, electrical machinery, and instruments at the level of modern global standards.

The results of the analysis of the dynamics of the main indicators of the balance in the structure of Ukraine's foreign trade during 2011-2023, and their compliance with the established benchmark values, allow us to conclude that the Ukrainian economy has started to gain more advantages from improved diversification of the geographical structure of exports (Table 5.15). This is evidenced by the improvement in the actual values of the share of the leading partner country in total foreign trade volume and the Herfindahl-Hirschman Index relative to the benchmark value.

At the same time, none of the indicators of Ukraine's foreign trade commodity structure met the benchmark values during the study period, and in 2023, there was a significant deterioration in the actual values of these indicators. This demonstrates that Ukraine's economy has few advantages in high-tech goods trade compared to the risks arising from the loss of the industrial sector's scientific and technological potential and the consolidation of its role as a supplier of raw materials to the global agricultural market.

Table 5.15

Dynamics of indicators of balancing the structure of Ukraine's foreign trade
in 2011-2023

Indicator	Normative value	Actual value		Compliance with the regulatory value in 2023	Advantage (+) Threat (-)
		2011	2023		
Share of the leading partner country in total foreign trade, %	No more than 30%	32,4	11,4	Applicable	+
Export concentration index (ECI)	No more than 0,15	0,099	0,053	Applicable	+
Share of high-tech goods in exports, %	More than 15%	5,9	5,7	Not applicable	-
Share of high-tech goods in imports, %	More than 15%	11,7	16,2	Not applicable	-
Technological dependence coefficient	No more than 1,0	2,42	4,97	Not applicable	-

Source: compiled by the author on the basis of own calculations

The results of the conducted study showed that during 2011-2023, positive structural changes occurred in foreign trade, characterized by an increase in trade turnover with European and Asian countries, as well as a weakening of trade dependence on CIS countries. As a result of the signing and implementation of the EU-Ukraine Association Agreement, the share of EU countries in Ukraine's total export volume increased significantly, indicating growing benefits from trade in this geographical direction. A significant number of Ukrainian exporters managed to reorient from the Russian market to the markets of EU and Asian countries, which led to a change in the main trading partner and a reduction of its share in Ukraine's foreign trade turnover to a safe level. Thus, during the full-scale war in 2022-2023, the geographical structure of Ukraine's exports became more diversified, allowing the country to gain more advantages from foreign trade and reduce the risks of the national economy's dependence on trade with a single leading partner country.

Changes in the commodity structure of foreign trade, on the contrary, indicate a decline in the competitive advantages of the Ukrainian economy, as there was an increase in the shares of plant-based products and animal and vegetable fats and oils in Ukraine's goods exports. Ukraine's dependence on the export of agricultural raw materials is evidenced by the export-to-import coverage ratio, which exceeds the benchmark value by 7 to 15 times. At the same time, negative changes occurred in the trade of high-tech products – in particular, the share of these goods in exports declined, while their share in imports increased, which led to a growing dependence of the Ukrainian economy on technological imports. Thus, Ukraine gains advantages from the export of raw materials, which can be considered unstable, as they depend on global market conditions and are constantly subject to the risk of exporters losing profits due to falling world prices or, as in wartime conditions, disruptions in product delivery logistics. In the segment of high-tech trade, the Ukrainian economy is exposed to risks stemming from increasing dependence on imports of high-tech products – risks that significantly outweigh the benefits of trading in these goods.

The advantages and risks for the Ukrainian economy identified in the previous sections, which arise in the process of Ukraine's foreign trade, require more detailed

research regarding their impact on economic growth. In other words, to confirm the presence of benefits or risks resulting from the balance or imbalance in the volume and structure of exports and imports, it is important to determine the direction of the relationship between economic growth and the indicators that characterize the degree of foreign trade balance. In order to confirm or refute the conclusions drawn, a regression analysis will be conducted, which may yield two types of dependencies: (1) a direct influence of the foreign trade balance indicator on economic growth, which would confirm the presence of benefits from participation in trade; (2) an inverse influence of the foreign trade balance indicator on economic growth, which would indicate the presence of risks from participation in trade.

In order to assess the impact of the overall foreign trade balance indicators on Ukraine's economic growth during 2011-2023, we will use data from the State Statistics Service on the dynamics of the physical volume index of GDP (percentage compared to the previous year), GDP at current prices, and GDP per capita, which characterize the economic growth of our country and serve as the dependent variables (Table 5.16). The set of independent variables includes indicators that reflect the overall balance of Ukraine's foreign trade: the export-to-import coverage ratio; export and import quotas; the index of trade quantity conditions; the index of trade price conditions; and the terms of trade index (the ratio of the export price index to the import price index).

Table 5.16

Data for the regression analysis of the impact of the overall balance of foreign trade on Ukraine's economic growth

Years	Dependent variable			Independent variables					
	Indices of physical volume of GDP, %	Ukraine's GDP (in PPP terms), USD billion	GDP of Ukraine (at PPP) per capita, USD	Export-import coverage ratio	Export quota, %	Import quota, %	Index of quantitative terms of trade, %	Index of price terms of trade, %	Trading Conditions Index
	<i>Ind_GDP</i>	<i>GDP</i>	<i>GDP_pc</i>	<i>Ex/Im</i>	<i>Qex</i>	<i>Qim</i>	<i>Terms_q</i>	<i>Terms_pr</i>	<i>Terms_ind</i>
2011	105,5	569,8	18018	0,83	40,4	48,8	94,0	104,1	1,04
2012	100,2	571,2	18090	0,81	37,7	46,4	109,8	89,0	0,89
2013	100,0	571	18140	0,82	33,2	40,4	102,9	99,8	1,00

2014	93,4	533,6	17255	0,99	40,4	40,8	123,8	96,4	0,96
2015	90,2	481,5	15626	1,02	41,9	41,2	112,1	91,6	0,92
2016	102,4	492,2	16072	0,93	38,9	42,0	91,3	99,8	1,00
2017	102,4	504,4	16524	0,87	38,6	44,3	92,6	101,7	1,02
2018	103,5	521,5	17187	0,83	36,2	43,7	95,5	99,5	1,00
2019	103,2	538,2	17839	0,82	32,5	39,5	99,6	99,9	1,00
2020	96,2	517,9	17286	0,91	31,6	34,9	105,2	105,0	1,05
2021	103,4	535,6	18040	0,93	42,6	45,6	86,8	119,0	1,19
2022	71,2	348,4	15022	0,79	27,2	34,1	108,4	78,9	0,79
2023	105,5	320,5	16231	0,57	20,2	35,5	89,3	79,9	0,80

Source: compiled by the author based on data⁴⁹⁴

The results of the regression analysis of data for 2011-2023 revealed a significant ($R = 0.880$) dependence of Ukraine's *GDP* on changes in the import quota (*Qim*) and the index of trade price conditions (*Terms_pr*):

$$GDP = -1,45 + 0,76 \cdot Q_{im} + 1,06 \cdot Terms_{pr} \quad (5.1)$$

As shown in Equation 5.1, there was a direct relationship between the dynamics of Ukraine's GDP (at PPP) and the value of the import quota during the study period. An increase in the share of imports in GDP by 1% contributed to a 0.76% rise in GDP. This is due to the predominance of machinery and equipment, mineral fuels, oil and petroleum products, polymer and textile materials, and other intermediate goods in imports, which are used in the production of final consumer goods. A slightly stronger positive impact on Ukraine's GDP was exerted by the improvement in the trade price conditions: a 1% increase in the trade price index ensured a 1.06% increase in GDP. However, given the negative dynamics of Ukraine's trade price index during the study period, especially in 2022-2023, we can state that this indicator had a significant impact on the decline in GDP volumes. The coefficient of determination shows that 77.6% of Ukraine's GDP depended on changes in the import quota and trade price conditions, while 22.4% was influenced by other factors not included in the regression model. The

⁴⁹⁴ GDP per capita, PPP (current international \$). International Comparison Program, World Bank. World Development Indicators database, World Bank. Eurostat-OECD PPP Programme.

<https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD?locations>; Gross Domestic Product (1990-2023) with revised balance of payments data. https://www.ukrstat.gov.ua/operativ/operativ2020/vvp/vvp_rik/arh_vvp_rik_90-18u.htm; Geographical structure of Ukraine's foreign trade in goods.

https://ukrstat.gov.ua/operativ/operativ2021/zd/ztt/ztt_u/arh_ztt2021.html; Indices of physical volume, average prices and terms of trade in Ukraine's foreign trade in goods.

https://www.ukrstat.gov.ua/operativ/operativ2024/zd/in_fiz/arh_in_fiz_24_u.htm

calculation error of the coefficient for the independent variable Qim was 1.2%, and for $Terms_pr$ – 0.1%, which confirms the statistical significance of the obtained results.

As a result of the regression analysis of data for 2011-2023, no statistically significant relationship was found between Ukraine's GDP (at PPP) and changes in other foreign trade indicators (export-to-import coverage ratio, export quota, trade quantity index, and terms of trade index). Additionally, no relationship was confirmed between the other dependent variables (Ind_GDP ; GDP_pc) and any of the indicators characterizing Ukraine's foreign trade (Table 5.16).

Thus, the obtained results did not confirm the conclusion regarding the increasing threats to Ukraine's economic growth due to the deviation of the actual import quota values from the benchmark and the deterioration of the trade quantity conditions. Likewise, previous assumptions about the significant impact of risks arising from growing export dependence of the Ukrainian economy – reflected in the mismatch between the actual export quota values and the benchmark – were not confirmed. At the same time, it can be stated that in order to accelerate Ukraine's economic growth, it is necessary to generate advantages by improving the trade price conditions, whereby the growth rate of export prices exceeds the growth rate of import prices.

A regression analysis to examine the impact of advantages and risks associated with the balance of the geographical and commodity structure of foreign trade will be conducted using the indicators presented in Table 5.17.

Table 5.17

Data for the regression analysis of the impact of indicators of the balanced structure of foreign trade on Ukraine's economic growth

Years	Dependent variable			Independent variables				
	Indices of physical volume of GDP, %	Ukraine's GDP (in PPP terms), USD billion	GDP of Ukraine (at PPP) per capita, USD	Share of the leading partner country in total foreign trade, %	Herfindahl-Hirschman index	The share of high-tech products in exports of goods, %	Share of high-tech products in imports of goods, %	Technological dependence coefficient
	<i>Ind_GDP</i>	<i>GDP</i>	<i>GDP_pc</i>	<i>Main_partn</i>	<i>HHI</i>	<i>Ex_ht</i>	<i>Im_ht</i>	<i>Tech_dep</i>
2011	105,5	569,8	18018	32,4	0,099	5,9	11,7	2,42
2012	100,2	571,2	18090	29,4	0,081	6,8	12,4	2,25
2013	100,0	571	18140	27,3	0,074	6,3	12,7	2,45
2014	93,4	533,6	17255	20,7	0,055	6,4	12,8	2,05
2015	90,2	481,5	15626	16,3	0,042	6,5	12,1	1,84
2016	102,4	492,2	16072	11,58	0,037	6,8	13,8	2,18
2017	102,4	504,4	16524	11,77	0,035	6,3	13	2,37
2018	103,5	521,5	17187	11,24	0,032	7,1	14,7	2,51
2019	103,2	538,2	17839	11,5	0,033	6,5	16,4	3,06
2020	96,2	517,9	17286	14,9	0,044	6,2	17,2	3,04
2021	103,4	535,6	18040	13,5	0,039	5,4	15,2	3,01
2022	71,2	348,4	15022	12,2	0,053	6,7	15,1	2,83
2023	105,5	320,5	16231	11,4	0,053	5,7	16,2	4,97

Source: compiled and calculated by the author based on data⁴⁹⁵

The results of the linear regression revealed a strong relationship ($R = 0.928$) between GDP (at PPP) and such indicators as the share of the leading partner country in foreign trade turnover and the Herfindahl-Hirschman Index (Table 5.18). It should be noted that the relationship between GDP and changes in the share of the leading partner country in foreign trade turnover was direct, while the relationship with changes in the Herfindahl-Hirschman Index was inverse. Specifically, a 1% increase in the share of the leading partner country in foreign trade turnover led to a 0.93% increase in GDP, while a 1% increase in the Herfindahl-Hirschman Index resulted in a

⁴⁹⁵ GDP per capita, PPP (current international \$). International Comparison Program, World Bank. World Development Indicators database, World Bank. Eurostat-OECD PPP Programme.

<https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD?locations>; Gross Domestic Product (1990-2023) with revised balance of payments data. https://www.ukrstat.gov.ua/operativ/operativ2020/vvp/vvp_rik/arh_vvp_rik_90-18u.htm; Commodity Structure of Ukraine's Foreign Trade in 2011-2023. https://www.ukrstat.gov.ua/operativ/operativ2024/zd/tsztt/arh_tsztt2024_u.html.

0.845% decrease in the dependent variable, all other factors being equal. The calculated value of the Fisher criterion exceeds its critical (tabular) value, which indicates a strong relationship between the variables. The coefficient of determination shows that 86.1% of the change in Ukraine's GDP depended on the balance of the geographical structure of foreign trade, and 13.9% – on other factors. The statistical error in calculating the coefficients for the independent variables did not exceed 1%, which confirms the reliability of the regression results.

Table 5.18

The results of regression analysis of the dependence of Ukraine's economic growth on the indicators of the balanced structure of foreign trade in 2011-2023

Factor attributes	Dependent variable	
	<i>GDP</i>	<i>GDP_pc</i>
Number of observations	13	13
Constant value	1,072 (0,703)	7,253*** (0,429)
<i>Main_partn</i>	0,930*** (0,118)	0,431*** (0,068)
<i>HHI</i>	-0,845*** (0,118)	-0,353*** (0,069)
<i>Tech_dep</i>	-	0,233*** (0,049)
R	0,928	0,912
R ²	0,861	0,832
F-criterion	F(2,10)=31,194	F(3,9)=14,960

* - statistical error rate at the level of 10%;

** - statistical error rate at the level of 5%;

*** - statistical error rate at the level of 1%.

Source: calculated by the author

The direct relationship between GDP and the share of the leading partner country confirms the importance of the changes that have occurred in the geographical structure of Ukraine's foreign trade. Despite the improvement in the balance of the geographical structure of foreign trade due to a significant decrease in the share of the leading partner country in foreign trade turnover – following the gradual reduction and eventual cessation of trade with Russia – Ukrainian exporters had to reorient toward the markets of other countries, including the European market. This proved to be a challenging task, as not all types of products from Ukraine's manufacturing sector, particularly in the

fields of mechanical engineering and instrument making, were competitive in the EU market or in other countries. As a result, significant changes occurred in the commodity structure of Ukraine's exports, which is now dominated by agricultural raw materials. The reduction in the share of the leading partner country in foreign trade turnover, on the one hand, indicates a decrease in the negative impact of related risks on economic growth, contributing to additional benefits from improved geographical balance in foreign trade. On the other hand, the decline in the share of the leading partner country in foreign trade turnover, against the backdrop of a sharp drop in trade volumes in recent years, had a negative impact on Ukraine's economic growth.

Ukraine's exports are highly diversified, as demonstrated above (Figure 5.8), with the Herfindahl-Hirschman Index showing very low values, indicating that risks associated with export concentration are absent. In 2022-2023, the Herfindahl-Hirschman Index showed a slight increase; however, despite the inverse relationship between this index and GDP, this trend does not pose a threat to Ukraine's economic growth, as the index value remains well below the critical threshold. In addition, the regression analysis did not reveal any relationship between changes in the Herfindahl-Hirschman Index and the other indicators of economic growth (GDP index, GDP per capita). There was also no correlation between GDP and the indicators of the commodity structure of foreign trade, as measured by the share of high-tech products in exports and imports, as well as the technological dependence ratio.

The results of the first regression model described above were confirmed by the results of the second model, which reflects a strong ($R = 0.912$) direct relationship between GDP per capita and the share of the leading partner country in foreign trade turnover, as well as an inverse relationship with the Herfindahl-Hirschman Index. According to the obtained results, the influence of these independent variables was somewhat smaller. Specifically, a 1% increase in the share of the leading partner country in foreign trade turnover led to a 0.431% increase in GDP per capita, while a 1% increase in the HHI resulted in a 0.353% decrease in the dependent variable.

According to the second regression model, a 1% increase in the technological dependence ratio contributed to a 0.233% increase in GDP per capita. The

technological dependence ratio is calculated as the ratio of high-tech product imports to exports, and its increase from 1.84 in 2015 to 4.97 in 2023 indicates a significant rise in the import of high-tech products exceeding exports, primarily due to the increase in imports of electrical machinery and equipment. The positive dynamics of high-tech product imports contributed to Ukraine's economic growth, as, in the context of domestic enterprises' lack of locally produced equipment, the import of machinery and equipment allows for the modernization and technological upgrading of production capacities.

The coefficient of determination showed that 83.2% of the change in Ukraine's GDP per capita depended on the dynamics of the share of the leading partner country in foreign trade turnover, the level of geographical export diversification, and technological dependence, while 16.8% depended on other factors. The calculated value of the Fisher criterion exceeded its critical (tabular) value, indicating a strong relationship between the dependent and independent variables. The regression error did not exceed 1%, which confirms the statistical significance of the identified relationships between the indicators. The calculations did not confirm a dependence of GDP and GDP per capita on changes in the share of high-tech products in exports and imports of goods.

Summarizing the results of the conducted study, it should be noted that no threats to Ukraine's economic growth were confirmed as arising from imbalances in export and import volumes, the increasing import dependence of the Ukrainian economy, or the deterioration of trade quantity conditions. The regression analysis confirmed the existence of advantages for the Ukrainian economy resulting from the improvement of trade price conditions. A trend was identified indicating a reduction in risks associated with dependence on trade with the largest trading partner, which suggests that the national economy is gaining additional benefits from improved geographical balance in foreign trade. The regression analysis revealed a positive impact of technological dependence on Ukraine's economic growth, which contradicts the previously drawn conclusion about increasing risks due to the growing share of high-tech products in imports and the rising value of the technological dependence

ratio. Thus, at the current stage of development, the Ukrainian economy benefits from the import of high-tech products, which are essential for the modernization of industrial enterprises as a foundation for increasing their productivity.

5.5. Tools for Maximizing Benefits of the European Integration Process to Improve Ukraine's Trade Balance

Until 2014, the European Union was an important, but not the key, trading partner for Ukraine. For example, in 2013, 25% of Ukrainian exports were directed to the EU, which was significantly less than the volume of exports to post-Soviet states (35%) and other countries (39%). At the same time, EU countries were interested in expanding economic cooperation. Ukraine was seen as a promising market for products from EU countries, while Ukrainian enterprises expected to gain advantages from the elimination of most tariff barriers on the EU market. To this end, negotiations on an Association Agreement began in 2008, with the Deep and Comprehensive Free Trade Area (DCFTA) as one of its key components. The DCFTA envisages not only the reduction of customs duties but also the large-scale harmonization of Ukrainian regulations and standards with those of the EU. As a result of the completion of all necessary procedures, the Association Agreement between Ukraine and the EU entered into full force in September 2017.

According to the provisions of the Deep and Comprehensive Free Trade Area Agreement, tariffs on most goods have been reduced to zero, while the remainder were granted a transitional period of up to 7 years. Nearly half of Ukraine's agricultural goods were liberalized when the agreement entered into force, but a small number of goods were subject to a transitional period lasting until 2023. Import duties in the EU will not be reduced to zero for all Ukrainian products by 2026 – 8.7% of agricultural tariffs on “sensitive” products (dairy products, eggs, sugar, animal and vegetable oils and fats) will be subject to a limited linear reduction of 20-60%, after which a residual tariff will apply⁴⁹⁶. With regard to the import into the EU of such goods as sugar, poultry meat, and pork, tariff quotas are applied, which set the number of products that are exempt from duty when imported into EU countries.

⁴⁹⁶ Pogłębiona i kompleksowa strefa wolnego handlu między UE a Ukrainą. <https://trade.ec.europa.eu/access-to-markets/pl/content/poglebiona-i-kompleksowa-strefa-wolnego-handlu-miedzy-ue-ukraina>

According to the DCFTA agreement between Ukraine and the EU, the imposition of export duties is prohibited by both parties. In this regard, the Ukrainian government must gradually eliminate existing export duties on certain goods by 2026, including livestock, raw materials, seeds of specific oil crops, and certain types of metals. Additionally, a special safeguard mechanism for Ukrainian exports is foreseen until 2031, which allows Ukraine to introduce a surcharge on export duties for certain goods – such as raw hides, sunflower seeds, and types of metal, steel, and copper – if, within one year, the total export of these products from Ukraine to the EU exceeds a set threshold.

The EU–Ukraine Association Agreement, followed by the implementation of the DCFTA, helped significantly mitigate the consequences of the collapse in Ukraine’s trade. Although trade with the EU declined sharply in 2014–2015, the drop was smaller than in trade with post-Soviet states or third countries. Ukrainian exports to the EU decreased only in 2015 (-23%), while imports fell in 2014 and 2015 (by 22% and 27%, respectively). Since 2016, Ukrainian exports began to grow – initially slightly (5%), and then in the following year by 29%, reaching USD 17.5 billion, thus exceeding the 2013 level (USD 16.8 billion). It should be noted that in 2017, exports to the EU grew much faster than to post-Soviet countries (15%) and other countries (12%) during that period, which further confirmed the benefits of Ukraine’s participation in the DCFTA.

Given that the volume of imports to Ukraine has traditionally exceeded the volume of Ukrainian goods exports, including in trade with EU countries, it is important to explore the opportunities for more effective use of the advantages gained by the Ukrainian economy as a result of the introduction of the free trade regime with the EU. To this end, it is necessary to analyze the commodity structure of Ukraine’s foreign trade with EU countries and identify the product groups in which the export potential of the Ukrainian economy can be utilized to a greater extent.

The results of the comparison between data from 2017 and 2021 show that, in 2021, there was growth across all major product groups in Ukraine’s exports to the EU, with the most significant increase observed in base metals and products made from them (Table 5.19). In 2023, exports of certain product groups declined significantly compared to 2021, due to the loss of part of the industrial potential as a result of the destruction of enterprises and the occupation of industrial cities in the Donetsk and Luhansk regions. A substantial drop in exports in 2023 occurred in the product group

“Mineral fuels; oil and products of its distillation” – by 52.6% compared to 2021 – since a large part of the industrial facilities in this sector was destroyed by Russian forces during the first year of the full-scale war. The 52.3% decline in sales of metallurgical products over the same period was largely due to the challenges faced by this sector in Ukraine (disruption of many production chains as a result of hostilities in the Donbas region). However, some product groups that were previously exported in small volumes recorded significant growth during the period from 2017 to 2023. For example, meat product exports increased from USD 1 million to USD 407.2 million, dairy products – from USD 42 million to USD 227 million, and furniture – from USD 145 million to USD 698 million.

Table 5.19

Dynamics of exports of major goods from Ukraine to the EU in 2013-2021

	Export volume, mln USD			Change, %		
	2017	2021	2023	2021/2017	2023/2017	2023/2021
Base metals and their products	3190	6355,2	3032,8	+99,2	-4,9	-52,3
Cereal crops	1677	1934,8	4575,4	+15,4	+172,8	+136,5
Electric machines	2043	2573,5	1506,6	+26,0	-26,3	-41,5
Seeds and fruits of oilseeds	1095	1479,2	1942,7	+35,1	+77,4	+31,3
Mineral fuels; petroleum and its distillation products	524	581,3	275,5	+10,9	-47,4	-52,6
Wood and wood products	834	1436,8	1254,5	+72,3	+50,4	-12,7
Fats and oils of animal or vegetable origin	1472	2362,5	2981,5	+60,5	+102,5	+26,2

Source: calculated by the author according to the State Statistics Service of Ukraine⁴⁹⁷

As shown in Table 5.19, in 2023 compared to 2021, an increase in export volumes was observed only in the product groups of agricultural goods. The largest growth occurred in the export of cereals – more than doubling. The increase in the export volumes of oilseed crops, and animal and vegetable fats and oils, occurred at a

⁴⁹⁷ Cooperation between Ukraine and the EU countries in 2017. Statistical collection. Kyiv: State Statistics Service of Ukraine, 2018. 182 p., pp. 30-38; Commodity structure of foreign trade with the EU countries in 2021-2023. https://www.ukrstat.gov.ua/operativ/operativ2021/zd/tsztt/ES/tsztt/ES_u/arh_tsztt_es_2024_u.html.

comparatively slower pace, which is due to the protection of EU markets through subsidies to domestic producers of these goods and the imposition of phytosanitary barriers. However, during the study period, a steady upward trend in exports was observed across all major types of agricultural products, indicating the strengthening of domestic agricultural producers' competitive positions in the European market. At the same time, attention should be drawn to the 41.5% decrease in the export of electrical machinery in 2023 compared to 2021, which reflects a significant deterioration in the quality of the export commodity structure, as this type of product is classified as high-tech and has significantly higher added value compared to agricultural goods.

According to expert estimates, the total export potential of the EU market for Ukrainian goods amounts to approximately USD 20 billion, of which USD 9.7 billion remains untapped⁴⁹⁸. Thus, Ukrainian goods exports to the EU have the potential to grow by nearly USD 10 billion. From the perspective of maximizing the benefits of trade, it is important to utilize this potential across specific product groups, as export efficiency is higher for goods with a greater degree of processing.

However, Ukraine's highest export potential is concentrated specifically in the raw material sectors of the economy. For example, the total export potential for supplying sunflower oil to EU countries is estimated at USD 1.7 billion, of which USD 554.6 million remains untapped, while the total export potential for wheat amounts to USD 667 million, with an unused potential of USD 423.1 million (Figure 5.10). At the same time, the export potential in the trade of goods with higher added value is significantly lower. In particular, the total export potential for supplying automotive electrical wiring from Ukraine to the EU amounts to USD 911.6 million, of which USD 191.2 million remains untapped – several times less compared to the aforementioned agricultural product groups. The untapped potential for the export of household electrical appliances (coffee machines, kettles) is also relatively small – USD 190.5 million – but it is comparable to the volume of actual exports (USD 185 million).

⁴⁹⁸ Huzhva I., Ivanov E. Strategic guidelines for deepening trade and economic relations between Ukraine and the European Union in the context of the Association Agreement, p. 61. https://fru.ua/images/doc/analytics/2021/NDR_Ukr-EU.pdf

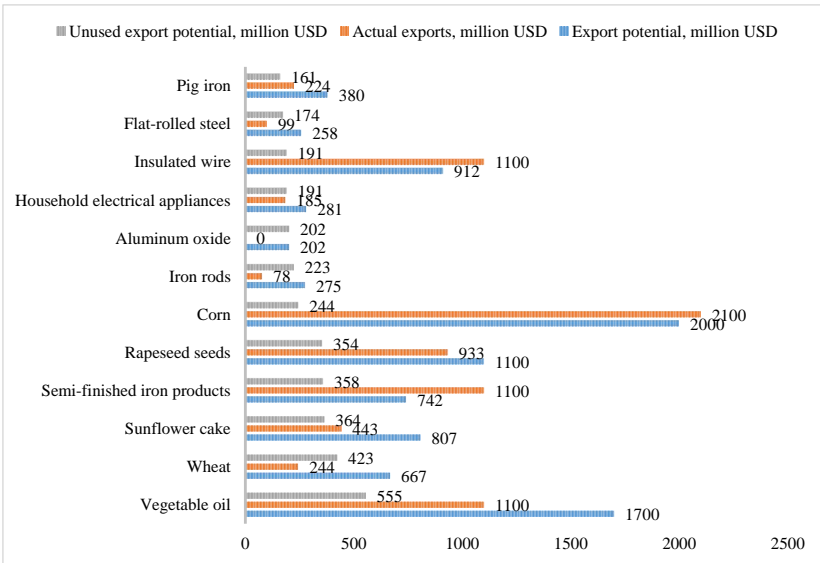
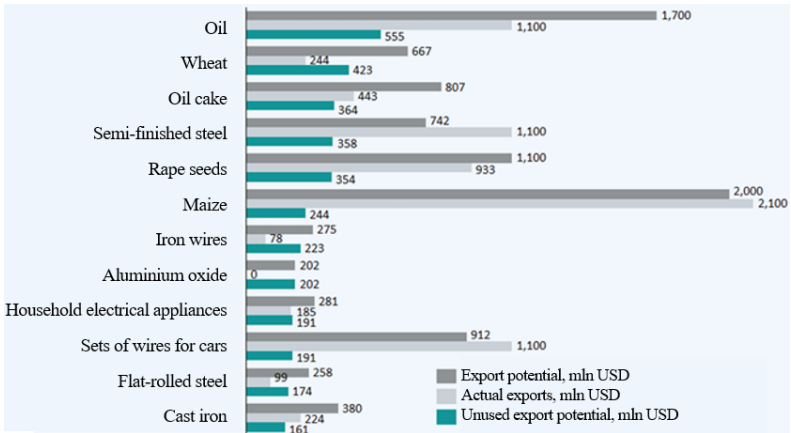


Fig. 5.10. Commodity groups of Ukrainian exports to the EU with the highest export potential⁴⁹⁹

Thus, Ukraine has significant untapped reserves for increasing exports to EU countries, which underscores the importance of identifying appropriate instruments – institutional, organizational, and economic – for expanding export volumes in the main

⁴⁹⁹Compiled by the author according to: Huzhva I., Ivanov E. Strategic guidelines....., p. 63

product groups where additional export growth is possible. Particular attention should be paid to goods with a higher level of added value.

Before the full-scale invasion of Ukraine by Russian forces, the main issue in Ukraine's trade with EU countries was tariffs and tariff quotas, which reduced the price competitiveness of Ukrainian products on the European market. Therefore, the primary measure considered to promote an increase in Ukraine's exports to the EU was the elimination of import duties on nitrogen fertilizers, mineral and chemical fertilizers, buses, passenger cars, trucks, bicycles, as well as the removal of import quotas and duties in the EU on key Ukrainian agri-food product groups (honey, juices, poultry meat, sugar). After the outbreak of the full-scale war, in June 2023, the European Parliament lifted EU import duties on Ukrainian agricultural products for a period of one year, and in May 2023, a decision was made to extend for another year the suspension of import duties, anti-dumping duties, and safeguard measures on Ukrainian exports to the European Union in order to support Ukraine's economy⁵⁰⁰.

The suspension of tariffs applies to fruits and vegetables subject to the entry price system, as well as to agricultural and processed agricultural products that are subject to tariff quotas. According to the Association Agreement between Ukraine and the EU, zero tariffs have applied to industrial goods since January 1, 2023, and therefore they are not included in the new proposal. As a result, Ukrainian producers have gained the opportunity to increase exports of both agricultural and industrial products to EU countries, which will allow for greater utilization of the existing export potential.

However, the conditions for exporting agricultural products from Ukraine to the EU are unstable, due to the desire of certain countries to protect their own agri-food producers. Thus, in May 2023, the European Commission imposed a ban on imports from Ukraine of wheat, corn, rapeseed, and sunflower seeds into Bulgaria, Poland, Romania, Slovakia, and Hungary at the request of the governments of these countries, and on June 5 this ban was extended until September 15, 2023. Therefore, Ukraine

⁵⁰⁰ Bezcelowy handel UE z Ukrainą wydłużony o rok. <https://www.rp.pl/rolnictwo/art38447671-bezcelowy-handel-ue-z-ukraina-wydłużony-o-rok>

needs to employ instruments not only to promote the export of agricultural products but also to increase the export of industrial goods.

In order to maximize Ukraine's benefits from trade with EU countries, a comprehensive application of institutional, economic, and organizational instruments is necessary (Table 5.20). Among the institutional instruments, the Export Strategy of Ukraine should be highlighted, the development of which is essential due to the expiration of the previous strategy in 2021 and the drastic changes in domestic production conditions and external factors affecting Ukraine's trade environment following the start of the full-scale war with Russia. The Export Strategy of Ukraine should take into account all aspects of the changes in the trade regime with EU countries and Ukraine's acquisition of candidate status for membership in the European Community. Given the significant challenges in ensuring the export of agricultural raw materials to EU countries, the Export Strategy must identify priority sectors of the processing industry that should receive state support to increase the export of manufactured goods to the European market.

Table 5.20

Tools to increase the efficiency of using Ukraine's export potential in the context of European integration

Tools	Measures	Levers
1. Institutional	Adoption of the Export Strategy of Ukraine Optimization of the export credit agency activities Improvement of the customs administration system Intensification of negotiations within the framework of the Industrial Dialogue	- state support for manufacturers exporting products with a high level of added value; - guaranteeing payments, lending and insurance of export operations of enterprises; - minimizing discriminatory burdens during customs procedures, strengthening cooperation between the customs control authorities of Ukraine and the EU neighboring countries; - application of European quality standards in industrial production; - promoting the use of technological and innovative solutions
2. Economic	Development of industrial parks Restoration of free economic zones (FEZs)	- exemption from corporate income tax for 5 years and a 9% tax rate for the following 5 years, provided that the funds are reinvested in the development of export-oriented production; - exemption from corporate income tax for 5 years and application of a half-rate for the following 5 years, provided that the freed-up funds are reinvested in the development of export-oriented production;

		<ul style="list-style-type: none"> - preferential lending for production activities (at 2% annual interest); - preferential land lease rates or purchase prices for land plots designated for enterprise construction
3. Organizational	Establishment of trade missions at Ukrainian embassies in the EU	<ul style="list-style-type: none"> - promoting the development of Ukraine's trade and economic relations, advancing the export of goods and services originating from Ukraine, and attracting foreign investment into priority sectors of Ukraine's economy; - preparing assessments regarding the feasibility of exporting or importing goods and services, and developing new forms of cooperation with foreign countries to increase the volume of exports of goods and services originating from Ukraine.

In order to enhance the promotion of Ukrainian industrial products in EU markets, it is important to utilize the opportunities within the framework of the EU-Ukraine Industrial Dialogue ("High-Level Ukraine-EU Dialogue on Horizontal Issues and Specific Industrial Sectors"), which was launched in 2016 to deepen cooperation between Ukrainian enterprises and business structures in the EU. The expected effects of such enhanced cooperation include the development of medium- and high-tech industrial sectors and an increase in export volumes as a result of addressing financial and technological challenges faced by domestic enterprises through the inflow of investments and the integration of enterprises into global and European value chains, as well as the strengthening of cooperation between Ukrainian enterprises and those of EU member states. Equally important is the study and adoption of European experience in managing the production of export goods, the implementation of European quality standards in industrial production, and the development and application of new technologies and innovations.

For the effective implementation of institutional instruments, it is necessary to introduce economic instruments through the development of industrial parks and the restoration of free economic zones, which should specialize in the production of export-oriented goods in the priority industrial sectors defined in Ukraine's Export Strategy. In this context, it is important to apply specific economic levers to support the activities of such enterprises – such as corporate income tax incentives, preferential lending, and others.

Organizational instruments are necessary to facilitate the conclusion of international contracts by enterprises and to provide support for their implementation by all parties to the agreements. In this regard, it is advisable to establish trade missions at Ukrainian embassies in EU countries, which would assist Ukrainian exporters in resolving issues related to receiving foreign currency earnings for exported goods and VAT refunds on export operations. These missions would also provide legal support during anti-dumping and anti-subsidy investigations, resolve trade disputes, and offer informational support for conducting market research in the EU and participating in exhibitions, trade fairs, and business forums.

Conclusions of the Chapter

Ukraine is characterized by the lowest level of foreign trade openness and the greatest imbalance between exports and imports compared to Central and Eastern European (CEE) countries. According to the results of cluster analysis in 2023, Ukraine is viewed as a separate group distinguished by a low level of foreign trade openness. Compared to CEE countries, Ukraine had the lowest indicators for the export quota, import quota, and total foreign trade quota. The export-to-import coverage ratio in Ukraine was the lowest among the analysed countries and significantly below both the benchmark and optimal levels. The group of CEE countries with the highest level of foreign trade openness includes Slovenia, the Czech Republic, Hungary, and Slovakia. The group with a high level of openness includes Estonia, Latvia, and Lithuania, while the group with a moderate level of trade openness comprises such CEE countries as Poland, Croatia, Bulgaria, and Romania.

The main factors influencing the openness of Ukraine's foreign trade are the implementation of free trade agreements, particularly with EU countries, and the utilization of the existing potential of key export-oriented sectors of the economy. A favorable institutional factor contributing to Ukraine's trade openness has been the complete elimination of tariff duties and quantitative restrictions within the framework of the DCFTA, which has supported the growth of export and import volumes with EU countries, directly affecting the openness level of the national economy.

Amid the full-scale invasion of Ukraine by Russian forces, the dynamics of Ukrainian export volumes during 2022-2023 showed a downward trend, but access to the joint European market helped soften this negative trajectory. The greatest potential for enhancing foreign trade openness lies in increasing exports of agricultural and food products, particularly animal and vegetable fats and oils, while the export potential of the metallurgical sector has significantly declined.

After joining the European Union, CEE countries have gradually been narrowing the gap with developed countries in terms of real GDP per capita. An important factor in the economic growth of CEE countries during 2015-2023 was the level of foreign trade openness. The growth of GDP in CEE countries was directly dependent on the increase in the foreign trade quota, while GDP per capita (at PPP) depended on the increase in the import quota. At the same time, an increase in the export quota led to a decrease in GDP per capita. The positive impact of the import quota was greater than the negative impact of the export quota on economic growth in CEE countries. The study found no relationship between the economic growth of CEE countries and the dynamics of the ratio of FDI to GDP or population growth rates.

Ukraine's economic growth in 2013-2023 depended on the level of foreign trade openness, inflow of foreign direct investment, changes in population size, and the GDP of the previous period. The relationship between GDP per capita at PPP and the foreign trade quota was inverse, indicating a negative impact of trade openness on Ukraine's economic growth. The dynamics of the share of foreign direct investment in GDP and the rate of population growth had a positive effect on Ukraine's economic growth. Based on the results of the regression analysis, an econometric model was developed, which allowed the justification of both optimistic and pessimistic short-term scenarios for Ukraine's economic growth. According to the optimistic scenario, Ukraine's GDP per capita at PPP is projected to decline annually by 2.28% in 2024-2026, while under the pessimistic scenario, this indicator is expected to decrease by 2.33% annually. Thus, under both the optimistic and pessimistic scenarios, a decline in Ukraine's GDP per capita is expected over the next three years.

The results of the calculation of general indicators of the degree of foreign trade balance in 2011-2023 showed that the risks from foreign trade outweighed the benefits for Ukraine. The volume of imports exceeded the volume of exports in value terms, resulting in foreign currency expenditures being higher than foreign currency earnings, which negatively affected the country's balance of payments. The export quota value declined significantly, indicating a reduction in risks and a weakening of export dependence, while the import quota slightly exceeded the benchmark value. Ukraine's terms of trade index did not meet the benchmark level and showed a downward trend, indicating growing risks for the Ukrainian economy due to an unfavorable ratio between export and import prices.

During 2011–2023, positive structural changes occurred in foreign trade, characterized by an increase in trade turnover with European and Asian countries, a weakening of trade dependence on CIS countries, a shift in the main trading partner, and a reduction in its share in Ukraine's foreign trade turnover to a safe level. In 2021-2023, Ukraine's export geography became more diversified, which provided advantages from foreign trade and reduced the threat of the national economy's dependence on trade with a single leading partner country. Changes in the commodity structure of foreign trade suggest a decline in the competitive advantages of the Ukrainian economy, as Ukraine's dependence on the export of agricultural raw materials has increased, while its dependence on technological imports has grown simultaneously.

Indicators of economic openness, as well as investment and human resources, had varying impacts on the economic growth of CEE countries and Ukraine. GDP per capita in CEE countries was significantly influenced by changes in export and import quotas. At the same time, the relationship between the dependent variable and the export quota was inverse, while the impact of the import quota had a direct effect on the dependent variable. The results of the study did not reveal a statistically significant relationship between economic growth indicators and the ratio of FDI to GDP in CEE countries. Thus, the economic growth of CEE countries in 2015–2023 largely depended on the effective mobilization of internal investment resources. The impact of economic openness on Ukraine's economic growth in 2013-2023 was negative, as

evidenced by the inverse relationship between GDP per capita at PPP and changes in the foreign trade quota. At the same time, foreign capital and human resources were positive factors for Ukraine's economic growth, since the study revealed a direct relationship between GDP per capita at PPP and the dynamics of the share of FDI in GDP, as well as the rate of population growth. However, no statistically significant impact of the export and import quotas on Ukraine's GDP per capita at PPP during 2013-2023 was confirmed. Ukraine's GDP per capita at PPP was 99.7% dependent on the previous year's GDP per capita, the foreign trade quota, the share of foreign direct investment in GDP, and the population growth rate.

The dynamic growth in Ukraine's foreign trade volumes with EU countries following the implementation of the Association Agreement highlights the need to use effective instruments to maximize the benefits for the Ukrainian economy from increased export volumes and improvements in its qualitative structure. Ukraine has the opportunity to strengthen the competitive position of its exporters in EU markets due to the elimination of duties and tariff quotas on industrial goods as a result of the gradual implementation of the DCFTA provisions, as well as the European Parliament's decision to suspend duties on agricultural products in order to support the Ukrainian economy during the war. The appropriate response of the government should be the development and implementation of a set of institutional, economic, and organizational instruments aimed at supporting manufacturing enterprises that produce and export goods to EU countries. Key institutional measures should include the development and implementation of Ukraine's Export Strategy and the optimization of the Export Credit Agency's activities, the effectiveness of which will depend on the application of effective economic instruments designed to promote the production and export of manufactured goods within industrial parks and free economic zones. Organizational instruments are related to providing support for the activities of Ukrainian exporters in foreign markets and may be implemented through trade missions, which should be established at Ukrainian embassies in EU countries.

CHAPTER 6. PREREQUISITES, PROBLEMS AND PROSPECTS OF ECONOMIC INTEGRATION OF UKRAINE WITH THE EU

(Olena Sokolovska)

6.1. Assessing the Effectiveness of Economic Integration within the EU

The economic effectiveness of integration processes within the EU must be assessed taking into account both internal and external factors. Internal factors, which reflect the scale, depth, and specifics of European integration, include a set of economic activity indicators within the regional bloc: GDP per capita in the EU; volumes of intra-regional trade and its share in the EU's total foreign trade turnover; the share of high-tech exports in the total intra-regional exports of the EU; and foreign direct investment per capita in the EU. At the same time, external factors also have a significant influence, as they determine the place and role of the integration bloc in the global economy. These include indicators such as: the EU's share in global GDP; the EU's share in global trade turnover; the EU's share of the world's population; the EU's share in global high-tech exports; and the EU's share in global FDI volume.

First, let us consider the internal and external indicators that characterize the dynamics of economic growth in the EU. Overall, GDP at current prices showed a positive trend during the study period and, according to World Bank data, increased from USD 14.56 trillion in 2010 to USD 18.35 trillion in 2023⁵⁰¹. At the same time, it can be assumed that, in addition to internal factors influencing the production volumes of EU countries, external factors also play a significant role in the GDP dynamics of the integration bloc. In particular, the decline in GDP from USD 15.65 trillion in 2014 to USD 13.55 trillion in 2015 was largely due to the Russian military invasion of Donbas and the annexation of Crimea. As a result of the economic crisis caused by the COVID-19 pandemic, the EU's GDP in 2020 declined slightly – to USD 15.38 trillion compared to USD 15.69 trillion. The full-scale war in Ukraine led to a more significant decline in EU GDP – from USD 17.32 trillion in 2021 to USD 16.76 trillion in 2022.

⁵⁰¹ International trade of EU, the euro area and the Member States by SITC product group. https://ec.europa.eu/eurostat/databrowser/view/ext_lt_intertrd/default/table?lang=en&category=ext_go.ext_g_o_agg.ext_go_lti.ext_go_lti_int

Despite the overall upward trend in the EU's GDP during 2010-2023, the relative indicators used to characterize the internal and external factors of European integration show different trends. For instance, the dynamics of the EU's GDP per capita are increasing, while the EU's share in global GDP demonstrates a downward trend (Figure 6.1). Thus, the increase in EU GDP per capita from USD 32,965.8 in 2010 to USD 40,823.9 in 2023 indicates a positive effect of this internal regional factor on the development of European integration. At the same time, from an external perspective, there has been a decline in the effectiveness of European integration, as evidenced by the decrease in the EU's share of global GDP from 21.9% to 17.4% over the same period.

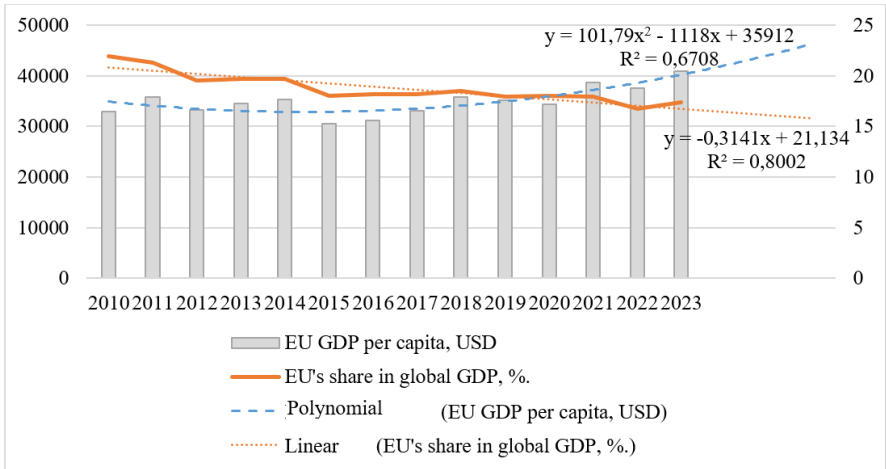


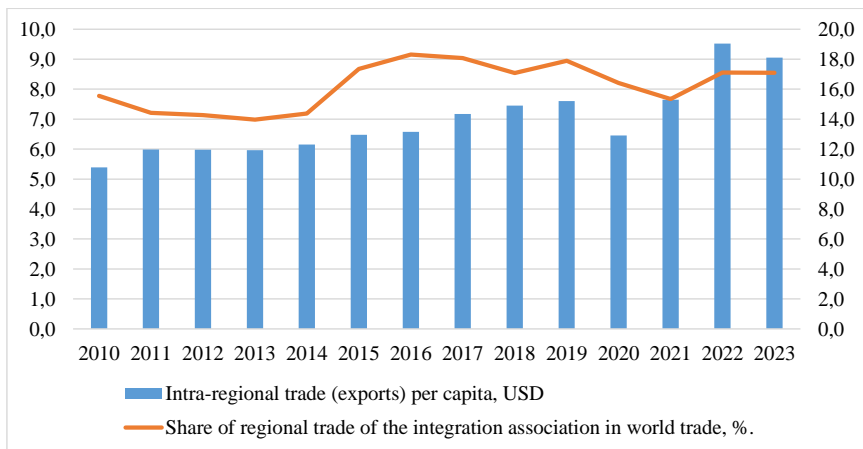
Fig. 6.1. Dynamics of indicators characterizing the GDP of the European Union in 2010-2023.⁵⁰²

The EU's trade indicators, which reflect the effectiveness of the integration bloc from both internal and external perspectives, have improved in the long term, although their dynamics have not been consistent. Intra-regional EU exports per capita increased

⁵⁰² International trade of EU, the euro area and the Member States by SITC product group. https://ec.europa.eu/eurostat/databrowser/view/ext_lt_interrtd/default/table?lang=en&category=ext_go.ext_go_agg.ext_go_lti.ext_go_lti_int

from USD 5.4 in 2010 to USD 9.1 in 2023 (Figure 6.2). This indicator showed steady growth during 2010-2019, but in 2020, due to the crisis caused by the COVID-19 pandemic, its value declined to USD 6.5, highlighting the vulnerability of internal EU trade to global risks. At the same time, it is worth noting that in 2022, the volume of intra-regional EU exports per capita rose to USD 9.5 compared to USD 7.6 in 2021, indicating that the first year of Russia's full-scale invasion of Ukraine did not negatively impact trade within the Union. However, the decline of the indicator in 2023 to USD 9.1 may indicate a reduction in trade turnover between EU countries as a result of the blockade of the Ukrainian-Polish border by Polish farmers and transporters, which slowed down the functioning of regional value chains that include Ukrainian producers.

It should be noted that, according to our calculations based on Eurostat data⁵⁰³, the share of intra-regional trade in the EU's total trade volume increased from 40% to 42.2% during 2010-2015. However, in 2016–2017, this indicator declined to 41%, followed by a further decrease to 40% in 2018–2020 and down to 37-38% in 2021-2023. This indicates the growing importance of external markets for EU countries starting from 2016, after the implementation of the free trade area with Ukraine.



⁵⁰³ International trade of EU, the euro area and the Member States by SITC product group. https://ec.europa.eu/eurostat/databrowser/view/ext_lt_intertrd/default/table?lang=en&category=ext_go.ext_g_o_agg.ext_go_lti.ext_go_lti_int

Fig. 6.2. Dynamics of intra-regional trade indicators in the EU in 2010-2023⁵⁰⁴

As shown in Figure 6.2, the share of EU regional trade in global trade also demonstrated a positive long-term trend – increasing from 15.6% in 2010 to 17.1% in 2023. At the same time, it is worth noting that the decline of this indicator from 15.6% in 2010 to 14% during 2011-2014 reflects the prolonged impact of the 2008-2009 global financial crisis. The recovery of the European economy was hindered not only by internal factors but also by growing uncertainty caused by the events in Ukraine in 2013-2014 (the Russian military invasion of Donbas and the annexation of Crimea by Russia). The increase in the EU's share of global regional trade began in 2015, when the indicator rose to 17.3%, followed by further growth to 18% in 2016-2017. A significant factor behind this positive trend is considered to be the signing of the Association Agreement and the implementation of the provisions of the Free Trade Area between Ukraine and the EU, which stimulated trade within the Union as a result of improved trade conditions with Ukraine. For instance, trade in intermediate goods between EU countries may have increased due to the activation of value chains in the production of technological goods supplied to the Ukrainian market. On the other hand, the volume of intra-regional trade in finished products within the EU can be viewed as a result of improved access to raw materials from Ukraine, which are used in their production.

The EU's exports are characterized by a high level of technological sophistication, as evidenced by the share of high-tech products in exports, which stands at 16% (Figure 6.3). In addition, European producers of high-tech goods maintain competitive positions in the global market, although the EU's share in global high-tech exports declined from 29.7% in 2011 to 22.1% in 2021. The relatively stable share of high-tech goods in EU exports, alongside the declining EU share in global high-tech

⁵⁰⁴ Calculated by the author according to: Total annual goods exports by European Union member states to other countries within the EU from 1999 to 2023. <https://www.statista.com/statistics/1375209/eu-internal-trade-intra-eu-exports-member-state/>; Population, total - European Union. <https://data.worldbank.org/indicator/SP.POP.TOTL?locations=EU>; Statistics on merchandise trade. https://www.wto.org/english/res_e/statis_e/merch_trade_stat_e.htm

exports, may indicate a gradual loss of the EU's position in global markets due to the growing presence of other countries that are leaders in technology production.

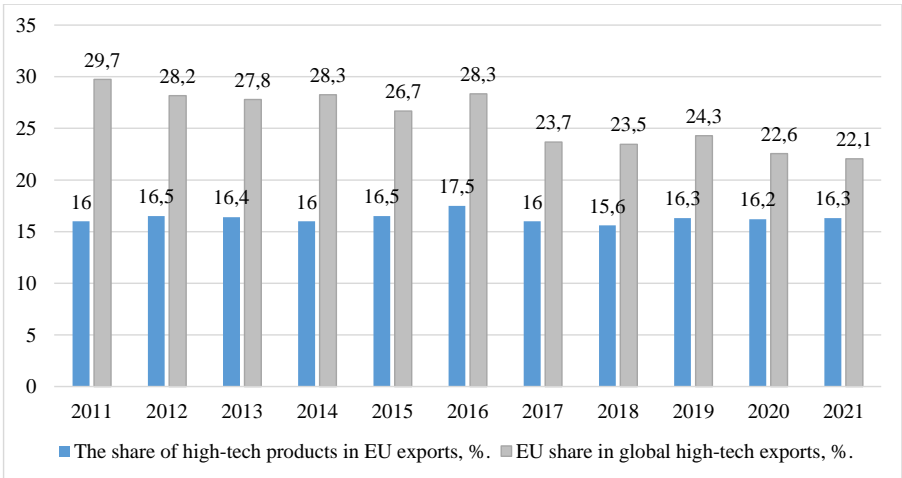


Fig. 6.3. EU trade in high-tech products⁵⁰⁵

The investment index per capita in the EU, which we calculated as the ratio of the total stock of FDI in the EU economy to the population, showed an upward trend during the study period, as evidenced by the doubling of its value – from USD 13,242.7 in 2010 to USD 26,425.2 in 2022 (Figure 2.4). The highest value of this indicator was recorded in 2020 and amounted to USD 28,207.2, followed by a decrease in 2021 to USD 27,791.7 as a result of the economic crisis during the pandemic. The further decline of the investment index per capita in 2022 was caused by a reduction in the volume of FDI in the EU economy to USD 11.8 trillion, compared to a total of USD 12.6 trillion in 2021. This was linked to Europe's economic challenges triggered by Russia's invasion of Ukraine in February of that year, during which many European countries experienced stagnation or recession.

As the analysis of statistical data shows, overall, the economies of EU countries are attractive for foreign investment, as one-quarter of all global FDI is concentrated

⁵⁰⁵ Calculated and compiled by the author based on: High-technology exports (current US\$) - European Union. <https://data.worldbank.org/indicator/TX.VAL.TECH.CD?locations=EU>; High-technology exports (current US\$) – World. <https://data.worldbank.org/indicator/TX.VAL.TECH.CD>

there annually. However, the dynamics of the EU's share in global FDI over the study period were uneven. Despite a general long-term downward trend and a decline in this indicator from 26.7% in 2010 to 25.9% in 2022, several peak periods of rapid growth were observed following times of crisis (Figure 6.4). In particular, after a drop to 24% in 2014 – largely due to events in Ukraine – the indicator rose to 26.1% in 2015. At the end of 2019, amid growing uncertainty and financial risks due to the COVID-19 pandemic, capital outflows by investors from the EU economy led to a decrease in the EU's share of global FDI to 25.5%. However, in 2020, despite the difficult economic situation in both Europe and the world, the European economy proved to be more investment-attractive, which contributed to an increase in the indicator to 28.6%.

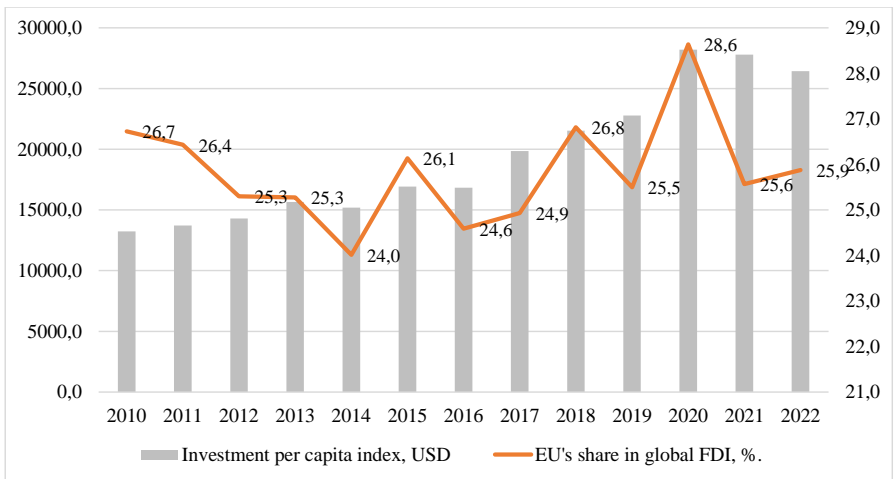


Fig. 6.4. Dynamics of indicators characterizing the level of foreign direct investment in the EU in 2010-2022⁵⁰⁶

The population of the EU is growing at a slower pace than the global population, which is why the European integration indicator reflecting the external demographic

⁵⁰⁶ Calculated and compiled by the author based on: Value of foreign direct investment (FDI) inward stock in the European Union from 2005 to 2022. <https://www.statista.com/statistics/1349425/eu-fdi-inward-stock/>; FDI stocks. OECD Data. <https://www.oecd.org/en/data/indicators/fdi-stocks.html?oeecdcontrol-e522a693d4>

position of the Community shows a long-term downward trend. Specifically, the population of the EU increased from 441.5 million in 2010 to 449.4 million in 2023, while the world population grew from 6.97 billion to 8.02 billion over the same period. Accordingly, the EU's share of the global population declined from 6.33% in 2010 to 5.6% in 2023.

To assess the effectiveness of European integration, we will calculate the overall integral indicator of the integration process development using formula 2.7, which includes sub-indices reflecting the impact of both intra-regional and external components. Therefore, we will first calculate the sub-index of the intra-regional component of integration process development (formula 2.8) based on the standardized values of the relevant indicators previously discussed (Figures 6.1–6.4). All components of the sub-index for the intra-regional aspect of EU integration development are indicators that have a stimulating effect on European integration; therefore, we used formula 2.4 to standardize their values. It should also be noted that not all indicators are available in statistical databases for the full 2010–2023 period. Thus, we will consider the period from 2011 to 2021, for which all necessary indicators are available and can be calculated.

According to our calculations, the sub-index of the intra-regional component of integration process development in the EU showed an upward trend, indicating the strengthening of economic integration within the Community. A slight decrease in the sub-index (int to 0.778 in 2014) can be explained by the accession of Croatia in 2013, which required certain economic resources but resulted in a positive outcome from EU enlargement in the following periods. It is also worth noting that in 2020, when European integration was negatively affected by events such as the global pandemic and Brexit, the value of the sub-index slightly increased (to 0.879) compared to the previous year, and in 2021, the indicator rose to 0.922, confirming the EU's ability to

ensure the resilience of the integration process to shocks through the effective use of its endogenous growth potential.

Table 6.1

Results of the calculation of the sub-index of the intra-regional component of the development of EU integration processes

Years	EU GDP per capita, USD	Intra-regional trade (exports) per capita, USD	Share of intra-regional trade in total foreign trade turnover, %	Share of high-tech products in EU exports, %	Investment per capita index, USD	Iint
2011	0,924	0,630	0,946	0,909	0,486	0,754
2012	0,857	0,630	0,998	0,938	0,507	0,761
2013	0,893	0,628	1,000	0,932	0,555	0,781
2014	0,911	0,648	0,988	0,909	0,539	0,778
2015	0,787	0,682	0,988	0,938	0,600	0,785
2016	0,805	0,692	0,974	0,994	0,597	0,797
2017	0,855	0,755	0,963	0,909	0,704	0,831
2018	0,923	0,784	0,948	0,886	0,763	0,858
2019	0,906	0,800	0,958	0,926	0,807	0,877
2020	0,887	0,680	0,944	0,920	1,000	0,879
2021	1,000	0,805	0,906	0,926	0,985	0,922

Source: calculated by the author

The next step in calculating the integral indicator is to determine the sub-index that reflects the impact of the external component on the overall integral indicator of integration process development in the EU (formula 2.9). Despite the earlier conclusion regarding the effectiveness of European integration based on internal regional factors, it should be noted that the EU has demonstrated lower resilience to external influences and a certain weakening of its position in the global economy. This is evidenced by the decline in the sub-index from 0.931 in 2011 to 0.835 in 2021 (Table 6.2). The decrease in the external factors sub-index of European integration occurred in 2013-2014 following Croatia's accession, as well as in 2020–2021 due to the United Kingdom's exit from the EU and the economic crisis caused by the pandemic. Therefore, from the standpoint of resilience to external factors and the ability to maintain strong positions in the global economy, the effectiveness of the European integration process has declined over the study period.

Table 6.2

Results of the calculation of the sub-index of the external component of the development of EU integration processes

Years	EU share in global GDP, %	Share of EU regional trade in world trade, %	EU share in global high-tech exports, %	EU's share in global FDI, %	Share of the EU population in the world's population, %	Iext
2011	0,973	0,788	1,000	0,924	0,987	0,931
2012	0,890	0,780	0,948	0,885	0,976	0,893
2013	0,900	0,763	0,936	0,884	0,967	0,887
2014	0,900	0,785	0,951	0,840	0,957	0,884
2015	0,822	0,948	0,898	0,914	0,949	0,905
2016	0,831	1,000	0,954	0,860	0,938	0,915
2017	0,831	0,988	0,797	0,872	0,929	0,881
2018	0,845	0,933	0,790	0,938	0,921	0,883
2019	0,817	0,978	0,818	0,892	0,912	0,881
2020	0,822	0,897	0,760	1,000	0,904	0,873
2021	0,817	0,838	0,743	0,894	0,894	0,835

Source: calculated by the author

The calculation of the overall integral indicator of the potential for integration process development in the EU – as the arithmetic mean of the two sub-indices discussed (according to formula 2.7) – allows us to conclude that the effectiveness of European integration has increased in the long term, as the value of the integral indicator rose from 0.842 in 2011 to 0.879 in 2021 (Figure 6.5). Thus, despite a certain weakening of the EU's external positions, European integration possesses substantial internal potential for economic development, which is effectively utilized by the members of the integration bloc to ensure economic growth and the further expansion of the Community.

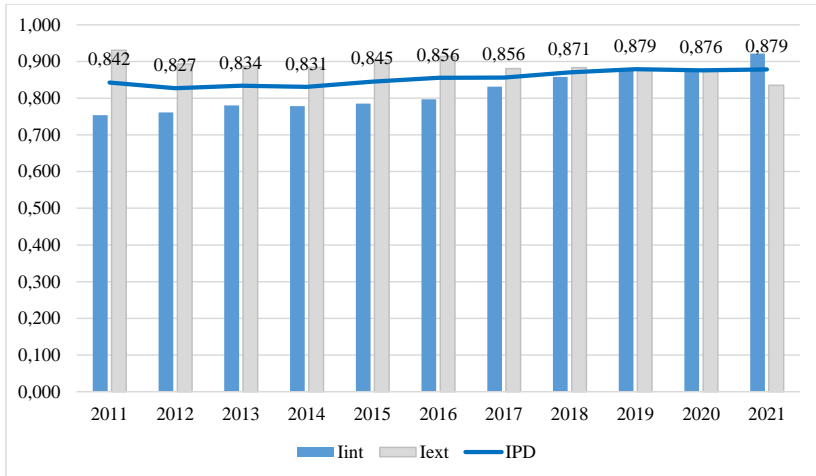


Fig. 6.5. Dynamics of the integral indicator of the potential for the development of the integration process in the EU (IPD)

Source: calculated by the author

Thus, the results of the conducted study showed that the process of European integration during 2011-2021 was effective. At the same time, the intra-regional component of integration development was utilized more efficiently than the external component. The high effectiveness of using the EU's internal integration potential is evidenced by significant improvements in such indicators as GDP per capita, intra-regional trade (exports) per capita, the share of high-tech products in EU exports, and the investment index per capita. On the other hand, the declining effectiveness of the external integration component and the weakening of the EU's position in the global market are reflected in the deterioration of indicators such as the EU's share in global GDP, the EU's share in global high-tech exports, and the EU's share in global FDI volume.

6.2. Prerequisites for Deepening Ukraine's European Integration

For a long time, the EU regarded cooperation with Ukraine as the foundation for forming a "buffer" zone between European countries and Russia. The programs implemented in Ukraine with the support of EU funds were primarily aimed at

improving border infrastructure and enhancing the security of EU member states along the Ukrainian border. In turn, Ukraine's aspirations for European integration were mostly declared in various documents and reflected in publications; however, practical measures to advance this process were ineffective, as the country's economy and politics remained largely oriented toward cooperation with Russia.

The situation changed after the 2013 Revolution, when society prevented the political leadership from abandoning the process of European integration. A fundamental prerequisite for Ukraine's integration into the EU was the signing of the Association Agreement in 2014, which, in addition to deepening political relations, enabled the implementation of the Deep and Comprehensive Free Trade Area (DCFTA) between Ukraine and the EU in 2016. This facilitated mutual market access for producers from both Ukraine and the EU. The European Parliament accepted Ukraine's application for EU membership in February 2022, and in June of the same year, the country was granted candidate status. Official accession negotiations began in December 2023.

The decision of the European Council to grant Ukraine candidate status likely would not have occurred under pre-war circumstances. Although the country's aspirations to join the EU had been evident for some time, an official membership application was not seriously pursued by Ukrainian politicians until the Russian invasion. Thus, paradoxically, Russia's aggression turned Ukraine's aspiration to pursue EU membership into a tangible reality⁵⁰⁷.

Given the necessity for Ukraine to fulfill a large number of requirements and ensure compliance with the Copenhagen criteria, accession to the EU appears to be a long-term prospect. However, the intensification of institutional reforms will contribute to deepening economic cooperation, which will significantly bring Ukraine closer to EU membership. Ukraine's economy was already interconnected with the EU economy before the full-scale Russian aggression, and these ties have further expanded

⁵⁰⁷ Petrov R. Bumpy Road of Ukraine Towards the EU Membership in Time of War: "Accession Through War" v "Gradual Integration". European Papers, 27.12.2023.
<https://www.europeanpapers.eu/en/europeanforum/bumpy-road-ukraine-towards-eu-membership-time-war>

and strengthened since February 2022. Therefore, experts on European integration predict that by the time Ukraine joins the EU, its integration into the EU economy will be significantly deeper⁵⁰⁸.

Ukraine's role in the EU economy has been limited, given the size and complexity of its partners' economies. However, in certain sectors, Ukraine's role has already strengthened and continues to grow gradually. For Ukraine, the EU has always been an important trading partner, and amid Russia's full-scale war in Ukraine, cooperation has deepened. In 2022, trade in goods with the EU accounted for more than half of Ukraine's total goods trade, compared to a stable share of 40% just a few years earlier. Nevertheless, Ukraine's role as a trading partner for the EU remains secondary.

Ukraine's position in the trade of EU member states varies in terms of geography and specific product categories. From a geographical perspective, Ukraine trades more intensively with its neighboring countries. In 2022, exports to Ukraine accounted for 2.8% of Poland's total exports – the highest share among EU member states. Lithuania had an even higher share (3.8%) in 2021, but it declined due to logistical issues that arose after Belarus allowed Russia to use its territory to launch attacks on Ukraine. Other EU member states had significantly smaller shares. As for imports from Ukraine, the highest share of Ukrainian imports in an individual member state's total imports were observed in Bulgaria, where imports from Ukraine accounted for 3.2% of the country's total. For all other partners, the shares were lower, ranging from approximately 2% to nearly zero – for instance, in the cases of France or Ireland.

Ukraine plays a minimal role as both a destination and a source of foreign direct investment (FDI) for the EU. In 2021, the external volume of FDI from the EU to Ukraine amounted to €29 billion, or about 0.2% of the total external investment of the integration bloc. It is worth noting that the Netherlands and Cyprus are the leading investors in Ukraine. At the same time, according to analysis by the National Bank of Ukraine, these two EU member states were primarily used for round-tripping

⁵⁰⁸ Akhvlediani T., Movchan V. The Impact of Ukraine's Accession on the EU's Economy: The Value Added of Ukraine. Policy Paper. February, 2024

transactions, indicating that approximately one-third of the FDI entering Ukraine was of Ukrainian origin⁵⁰⁹.

At the same time, the EU is the largest investor in Ukraine, accounting for approximately 75% of the total volume of investment received by the Ukrainian economy. In addition to bilateral transactions, EU member states have also been used as a platform for foreign direct investment by transnational companies into Ukraine⁵¹⁰. Such companies include ArcelorMittal, headquartered in Luxembourg, and several companies registered in the Netherlands – such as COFCO International, the agricultural platform of China’s largest state-owned enterprise COFCO Corporation; and DP World, a global logistics company. In addition, several major U.S. commodity firms (Bunge, Cargill, and Archer Daniels Midland) have also invested in Ukraine. All major mobile operators in Ukraine (Kyivstar, Vodafone, and Lifecell) are formally registered as Dutch FDI, although their ultimate beneficial owners are located in Russia, Azerbaijan, and Turkey⁵¹¹.

Major European retail chains (such as Auchan, H&M, and IKEA) have also invested in Ukraine, along with manufacturing companies including Danone, Leoni, Unilever, and Jacobs Douwe Egberts. Finance is another significant sector for EU investment: several major EU banks operate in Ukraine, including Raiffeisen Bank, OTP Bank, and Credit Agricole. At the same time, the ban on the purchase of agricultural land by foreigners – which remains in effect even after the moratorium on domestic sales of agricultural land was lifted – continues to hinder the inflow of FDI from the EU into Ukraine’s agricultural sector.

In 2021, the total volume of Ukrainian FDI in the EU amounted to €14 billion, or 0.1% of the total. The Ukrainian steel producer MetInvest owns plants in Italy, while MHP, one of Ukraine’s leading agricultural and food industry companies, has opened facilities in the Netherlands and Slovakia, helping to reduce the impact of trade barriers that still exist under the Association Agreement. Roshen, a confectionery manufacturer, operates factories in Lithuania and Hungary; juice producer T.B. Fruit

⁵⁰⁹ Estimation of round tripping transactions for 2010-2023. National Bank of Ukraine, Statistics and Reporting Department. Kyiv: National Bank of Ukraine, 2024. <https://bank.gov.ua/en/news/all/otsinka-obsyagiv-pryamih-inozemnih-investitsiy-v-yakih-kintsevim-kontrolyuyuchim-investorom-ye-rezident-round-tripping-za-2010>

⁵¹⁰ Akhvediani T., Movchan V. The Impact of Ukraine’s...

⁵¹¹ Akhvediani T., Movchan V. The Impact of Ukraine’s...

has two plants in Poland; pet food manufacturer Kormtech opened a facility in Lithuania; and IMMER Group, specializing in packaging materials, launched production in Latvia⁵¹².

Amid the war, inflows of foreign direct investment (FDI) into Ukraine – including from EU countries – have significantly declined, with foreign investors instead withdrawing capital abroad. In contrast, Ukraine’s trade volumes with the EU have shown an upward trend, particularly during 2021-2023. Total trade turnover between Ukraine and the EU increased from USD 32.1 billion in 2010 to USD 55.9 billion in 2023 (Figure 2.6). A significant rise occurred in 2021 (up to USD 55.7 billion) following a drop to USD 42.4 billion in 2020. Even in 2022, after the start of the full-scale war, the decline in trade turnover was minor compared to previous crisis periods. These positive developments in bilateral trade make it possible to consider the deepening of trade cooperation as a key precondition for advancing Ukraine’s European integration.

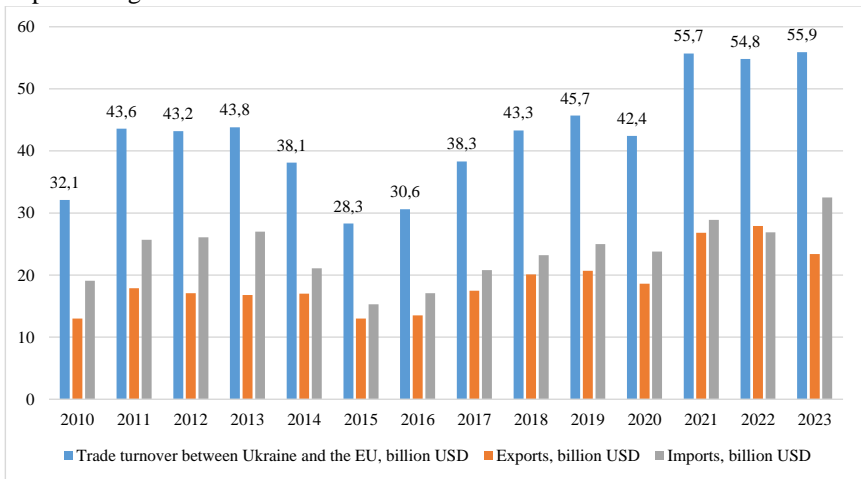


Fig. 6.6. Dynamics of trade in goods between Ukraine and the EU in 2010-2023⁵¹³

⁵¹² Pirozhok O. Export of factories. What Ukrainian companies "take root" in Europe. Ekonomichna Pravda, February 5, 2019. <https://www.epravda.com.ua/publications/2019/02/5/644962/>

⁵¹³ Compiled by the author based on data: Geographical structure of foreign trade in goods with the EU countries. https://www.ukrstat.gov.ua/operativ/operativ2021/zd/ztt_ES/ztt_es_u/arh_ztt_es_2024_u.html

To assess the effectiveness of trade between Ukraine and the EU as one of the main preconditions for the country's European integration, we will conduct an econometric analysis based on the gravity model (equation 1.1). As dependent variables, we will successively use data on total trade turnover between Ukraine and the EU, exports of goods from Ukraine to the EU, and exports from the EU to Ukraine, as presented in Table 2.3. The list of independent variables includes indicators such as Ukraine's GDP per capita (in PPP), the EU's GDP per capita (in PPP), and the average annual Brent oil price as a proxy for trade distance between partner countries (Table 6.3). For the regression analysis, the statistical data will be transformed into natural logarithms.

Table 6.3

Independent variables for building a gravity model of trade cooperation between Ukraine and the EU⁵¹⁴

Years	Dependent variables			Independent variables		
	Trade turnover between Ukraine and the EU, mln USD	Exports from Ukraine to the EU, mln USD	Exports from the EU to Ukraine, mln USD	GDP of Ukraine (at PPP) per capita, USD	EU GDP (at PPP) per capita, USD	Average annual price of Brent crude oil, USD per barrel
	<i>Trade</i>	<i>E_{Ukr}</i>	<i>E_{EU}</i>	<i>GDP_{Ukr}</i>	<i>GDP_{EU}</i>	<i>Brent oil</i>
2010	32153,1	13051,9	19101,2	17026	32862	79,47
2011	43722,7	17969,9	25752,8	18018	34495	111,26
2012	43237,6	17081,2	26156,4	18090	34965	111,63
2013	43805,1	16758,6	27046,5	18140	36065	108,56
2014	38072	17002,9	21069,1	17255	37065	98,97
2015	28345,3	13015,2	15330,1	15626	38224	52,32
2016	30637	13496,2	17140,8	16072	40552	43,67
2017	38332,7	17533,4	20799,3	16524	42666	54,25
2018	43373,4	20157	23216,4	17187	44654	71,34
2019	45762,8	20750,7	25012,1	17839	48194	64,3
2020	42464,6	18604,9	23859,7	17286	47106	41,96
2021	55747,1	26792,9	28954,2	18040	51916	70,86
2022	54853,1	27890,7	26962,4	15022	57339	100,93
2023	55879,3	23392,1	32487,2	16231	60348	82,49

⁵¹⁴ Compiled by the author based on the data: Geographical structure of foreign trade; GDP per capita, PPP (constant 2021 international \$) – Ukraine.

<https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.KD?locations=UA>; GDP per capita, PPP (current international \$) - European Union.

<https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD?locations=EU>; Annual Prices (Nominal). World Bank. <https://thedocs.worldbank.org/en/doc/5d903e848db1d1b83e0ec8f744e55570-0350012021/related/CMO-Historical-Data-Annual.xlsx>

The gravity model was calculated using the Statistica 7.0 software, and three statistically significant relationships were identified. First and foremost, the results confirmed a strong direct relationship ($R = 0.979$) between the trade turnover between Ukraine and the EU and all the independent variables included in the regression model:

$$\text{Trade} = -16,455 + 1,494 \cdot \text{GDP}_{Ukr} + 1,049 \cdot \text{GDP}_{EU} + 0,313 \cdot \text{Brent oil} \quad (6.1)$$

As shown in Equation 6.1, the greatest impact on bilateral trade turnover was exerted by the dynamics of Ukraine's GDP per capita (in PPP): a 1% increase in this independent variable led to a 1.494% increase in the dependent variable. A slightly smaller effect was observed from changes in the EU's GDP per capita (in PPP): a 1% increase in this independent variable resulted in a 1.049% increase in trade turnover. This indicates a lower dependence of trade turnover on the growth of EU member states' economies.

The weakest positive impact on bilateral trade was observed in the case of changes in the global oil price: a 1% increase in oil prices led to a 0.313% increase in the dependent variable. The positive influence of this variable is explained by the fact that rising oil prices lead to higher prices for goods – primarily due to increased transportation costs for raw materials, components, and finished products – which, in turn, raises the overall value of bilateral trade turnover.

The coefficient of determination ($R^2 = 0.959$) indicates that 95.9% of the changes in trade turnover between Ukraine and the EU were explained by the macroeconomic factors included in the regression model (6.1), while the remaining 4.1% were influenced by other factors. The calculated value of the F-statistic significantly exceeds its critical value $F(3,10) = 78.504$, confirming the strength of the identified relationship between the variables. The margin of error in the calculations does not exceed 1%, which confirms the statistical significance of the results obtained.

The second model, obtained through regression analysis, demonstrates a strong ($R = 0.955$) direct relationship between exports of goods from Ukraine to the EU and the GDP per capita (in PPP) of both sides, as well as the global oil price:

$$E_{Ukr} = -15,211 + 1,092 \cdot \text{GDP}_{Ukr} + 1,237 \cdot \text{GDP}_{EU} + 0,276 \cdot \text{Brent oil} \quad (6.2)$$

The greatest influence on Ukrainian exports to the EU during the study period was exerted by the dynamics of GDP per capita in the EU: a 1% increase in this independent variable led to a 1.237% increase in the dependent variable. This confirms the importance of the EU single market for Ukrainian export-oriented producers. At the same time, the economies of EU countries are characterized by stable growth and rising national income, which drives greater demand for imported goods – including those coming from Ukraine.

The impact of the dynamics of GDP per capita in Ukraine on the export of Ukrainian goods to the EU was comparatively smaller: a 1% increase in this independent variable resulted in a 1.092% increase in the dependent variable. This relationship indicates the export-oriented nature of the Ukrainian economy and the positive effect of economic growth on goods exports. The smallest positive influence on Ukraine's exports to the EU came from the dynamics of the global oil price: a 1% increase in oil prices led to a 0.276% rise in exports.

The coefficient of determination ($R^2 = 0.913$) indicates that 91.3% of the variation in the volume of goods exported from Ukraine to the EU was explained by the macroeconomic factors included in the regression model (6.2), while 8.7% was influenced by other factors. The calculated value of the F-statistic exceeded its critical value $F(3,10) = 35.236$, confirming the strength of the relationship between the dependent and independent variables. The margin of error did not exceed 5%, which supports the statistical significance of the obtained results.

The third model reflects a strong ($R = 0.957$) direct relationship between exports of goods from the EU to Ukraine and the GDP per capita (in PPP) of both Ukraine and the EU, as well as the global oil price:

$$E_{EU} = -18,792 + 1,833 \cdot GDP_{Ukr} + 0,897 \cdot GDP_{EU} + 0,331 \cdot Brent\ oil \quad (6.3)$$

As shown in the equation above, the expansion of the Ukrainian economy is a key factor and precondition for trade cooperation between the EU and Ukraine. According to the regression analysis, a 1% increase in Ukraine's GDP per capita led to a 1.833% increase in exports from the EU to Ukraine, whereas a 1% increase in the EU's GDP per capita resulted in a 0.897% increase in exports to Ukraine. Additionally,

exports of goods from the EU to Ukraine were more sensitive to changes in oil prices than exports of Ukrainian goods to the EU (see Equation 6.2).

The coefficient of determination ($R^2 = 0.916$) indicates that 91.6% of the variation in the volume of exports from the EU to Ukraine was explained by the macroeconomic factors included in the regression model (6.3), while 8.4% was influenced by other factors. The calculated value of the F-statistic exceeded its critical value $F(3,10) = 36.697$, confirming the strength of the relationship between the dependent and independent variables. The margin of error did not exceed 1%, which confirms the statistical significance of the obtained results.

Thus, the results of the gravity model indicate that the expansion of Ukraine's economy has a stronger impact on the volume of Ukraine–EU trade, as well as on the volume of Ukrainian exports to the EU, than the growth of the EU economy or the global oil price. This conclusion is based on the fact that the coefficients for the independent variables representing Ukraine's economic growth are larger than those for the EU's economic growth and oil price dynamics. The growth of the Ukrainian economy was accompanied by increased demand for intermediate goods and finished products from European countries – either sold on the Ukrainian market or used by domestic enterprises in production – which, in turn, drove the growth of trade volumes.

6.3. Problems of Ukraine's Integration into the EU in the Context of War

Over the past decade, Ukraine's development has been closely linked to the intensification of the European integration process and accompanied by efforts to overcome obstacles along this path. Since 2014, numerous significant changes have taken place as a result of transforming the country's core institutions toward more pro-European governance, Ukraine's resistance against Russian occupation, and the continued advancement of democracy. Between 2014 and 2024, Ukraine's key achievements on the path to European integration include the signing of the Association Agreement with the EU, the implementation of the Deep and Comprehensive Free Trade Area (DCFTA) with the EU, obtaining candidate status for

EU accession, and receiving substantial financial and military support from the European Union following the start of russia’s full-scale invasion.

Between 2014 and 2023, there was also a significant transformation in public attitudes toward European integration. According to a study conducted by experts from the “MOBILIZE” and “Identity and Borders in Flux” (IBIF) projects, around 50% of surveyed Ukrainians in 2014 agreed that Ukraine should become a member of the EU, whereas by 2023, this view was supported by 87% of respondents⁵¹⁵. The results of the study showed that pro-European sentiment among Ukrainians increased in 2019 following the presidential and parliamentary elections, as well as in 2022 after the onset of russia’s full-scale aggression and the escalation of the economic crisis in Ukraine (see Fig. 6.7). This confirms the strong and consistent desire of Ukrainian citizens for European integration.

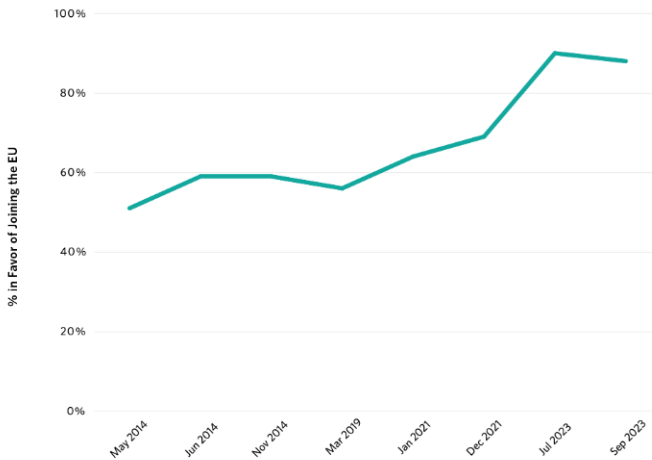


Fig. 6.7. Ukrainians' support for Ukraine's accession to the EU⁵¹⁶

Ukrainians’ unity on the issue of European integration strengthened following the start of russia’s full-scale aggression. As of August 2023, around 90% of surveyed

⁵¹⁵ Onuch O. Ukrainians’ Unwavering Path Toward the EU.

<https://carnegieendowment.org/research/2024/06/ukrainians-unwavering-path-toward-the-eu?lang=en>

⁵¹⁶ Onuch O. Ukrainians’ Unwavering Path Toward the EU....

citizens supported Ukraine's accession to the EU. It is worth noting that the rise in pro-European sentiment was observed across all regions of Ukraine (see Fig. 6.8). By the second year of the full-scale Russian invasion, support for EU membership among residents of the southern regions had increased by 25 percentage points (p.p.), while in the eastern regions it rose by 28 p.p. Support for European integration also grew in the central and western regions, where traditionally a higher proportion of citizens have backed Ukraine's integration with the EU. As of September 2023, the level of full support for European integration reached 65% in the central region and exceeded 70% in the western region.

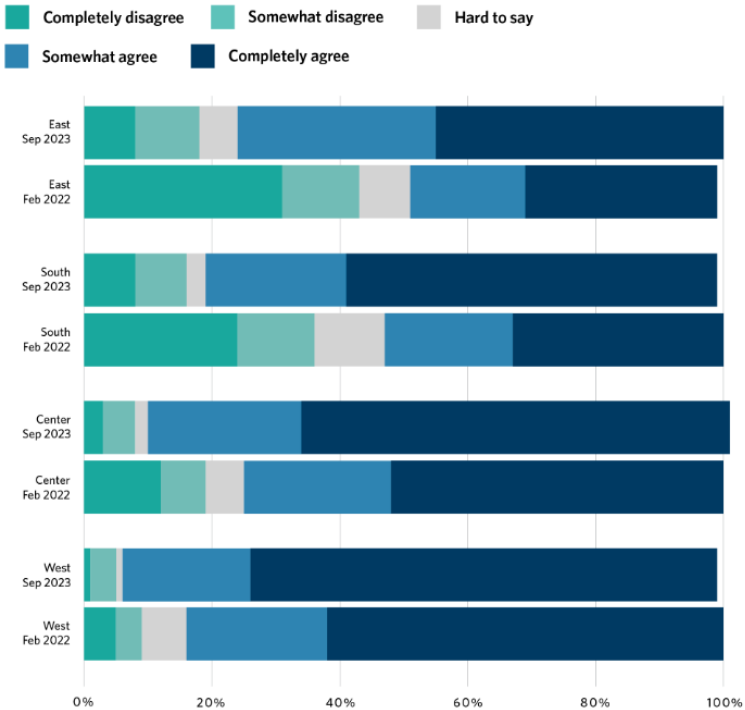


Fig. 6.8. Changes in the opinion of Ukrainians regarding support for Ukraine's accession to the EU between February 2022 and September 2023, by region⁵¹⁷

⁵¹⁷ Onuch O. Ukrainians' Unwavering Path Toward the EU...

These positive shifts in public opinion regarding Ukraine's European integration reflect the unity of Ukrainians in the face of war and demonstrate their perception of the European Union not only as an effective integration bloc with high economic and social standards, but also as a model of democracy and institutional order.

At the same time, it is important to note that the issue of forming public consensus on Ukraine's European integration is not among the most challenging. Despite Ukraine's significant progress along the path of European integration, the war has intensified security threats and exacerbated problems related to the deepening economic crisis caused by the loss of a significant part of its territory, the destruction of industrial capacity, difficulties in implementing joint agreements between Ukraine and the EU, and the challenges of reforming the institutional foundations of cooperation.

Ukraine is a relatively small open economy that shares land borders with four EU member states (Poland, Slovakia, Hungary, and Romania) and one candidate country (Moldova). Among Ukraine's defining characteristics is its vast territory, which exceeds that of all current EU member states. Additionally, Ukraine has the largest area of arable land – 32 million hectares – compared to 20 million hectares in Turkey and 18 million hectares in France.

Ukraine remains a leader among European countries in terms of population. According to World Bank estimates, Ukraine's population declined from 44 million in 2021 to 38 million in 2022 as a result of the full-scale Russian aggression. Nevertheless, the country still ranks fifth after four EU member states and second among candidate countries, following Turkey. Even according to the most pessimistic estimates of Ukraine's actual population (32 million as of early 2023, according to the Institute for Demography and Social Studies⁵¹⁸), Ukraine will remain one of the largest countries, dropping only one position to sixth place compared to EU member states.

At the same time, Ukraine remains the poorest country compared to EU member states and candidate countries for EU accession. In 2022, Ukraine's GDP per capita

⁵¹⁸ Depopulation is an inevitable scenario for Ukraine. "Interfax-Ukraine, September 24, 2023. <https://interfax.com.ua/news/economic/936937.html>

was only USD 4,534, compared to the EU average of USD 24,275, placing Ukraine last among both EU countries and candidate countries⁵¹⁹. Ukraine held a similar position in 2021, that is, even before the start of the full-scale war.

A key external factor in the deterioration of Ukraine's economic situation was the Russian military aggression in 2014, which resulted in the occupation of about 7% of Ukraine's territory, including Crimea and part of the Donbas region. This led to the loss of human capital, vital industrial assets, and natural resources, including those in the Black Sea, reduced the country's transport and transit potential, and rendered areas closer to the front line unsafe and less attractive for investment.

However, the role of internal negative factors that create challenges for Ukraine's European integration is more significant. First and foremost, the lack of rule of law should be highlighted, as it leads to ineffective protection of property rights, resulting in reduced inflows of investment and innovation into the Ukrainian economy, thereby lowering the potential for economic growth throughout the entire period of independence. At the same time, it is also necessary to acknowledge the large-scale transformations and reforms that Ukraine has undertaken since 2014, demonstrating its commitment to the implementation of democracy and market economy reforms.

In 2022, Ukraine's GDP amounted to 161 billion USD, which was lower than Hungary's figure but higher than that of Slovakia. More than half of the value added in Ukraine's economy is generated in the services sector. The share of services in Ukraine's GDP was 52% in 2021 and increased to 61% in 2022, as over half of government spending was allocated to the security and defense sector. A dominance of services is also characteristic of all EU member states.

The structure of Ukraine's economy differs from that of the EU due to the asymmetric contribution of agriculture and industry to value added. In 2022, the value added by industry and construction amounted to 19.2% of GDP, which is significantly lower than in most EU member states, candidates, and potential candidates for accession. Deindustrialization of the Ukrainian economy has been a long-term trend,

⁵¹⁹ Akhvlediani T., Movchan V. The Impact of Ukraine's Accession on the EU's Economy: The Value Added of Ukraine. Policy Paper. February, 2024

as enterprises inherited from the Soviet Union were unable to withstand competitive pressure and the challenges of transformation. At the same time, new enterprises emerged primarily in agriculture and the service sector. The share of agriculture in Ukraine's GDP is about 8.5%, which is higher than in any EU member state. Among candidate and potential candidate countries, Ukraine ranks second only to Albania by this indicator. This reflects Ukraine's traditionally significant potential in the sector, stemming from vast areas of fertile black soil and active investments in new technologies that are gradually narrowing the gap with EU countries in terms of average agricultural yield.

In general, Ukraine's European integration challenges can be divided into two groups (Table 6.4). The first group includes risks and threats that slow down the country's progress toward EU membership. Considering that accession to the EU is only possible once a country meets the Copenhagen criteria, the most significant group of issues hindering Ukraine's European integration are institutional and political in nature. Specifically, the country's low institutional capacity to implement European legal norms, an inefficient judiciary and the slow pace of its reform, and the lack of rule of law largely give rise to economic and social problems that also create obstacles to Ukraine's integration into the EU.

Table 6.4

Problems of Ukraine's integration into the EU

Problems hindering integration	Problems that will arise after joining the EU
Institutional and political	
1. Low institutional capacity of the authorities to implement the tasks of European integration under martial law 2. Inefficient judicial system 3. Slow implementation of the Copenhagen criteria in Ukraine 4. Ineffective mechanism of communication with partner countries to resolve disputes	1. Partial loss of sovereignty and the need to implement EU decisions 2. The danger of Ukraine's involvement in the conflict of civilizations between the West and the Muslim world 3. Permanent threat of military aggression by the Russian Federation
Economic	
1. Low GDP and income per capita 2. Loss of competitiveness of processing industries due to the war 3. Uncompetitiveness of domestic processing industry products in the foreign market	1. Relocation of hazardous industries from EU countries to Ukraine 2. Strengthening the raw material orientation of Ukraine's economy 3. Ousting domestic producers from the domestic market

4. Difficulty of implementing European standards in production	4. Outflow of skilled labor to EU countries
Social	
1. Low level of social security of the population 2. The loss of human capital in times of war	1. Deepening demographic crisis 2. Intensification of migration processes 3. Rising unemployment

So, the low GDP per capita and the lack of protection for low-income groups have made Ukraine the poorest country in Europe. Accordingly, the accession of such a country to the EU would lead to significant expenditures from the European budget to implement programs aimed at “equalizing” income levels across regions – an issue that some current EU member states, which currently oppose Ukraine’s accession, do not support.

Such a social issue as the loss of human capital due to the full-scale war, in the context of ineffective institutions in the country, will further deepen economic problems by worsening the labor market situation and increasing the shortage of skilled workers in certain sectors of the manufacturing industry.

Addressing institutional and political issues in Ukraine, on the one hand, will accelerate the country's accession to the EU, and on the other hand, will help overcome or mitigate economic and social challenges. In particular, ensuring the rule of law and the effectiveness of the judicial system will improve the institutional conditions for doing business, thereby enhancing the investment attractiveness of the Ukrainian economy for foreign companies. In turn, the arrival of foreign investors in Ukraine will help restore the industrial potential significantly damaged during the war, create new jobs, and improve the social situation through increased employment and rising income levels.

European integration of Ukraine will significantly contribute to improving the quality of the institutional environment in the country and ensuring stability in the regulatory framework across all areas of public life. At the same time, following accession to the EU, there is a high likelihood of political, economic, and social challenges arising, which may complicate the adaptation of the economy and society to the new reality. First and foremost, the transfer of part of Ukraine’s sovereign powers to the political institutions of the EU and the obligation to comply with decisions of the

European Commission may be perceived by some domestic politicians and citizens as a loss of national sovereignty. This could destabilize the situation due to the active efforts of political parties advocating for Ukraine's withdrawal from the integration bloc. Additionally, the constant threat of a full-scale war with Russia will remain, requiring ongoing efforts by politicians and the military to accelerate Ukraine's accession to NATO.

The mandatory implementation of EU decisions and regulations in the economic sphere may lead to the placement of environmentally hazardous industries in Ukraine, with their construction promoted as major foreign investments and job creation initiatives. There is also a high risk that Ukraine's economy will become entrenched in a raw-material-based role within the EU's common market system, resulting in further deindustrialization and a deepening of its agricultural specialization. At the same time, if access for Ukrainian producers of agricultural and food products to the EU market continues to be limited, the country will face challenges in expanding into markets in Africa and the Middle East.

Ukraine's accession to the EU will also eliminate barriers to labor mobility, a process that has already been occurring and is likely to intensify toward European countries. As a result, there is a high probability of worsening demographic trends in Ukraine and a growing shortage of young, qualified workers. This, in turn, could lead to the closure of businesses, a reduction in available jobs, and rising unemployment. At the same time, it is important to emphasize that timely identification of potential challenges that may arise during the European integration process and after Ukraine's accession to the EU should be carried out in order to develop appropriate institutional, economic, and social measures aimed at reducing the likelihood of these issues or eliminating them entirely.

6.4. Transformation of Ukraine's Economy During Wartime and Its Impact on Cooperation with EU Countries

The deepening of Ukraine's cooperation with the EU during 2014–2023 was largely driven by the armed aggression of the Russian Federation against Ukraine. Over this period, the European Union introduced a number of new institutional and

economic instruments aimed at improving trade conditions between Ukraine and EU countries, as well as adopted important political decisions that supported Ukraine's progress on the path of European integration. Amid the war, Ukraine's economy underwent significant structural changes, which also affected the volume and structure of trade in goods with the EU.

As a result of Russia's full-scale aggression, martial law was immediately imposed in Ukraine, which significantly altered the country's governance in many key areas and had substantial economic consequences. A general mobilization was declared, and men of conscription age were prohibited from leaving the country without special permission. Central authorities were granted powers to introduce curfews, restrict the movement of individuals and vehicles within the country, and use private and municipal property for national defense needs and the protection of the population.

Economic and political priorities, as well as state governance mechanisms, were adjusted to meet the needs of wartime, national defense, civilian protection, and the expansion of military production. Among the broad range of powers granted, military administrations were authorized to utilize the production capacities and workforce of enterprises of all forms of ownership to meet the country's defense needs. The transition to a wartime economy led to the introduction of command-based governance and administrative restrictions in many sectors. On the other hand, under extraordinary circumstances, the government temporarily allowed greater flexibility and economic freedom for businesses.

Before the war, the government conducted some price monitoring of socially important goods, including certain types of fuel. Since the beginning of the war, however, the authorities did not introduce any additional price regulations. On the contrary, after missile strikes on Ukraine's main oil refinery and fuel depots in May-July 2022 triggered a fuel crisis, the government eased price controls to encourage traders to increase fuel imports.

Since the beginning of the full-scale war, the National Bank of Ukraine (NBU) has introduced a number of restrictions on foreign exchange operations. Legal entities

were allowed to use foreign currency only for critical imports, based on a list defined by the authorities. Upper limits were imposed on non-cash transactions using hryvnia credit and debit cards abroad. In effect, both the capital account and the current convertibility of the Ukrainian currency were suspended⁵²⁰. Since then, some of these measures have been eased or adjusted to the new circumstances.

The Cabinet of Ministers permitted procuring entities to acquire all necessary goods and services for national defense through direct contracts, bypassing the Prozorro electronic procurement system. However, in June 2022, public procurement through Prozorro was reinstated, albeit with numerous exceptions for urgent military needs. Changes to the procurement process were frequent and significant, with further adjustments implemented at the end of 2022 and the beginning of 2023. In the first quarter of 2023, competitive bidding was resumed, with procedures adapted to the rapidly changing circumstances.

The shock caused by Russian aggression required a macroeconomic policy response on several fronts to stabilize the balance of payments, the foreign exchange market, the banking sector, domestic prices, the budget, and more. In the initial months of the war, the National Bank of Ukraine and the government had to rely primarily on their own resources and policy measures. Starting from the second half of 2022, increased inflows of external assistance helped stabilize monetary and fiscal accounts, and, consequently, the balance of payments and the exchange rate.

The difficult economic situation in Ukraine in 2022 is reflected in key macroeconomic indicators. In particular, Ukraine's GDP at constant prices decreased by 30.3% in 2022, while inflation rose by 26.6% during the same period (Table 6.5). The unemployment rate increased from 9.8% in 2021 to 24.5% in 2022. There was a significant loss of human capital, as evidenced by the decline in the total population from 41 million in 2021 to 34.8 million in 2022, with a further decrease to 32 million in 2023.

According to the IMF World Economic Outlook database from April 2023, total revenues of the general government sector in Ukraine increased by 31.6% in nominal

⁵²⁰ Boyarchuk, D. and M. Dabrowski. The Ukrainian war economy. Working Paper 12/2023, Bruegel

terms compared to 2021. General government revenues as a share of GDP rose from 36.3% in 2021 to 53.2% in 2022. This growth can be explained by a significant increase in nominal revenue and a slower decline in nominal GDP. Foreign grants accounted for 9.8% of GDP⁵²¹, or 18.4% of total revenue. Payroll tax collection (social security contributions) increased by 21.8% year-over-year, despite millions of refugees abroad and a substantial drop in wages. Military compensation was the main driver of the increase in payroll tax revenue.

Table 6.5

Dynamics of Key Macroeconomic Indicators of Ukraine in 2018-2023⁵²²

Indicator	2018	2019	2020	2021	2022	2023
GDP in constant prices, % of the previous year	3,5	3,2	-3,8	3,4	-30,3	-3,0
Inflation (consumer prices), % of the previous year	9,8	4,1	5,0	10,0	26,6	20,0
Unemployment rate, % of the total labor force	9,0	8,5	9,2	9,8	24,5	20,9
Population, million people	42,0	41,7	41,4	41,0	34,8	32,0
Public administration revenues, % of GDP	39,8	39,4	39,7	36,3	53,2	47,3
Public administration expenditures, % of GDP	41,9	41,5	45,6	40,3	69,9	67,7
Current account balance, % of GDP	-3,3	-2,7	3,3	-1,6	5,7	-4,4

In 2022, nominal expenditures of the general government sector increased by 55.9% compared to 2021, reaching 69.9% of GDP (compared to 40.3% in 2021; see Table 6.5). This substantial change (almost 30 percentage points) can be explained by a significant increase in military spending and expenditures on security and defense amid a decline in GDP. In addition, there was a notable shift in the functional structure

⁵²¹ Ukraine: Request for an Extended Arrangement Under the Extended Fund Facility and Review of Program Monitoring with Board Involvement-Press Release. IMF Country Report 2023/132. <https://www.imf.org/media/Files/Publications/CR/2023/English/UKREA2023001.ashx>

⁵²² Boyarchuk, D. and M. Dabrowski. The Ukrainian war economy....

of budget expenditures in 2022 – all spending was reduced except for expenditures on defense, law enforcement, social protection, and healthcare.

During the war, the volume and structure of industrial production changed significantly due to the destruction of enterprises and infrastructure, the migration of the labor force both within Ukraine and abroad, as well as the disruption of logistics routes for the delivery of raw materials, components, and finished products. In the first year of the full-scale Russian invasion of Ukraine, almost all sectors of the manufacturing industry experienced a decline in the volume of sold products (see Table 6.6). The worst situation was observed in the sales of coke and petroleum refining products, the volume of which decreased by 52% in 2022 compared to 2021 and by 29.6% in 2023 compared to 2022. Accordingly, the share of this sector in the total volume of industrial product sales declined from 2.6% in 2021 to 0.9% in 2023.

The volume of sales of metallurgical products decreased by 50.3% in 2022 compared to 2021, and the share of this sector in total industrial production almost halved – from 14.5% to 8.8%. Despite the risks and threats of war, metallurgical enterprises managed to increase product sales in 2023 by 5% compared to 2022. After a significant decline in chemical industry sales in 2022 compared to 2021 (-37.1%), enterprises in this sector increased sales by 18% in 2023 compared to 2022; however, the volumes did not recover to the 2021 level.

The sales of machinery products decreased by 17.9% in 2022 compared to 2021, but in 2023 they increased by 58.5% compared to 2022, exceeding the 2021 level by 1.3 times. The best performance was observed in the production of motor vehicles, trailers, semi-trailers, and other transport equipment – sales in this segment rose by 6.1% in 2022 compared to 2021 and by 75.5% in 2023 compared to 2022. The rapid recovery of machinery production and the positive dynamics in the transport manufacturing sector were largely driven by the reorientation of many enterprises to meet wartime demands.

Table 6.6

Dynamics of Output Sales Volumes by Major Industrial Sectors of Ukraine during
the War⁵²³

Industry sectors	2021		2022		2023	
	million UAH	Share in total volume, %	million UAH	Share in total volume, %	million UAH	Share in total volume, %
production of food, beverages and tobacco products	842596,4	18,0	720865,5	18,7	889643,0	20,2
production of coke and oil refining products	121251,5	2,6	58195,5	1,5	40984,5	0,9
production of chemical products	122722,7	2,6	77133,0	2,0	91293,3	2,1
metallurgical production, production of finished metal products	679491,0	14,5	337768,5	8,8	354881,0	8,1
mechanical engineering	243473,3	5,2	199890,9	5,2	316798,0	7,2
production of motor vehicles, trailers and semi-trailers and other vehicles	85140,6	1,8	90365,5	2,3	158618,4	3,6

During 2014–2021, there was a generally increasing trend in the production of grain crops and sunflower seeds, with the exception of 2020, when production of these products declined by 13.7% and 14.1%, respectively, compared to 2019 (see Fig. 6.9). In 2021, the highest production volumes of grain crops (86 million tons) and sunflower seeds (16.4 million tons) were recorded for the entire study period. However, as a result of the full-scale invasion of Russian forces into Ukraine in 2022, the production volumes of grain crops decreased by 37.4% compared to 2021, while the production of sunflower seeds declined by 30.9%, respectively. Agricultural enterprises are gradually adapting to operating under martial law, as evidenced by a 10.9% increase in grain crop

⁵²³ Compiled by the author based on the data: Volume of industrial products (goods, services) sold by enterprises by types of economic activity of industry in 2010-2023. https://www.ukrstat.gov.ua/operativ/menu/menu_u/prom.htm

production in 2023 compared to the previous year, and a 112.6% increase in sunflower seed production over the same period.

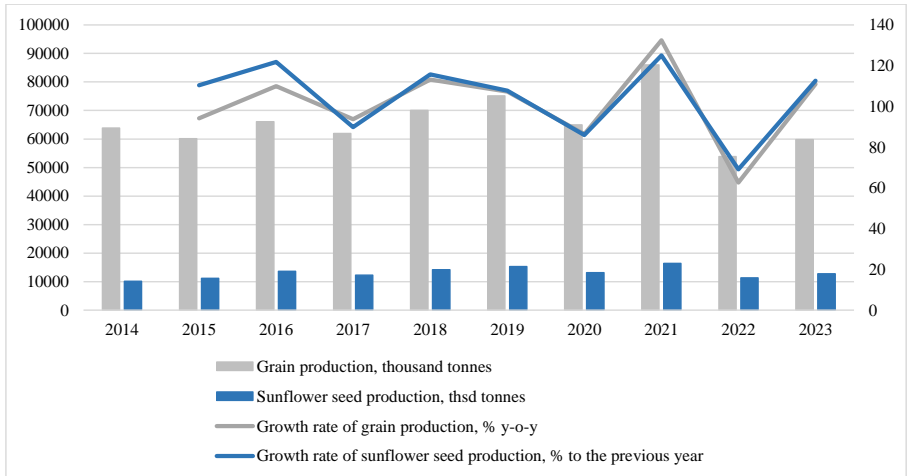


Fig. 6.9. Dynamics of production of major crops in Ukraine in 2014-2023⁵²⁴

Under the influence of the new economic conditions that emerged in Ukraine due to the destruction of industrial capacity by the aggressor, the decline of agricultural enterprises and infrastructure, and the disruption of logistics routes, the commodity structure of trade with the EU changed. Structural transformations in bilateral trade were also significantly driven by shifts in economic policy, which facilitated improved access of Ukrainian goods to the European market following the abolition of existing import duties and tariff quotas in June 2022, as well as the Ukrainian government's decision to ensure critical imports and introduce preferential conditions for importing vehicles from EU countries into Ukraine.

The structure of Ukraine's exports to the EU saw an increase in agricultural products and a decrease in ferrous metals. In 2021, the share of agri-food products, including foodstuffs, accounted for 28.6% of Ukraine's goods exports to the EU. This figure rose to 45% in 2022 and further increased to 53.4% in 2023. The main factor

⁵²⁴ Built and calculated by the author based on the data: Volume of production (gross harvest) of agricultural crops. https://www.ukrstat.gov.ua/operativ/menu/menu_u/cg.htm

behind these changes was a nearly twofold increase in the export of grain crops, with their share in total exports rising from 7% in 2021 to 16% in 2022 and to 19.6% in 2023.

It is worth noting that the significant increase in grain exports was primarily due to the rise in corn exports, which has always been subject to zero import duties in the EU; therefore, the export conditions for this product remained unchanged while demand for grain grew. The volume of exports of animal and vegetable fats and oils increased by 46% in 2022 compared to 2021, which was also unrelated to any changes in trade conditions aimed at supporting Ukraine, as the EU–Ukraine Association Agreement already provides for a zero tariff rate on these products.

At the same time, the improvement of trade conditions for livestock products due to the elimination of tariff quotas enabled a twofold increase in the export of meat and edible offal from Ukraine to the EU. Additionally, the share of this product group in total exports rose from 0.7% in 2021 to 1.7% in 2023.

Alongside the increased demand in the EU for food products from Ukraine, which supported the growth of agricultural exports, there was a significant decline in the export volumes of ferrous metals. This was driven by a reduction in production due to wartime conditions and logistical challenges, as well as rising domestic demand for these materials from enterprises in the military-industrial complex. Although in June 2022 the EU temporarily lifted safeguard measures on Ukrainian metallurgical products, the export volumes of ferrous metals did not increase, as metallurgical enterprises suffered significant destruction and were unable to fully resume operations. In 2022, exports of ferrous metals from Ukraine to the EU declined by 42% compared to 2021, and their share in total exports fell to 10%. The downward trend continued in 2023, with ferrous metal exports decreasing by a further 22.3% relative to 2022, and their share in Ukraine's goods exports dropping to 9.2%.

The main transformations in the structure of Ukraine's imports from the EU are related to the sharp increase in purchases of mineral fuels, oil, and petroleum products. The share of these products in total imports rose from 11% in 2021 to 25% in 2022, with the value of imports increasing by 142% over the same period. The key reasons

for the increase in supplies of mineral fuels from the EU to Ukraine included: the cessation of imports from Belarus and Russia, which were the main suppliers prior to 2022; the destruction of oil refineries and fuel depots by Russian missile strikes at the beginning of the full-scale invasion, which necessitated higher fuel imports; and rising global prices for oil and fuel, which further increased import costs. However, in 2023, fuel imports largely stabilized, with the value increasing by only 2% compared to 2022, and the share in total goods imports decreasing to 20.4%.

In 2022, the Ukrainian government temporarily abolished customs clearance taxes on vehicles, driven by the significant increase in demand for such transport on the front lines. As a result of this decision, the import of land vehicles (excluding railway) declined only slightly by 9% compared to 2021, while their share in total goods imports increased to 12%. In 2023, the value of imports of land vehicles (excluding railway) rose by 25.2% compared to 2022, although their share in total goods imports decreased to 11.3%.

At the same time, in 2022, demand for imported machinery and electrical equipment declined, as many enterprises suspended projects and programs aimed at modernizing production facilities and implementing new technologies due to martial law. Specifically, imports of electrical machinery fell by 31% compared to 2021. However, by 2023, the demand for imported machinery and electrical equipment by domestic enterprises had increased, explained by their adaptation to wartime conditions and the need to restore operations after damage to the energy infrastructure. Thus, in 2023, imports of machinery and electrical equipment from the EU to Ukraine rose by 25.7% compared to 2022.

Under the impact of the war, significant transformations occurred in Ukraine's economy, which also led to changes in trade with the EU. Ukraine's economic ties with the EU began to develop rapidly after the signing of the Association Agreement, and following the full-scale invasion of Ukraine by Russian forces, cooperation with its closest neighbors – Poland, Romania, Hungary, Slovakia, and Bulgaria – deepened. In addition to changes in the geographical structure of trade, transformations are also being observed in the commodity structure of trade between Ukraine and the EU.

Agricultural products dominate Ukraine's exports, while the share of metallurgical products has significantly declined. In imports, mineral fuels, oil and petroleum products, as well as transport vehicles, prevail. In 2022-2023, the main factors influencing the dynamics of trade flows between Ukraine and the EU included the ability of Ukrainian enterprises to maintain the production of export goods and to ensure their transportation to consumers in EU countries. Changes in Ukraine's economic policy under martial law also had a significant impact on the export of agricultural products, as restrictions were introduced on the export of certain goods, as well as on the volume of critical imports, particularly military and dual-use goods.

6.5. Mechanisms for Enhancing Ukraine-EU Economic Cooperation

The development of Ukraine's cooperation with the EU is influenced by global market conditions, which are shaped by the unpredictability of geopolitical processes and crises in leading world economies. These factors impact both the quality and pace of Ukraine's European integration process. russia's full-scale aggression against Ukraine has altered the global political landscape, generated numerous risks and threats, and caused turbulence in the economic and security environment, the consequences of which remain difficult to predict. As a result of the war in Ukraine, contradictions between key geopolitical blocs have intensified, and the socio-economic situation has deteriorated both regionally and globally. This is evident in rising energy prices, food shortages and heightened threats to food security, increased consumer goods prices, and declining living standards in many countries.

The process of Ukraine's European integration has also been affected by the deterioration of the situation in EU countries in 2022–2023, caused by russia's full-scale aggression, the aggressor state's blockade of export logistics routes for Ukrainian agricultural products, and the cessation of energy supplies from russia to EU countries. The deepening of socio-economic problems in the EU was reflected in rising food

prices – for example, in August 2022, bread prices increased by 66% in Hungary, 33% in Lithuania, and 32% in Estonia and Slovakia⁵²⁵.

Overall, at the beginning of 2022, EU countries experienced an energy shortage, and in March of that year, an “inflationary shock” occurred⁵²⁶. As a result of the Russian blockade, EU countries faced an energy crisis accompanied by record-high gas prices, which temporarily halted large-scale efforts to implement European decarbonization policies and combat climate change. There was a significant decline in industrial production across the EU, and in major industrialized countries, governments introduced emergency measures to support the utilities sector and mitigate the negative impact of the energy crisis. The situation was particularly difficult in Germany, where industry accounts for approximately 30% of the economy, and 1.15 million people are employed in the industrial sector⁵²⁷.

The worsening of the social and economic situation in EU countries may have a cumulative effect and trigger the escalation of other latent problems. According to Ukrainian experts, such a situation could negatively affect the EU’s future common policy on Ukraine’s European integration. For instance, according to the Razumkov Centre, the majority of experts surveyed (64%) believe that a deterioration in the EU’s socio-economic situation could deepen divisions and disagreements among member states regarding Ukraine’s progress on the path to European integration⁵²⁸. At the same time, 57% of surveyed experts believe that the deterioration of the situation in the EU in 2022 due to political and economic pressure from Russia will not significantly slow down Ukraine’s European integration process or lead to a reduction in EU assistance to Ukraine. However, a considerable share of experts expressed the opposite view: 38% believe that Ukraine’s European integration will slow down, and 40% expect the EU

⁵²⁵ Bread in Europe rose by 18% over the year - Eurostat. Yevropeiska Pravda, September 20, 2022., <https://www.epravda.com.ua/news/2022/09/20/691651>

⁵²⁶ Geopolitical and geo-economic changes shaped by Russian aggression and the renewal of Ukraine's place in the world. Kyiv: Razumkov Center, 2022, p.9, https://razumkov.org.ua/uploads/article/2022_TRANSFORMANS_UKR.pdf

⁵²⁷ European industry is shrinking due to high energy prices. Yevropeiska Pravda, September 24, 2022., <https://www.epravda.com.ua/news/2022/09/24/691819>

⁵²⁸ Ukraine on the way to the EU - realities and prospects. Analytical study by the Razumkov Center. National Security and Defense. 2022. №1-2. https://razumkov.org.ua/images/journal/NSD187-188_2022_ukr_full.pdf

to reduce its support for Ukraine. Nonetheless, the vast majority of experts (72%) are convinced that despite the worsening socio-economic situation, the EU will not lift the sanctions imposed on the Russian Federation.

The process of Ukraine's integration into the EU is taking place under conditions of Russian aggression and the occupation of a significant part of the country's territory since 2014, which has led to substantial risks for socio-economic development as well as challenges and obstacles to Ukraine's European integration. On the other hand, accession to the EU Free Trade Area and obtaining candidate status for EU membership provides Ukraine with a range of additional competitive advantages, particularly in the areas of economic security, development of strategic industrial sectors, and integration into regional value chains. Therefore, Ukraine must accelerate its integration into the European economy, which experts view as "the most competitive and effective of all possible models of socio-economic development for Ukraine"⁵²⁹.

Despite the intensification of risks and threats under martial law, important steps to deepen Ukraine-EU cooperation were implemented in 2022-2023: liberalization of the trade regime, introduction of the "transport visa-free" regime, granting Ukraine candidate status for EU membership, and expansion of technical assistance programs for the country. At the same time, trade cooperation remains the key area delivering tangible benefits to the Ukrainian economy and reflects both the advantages and the challenges of the European integration process.

Over the past ten years, the EU has become Ukraine's key trading partner, with its share in the country's foreign trade turnover increasing from 32% to 40%. Trade with EU countries has become a critical external factor for maintaining stability in Ukraine's highly open economy during the prolonged war with Russia, which has caused significant losses to the country's industrial, labor, and logistical potential. During the war, shifts occurred in Ukraine's trade volumes with its main EU partner countries. It is worth noting that in 2022, trade declined with countries that are geographically distant from Ukraine and do not share a common border. For instance,

⁵²⁹ Ukraine on the way to the EU - realities and prospects...

Ukrainian exports to Spain decreased from USD 1,677.2 million in 2021 to USD 1,572.3 million; to Italy – from USD 2,866.4 million to USD 1,647.3 million; to Germany – from USD 2,866.4 million to USD 2,264.6 million; and to the Netherlands – from USD 2,262.5 million to USD 1,540.7 million (Table 6.7).

At the same time, there was an increase in exports from Ukraine to its closest neighboring EU countries. In 2022, exports to Poland rose by 19.7% compared to 2021, to Romania by 149.8%, and to Hungary by 39.9%, respectively. However, in 2023, after new logistics routes were established to ensure the delivery of goods from Ukraine to the EU, export volumes to Spain increased compared to the previous year, while exports to Italy, Germany, and the Netherlands declined only slightly. It is worth noting that the blockade of the Polish-Ukrainian border by Polish farmers and transporters led to a 28.6% decrease in the volume of Ukrainian exports in 2023 compared to 2022, while imports of Polish goods increased by 19.7%, further deepening the asymmetry of bilateral trade.

Table 6.7

Dynamics of Ukraine's trade with major EU partners, mln USD⁵³⁰

Country	2014		2021		2022		2023	
	Exports	Import	Exports	Import	Exports	Import	Exports	Import
Spain	1166,5	607,6	1677,2	975,9	1572,3	702,4	2008,3	888,0
Italy	2468,3	1508,9	3469,3	2675,5	1647,3	1801,4	1536,9	2278,2
Germany	1590,6	5361,5	2866,4	6284,4	2264,6	4563,0	2019,7	5061,7
Netherlands	1106,1	763,9	2262,5	1012,6	1540,7	1091,3	1490,8	1035,1
Poland	2644,6	3070,8	5557,4	4962,5	6653,0	5491,4	4755,4	6577,7
Romania	584,0	847,7	1543,4	796,4	3855,8	1503,2	3764,8	1566,8
Hungary	1509,9	1463,9	1622,1	1571,0	2270,9	1022,3	1184,8	1387,8

Under the conditions of full-scale war and disrupted maritime logistics, Ukraine's western border with the EU became a key logistical route. In the first half of

⁵³⁰ Compiled by the author based on the data: Geographical structure of foreign trade in goods with the EU countries. <https://www.ukrstat.gov.ua/>

2022, 52.2% of all Ukrainian goods were exported to the EU. Despite improvements in maritime logistics in 2023–2024 and reduced dependence of agricultural exports on the agreements under the “grain deal,” by the first half of 2024 the share of EU countries in Ukraine’s total goods exports had increased to 56.2%⁵³¹.

In 2022, Ukraine exported agricultural products and foodstuffs worth \$23.4 billion, of which \$12.9 billion (55.2%) were directed to the EU. In 2023, the total export volume of agricultural products from Ukraine decreased to \$22 billion, with \$12.5 billion (56.8%) exported to the EU. In the first half of 2024, this ratio changed slightly: out of the total value of agricultural exports and foodstuffs amounting to \$12.4 billion, 50.3% (or \$6.2 billion) were supplied to EU countries.

Overall, over the past 10 years, Ukraine has reoriented the geographical structure of its foreign trade toward the European market. This can be considered a significant achievement of both policymakers and domestic producers, as the EU is characterized by a high level of self-sufficiency due to intra-European economic ties, with "in recent years, 60% to 65% of the total foreign trade volume of EU member states accounted for by mutual trade among them"⁵³². As of 2023, Ukraine ranks 17th among main trading partners of the EU, while also being among the top three largest suppliers of agri-food products to the EU⁵³³.

At the same time, the deepening of Ukraine’s agricultural specialization in foreign trade in general – and in trade with the EU in particular – alongside its benefits for European integration, also poses a number of risks. Amid growing food security challenges in Europe and globally, the export of agricultural products from Ukraine has become an important factor in strengthening relations with EU member states. On the other hand, the EU’s complex common agricultural policy and its measures to protect European food producers create several barriers to Ukraine’s integration into this sector of the economy. This is evidenced by the rise of anti-Ukrainian sentiments

⁵³¹ Geographical structure of Ukraine's foreign trade in goods in the first half of 2024. <https://www.ukrstat.gov.ua/>

⁵³² Ukraine on the way to the EU - realities and prospects...

⁵³³ Indicators of trade and economic cooperation between Ukraine and the EU. Mission of Ukraine to the European Union. <https://ukraine-eu.mfa.gov.ua/posolstvo/torgovelnno-ekonomichne-spivrobitnictvo-ukrayina-yes/pokazniki-torgovelnno-ekonomichnogo-spivrobitnictva-ukrayina-yes>

among Polish farmers, who in 2022-2023 blocked the Polish-Ukrainian border demanding that the EU impose a ban on the import of Ukrainian grain.

The analysis of key trends in trade relations with the EU shows that the impact of the free trade area on the Ukrainian economy is ambiguous. On the one hand, the volume of intra-industry trade has been gradually increasing, and the level of trade openness with EU countries has improved⁵³⁴. However, the trade balance shifted from a surplus in 2022 (USD 0.9 billion) to a deficit in 2023 (USD -9.1 billion). Export concentration increased due to the rise in agricultural raw material supplies, while diversification of the export structure occurred only in a few small product groups, particularly in processed industrial goods.

The structure of trade with EU countries indicates a slow integration of Ukrainian enterprises into European value chains. This conclusion is based on the fact that the export of raw materials from Ukraine reflects integration at the initial stages of value chains, while the import of finished goods points to the inclusion of domestic enterprises at the final stages of value creation, with minimal value added by Ukrainian companies in the processes of marketing and distribution. Despite the low value added in Ukrainian goods exports, Ukraine has played a significant role in the EU economy and in the formation of production and logistics networks. The full-scale invasion of Ukraine by Russian forces in 2022 led to the disruption of network connections with leading European companies. In particular, BMW, Porsche, and Volkswagen halted part of their production facilities in March 2022 due to the temporary shutdown of Ukrainian enterprises that produced components for passenger car electrical systems⁵³⁵.

Further deepening of Ukraine's economic cooperation with the EU largely depends on the pace of restoration of industrial and energy facilities, the development

⁵³⁴ Bulletin on the current state of trade relations between Ukraine and the EU in 2023. Ministry of Economy of Ukraine. <https://me.gov.ua/Documents/Detail?lang=uk-UA&id=ae131754-36dc-4e6f-9a8f-89e872b8b451&title=BiuletynPotochnogoStanuTorgovelnikhVidnosinMizhUkrainoiuTas>

⁵³⁵ Volkswagen, BMW, and Porsche suspend production due to a lack of auto components from Ukraine. Forbes, March 7, 2022. <https://forbes.ua/inside/volkswagen-bmw-i-porsche-zupinyayut-virobnitstvo-cherez-brak-avtokomplektuyuchikh-z-ukrainishcho-zagrozhue-industrii-i-yak-dovgo-protvagnetsya-kriza-7032022-4183>

of new logistics and transportation routes, and the functioning of seaports. Currently, the resolution of logistics issues regarding the delivery of Ukrainian goods to the EU is taking place within the framework of the EU's "Solidarity Lanes" Action Plan. However, the capacity of these new routes has proven to be limited due to the inefficient operation of border crossing points and protests by farmers from Poland, Hungary, and Slovakia. At the same time, the several-fold increase in exports to Romania indicates the promising and reliable logistics of transporting agricultural products via the Danube River using the Romanian port of Constanta. Romania is actively expanding the cargo capacity of its transport infrastructure, upgrading transshipment facilities and grain storage capacities, and streamlining customs clearance procedures.

Trade liberalization with Ukraine provides a number of advantages for EU countries, allowing for an increased supply of goods on the European market and helping to curb rising prices for agricultural products and food. The removal of duties and suspension of anti-dumping measures on Ukrainian metallurgical products helps reduce the shortage of ferrous metals and improves the supply of raw materials to European enterprises. However, the Ukrainian government and domestic businesses should be aware that increasing exports of such products will not significantly enhance the positive effects of trade with the EU and will further reinforce the raw material orientation of the Ukrainian economy, which, in the long term, will not ensure high economic growth rates or a rapid economic recovery.

At the same time, Ukraine should capitalize on the positive changes in trade conditions with the EU that have resulted from the temporary removal of tariff and non-tariff barriers. Ukrainian enterprises have gained the opportunity to supply dairy and meat products to the European market without restrictions – products that are more highly processed and have greater added value compared to grain crops or sunflower seeds. In this context, Ukrainian producers have the chance to capture relevant market niches in the EU by taking advantage of the reduced presence of Belarusian and Russian competitors due to the sanctions imposed on exports from these countries. However, Ukrainian dairy and meat producers must ensure that their products comply with

European quality standards, which currently hinders the large-scale entry of domestic enterprises into the EU market.

Ukraine needs to step up efforts to sign and implement the “Agreement on Conformity Assessment and Acceptance of Industrial Products” (ACAA). This agreement serves as a tool for eliminating technical barriers to trade between Ukraine and the EU and provides for Ukrainian products to be marked with the CE label and freely sold on the European market without the need for an additional EU certificate. The removal of trade restrictions for Ukrainian exporters and the introduction of the “industrial visa-free regime” and “transport visa-free regime” will contribute to deepening economic cooperation and accelerating Ukraine’s integration into the EU single market. Trade liberalization contributes to the more effective implementation of the provisions of the Association Agreement and strengthens Ukraine’s negotiating position during the EU accession process. Moreover, in the context of war, trade with the EU serves as one of the tools for stabilizing the national economy, enhancing the economic and defense potential of the country, and will support Ukraine’s faster recovery after the war ends.

Accordingly, we will define the main directions for intensifying Ukraine's cooperation with the EU and ensuring the European integration of our country:

1. Achieving an agreement on the introduction of full duty-free access for Ukrainian goods to the EU market, the abolition of tariff quotas and trade protective barriers, both in the short-term and long-term. The full liberalization of trade relations between Ukraine and the EU is an important step for improving the investment climate in our country, as companies that will export large volumes of products to the EU market become highly attractive for investment.

2. The implementation of political and economic initiatives by Ukraine, Turkey, and Romania, supported by the UN, to increase the range of goods and the list of ports to enhance the export volumes of agricultural and metallurgical products, including to EU countries. The gradual easing of logistical restrictions in trade through the development of new transportation routes, the expansion of border infrastructure on the Ukraine-EU border, increasing the capacity of existing border crossing points, and the opening of new points adapted for the rapid customs clearance of large volumes of goods.

3. Intensification of efforts for the further integration of Ukraine into the EU single market in accordance with the provisions of the Association Agreement, ensuring mutual recognition of industrial goods assessment systems (ACAA), practical implementation of the rules for recognizing the equivalence of food products, and the harmonization and adaptation of regulatory frameworks for the mutual participation of both parties in public procurement programs.

4. The signing of new free trade agreements with countries that are trade partners of the EU, which will allow the application of preferential rules of cumulation of origin in determining the origin of goods, will promote the involvement of Ukrainian producers in new value chains and integration into global production networks.

The implementation of these measures will have a positive impact on the process of Ukraine's European integration, increase the resilience of the Ukrainian economy to the threats and risks of war, contribute to strengthening Ukraine's economic potential during the post-war recovery stage, and enhance its negotiating position in the EU accession process. However, achieving the objectives of accelerating Ukraine's European integration requires the establishment of a strong political and institutional foundation. Despite the ongoing war and the recognition of Ukraine's role in the future of Europe as a whole, the readiness of EU member states to expand the single market by admitting Ukraine varies significantly, with Hungary and Slovakia openly opposing Ukraine's integration into the Community.

Conclusions of the Chapter

In the long term, the process of European integration has been characterized by a trend toward increased efficiency, as evidenced by the growth of the integral indicator of the EU integration development potential from 0.842 in 2011 to 0.879 in 2021. This significant improvement in efficiency was primarily driven by the effective utilization of the intra-regional component of the integration process, with the corresponding sub-index showing an upward trend (from 0.753 in 2011 to 0.921 in 2021). This growth was largely due to increases in GDP per capita, intra-regional trade volume per capita, the share of high-tech products in EU exports, and the investment index per capita. The external component, however, demonstrated lower efficiency, as its sub-index declined from 0.931 in 2011 to 0.835 in 2021. This indicates a weakening of the EU's position

in the global market, resulting from a decrease in the EU's shares in global GDP, global high-tech exports, and global foreign direct investment (FDI) volumes.

Over the past decade, there has been a significant strengthening not only of the political factors driving deeper cooperation between Ukraine and the EU, but also of the economic dimension. This is evidenced by the adoption of the Association Agreement, the implementation of the Ukraine-EU Free Trade Area, the granting of EU candidate status to Ukraine, and the substantial increase in trade turnover between Ukraine and the EU despite the large-scale war in the country. As demonstrated by the results of the gravity model calculations, the expansion of the Ukrainian economy is a key factor and precondition for trade cooperation between the EU and Ukraine. An increase in Ukraine's GDP has a stronger impact on the volume of trade in goods between Ukraine and the EU, as well as on the volume of Ukrainian exports to the EU, than the GDP of the EU or global oil prices. The growth of the Ukrainian economy was accompanied by an increased demand for intermediate goods and finished products from European countries, which were either sold on the domestic market or used by enterprises in the production of goods. This, in turn, was a key driver of the increased volume of trade.

Ukraine is one of the largest countries in terms of land area and population, yet it remains the economically poorest among EU member states, candidates, and potential candidates for accession to the Community. To a large extent, low income levels are the result of the inefficient structure of the Ukrainian economy. While the services sector dominates in both Ukraine and EU countries, agriculture plays a significantly larger role in Ukraine's GDP compared to that of EU member states. The main obstacles slowing down Ukraine's European integration process are institutional and political in nature, preventing the swift implementation of European legal norms and standards in Ukraine, which are fundamental for meeting the economic and social criteria for EU membership. In turn, the unresolved economic and social issues delay Ukraine's accession to the EU due to the resistance of certain member states that are unwilling to increase their financial contributions to support development equalization programs for newly acceded countries.

During the war, Ukraine's economy underwent significant transformations, which were reflected in a substantial decline in the production of most types of industrial and agricultural goods in 2022. This had a notable impact on both the

dynamics and structure of Ukraine's trade with the EU. Ukraine's economic ties with the EU developed rapidly following the signing of the Association Agreement, and after the full-scale invasion by Russian forces, cooperation with neighboring EU member states deepened further. In terms of exports, agricultural products dominate, while the share of metallurgical products has significantly decreased. On the import side, the leading categories are mineral fuels, oil and oil refining products, as well as transport vehicles. The dynamics of goods flows between Ukraine and the EU in 2022–2023 were primarily influenced by factors such as the ability of Ukrainian enterprises to maintain the production of export goods and ensure their transportation to consumers in EU countries. Changes in Ukraine's economic policy under martial law also had a significant impact on the export of agricultural products, particularly due to the introduction of restrictions on the export of certain types of goods. Additionally, these policy changes affected the volume of critical imports, especially goods of military and dual-use nature.

The main directions for intensifying Ukraine's cooperation with the EU include: (1) **Signing an agreement on granting full duty-free access** for Ukrainian goods to the EU market, and the abolition of tariff quotas and trade protection barriers in both the short and long term; (2) **Implementation of initiatives by Ukraine, Turkey, and Romania**, supported by the UN, to expand the range of goods and the list of ports to increase export volumes; development of new transportation routes, enhancement of border infrastructure along the Ukraine-EU frontier, increased capacity of existing border crossing points, and the opening of new ones designed for fast customs clearance of large cargo volumes; (3) **Ensuring mutual recognition of industrial goods assessment systems** (ACAA), practical implementation of rules for recognizing the equivalence of food products, and harmonization and adaptation of legal frameworks for mutual participation in public procurement programs; (4) **Signing new free trade agreements with countries that are EU trade partners**, which will enable the application of preferential cumulation rules in determining the origin of goods.

**GEO-ECONOMIC ROLE OF UKRAINE'S FOREIGN TRADE
AND MECHANISM OF ITS IMPLEMENTATION IN
THE CONDITIONS OF EUROPEAN INTEGRATION**

Monograph

Підписано

до друку 15.05.2025. Формат 60x90/16.

Умовн. друк. арк. 21. Наклад 100 прим.

Замовлення №1433.

Друк ТОВ «Поліграф-Сервіс»,
вул. Садова 88А, м. Кропивницький, 25009