

Modernization of the Format of Ukraine’s Trade Integration With the EU in the Conditions of Implementation of the DCFTA

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Abstract

Purpose: The purpose is to define the efficiency and priorities of modernization of Ukraine’s trade integration with the EU countries in the implementation of DCFTA and to attempt to assess the indirect effects of the free trade agreement between countries.

Design/methodology/approach: To this end, a comparative analysis was carried out to assess the effectiveness of the Association Agreement and to identify the asymmetry of trade and economic integration

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between Ukraine and the EU. The correlation regression method was used to determine the dependence of Ukraine's exports to the EU countries on GDP changes and to identify the integration impacts on economic growth. In turn, the extrapolation method was employed to calculate forecasts for the economic growth rate and GDP per capita.

Findings: Determining the effectiveness and priorities of modernization of the trade integration format of Ukraine-EU in the implementation of the DCFTA, as well as evaluation of the intermediate results of the FTA between the countries. At present, it is necessary to modernize the format of Ukraine's trade integration with the EU in the context of the implementation of the DCFTA. Three main vectors for updating the Agreement have been identified as priorities: deepening sectoral integration; increasing duty-free export to the EU market; eliminating non-tariff measures restricting trade with the EU along with signing a number of agreements for the above-mentioned purpose.

Research limitations/implications: The results of the study will be useful to researchers of relevant issues, students, graduate students, doctoral students and teachers specializing in international relations and other academic disciplines, and the developed initiatives can be used by the government to form a new negotiating position on the Association Agreement between Ukraine and the EU.

Originality/value: Forecasting and modeling the Ukraine-EU foreign trade turnover based on the use of the gravity model and correlation-regression analysis confirms that the introduction of the DCFTA in 2016–2017 allowed Ukraine to increase exports to the EU and modernization of the trade part of the agreement will positively affect the economic and social development of Ukraine. In this context, it is necessary to take into account the national interests and trade partners, in particular the possibility of Ukraine's support for the EU initiative "European Green Deal" on the path to the formation of Europe as a carbon-neutral continent.

Keywords: international trade, trade agreements, development programs, marketing strategies, export-oriented model.

JEL: F10, F13, F17

Modernizacja formatu integracji handlowej Ukrainy z UE w warunkach realizacji DCFTA

Streszczenie

Cel: celem jest określenie efektywności i priorytetów modernizacji integracji handlowej Ukrainy z państwami UE przy wdrażaniu pogłębionej i kompleksowej umowy o wolnym handlu (DCFTA) oraz próba oceny pośrednich skutków umowy o wolnym handlu między krajami.

Metodologia: w tym celu przeprowadzono analizę porównawczą, aby ocenić skuteczność układu o stowarzyszeniu oraz określić asymetrię handlu i integrację gospodarczą między Ukrainą a UE. Do określenia zależności eksportu Ukrainy do krajów UE od zmian PKB, a także wpływu integracji na wzrost gospodarczy wykorzystano metodę regresji korelacji. Z kolei metoda ekstrapolacji została zastosowana do wyliczenia prognoz tempa wzrostu gospodarczego i PKB na mieszkańca.

Wyniki: określenie skuteczności i priorytetów modernizacji formatu integracji handlowej Ukrainy z UE we wdrażaniu DCFTA oraz ocena pośrednich skutków umowy między krajami. Obecnie konieczne jest unowocześnienie formatu integracji handlowej Ukrainy z UE w kontekście realizacji DCFTA. Za priorytetowe uznano trzy główne kierunki aktualizacji umowy: pogłębienie integracji sektorowej; zwiększenie bezcłowego eksportu na rynek UE; zniesienie pozataryfowych środków ograniczających handel z UE wraz z podpisaniem w tym celu szeregu porozumień.

Ograniczenia/implikacje badawcze: wyniki badań będą przydatne dla badaczy tej tematyki, studentów, doktorantów i wykładowców specjalizujących się w stosunkach międzynarodowych i innych dyscyplinach

naukowych, a wypracowane inicjatywy mogą posłużyć rządowi do sformułowania nowego stanowiska negocjacyjnego w sprawie układu o stowarzyszeniu między Ukrainą a UE.

Oryginalność/wartość: prognozowanie i modelowanie obrotów handlu zagranicznego między Ukrainą a UE w oparciu o model grawitacyjny i analizę regresji korelacji potwierdza, że wprowadzenie DCFTA w latach 2016–2017 pozwoliło Ukrainie na zwiększenie eksportu do UE, a unowocześnienie handlowej części porozumienia pozytywnie wpłynie na rozwój gospodarczy i społeczny. W tym kontekście konieczne jest uwzględnienie interesów narodowych i partnerów handlowych, zwłaszcza możliwości wsparcia przez Ukrainę unijnej inicjatywy „Europejski Zielony Ład” na drodze do kształtowania się Europy jako kontynentu neutralnego pod względem emisji dwutlenku węgla.

Słowa kluczowe: handel międzynarodowy, umowy handlowe, programy rozwoju, strategie marketingowe, model zorientowany na eksport.

1. Introduction

The dominant feature of the current stage of development of international economic relations is the increasing importance and growing role of international trade agreements. Integration and trade agreements are an integral part of national development strategies of individual countries and customs territories and regions on the basis of liberalization and deepening of relations. The total number of these agreements is growing every year, so in 2020 there were 494 existing trade agreements reported to the WTO, 62% of which are free trade areas (Figures on Regional Trade Agreements, 2020).

The purpose of creating free trade areas is to provide special conditions by providing incentives for trade between countries / integration groups by reducing customs tariffs, ensuring stable trade flows, achieving complementarity and a higher level of interconnection of national economies (U.S. Customs and Border Protection, 2020). Currently, there are several differences between free trade agreements and other regional agreements, which are reduced to the degree of trade and economic integration (European Commission, 2020).

Traditional free trade areas are characterized by: reduction of trade barriers; mutual abolition of tariffs in trade; elimination of quantitative restrictions on trade on a reciprocal basis (almost always, but not necessarily); development and unification of rules for determining the country of origin of goods; simplification and harmonization of customs procedures; increase in trade in goods and services between the signatories of the trade agreement.

Horn, Mavroidis, Sapir and Mölders (2009) emphasize that regional trade agreements were related to trade liberalization, so the agreements concluded before 1995 concerned mainly trade in goods and took the form of mostly free trade areas, customs were concerned in much less degree. Since the creation of the WTO in 1995, there has been a trend towards the expansion of multilateral trade agreements in the area of services, as well as trade aspects of intellectual property rights. Recent trade agreements often include issues of investment protection, competition policy, labor

standards, environmental protection, thus expanding the regulatory aspects of the WTO (Horn et al., 2009; Mölders, 2015; Pigman, 2016; Richard, 2016). Currently, there are two categories of such agreements: “WTO Plus” (WTO +) and “WTO Extra” (WTOX), the former is characterized by compliance with the provisions of the FTA (free trade area), which fall under the current WTO mandate. In this case, the parties have mutual bilateral commitments that go beyond what the countries have undertaken at the multilateral level of the WTO. The second category is characterized by the presence of those provisions that affect issues that are outside the current WTO mandate (Table 1).

WTO+	WTO _X		
Free trade area for industrial goods	Anti-corruption regulation	Civil defense	Illegal immigration
Free trade area for agricultural goods	Competition policy	Innovation policy	Illicit drugs
Export duties	Consumer protection	Cultural cooperation	Industrial cooperation
Sanitary and phytosanitary measures	Data protection	Dialogue on economic policy	Information society
Technical barriers to trade	Environmental protection laws	Education and training	Money laundering
State trade enterprises	Investments	Energy	Nuclear safety
Anti-dumping and countervailing measures	Capital movement	Financial Aid	Political dialogue
State aid	Labor market regulation	Health protection	Governance
Government Procurement	Intellectual property rights	Social issues	Regional cooperation
Trade-Related Investment Measures (TRIMS)	Human Rights	Statistics	Research and technology
Trade Aspects of Intellectual Property Rights (TRIPS)	Approximation of laws	Taxation	Small and medium enterprises
Trade in Services (GATS)	Audio and video products	Terrorism	Providing visas and asylum

Tab. 1. Areas of regulation of Comprehensive Free Trade Areas. Source: Based on (Horn et al., 2009; Mölders, 2015).

In the conditions of dynamization of global competition, on the one hand, and military actions in the east of the country and annexation of

a part of the territory of the country, on the other, trade integration for Ukraine assumes special urgency. The defining motive for concluding trade agreements is the protection and realization of national interests, first of all sustainable economic growth and global competitiveness, access to markets and efficient allocation of resources, activation of business (large and SMEs) and improving the welfare of the population. Therefore, the country seeks to develop foreign trade relations with a number of countries and is interested in deepening cooperation between Ukraine and the EU, bilaterally and multilaterally within the World Trade Organization (Emerson et al., 2006).

In retrospect, negotiations between Ukraine and the EU on the current basic agreement to replace the current Partnership and Cooperation Agreement began in 2007, and in 2008 the parties agreed on a new name for the future agreement – the Association Agreement (The European Union, 2020). The final XXI round of negotiations on the Association Agreement took place in Brussels in 2011, during which all current provisions of the Agreement were agreed (Ministry of Foreign Affairs of Ukraine, 2018; Government portal, 2020). Thus, the Association Agreement between Ukraine and the EU was concluded with the purpose of updating the basic institutional framework of political, trade and economic cooperation. A new round of trade integration took place in 2014, when the EU decided to abolish and reduce 98% of customs tariffs for Ukrainian exports. The final stage was the ratification of the Association Agreement between Ukraine and the EU by the Verkhovna Rada of Ukraine and the European Parliament. The Association Agreement, which contains the provisions of the Agreement on the Deep and Comprehensive Free Trade Area (DCFTA), entered into full force and effect on September 1, 2017, although some parts of it came into force on November 1, 2014, and the provisions of the Agreement on DCFTA – on January 1, 2016 (Baležentis & Yatsenko, 2018).

It should be noted that the current conditions of the Free Trade Area no longer correspond to the real trade and economic potential of Ukraine's cooperation with the EU. In this context, it should be noted that in accordance with the prescribed provisions, it is envisaged that consideration of options to expand the scope of the agreement or accelerated reduction of duties may be held in the fifth year of the document. These features determined the theme of the study, its architectonics and logic.

2. Literature Review

Regional trade agreements from the standpoint of international cooperation is one of the main locomotives of the two- and multifaceted trade system (Burakovsky et al., 2010). Trade and economic relations are construed as meaning interstate relations or integration associations, which are based on exchange and financial transactions, as well as cooperation

and joint development. They are the principal area of interstate economic cooperation. Bilateral trade and economic relations are founded upon terms of long-term cooperation agreed by both countries and set forth in international agreements. Greater effectiveness of such relations lies in them being developed on the basis of the created free trade area – a zone where there is a special preferential trade regime for members through removing domestic tariffs while maintaining them in trade with other territories (Yatsenko et al., 2017; Meyers et al., 2018; Yatsenko et al., 2018; Glova et al., 2020).

Trade integration is a general tool serving to optimize interstate cooperation for the national economic interests to materialize. Regional trade agreements concluded in the last decade often go far beyond discussing terms of trade, including a number of provisions on issues such as investment, competition, internal regulation, which justify their use as a representation of the depth of economic cooperation between countries which signed the agreement. Therefore, RTAs, in which the reduction of tariff protection is only one of the many aspects that require harmonization, are not limited to liberalization as such (Molchanov, 2004; Grossman, 2016; Irwin, 2015), providing for a range of issues – from changes in business models of companies operating in sectors which fall within the agreement to the conditions of granting preferential access to the markets of partner countries and challenges of political coordination (DiCaprio et al., 2017; Emerson & Movchan, 2016) in order to level or enhance the effects of RTA both within the association of signatories and outside it within-RTA and outside-RTA effects (Goldberg & Pavcnik, 2016; MacPhee & Sattayanut, 2014).

At present, FTAs are being concluded to create suitable conditions for cooperation between countries or integration associations (Ministry of Foreign Affairs of Ukraine, 2019). Regional economic integration of markets within FTAs remains the most effective tool for strategic growth of different countries (Hoekman et al., 2013). The European Union (EU), by concluding these association agreements, provides its trade and economic partners with the most comprehensive and deepest cooperation available to third countries (European Free Trade Association, 2020). An important component of the agreement is the Deep and Comprehensive Free Trade Area (DCFTA), the creation of which is expected to contribute to Ukraine's economic modernization and integration into the EU internal market, mainly through the adoption of EU trade legislation (Spiliopoulos, 2014).

Shnyrkov and Chugaiev (2017) point to the problems of trade and economic integration of Ukraine and Russia due to the political conflict and the decline in trade between these countries and the change of focus on the markets of EU countries. However, despite the strategic focus on the European market, it was not possible to restore pre-crisis volumes of exports. Dabrowski et al. (2020) add that the change in the vector of trade flows has led to a restructuring of trade relations, deepening cooperation with the EU,

reducing exports to Russia, as well as strengthening Ukrainian-Chinese trade and economic relations in recent years. At the same time, Vošta, Musiyenko and Abrhám (2016), despite the above-mentioned transformations, add that the change in the vector of trade and economic relations has not helped to solve such problems as lower commodity prices, rising inflation and a negative trend of innovation and investment development. Koeth (2017) also emphasizes that expanding DCFTA cooperation could exacerbate Ukraine's current crisis. Despite these obstacles, on the way to DCFTA development, Ukraine was able to become one of the largest exporters of food (third place) to the EU in 2017, with a share of 42% of total Ukrainian exports of this product group (2019). In 2019, the total trade balance between Ukraine and the EU totaled 43.3 billion euros, the number of enterprises exporting products to the EU reached 14,500 (The European Union, 2020).

The *object* of the study is the process of trade and economic cooperation between Ukraine and the EU in the implementation of the deep and comprehensive free trade area between the countries.

The *subject* of the study is the mechanisms and tools of trade and economic cooperation between Ukraine and the EU in the context of trade integration.

The *purpose* is to define the efficiency and priorities of modernization of Ukraine's trade integration with the EU countries in the implementation of DCFTA and to attempt to assess the indirect effects of the free trade agreement between countries.

The *priorities were*: deepening sectoral integration, increasing duty-free exports to the EU market, and removing non-tariff measures restricting trade with the EU. To this end, a comparative analysis was carried out to assess the effectiveness of the Association Agreement and to identify the asymmetry of trade and economic integration between Ukraine and the EU.

3. Methodology and Data

The analysis was conducted in the context of modern methodological concepts and theories. In accordance with the set goal and in order to solve the main problem, the following research methods were used: the method of analysis and synthesis in determining the features of trade integration and trade and economic liberalization; the method of comparative analysis to assess and determine the effectiveness of the Association Agreement and to identify asymmetries of trade and economic integration of Ukraine and the EU; the correlation regression method was used to determine the reliance of Ukrainian exports to the EU countries on GDP changes and to identify the integration impacts on economic growth; in turn, the extrapolation method was employed to calculate forecasts for the economic growth rate and GDP per capita; and finally, the method of theoretical generalization was used to formulate conclusions.

The most commonly used mathematical methods for assessing the effectiveness of trade integration and the creation of a free trade area between countries should be the calculation of different types of indices (identified comparative advantage, complementarity of trade of partner countries, foreign trade intensity, intra-industry trade, trade specialization, etc.) (Richard, 2016; Dekhtyar, 2017) and many variations of the gravity model depending on the purpose of the simulation. However, these methods are increasingly criticized by scholars and do not answer the question of whether the level of economic prosperity in the country will change after joining the integration group and signing a free trade agreement.

To assess how effectively the potential of economic cooperation between countries is used, the most common econometric model is the gravity model. It was first put forward by J. Tinbergen in 1962. The author suggested a link exists between trade turnover of countries and their economic size, as shown by equation 1 (Tinbergen, 1962; Anderson, 1979):

$$F_{ij} = G \frac{M_i^\alpha M_j^\beta}{d_{ij}^\delta} \varepsilon_{ij} \quad (1)$$

where F_{ij} – trade between countries i and j ,
 M_i and M_j – gross domestic product of countries i and j ,
 d_{ij} – factor of trade costs, including logistics costs,
 ε_{ij} – all other factors that affect turnover, but are not included in the equation,
 α, β, δ – constants (model parameters).

Theoretical substantiation of this model was carried out by economists Helpman and Krugman (1985), Oguledo and Macphee (1994), Baier and Bergstrand (2001), Eaton and Kortum (2002), Anderson and Wincoop (2003), Martinez-Zarzoso and Nowak-Lehmann (2003), Awwad (2018), Khomenko (2020), etc. The gravity equation as a result became one of the most solid empirical patterns in economies and has continued to be appropriate for a long time. The gravity model has grown to be widespread, is often used in economics and has been given many possible interpretations. Although problems occur with the theoretical substantiation of the model, which has been examined by these world-renowned economists for a long time, the gravity equation has proved to be one of the most solid empirical laws in economics and continues to be relevant today. The fundamental assumption of the model rests upon Newton's law of universal gravitation, yet the GDP of partner countries is used in lieu of the mass of the Earth. This implies that trade between two countries stays in direct proportion to the size of their economies, while being inversely proportional to their remoteness.

As empirically accurate, the gravity model began to be broadly employed in economics and gained numerous interpretations. Thus, in the logarithmic form, the equation of gravity is expressed by formula 2:

$$\ln \ln(F_{ij}) = \beta_0 + \beta_1 \ln \ln(M_i) + \beta_2 \ln \ln(M_j) + \beta_3 \ln \ln(D_{ij}) + \varepsilon_{ij} \quad (2)$$

A distinctive feature of this model is the ability to add qualitative variables, such as membership in a particular integration group, signing a free trade agreement between countries, etc. In connection with what is stated above and basing on a detailed analysis of applications, opportunities and constraints, it is proposed to use the tools of gravity models to assess the effectiveness of Ukraine's trade cooperation with the EU, with account being taken of the signature of the Association Agreement between Ukraine and the EU and of the entry into force of its economic part, namely the Free Trade Area between Ukraine and the European Union, on December 1, 2016.

The equation of the gravity model taking into account the qualitative variable can be represented as 3:

$$\ln \ln(F_{ij}) = \beta_0 + \beta_1 \ln \ln(M_i) + \beta_2 \ln \ln(M_j) + \beta_3 \ln \ln(D_{ij}) + \beta_4 DUMMY_{ij} + \varepsilon_{ij} \quad (3)$$

where, F_{ij} – trade between countries i and j ,
 M_i and M_j – gross domestic product of countries i and j ,
 d_{ij} – factor of trade costs, including logistics costs,
 $DUMMY_{ij}$ – fictitious variable: membership of countries in a particular group,
 ε_{ij} – all other factors that affect turnover, but are not included in the equation,
 α, β, δ – constants (model parameters).

EU and Ukrainian statistics for the period 1999–2019 were used to estimate the parameters of this model. The EU GDP and the GDP of Ukraine, respectively, were chosen as indicators M_i and M_j . The distance between countries in this model was measured by means of different indicators, depending on the objectives and the factual basis of the study. This can be both the geographical distance and freight transport cost or the degree of closure of domestic markets for imports of goods from each other with the help of protectionist tools. In this case, the world average oil prices are chosen as an indicator of , as their variations change the transportation cost. In order to find out how countries' trade is influenced by the Free Trade Agreement between Ukraine and the EU, we use the DUMMY variable. DUMMY is 0 until 2015 and 1 from 2016 (Table 2).

Year	Ukraine's foreign trade turnover – EU, million USD	EU GDP, million USD	GDP of Ukraine, million USD	Oil prices, USD/barrel	The presence of FTA
1999	4,513.5	7,922,645.429	31,581	17.9	0
2000	5,235.6	7,259,398.86	31,262	28.4	0
2001	8,542.7	7,387,163.472	37,972	24.45	0
2002	11,834.2	8,049,115.975	42,352	25.01	0
2003	15,631.3	9,911,359.749	50,084	28.83	0
2004	20,557.0	11,398,794.13	64,820	38.1	0
2005	22,425.3	11,904,887.48	86,058	54.38	0
2006	28,282.5	12,702,923.38	107,648	65.14	0
2007	36,135.1	14,710,405.86	142,580	72.52	0
2008	46,997.9	16,236,756.36	179,817	96.99	0
2009	24,892.0	14,708,924.77	117,113	61.51	0
2010	32,153.1	14,540,385.61	136,013	79.47	0
2011	43,722.9	15,741,839.61	163,160	111.27	0
2012	43,237.7	14,636,155.64	175,781	111.63	0
2013	43,805.1	15,293,564.58	183,310	108.56	0
2014	38,072.0	15,633,064.32	133,503	99.03	0
2015	28,345.4	13,546,911.04	91,031	52.35	0
2016	30,637.1	13,882,598.81	93,356	43.55	1
2017	38,332.8	14,735,710.57	112,190	54.25	1
2018	43,389.9	15,931,983.32	130,902	68.99	1
2019	45,762.9	15,592,795.17	153,781	59.27	1

Tab. 2. Basic initial data for the construction of gravity model 1 for agricultural and non-agricultural products (commodity groups from 01 to 97 according to UKT FEA) (sections I–XXI). Source: Based on (The World Trade Organization, 2020; The World Bank, 2020; Ukraine National Debt, 2020; The Global Economy, 2020)

4. New Format of Ukraine's Trade Integration With the EU in the Conditions of Implementation of the DCFTA

There is no doubt that the Association Agreement and the Free Trade Area of Ukraine with the EU are the driver of trade, economic and social development of the national economy, which is primarily due to access to

the largest market on the continent. Currently, the process of European integration is taking place in all areas covered by the Agreement, but with different speed and efficiency. Most studies show that there is a lag in the implementation of the Agreement with the EU, and at the end of 2019 this was confirmed by official Government data (Government system "Pulse Agreement"; analytical center "Ukrainian Center for European Policy"). There are subjective and objective reasons for this, on the one hand (the permanent reform of economic sectors), and on the other – the conflict in eastern Ukraine. Everything is happening in the so-called "turbo regime", because the momentum observed after the adoption of a number of laws in autumn 2019 by the Verkhovna Rada of Ukraine has not turned into a stable dynamic progress to catching up the implementation of the Agreement with the EU. However, it should be noted that the positive fact is the open access to the Government system "Pulse Agreement" since 2019. According to official data, the overall progress in the implementation of the Agreement is 42% in 2019 and 43% in early 2020 (for comparison, 52% in 2018 and 41% in 2017). Thus, the Government reports a record in four areas: 100% implementation of the plan for 2019 in 4 of the 24 areas of reform: "Political dialogue, national security and defense", "Education, training and youth", "Financial cooperation and the fight against fraud", as well as "Social policy and labor relations". At the same time, "no significant progress has been made", i.e. 0% of tasks have been completed in three other areas: "Statistics and information exchange", "Public financial management" and "Consumer protection". And the main outsider is the transport sector, where year after year progress is close to zero and remains unchanged for several years.

Similar results of the monitoring report were obtained by the think tank Ukrainian Center for European Policy. According to them, Ukraine fulfilled the agreement at 41.6%, this figure almost coincides with the results of the Government report which was presented in February 2020 (it refers to the implementation of 42% of the Agreement). According to their analysis, technical regulation and public procurement have been identified among the "leaders"; medium-speed sectors include SPS (sanitary and phytosanitary measures) and the digital market; lagging sectors are customs and agriculture; and sectors that show no progress are transport and statistics.

Given that globalization, trade and integration processes have become more dynamic, the emergence of contradictions and asymmetries of economic development has become relevant. These processes are quite ambiguous, since they exert different influence on countries, which is conditional upon their economic development level. As a result of the study, the existing asymmetries of trade and economic integration of Ukraine and the EU were identified. It is determined that one of the gravest threats is the asymmetry in production and demand (Bilan et al., 2017; Osaulenko et

al., 2020; Yatsenko et al., 2019). Thus, Ukraine's share in the structure of EU trade is a little more than 1%, while the EU accounts for almost 42% of Ukraine's trade. The EU is also the largest investor in the Ukrainian economy. The negative trade balance in 2019 amounted to more than 4 billion US dollars. Thus, given the importance of this trade, its economic vector and the share of the trading partner, the current conditions of the Free Trade Area no longer correspond to the real trade and economic potential of Ukraine's cooperation with the EU. Most quotas are taken up by Ukrainian producers very quickly, which does not correspond to the export potential and ambitions of the business. In this context, it is quite logical that the EU is worried and afraid of the export expansion of Ukrainian producers, especially in agricultural markets. This complicates the negotiation process between Ukraine and the EU to increase trade quotas for Ukrainian producers, as Brussels is trying to protect its European market from the overstocking of cheap goods from countries with cheaper labor.

It is also worth noting the asymmetry in the volume of effective demand, as countries have different levels of economic development. In contrast to Ukraine, the EU population has high living standards, a fairly high level of wages, a high level of income, and as a result has the opportunity to purchase goods of good quality at affordable prices.

It is established that asymmetries have the most negative impact which is manifested in technological disproportion, raw material exports from Ukraine and high-tech imports, a negative balance and the constant growth of the negative trade balance of Ukraine. The structure of imports from the EU is dominated by goods with high added value, and the structure of exports of Ukraine is dominated by raw materials. The structure of Ukraine's foreign trade with the EU in 2019 is dominated by exports of grain crops, which accounts for 12% of exports in 2019, base metals and articles of base metal (21%), including ferrous metals (18.5%), and electrical equipment (14.3%). The structure of imports with the EU countries is dominated by electrical equipment (22.2%), mineral products (14.2%), mineral fuels, oil and products of its distillation (14.0%), products of chemical and related industries (17.4%) and finished food products (6.4%). The main aspects of the asymmetry of the Association Agreement are also highlighted, including: political, legal, economic, aspects of capital and labor movement, respectively. In general, the agreement with the EU is seen as a chance to significantly reduce the negative impact of the shadow sector in Ukraine's economy.

In addition, there are challenges associated with the significant costs of implementing European product standards, especially for micro, small and medium-sized enterprises. However, it should be noted that the implementation of European standards will improve the export competitiveness of industry in world markets, except for the EU countries to which there will be simply an open access.

Ukraine is interested in deepening trade and economic cooperation with the EU, both bilaterally and multilaterally within the framework of the World Trade Organization. At present, it is necessary to modernize the format of Ukraine's trade integration with the EU in the context of the implementation of the deep and comprehensive free trade area. Ukraine is interested in updating all annexes and the trade part of the Agreement. The provisions of the Agreement require new approaches, in particular the modernization of the trade part of the agreement, as they were developed in 2010, and in 10 years the standards and requirements have changed both in the European Union and in Ukraine, in particular in trade. The Association Agreement between Ukraine and the European Union marks in 2021 five years from the date of its entry into force and given the progress in the development of relations with the EU, the Ukrainian side seeks to update the Agreement within the framework of its mechanisms and instruments. Article 481 of the Association Agreement states that the parties shall carry out a comprehensive review of the achievement of the objectives of this Agreement five years after the date of its entry into force. The priority tasks are to bring the parameters of the Free Trade Area in line with the real structure of trade between Ukraine and the EU; to coordinate further liberalization of trade in goods and services with intellectual property rights; to achieve trade and economic balance, which will create better conditions and opportunities for both trading partners, and in particular for domestic exporters in the EU.

Some progress has begun in this direction. Currently, Deputy Prime Minister for European and Euro-Atlantic Integration O. Stefanyshyna has discussed with EU Trade Commissioner F. Hogan the development of trade relations between Ukraine and the EU and full liberalization of all four freedoms (free movement of goods, services, labor and capital), as well as the opportunity to update the trade part of the Association Agreement in 2021, which will give both parties a chance to establish trade and economic cooperation in the coming years. In this context, it is important to take into account the needs of Ukrainian business and the national economy as much as possible while preparing mutually beneficial initiatives for trade and economic cooperation with the EU. The developed initiatives will become the basis of a new negotiating position on the Agreement. The Government is considering the so-called "Norwegian track" for Ukraine, where the Association Agreement may stipulate that its goal is the full liberalization of all four "freedoms", even if after the renewal of the Agreement there are not enough mechanisms for this. The Agreement may be renewed in the future, as 80% can be renewed by a decision of the bilateral bodies of Ukraine and the EU, except for the political part.

Currently, three main vectors for updating the Agreement (European integration 2.0) have been identified: 1) deepening sectoral integration; 2) increasing duty-free exports to the EU market; 3) eliminating non-tariff

measures restricting trade with the EU. If we detail the national trade and economic priorities, they indicate: harmonization of technical regulations for industrial goods in order to simplify certification procedures for domestic industrial goods; revision of a number of trade tariff quotas; cooperation in the field of justice and security; conclusion of the Common Aviation Area Agreement and the ACAA Agreement (so-called “industrial visa-free travel”); integration of Ukraine’s energy system into the single European electricity market (promotion of Ukraine to ENTSO-E – European Network of Electricity Transmission System Operators); simplification of customs procedures; granting the internal market regime in four sectors (financial, telecommunication, postal and courier, maritime); adaptation of Ukrainian legislation in the field of digital technologies to EU standards in order to integrate them into the digital single market and strengthen cybersecurity. The adoption of the Agreement on Conformity Assessment and Acceptance of Industrial Products (ACAA) will allow domestic exporters of industrial goods to mark their products with the CE mark and sell them freely on the EU market without additional certification (Government portal, 2020). This will reduce non-tariff barriers for Ukrainian industrial exports to the EU. It is also worth noting that after signing the ACAA, it will be profitable to locate production in Ukraine for further export to the EU; this will attract foreign investment, aid the revival of industry, increase the competitiveness of goods on the world market.

The implementation of the terms of the Agreement in the field of sanitary and phytosanitary measures is also a priority. Ukraine has done a lot of work in this direction; European standards are already in force in many areas. Thus, trade relations between the countries due to the introduction of the free trade regime will promote the intensification of trade and economic cooperation and expand the range of exports.

At the same time, the European Union is focusing on other innovation and global issues, including the large-scale European Green Deal initiative, which should make Europe the world’s first carbon-neutral continent by 2050. Empirically, this means the need for Ukraine to financially and regulatorily support European industry and the agricultural sector in transforming and adapting as quickly as possible to the inevitable economic consequences of the global climate crisis, and thus effectively protect itself from growing competition from third-country producers. In practice, this means applying the principle of “more for more” in trade and economic cooperation and the negotiation process, i.e. more financial and technical assistance, more access to the EU market and opportunities for sectoral cooperation in exchange for more structural economic reforms. That is, in the future, the clearly defined benefits from the access of Ukrainian goods and services to the EU market should be the defining principle of the process of adaptation of Ukrainian legislation. Therefore, it is very important for the Ukrainian side

to show a strategic vision, to formulate attractive and convincing proposals for the EU that resonate with the priorities of the “European Green Deal”.

However, it should be noted that a number of experts point out that the European side can only agree to update the annexes to the Agreement, the main text of which will remain unchanged. Also, the process of renewing the Agreement in the near future may be complicated by the exit of Britain from the EU and the need for a new trade policy and a number of rounds of negotiations on this issue.

5. Analysis of the Experimental Results

We used a gravity econometric model to analyze the effectiveness of trade integration between Ukraine and the EU and determine the prospects for trade and economic cooperation. As a result of calculations, the equation of Tinbergen's gravity model is obtained, which describes the dynamics of Ukraine's foreign trade turnover with the EU in 1999–2019:

$$\ln \ln(F_{ij}) = -12,333 + 0,807 \ln \ln(M_i) + 0,826 \ln \ln(M_j) - 0,06 \ln \ln(D_{ij}) + 0,147 DUMMY_{ij}$$

The results of the regression analysis supported the hypothesis that a direct relationship exists between the foreign trade turnover of the partner countries and their gross domestic product and that the relationship between the foreign trade turnover and transport costs is inverse. Examination of the model by Fisher's test showed that the model is statistically significant (Table 3).

Indicator	Value
β_0	-12.333
β_1	0.807
β_2	0.826
β_3	-0.060
β_4	0.147
R^2	0.944
R	0.971
F actual	66.905
F critical (0,05)	3.010

Tab. 3. The main results of model 1. Source: Compiled by the authors.

The economic interpretation of this model allows us to state that when the EU GDP goes up by 1 US dollar, bilateral trade increases by 0.807 US dollar; with a rise in Ukraine's GDP of \$1, foreign trade turnover increases by \$0.826; a growth in oil prices of \$1 is expressed in a drop in turnover of \$0.06; the Free Trade Agreement, in turn, increases foreign trade turnover by \$0.147 for each US dollar of foreign trade turnover. The coefficient of determination is close to 1, so it approximates the data well and indicates a significant level of explanation of the causal relationships of the proposed model. For a visual picture, the foreign trade turnover of Ukraine and the EU in 1999–2019 is modeled (Figure 1).

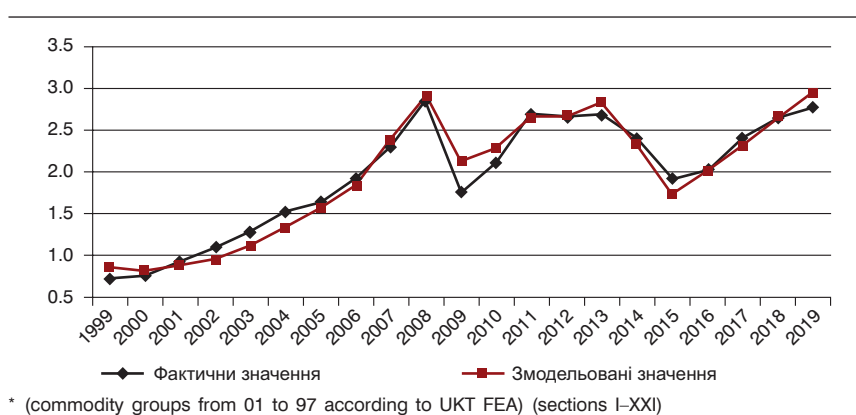


Fig. 1. Actual and simulated values of foreign trade turnover of Ukraine and the EU, million USD. Source: Built by the authors in Microsoft Excel.

The gravity model makes it possible to forecast the volume of bilateral trade in the coming years (Figure 2).

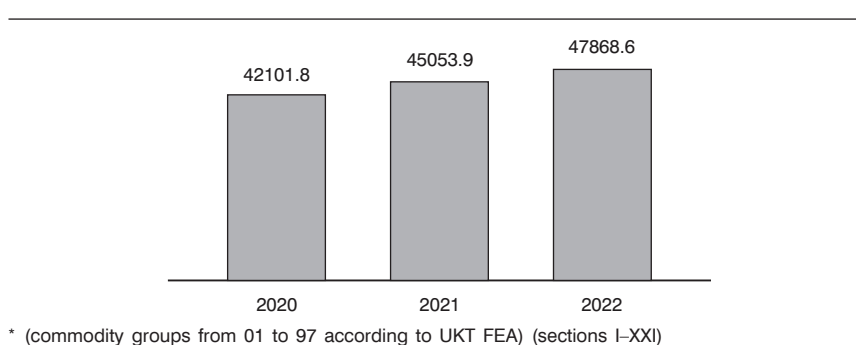


Fig. 2. Projected trade turnover between Ukraine and the EU in 2020–2022, million USD. Source: Built by the authors in Microsoft Excel.

Thus, modeling the degree of impact of crisis phenomena in the economy of the EU or Ukraine on bilateral trade and economic relations displayed the significance of each of them. In this instance, bilateral trade between the EU and Ukraine was found to be more elastic than the dynamics of economic growth in Ukraine's GDP and less elastic than the dynamics of EU GDP. The study confirms that the FTA between Ukraine and the EU has already had a significant impact on the growth of trade between the countries, and the projected values for 2020–2022 suggest a further increase in their mutual trade. The adequacy of the gravity model has been corroborated by the main criteria, hence it can be employed as a foundation for more extensive research on forecasting the development of bilateral trade.

A correlation-regression analysis was performed to determine the dependence of Ukraine's exports to the EU countries on changes in gross domestic product on the basis of the following initial data (Table 4).

Indicator	2002	2003	2004	2005	2006	2007
Export	7,358.2	9,886.6	12,570.8	12,001.3	14,361.6	16,899.4
GDP	42,351.6	50,084.2	64,819.7	86,057.9	107,648	142,580
Indicator	2008	2009	2010	2011	2012	2013
Export	22,248.3	12,523.8	16,168.9	21,495.3	20,826.2	20,954.3
GDP	179,817	117,113	136,013	163,160	175,781	183,310
Indicator	2014	2015	2016	2017	2018	2019
Export	20,994.5	15,943.1	16,501.2	17,533.4	20,165.9	20,750.742
GDP	133,503	91,031	93,356	112,190.4	1309,02	153,781.07

Tab. 4. Initial data of exports to the EU and Ukraine's GDP for 2002–2019, in million US dollars. Source: Compiled by the authors on the basis of (The World Bank 2020; The State Statistics Service of Ukraine 2020).

The correlation coefficient (r) for a series with a term of eighteen years is equal to 0.898744. Since it is greater than 0, the relationship between the two indicators is direct and means that a rise in exports to the EU countries will lead to an increase in GDP. As the value of the correlation indicator is close to 1, the relationship can be referred to as quite strong and is explained by the EU now being our main and priority trading partner. The regression equation has the form: $y = 8.7623x - 25,447$ (Figure 3), which, provided that we take the value of exports for x , and the volume of GDP for y , shows how much the volume of gross domestic product will grow should Ukraine's exports to the EU countries increase by \$1 million.

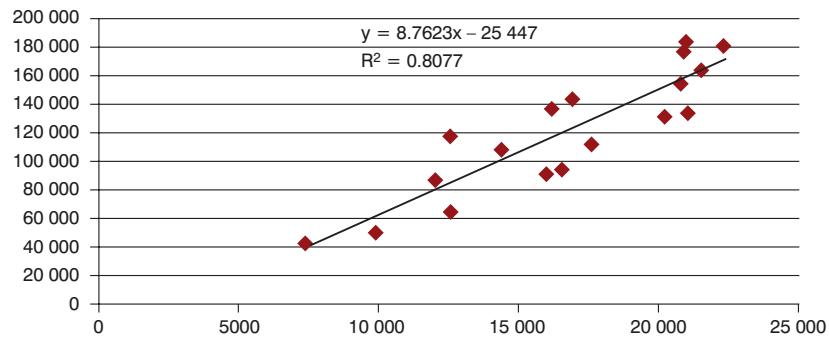
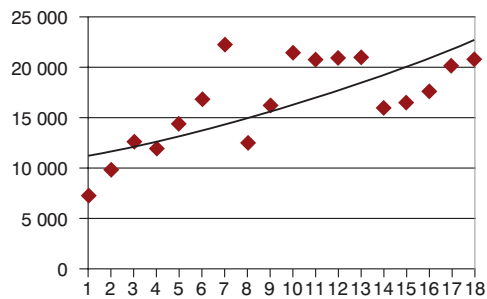


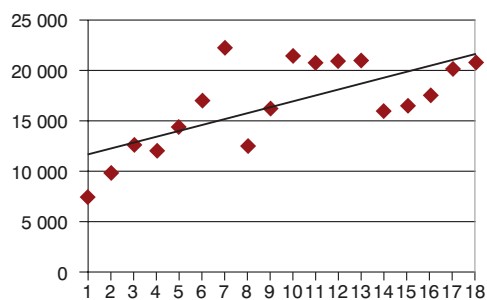
Fig. 3. Regression equation and coefficient of determination of exports to EU countries and Ukraine's GDP. Source: Built by the authors in Microsoft Excel.

It should be noted that Ukraine's economic growth has become significantly more dependent on exports in recent years and this dependence continues to grow, which is typical of most emerging market countries.

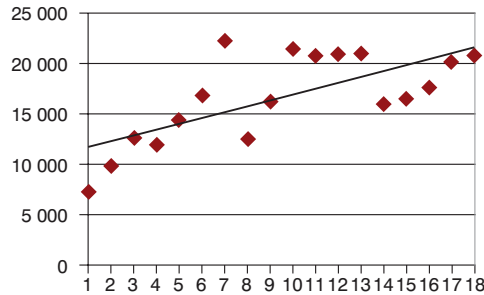
We will forecast the volume of exports from Ukraine to the EU countries for 3 years using the method of time series analysis. To do this, let us consider several trend lines to select the most accurate forecast.



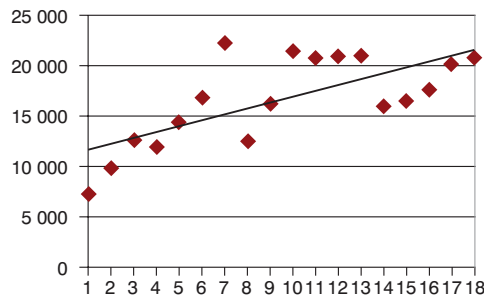
a) Exponential trend line of exports from Ukraine to EU countries



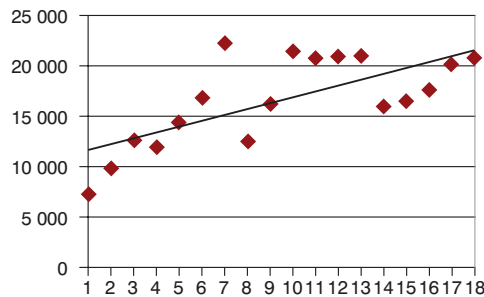
b) Linear trend of exports from Ukraine to EU countries



c) Logarithmic trend line of exports from Ukraine to EU countries



d) Polynomial trend line of exports from Ukraine to EU countries



e) Exponential trend line of exports from Ukraine to EU countries

Source: Built by the authors in Microsoft Excel.

According to the considered trend lines, the power trend line best describes Ukraine's exports to the EU (the value of R-square is 0.7303, i.e. the closest value to one of the above, which points to a high degree of coincidence of the line with the data). The 2020–2022 forecast of exports from Ukraine to the EU countries provided in Table 5 below.

Year	2002	2003	2004	2005	2006	2007
Export	7,358.2	9,886.6	12,570.8	12,001.3	14,361.6	16,899.4
–	8,256.4	10,351.82	11,816.13	12,979.05	13,959.33	14,814.99
Year	2008	2009	2010	2011	2012	2013
Export	22,248.3	12,523.8	16,168.9	21,495.3	20,826.2	20,954.3
–	15,579.24	16,273.05	16,910.64	17,502.12	18,054.99	18,574.95
Year	2014	2015	2016	2017	2018	2019
Export	20,994.5	15,943.1	16,501.2	17,533.4	20,165.93	20,750.74
–	19,066.48	19,533.15	19,977.88	20,403.05	20,810.68	21,202.45
Year				2020	2021	2022
Export				–	–	–
Estimated value of exports				21,579.83	21,944.05	22,296.20

Tab. 5. Forecast of exports from Ukraine to EU countries for 2020–2022, in million US dollars. Source: Compiled by the authors on the basis of (The World Bank, 2020; The State Statistics Service of Ukraine, 2020).

In summary, it should be noted that the export forecast from Ukraine to the EU for 2020 amounted to \$21,579.83 million, for 2021 – \$21,944.05 million and for 2022 – \$22,296.2 million. Thus, in order to maintain the positive dynamics in Ukraine’s trade and economic relations with the EU and deepen the country’s European integration, it is necessary to modernize the format of Ukraine’s trade integration with the EU in the implementation of the deep and comprehensive free trade area.

6. Conclusions

The desire of countries to increase the competitiveness of the national economy correlates with the opening of the state economy and the intensification of integration processes, which leads to positive consequences for economic growth. Integration is based on the liberalization and deepening of trade and economic relations and trade agreements are an integral part of national development strategies.

Relevant formats of trade integration are also used by Ukraine, so on January 1, 2016 the free trade area with the European Union began to function, and on September 1, 2017 the Association Agreement between Ukraine and the EU entered into full force and effect, which is the largest EU Agreement with a third country. The process of European integration is taking place in all areas covered by the Agreement, with different speed

and efficiency, and there is currently a certain lag in the implementation of the Agreement with the EU. The free trade area with the EU, on the one hand, is a driver of trade, economic and social development of the national economy and has opened access to the largest market on the European continent for domestic exporters. Currently, the EU is Ukraine's main trading partner, accounting for about 42% of trade and the largest foreign investor in the national economy. On the other hand, the existing asymmetries of trade and economic integration of Ukraine and the EU in production output are identified: in the level of effective demand; in technological disproportion; raw material exports from Ukraine and high-tech imports; a negative balance and the constant growth of the negative trade balance of Ukraine.

Ukraine is currently interested in deepening trade and economic cooperation with the EU, both bilaterally and multilaterally within the framework of the World Trade Organization. However, the current conditions of the Free Trade Area no longer correspond to the real trade and economic potential of cooperation between countries and most quotas are taken up by domestic producers very quickly. At present, it is necessary to modernize the format of Ukraine's trade integration with the EU in the context of the implementation of a deep and comprehensive free trade area, which will contribute to the deepening of the country's European integration. The trade part of the agreement needs urgent modernization, as in 2021 the Agreement will be 5 years old from the date of entry into force and may be renewed within the framework of its mechanisms and instruments, as such a possibility is provided by its provisions under Article 481 of the Association Agreement. Three main vectors for updating the Agreement have been identified as priorities: deepening sectoral integration; increasing duty-free exports to the EU market; eliminating non-tariff measures restricting trade with the EU, as well as signing a number of agreements to this end.

Forecasting and modeling of foreign trade turnover between Ukraine and the EU based on the use of the gravity model shows that there is a clear considerable effect of economic growth on EU GDP. Thus, with the growth of EU GDP of \$1, foreign trade turnover of all goods will increase by \$0.807. Ukraine's GDP has a much smaller impact, which can be explained by the inequality of the economies of the EU and Ukraine. With an increase in Ukraine's GDP of \$1, foreign trade turnover increases by \$0.826. Countries are at relatively short distances and transportation (oil prices) is not a major part of the costs. Accordingly, these factors do not matter too much for their mutual trade. The fictitious (or qualitative) indicator of the free trade area between Ukraine and the EU played a significant role in forecasting trade turnover between the countries for 2020–2022, as the FTA in 2016–2017 permitted Ukraine to increase exports and imports with the EU. In recent years, the dependence of economic growth on exports has significantly increased and continues to grow for

Ukraine, as well as for most emerging market countries. The forecast of exports from Ukraine to the EU will grow dynamically to \$22,296.2 million in 2022, and modernization of the format of trade integration of Ukraine with the EU in the conditions of realization of the deep and comprehensive zone of free trade, positive dynamics, acceleration of economic growth and an increase of competitiveness of national exporters will be observed as well as business revitalization, including SMEs along with the access to markets and efficient allocation of resources thus improving the welfare of the population. The negotiation process should also take into account the EU's fears about the possible export expansion of producers from Ukraine and find optimal solutions that will create better conditions and opportunities for both trading partners. One of the options could be to support Ukraine's large-scale EU initiative "European Green Deal", the implementation of which in the future until 2050 should make Europe the world's first carbon-neutral continent.

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