JOURNAL
OF EUROPEAN ECONOMY
Vol. 25. № 2 (97). April–June 2026
Publication of West Ukrainian National University

European Economic Integration

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ECONOMIC INTERDEPENDENCE BETWEEN UKRAINE AND OTHER EUROPEAN COUNTRIES IN THE CONTEXT OF STRATEGIC PARTNERSHIP DEVELOPMENT DURING THE WAR

Abstract

The work analyzes the nature of economic interdependence between Ukraine and European countries under the conditions of Russia's military aggression against Ukraine.The authors develop and justify an integral Index of Economic Interdependence (EIDI) between Ukraine and 41 European economies (EU countries, candidates, and EFTA states). The index encompasses four key com-

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ponents of bilateral relations: trade in goods and services, financial links, international assistance, and migration flows (relative to Ukrainian and partner GDP or population) in 2024-2025. Additionally, an Economic Asymmetry Index (EAI) is created to assess imbalances in interdependence between Ukraine and its partners.The results show that Ukraine's most significant partners are Germany, Poland, Cyprus, the Netherlands, and the United Kingdom, with Cyprus serving as a key financial center and Germany acting as the leading trade, migration, and donor partner. Ukraine has a balanced interdependence with 24 European economies and an asymmetrical one with 17 states. Geographic proximity strengthens trade and migration links, while distant countries provide more international aid.

Key Words:

bilateral economic relations, economic asymmetry, economic interdependence, European integration of Ukraine, foreign investment, international aid, international trade, migration.

JEL: C43, F14, F15, F21, F22, F24, F35.

2 formulas, 4 tables, 43 references.

Problem Statement

Economic relations in Europe are currently experiencing the most significant economic system shock in the twenty-first century. Russia's full–scale invasion of Ukraine has had profound consequences not only for the Ukrainian economy but also for European economies, transforming trade, financial, energy, and migration relations across the continent. This conflict has exacerbated inflationary pressures, disrupted supply chains for goods and services, driven up energy costs, and precipitated a surge in refugee flows. The war has significantly increased the vulnerability of European economies due to their high degree of interconnectedness and dependence on external markets and energy resources (Zhang & Nadyrov, 2024).

At the same time, the war has accelerated the transformation of economic relations between Ukraine and European countries. The growing role of financial

and military support, the reorientation of trade relations, the expansion of migration flows and institutional integration have intensified economic ties between Ukraine and the European Union, creating new dimensions of economic interdependence under wartime conditions (European Commission et al., 2023).

This study presents the Economic Interdependence Index as a new tool to measure and compare the economic relations between Ukraine and European countries during wartime. Existing approaches to measuring economic interdependence include, inter alia, the Geoeconomic Interconnectivity Index (GEOII), which integrates trade, financial, and political-regulatory dimensions of cross-border ties between countries (Bertelsmann Stiftung et al., 2025), and related frameworks for assessing geoeconomic connectivity that incorporate trade openness, tariff structures, and the level of institutional integration as key components of economic interconnectedness. These approaches, alongside the theoretical foundations of the concept of interdependence (Keohane & Nye, 1977), operationalize economic ties predominantly through partial or unidimensional indicators, such as trade intensity or formalized economic agreements. Concurrently, Russia's war against Ukraine has significantly transformed economic relations between Ukraine and European nations, revealing the limitations of existing indices in reflecting shifts in trade flows, energy dependence, supply chain resilience, and investment linkages. In this context, a clear analytical need arises for developing an economic interdependence index that would integrate multidimensional aspects of economic interaction and more adequately reflect the asymmetric and geopolitically driven nature of contemporary economic relations between Ukraine and Europe.

Literature Review

In the context of the implementation of Ukraine's European integration aspirations, as well as the economic transformations caused by the full–scale military aggression, the importance of analyzing economic interdependence between Ukraine and European countries is growing rapidly (Hari P, 2023). The intensity of trade, investment, financial, and migration links determines not only the economic dynamics of the country's development but also its resilience to external shocks and its prospects for accelerated integration into the European Union.

Economic interdependence between countries has long remained a central concept in international political economy and international trade theory. Both classical and contemporary scholarly approaches argue that complex systems of mutual dependence among national economies are based on cross-border trade, financial flows, foreign aid, and migration processes. According to the principles of liberal economic theory, increasing economic interdependence contributes to economic development and political stability by strengthening incentives for eco-

nomic cooperation and reducing the likelihood of political conflicts (Keohane & Nye, 1977).

Scholars of realist and neo-mercantilist approaches emphasize that asymmetric interdependence can create vulnerabilities and strategic disadvantages that can be exploited in contexts of geopolitical competition (Krasner, 1978; Gilpin, 2001). In Gilpin's analysis, interdependence is interpreted through the lens of the distribution of economic power and the capability of states to exploit economic ties to achieve political goals. Similarly, modern strategic trade theory demonstrates that economic interdependence can be actively configured by state intervention, particularly through trade instruments designed to enhance the competitive positioning of national enterprises in international markets (Brander & Spencer, 1985).

Furthermore, the theory of trade expectations developed by Copeland (1996) challenges the classical liberal assumption that "the higher the level of trade between states, the lower the probability of war". Instead, it demonstrates that the effects of economic interdependence depend primarily on states' expectations regarding the future dynamics of trade relations. States are guided not only by absolute gains but also by relative gains; therefore, even mutually beneficial trade can increase the risk of conflict if there are concerns about the unequal distribution of benefits or potential threats to national security (Copeland, 1996).

Hirschman's (1980) work argues that international trade relations can generate power asymmetries that are used as instruments of political influence and economic pressure. In particular, unequal dependence between countries creates opportunities for leading states to restrict access to markets or resources, thereby transforming economic ties into a lever of geopolitical influence.

In contemporary research, this idea has been developed into the concept of "weaponized interdependence" proposed by Farrell & Newman (2019), according to which states that control key nodes of global economic networks are able to use them as instruments of coercion. In this context, economic interdependence is transformed from a source of mutual benefit into a mechanism of strategic influence, implemented through sanctions, restrictions on access to financial resources, or disruptions of global supply chains.

Economic globalization has led to the emergence of highly interconnected economic systems in which disruptions in one region may have far-reaching global consequences. This demonstrates both the high level of economic interdependence and the growing need for international coordination to mitigate risks. In the era of growing economic interdependence, even localized crises can propagate through global supply chains and destabilize them (Baldwin & Evenett, 2020).

The growing importance of economic security is prompting many governments to reconsider their dependence on global production networks and strate-

gic imports. In this regard, development strategies based on economic resilience and the diversification of supply chains are receiving increasing attention in academic literature.In particular, the study by Korovkin & Makarin (2022) demonstrates that military conflicts generate not only direct but also indirect economic effects that propagate through inter-firm and inter-industry networks. Even companies that are not directly located in conflict zones may experience significant economic losses due to disruptions in production and logistics linkages. Furthermore, recent empirical research confirms that shocks caused by the Russia–Ukraine conflict spread across global production systems, affecting food availability through complex international supply networks (Laber et al., 2023).

Another crucial dimension of wartime economic interdependence involves the restructuring of trade routes and supply chains. Disruptions to Black Sea shipping compelled Ukraine to develop alternative export channels through European countries, particularly via Poland, Romania, and other EU member states. These new logistical corridors have reinforced economic linkages between Ukraine and European markets, although they simultaneously generated new challenges related to infrastructure capacity and regulatory coordination.

Studies on the global production networks under conditions of armed conflict indicate that the war affects these networks not only through direct economic losses but also through systemic disruptions of key resource chains. In particular, research by Laberet al. (2023) demonstrates that Russia's military aggression against Ukraine caused substantial losses in global food production, including a reduction in agricultural output in Ukraine and a decrease in the supply of 125 food products to 192 countries in 2022.

Economic and political interdependence, traditionally associated with vulnerability and imbalances, can also be conceptualized as a mechanism for ensuring resilience during wartime. The transformation of the European economic system under the impact of the Russian-Ukrainian war highlights the importance of analyzing the European Union's dependence on imports of strategically important goods from Ukraine. In particular, Ukraine accounts for approximately 28% to 41% of EU imports of iron ore and concentrates, while in certain agri-food products, such as sunflower and soybean oil, its share exceeds 60% to 90%, indicating a high level of structural dependency (Lewicka et al., 2025).

Despite the fact that the Ukrainian economy is characterized by a high degree of financial, trade, and institutional dependence on EU countries, this asymmetry provides access to critical external resources necessary for macroeconomic stabilization and structural transformations. As noted by Shkuropadska et al. (2023), Russia's military aggression has generated profound macroeconomic destabilizing effects that Ukraine is unable to overcome independently due to its limited financial and institutional capacity. In this context, the European Union, possessing significantly greater economic and institutional resources, performs not only the function of maintaining its own stability but also acts as the primary

source of financial and political support for Ukraine under conditions of deepening interdependence.

The economic consequences of the military aggression against Ukraine extend far beyond Ukrainian territory. According to Sokhatskyi (2024), the effects of the Russian-Ukrainian war on European economic and political security include increased economic risks for EU member states due to slowed economic growth, disruptions in supply chains, and volatility in energy and food commodity markets.

The studies dedicated to the consequences of the Russia–Ukraine war on economic relations of Ukraine with European countries are characterized by a focus on specific aspects of the transformation processes in Ukraine's economy and its interaction with European countries (Taran, 2023; Shnyrkov & Chugaiev, 2023; Djankov & Blinov, 2022). Within such approaches, several key directions can be identified: the analysis of the macroeconomic consequences of the war for the national economy and labor market, the study of structural changes in foreign trade and logistics chains, and the assessment of Ukraine's political and institutional integration into the European Union.

The absence of a comprehensive approach to analyzing economic interdependence between Ukraine and European countries under conditions of war necessitates expanding economic analysis beyond the study of trade dynamics and trends. The methodological framework should integrate the analysis of investment processes, financial assistance, and migration aspects into a unified analytical model. Such an approach is particularly important, as it allows identifying future vectors of deep structural transformation of Ukraine's economic ties with the European countries.

The purpose of this study is to assess the level of economic interdependence between Ukraine and European countries under wartime conditions, based on a comprehensive analysis of trade, financial, and migration linkages, as well as international assistance flows. Furthermore, the study aims to identify Ukraine's key partner countries and to determine the structural characteristics that shape these economic relationships. The central hypothesis of the study is that economic interdependence between Ukraine and European countries under wartime conditions demonstrates a heterogeneous and asymmetric character across different dimensions of economic relations.

Methodology

There are several methodological approaches to measure interdependence between countries. Conley & Ligon (2002) suggest economic distance approach based on covariance between economic growth in both countries, geographical distance, and transportation costs. Oneal (2003) focuses on trade dependence between countries as a factor decreasing the risk of disputes between them.

Blanchard & Ripsman (1996) consider trade structure to assess availability of substitute goods for essential imported resources and alternative supplies from other sources. Pourshahabi et al. (2024) developed a Potential Indirect Vulnerability Index that covers dependence of a country on product supplies from an intermediary country and dependence of the intermediary country on foreign direct investments from a particular investing economy. Korganashvili (2016) uses a coefficient based on ratios of GDP per capita and GDP per area of both countries (i.e. ratios of development levels) and ratios of various forms of international economic relations (specifically, flows from country A to country B relative to those from country B to country A). If the aggregate coefficient deviates from 1, there is an asymmetrical dependence of one country on another. Thus, the existing studies consider individual or complex measures constructed from a set of parameters such as business cycle synchronization, transportation costs, development gaps, trade, and other forms of international economic relations.

In this study, an index of economic interdependence between Ukraine and each EU member state or related economy (former member state, candidate countries, and EFTA member states) is created (in total 41 partner economies). This approach allows us to cover almost all European economies, at least those with an institutional link with the EU. Georgia and Türkiye were included as they were reclassified from Asian to European economies, which formally allowed them to seek membership in the EU. Meanwhile, most European micro-states and countries with hostile relations with Ukraine (Russia and Belarus) were not included.

The index includes 4 components of bilateral economic relations: trade (T), financial links (F), international aid (A), and migration (M). The first two components are measured in both directions, while the last two are unidirectional (considering negligible flows in the opposite directions). Stock variables (F and M) are assigned a lower weight (i.e., divided by 2) than flow indicators (T and A). Analternative approach was also tested when flow variable equivalents were calculated to provide more precise weights for stock variables relative to T and A. For example, foreign investments and external debt generate income as an item within balance of payments statistics, whereas migrants generate remittances or wages for temporary migrants that are also reflected in the balance of payments. But several problems were encountered leading to a choice of the aforementioned rough weighting approach:

- Large variance of flow to stock values among European countries and across time;
- Migrants play larger role in the economy than it can be measured by wages or remittances (for example, profit generated for business);
- The stock of investments also has a value-at-risk effect and a future income effect due to risks and the time lag between investment and income generation;
- Incomplete statistical data on flow variables of migration effects and investments.

The Economic Interdependence Index (EIDI) is an average of the intensity of bilateral economic relations for Ukraine (EIua) and the corresponding intensity for a partner economy (EIpe). Additionally, the Economic Asymmetry Index (EAI) is calculated as the difference between EIua and EIpe. Economic relations intensity indices are calculated as:

$$EIua = \frac{T}{Gua} + \frac{F}{2Gua} + \frac{A}{Gua} + \frac{M}{2Pua}, \quad (1)$$

$$EIpe = \frac{T}{Gpe} + \frac{F}{2Gpe} + \frac{A}{Gpe} + \frac{M}{2Ppe}, \quad (2)$$

where the components are ratios (in %) of trade (T), financial links (F), and international aid (A) relative to Ukraine's GDP (Gua) and partner's GDP (Gpe), and of migration (M) relative to Ukraine's population (Pua) and partner's population (Ppe), respectively.

The indices are calculated for the period 2024-2025 based on the most recent data available at the moment of analysis (March 2026), taking into account statistics publication lags. The values are either measured in euros or converted from U.S. dollars to euros using the data of International Monetary Fund (2026) on period-average exchange rates (for flow variables) or end-of-period exchange rates (for stock variables).

Trade is the total value of the bilateral exports and imports of the partner economies to and from Ukraine in 2025 for goods and in 2024 for services. The main sources are Eurostat (2026b) and Eurostat (2026d), respectively. The missing data were filled from State Statistics Service of Ukraine (Ukrstat, n.d.). Statistics on services trade is published with a larger lag. But choosing merchandise trade statistics also for 2024 would undermine the premise that utilizing more recent data is preferable for current and near-future decision-making.

Financial links are the total value of the (bilateral) foreign direct investments to and from Ukraine in 2024 (International Monetary Fund, 2025a), portfolio investments to and from Ukraine in 2024 (International Monetary Fund, 2025b), Ukrainian private sector's loans received from non-residents in 2024 (National Bank of Ukraine, n.d.), Ukraine's external public debt in 2025 (Ministry of Finance of Ukraine, n.d.), banks' claims and liabilities vis-à-vis Ukrainian residents in the 3rd quarter of 2025 (Bank for International Settlements, n.d.). Financial link data are less precise because of missing values for some countries, underreporting, or conversely, overlapping values across different sources for the debt.

International aid to Ukraine is the total bilateral (financial, humanitarian, and military) aid allocations to Ukraine between January 24, 2022, and October 31, 2025, from Statista (2025), transformed into average annual value. A partner

economy's contribution is estimated as a total value of its individual aid and its share in the EU institutions' assistance, which is calculated proportionally to its contribution to the EU budget revenue in 2024 taken from European Commission (2025).

Migration is measured as the number of emigrants born in Ukraine and living in a partner economy in the middle of 2024 according to United Nations Department of Economic and Social Affairs (2024).GDP and total population are taken from Eurostat (2026a) and Eurostat (2026c), while the missing values are filled with data from World Bank (n.d.) and United Nations (n.d.).

Another adjustment is to consider the product of Economic Interdependence Index and road (and ferry sometimes) distance (EIDI*D) in thousand kilometers according to Google (n.d.)in case of Albania and according to similar search queries on distance between Kyiv and other capitals of European countries. The share of people in the EU member states supporting accession of Ukraine to the EU (AccEU) is also provided for reference (Statista, 2024).

After calculating the indices, all the partner economies are classified according to EIDI and EAI into 9 bivariate categories. The thresholds between low, middle, and high values are calculated as the mean +/- 0.5 standard deviations after excluding Cyprus as an outlier, i.e. 1.25 and 3.41 for interdependence and -1.3 and 2.88 for asymmetry. Finally, correlation analysis is carried out among the main indicators. Its robustness is assessed by excluding the outlier.

Research Results

The most important trade partners (in Europe) for Ukraine are Germany, Poland, and Türkiye, which collectively account for international trade (bilateral exports + imports) equivalent to 23% of Ukraine's GDP (Table 1). The most important financial partners are Cyprus, the Netherlands, and the United Kingdom, the bilateral assets and liabilities vis-à-vis which are roughly equivalent to 40% of Ukraine's GDP. The most important donors of international aid to Ukraine are Germany and the United Kingdom with annual aid allocations equivalent to 9% of Ukraine's GDP. The most popular places for Ukrainian emigrants are Germany, Poland, and Czechia, which jointly host approximately 8% of Ukrainian population. Therefore, the highest overall bilateral economic relations intensity from Ukrainian perspective is with Germany, Poland, Cyprus, the Netherlands, United Kingdom, and France (see Table 2), which is explained in most cases by the large size of these economies as well as their financial intermediary role (particularly in case of Cyprus).These deep ties underscore the strategic imperative for Ukraine to maintain strong relations with these partners.

Table 1

Bilateral economic relations intensity between Ukraine and other European economies, breakdown by type of relations, %

Partner economy	T/Gua	F/Gua	A/Gua	M/Pua	T/Gpe	F/Gpe	A/Gpe	M/Ppe
Albania	0.04	0.00	0.00	0.00	0.31	0.01	0.00	0.00
Austria	1.23	2.51	0.40	0.26	0.44	0.89	0.14	1.09
Belgium	1.15	0.23	0.91	0.22	0.33	0.07	0.26	0.70
Bosnia and Herzegovina	0.03	0.00	0.00	0.00	0.22	0.00	0.00	0.00
Bulgaria	1.26	0.26	0.10	0.16	2.12	0.44	0.18	0.95
Croatia	0.17	0.06	0.12	0.07	0.36	0.12	0.24	0.66
Cyprus	0.52	27.15	0.02	0.01	2.65	137.60	0.10	0.35
Czechia	2.76	0.28	0.29	1.36	1.51	0.15	0.16	4.73
Denmark	0.72	0.48	1.79	0.11	0.32	0.22	0.81	0.73
Estonia	0.37	0.71	0.17	0.07	1.61	3.14	0.73	1.79
Finland	0.21	0.08	0.70	0.17	0.14	0.05	0.45	1.13
France	1.41	3.51	3.18	0.26	0.09	0.21	0.19	0.14
Georgia	0.20	0.07	0.00	0.03	1.10	0.38	0.00	0.33
Germany	7.28	4.21	6.18	3.74	0.30	0.17	0.25	1.70
Greece	0.95	0.03	0.18	0.06	0.71	0.02	0.13	0.20
Hungary	2.96	0.63	0.16	0.22	2.54	0.54	0.13	0.88
Iceland	0.02	0.00	0.01	0.00	0.10	0.00	0.06	0.17
Ireland	0.78	0.85	0.33	0.33	0.25	0.27	0.10	2.32
Italy	2.50	0.39	1.86	1.05	0.20	0.03	0.15	0.67
Kosovo	0.01	0.00	0.00	0.00	0.25	0.03	0.00	0.00
Latvia	0.40	0.21	0.12	0.08	1.73	0.92	0.54	1.59
Liechtenstein	0.00	0.03	0.00	0.00	0.08	0.84	0.00	0.16
Lithuania	1.20	0.15	0.25	0.12	2.68	0.34	0.57	1.52
Luxembourg	0.09	2.04	0.09	0.00	0.19	4.18	0.18	0.25
Malta	0.19	0.66	0.01	0.00	1.41	5.02	0.11	0.27
Moldova	0.64	0.02	0.00	0.38	6.68	0.24	0.00	4.73
Montenegro	0.06	0.03	0.00	0.06	1.39	0.79	0.00	3.52
Netherlands	2.46	8.47	1.94	0.32	0.39	1.33	0.30	0.67
North Macedonia	0.06	0.00	0.00	0.05	0.70	0.03	0.00	1.05
Norway	0.47	0.01	1.07	0.19	0.18	0.01	0.41	1.28
Poland	12.47	0.74	1.43	2.91	2.59	0.15	0.30	2.94
Portugal	0.25	0.04	0.25	0.16	0.15	0.03	0.15	0.56
Romania	2.04	0.08	0.33	0.48	1.01	0.04	0.16	0.96
Serbia	0.26	0.02	0.00	0.03	0.55	0.04	0.00	0.16
Slovakia	1.70	0.11	0.19	0.32	2.30	0.15	0.26	2.24
Slovenia	0.46	0.05	0.06	0.01	1.19	0.13	0.15	0.15
Spain	1.64	0.22	1.24	0.58	0.18	0.02	0.14	0.45
Sweden	0.48	0.58	1.61	0.12	0.15	0.18	0.51	0.43
Switzerland	0.93	3.15	0.16	0.21	0.18	0.62	0.03	0.90
Türkiye	3.20	0.42	0.01	0.19	0.45	0.06	0.00	0.08
United Kingdom	1.59	6.46	2.79	0.72	0.08	0.33	0.14	0.40

Note: T = bilateral trade; F = financial links; A = international aid; M = migration; Gua = Ukraine's GDP; Gpe = partner's GDP; Pua = Ukraine's population; Ppe = partner's population (in case of migration). T, F, and A are expressed relative to either Gua or Gpe; M is ex-

pressed relative to Pua or Ppe. Source: calculated by the authors based on data from Bank for International Settlements (n.d.), European Commission (2025), Eurostat (2026a; 2026b; 2026c; 2026d), International Monetary Fund (2025a; 2025b), National Bank of Ukraine (n.d.), Ministry of Finance of Ukraine (n.d.), United Nations Department of Economic and Social Affairs (2024), Statista (2025), Ukrstat (n.d.), United Nations (n.d.), World Bank (n.d.).

As for the perspective of the partner economies, the most dependent ones on trade with Ukraine are Moldova (7% of its GDP), as well as Lithuania, Cyprus, Poland, Hungary, Slovakia, and Bulgaria (2.5% to 3% GDP) because of their geographical proximity or size (Table 1). As a financial intermediary, Cyprus turned out to be highly dependent on Ukraine financially (with the bilateral assets and liabilities >100% of its GDP), which makes it a statistical outlier. Three other small economies are also dependent: Malta, Luxembourg, and Estonia (3% to 5% of their GDP). The largest relative donors of international aid to Ukraine are Denmark, Estonia, Lithuania, Latvia, and Sweden (0.5% to 0.8% of their GDP). They are all states in the Baltic region, mostly small and neighbouring Russia, which exposes them to heightened security risks. The largest immigration contribution was made by Ukrainians to Moldova, Czechia, Montenegro, Poland, Ireland, and Slovakia owing to mostly geographical proximity and similar (Slavic) languages or at least relatively small population in some cases in recipient economies. This provides evidence of the heterogeneous character of interdependence across different dimensions of economic relations. Overall, economic relations intensity with Ukraine is highest in Cyprus, Moldova, Estonia, Poland, Lithuania, Malta, and Czechia. Therefore, these countries are among the partners most objectively interested in a good economic situation in Ukraine (Table 2).

Table 2

Aggregate indicators of economic relations between Ukraine and other European economies

Partner economy	EIua	EIpe	EIDI	EIDI*D	EAI	AccEU
Albania	0.04	0.31	0.18	0.35	-0.27	
Austria	3.02	1.57	2.30	3.06	1.44	45
Belgium	2.28	0.97	1.63	3.38	1.32	62
Bosnia and Herzegovina	0.03	0.22	0.13	0.20	-0.18	
Bulgaria	1.58	2.99	2.29	3.28	-1.41	50
Croatia	0.35	0.98	0.67	0.99	-0.63	76
Cyprus	14.12	71.72	42.92	111.43	-57.60	64
Czechia	3.87	4.11	3.99	5.38	-0.25	44
Denmark	2.81	1.60	2.21	4.34	1.21	76

Partner economy	Elua	Elpe	EIDI	EIDI*D	EAI	AccEU
Estonia	0.92	4.81	2.86	4.37	-3.89	80
Finland	1.03	1.17	1.10	2.20	-0.14	85
France	6.48	0.46	3.47	8.24	6.02	56
Georgia	0.25	1.46	0.85	2.77	-1.21	
Germany	17.43	1.48	9.45	12.80	15.95	52
Greece	1.17	0.95	1.06	2.37	0.22	57
Hungary	3.55	3.38	3.46	3.89	0.17	41
Iceland	0.03	0.25	0.14	0.63	-0.22	
Ireland	1.71	1.64	1.67	5.04	0.06	71
Italy	5.07	0.70	2.89	6.81	4.37	68
Kosovo	0.02	0.27	0.14	0.25	-0.25	
Latvia	0.67	3.53	2.10	2.75	-2.86	68
Liechtenstein	0.02	0.58	0.30	0.60	-0.56	
Lithuania	1.59	4.17	2.88	4.36	-2.58	80
Luxembourg	1.20	2.58	1.89	3.93	-1.38	72
Malta	0.53	4.16	2.35	7.93	-3.63	78
Moldova	0.84	9.17	5.00	2.98	-8.33	
Montenegro	0.11	3.55	1.83	3.32	-3.44	
Netherlands	8.80	1.69	5.24	10.36	7.11	64
North Macedonia	0.09	1.24	0.67	1.15	-1.15	
Norway	1.64	1.23	1.43	3.17	0.41	
Poland	15.73	4.43	10.08	7.93	11.29	69
Portugal	0.59	0.59	0.59	2.44	0.00	84
Romania	2.64	1.68	2.16	2.30	0.97	63
Serbia	0.28	0.65	0.47	0.63	-0.37	
Slovakia	2.11	3.75	2.93	3.58	-1.65	58
Slovenia	0.54	1.48	1.01	1.63	-0.94	51
Spain	3.28	0.55	1.92	6.98	2.73	81
Sweden	2.44	0.96	1.70	3.28	1.48	79
Switzerland	2.77	0.97	1.87	4.12	1.80	
Türkiye	3.52	0.52	2.02	4.03	3.00	
United Kingdom	7.97	0.59	4.28	10.37	7.38	

Note: Elua = economic relations intensity for Ukraine; Elpe = economic relations intensity for partner economy; EIDI = economic interdependence index; EAI = economic asymmetry index; D = road (and ferry sometimes) distance; AccEU = share of people in the EU member states supporting accession of Ukraine to the EU. Source: calculated by the authors based on data from Bank for International Settlements (n.d.), European Commission (2025), Eurostat (2026a; 2026b; 2026c; 2026d), International Monetary Fund (2025a; 2025b), National Bank of Ukraine (n.d.), Ministry of Finance of Ukraine (n.d.), United Nations Department of Economic and Social Affairs (2024), Statista (2025), Ukrstat (n.d.), United Nations (n.d.), World Bank (n.d.).

The highest overall economic interdependence is observed for Cyprus, Poland, Germany, the Netherlands, Moldova, United Kingdom, Czechia, France, and Hungary (in descending order). The distance-adjusted economic interdependence index is highest for Cyprus, Germany, the United Kingdom, the Netherlands, France, Poland, Malta, Spain, and Italy.

However, this high interdependence may reflect either true mutual dependence or asymmetric dependence (Table 3). The largest group of partner economies has a balanced but small interdependence with Ukraine (for example, Portugal and Bosnia and Herzegovina). Moderate interdependence shows more diversity in the type of dependency (economic dependence of Ukraine on Italy and Türkiye, balanced relations with e.g., Ireland, and dependence e.g., of Estonia on Ukraine). In high interdependence groups there is substantial dependence of Ukraine on the large European economies, balanced relations with Czechia and Hungary, and dependence of Cyprus and Moldova on Ukraine. Therefore, the main hypothesis of the study regarding asymmetric character of economic interdependence is also largely supported by the evidence.

Table 3

Classification of European partner economies by value and type of interdependence with Ukraine

Asymmetry	Interdependence		
	Min	Middle	Max
Larger dependence on a partner		Italy, Türkiye	France, Germany, Netherlands, Poland, United Kingdom
Balanced	Albania, Bosnia and Herzegovina, Croatia, Finland, Georgia, Greece, Iceland, Kosovo, Liechtenstein, North Macedonia, Portugal, Serbia, Slovenia	Austria, Belgium, Denmark, Ireland, Norway, Romania, Spain, Sweden, Switzerland	Czechia, Hungary
Larger dependence on Ukraine		Luxembourg, Montenegro, Bulgaria, Estonia, Latvia, Lithuania, Malta, Slovakia	Cyprus, Moldova

Source: calculated by the authors based on data from Bank for International Settlements (n.d.), European Commission (2025), Eurostat (2026a; 2026b; 2026c; 2026d), International Monetary Fund (2025a; 2025b), National Bank of Ukraine (n.d.), Ministry of Finance of Ukraine (n.d.), United Nations Department of Economic and Social Affairs (2024), Statista (2025), Ukrstat (n.d.), United Nations (n.d.), World Bank (n.d.).

Correlation analysis results presented in Table 4 show that countries where population is more favourable to accession of Ukraine to the EU also provide more aid to Ukraine relative to their GDP (correlation 0.45 significant at $p < 0.05$ indicates a distinct soft power effect) and are more distant (0.49). Other variables are not significantly correlated with the share of people in the EU member states supporting accession of Ukraine to the EU.

Table 4

Correlation matrix

	Gpe	Ppe	T/Gpe	F/Gpe	A/Gpe	M/Ppe	EIDI	EAI	D	AccEU
Gpe	1.00									
Ppe	0.89	1.00								
T/Gpe	-0.29	-0.22	1.00							
F/Gpe	-0.10	-0.11	0.22	1.00						
A/Gpe	0.02	-0.07	0.01	-0.07	1.00					
M/Ppe	-0.07	-0.09	0.62	-0.10	0.11	1.00				
EIDI	0.10	0.07	0.32	0.95	0.00	0.07	1.00			
EAI	0.42	0.40	-0.36	-0.91	0.09	0.02	-0.78	1.00		
D	0.07	0.03	-0.45	0.12	-0.18	-0.43	-0.02	-0.10	1.00	
AccEU	-0.18	-0.16	-0.26	-0.02	0.45	-0.22	-0.10	-0.05	0.49	1.00

Note: Gpe = partner economy's GDP; Ppe = partner economy's population; T/Gpe = ratio of bilateral trade to parner economy's GDP; F/Gpe = ratio of financial links to partner economy's GDP; A/Gpe = ratio of interational aid relative to partner economy's GDP; M/Gpe = ratio of migration to partner economy's population; EIDI = economic interdependence index; EAI = economic asymmetry index; D = road (and ferry sometimes) distance; AccEU = share of people in the EU member states supporting accession of Ukraine to the EU.

Source: calculated by the authors based on data from Bank for International Settlements (n.d.), European Commission (2025), Eurostat (2026a; 2026b; 2026c; 2026d), International Monetary Fund (2025a; 2025b), National Bank of Ukraine (n.d.), Ministry of Finance of Ukraine (n.d.), United Nations Department of Economic and Social Affairs (2024), Statista (2025), Ukrstat (n.d.), United Nations (n.d.), World Bank (n.d.).

Overall economic interdependence is negatively related to distance, which is in line with the gravity approach. The correlation -0.38 is significant, but only if Cyprus is excluded. This country traditionally played the role of a financial intermediary and offshore center, which explains its hyperinterdependence with Ukraine, particularly in the financial links component (foreign direct investment and private loans, mostly in the form of claims on Ukraine), and affects the Pearson correlation coefficients.

Economic relations asymmetry (larger dependence of Ukraine) is positively correlated with the GDP (0.42 / without Cyprus 0.82) and population (0.40 / 0.75) of partners. Trade and migration intensity (calculated relative to partner's GDP) are positively related to each other (0.62) and negatively to distance (-0.45 and -0.43, respectively). Financial links and international aid are not significantly related to distance or to the intensity of trade and financial links. But distance corrected (×D) trade and financial links are correlated (0.59 / 0.38).

Discussion

The scientific novelty of the study lies in the creation of a comprehensive interdependence index and the classification of European countries by the level and asymmetry of economic relations with Ukraine under modern security challenges.

Similar to the index by Korganashvili (2016), the proposed index also covers four forms of bilateral international economic relations, but normalizes them relative to each country's GDP. In comparison to Oneal (2003) and Blanchard & Ripsman (1996), it goes beyond considering international trade alone. Nevertheless, Blanchard & Ripsman (1996) pay more attention to the product structure of international trade dependence. The covariance approach by Conley & Ligon (2002) measures aggregate interdependence between business cycles, which is closer to a "black box" approach (except for addressing transportation costs), whereas in this study, trade, financial, and migration channels of interdependence are presented in explicit form.

Following the theoretical views of Keohane & Nye (1977), this paper empirically identifies the set of European countries with the highest levels of interdependence with Ukraine, which supports further economic cooperation and minimizes reasons for political conflicts. Meanwhile, the proposed Economic Asymmetry Index evaluates the set of countries, on which Ukraine depends asymmetrically, generating vulnerabilities under worse geopolitical scenarios, in line with the theoretical perspective of Hirschman (1980). Nevertheless, under the challenges of the russia–Ukraine war, asymmetrical relations should not be treated only in negative way. As in Shkuropadska et al. (2023), asymmetry interpretation here is also about getting important strategic resources and support from larger European powers. There are also smaller countries in Europe that are vulnerable to risks in Ukraine, in particular due to the military conflict, which is consistent with the frameworks of Korovkin & Makarin (2022) and Laber et al. (2023).

The current paper utilizes contemporary comprehensive statistical data for empirical estimation of interdependence and its nature and provides methodological innovations (correction for the size of both partner countries and distance, a two-dimensional classification framework for countries, and correlation analysis of

economic interdependence dimensions, distance, and readiness to accept Ukraine as a new EU member state).

However, this study also has several limitations, including different time periods for particular international economic indicators within 2024-2025 (blurring temporal precision of the ranking from a one-year to a two-year period), imprecise estimation of financial relations and actual population of Ukraine, difficulty in weighing stock and flow variables based on data availability and theoretical constraints discussed in the Methodology section. Sectoral breakdown of interdependence was outside the scope of this study too, unlike Ukrainian individual industries' importance at the European markets in Lewicka et al. (2025). Instead, our approach is based on aggregate international economic indicators. Correlation analysis results are partially sensitive to outlier (Cyprus).

Future research should focus on the dynamic evolution of economic interdependence by applying the EIDI across pre-war, wartime, and post-war periods to capture structural transformations in Ukraine–EU economic relations. The suggested methodological framework and formulae can also be used for assessment of interdependence between other nations both in Europe and worldwide.

Practical Implementation

The practical significance of the results consists in deepening the understanding of the structure of Ukraine's economic interaction with the rest of Europe and identifying strategic priorities in the process of European integration. This framework allows researchers and policymakers to better determine strategic partnerships, bargaining power, and stimuli for bilateral cooperation.

Conclusions

This paper examines the level and structure of economic interdependence between Ukraine and 41 European partner economies institutionally affiliated with the European Union over the period 2024–2025. The study introduces a novel and comprehensive methodological approach by developing an integral Economic Interdependence Index (EIDI), which incorporates four key dimensions of bilateral relations: trade, financial linkages, international aid, and migration. This framework enables a transition from fragmented assessments toward a holistic evaluation of interstate economic interactions.

There is an especially large economic interdependence between Ukraine and Cyprus, Poland, Germany, but the UK is among the leaders after correction for distance. Ukraine has a relatively balanced economic interdependence with 24 European economies (especially Czechia and Hungary), higher dependence on 7 large economies (especially Germany and Poland), while 10 smaller economies

depend moderately or highly on Ukraine (especially Cyprus). Germany is the main trade, migration partner and aid donor for Ukraine, while Cyprus is the main financial partner. Relative to partner's GDP or population, Ukraine has the most intensive trade and migration relations with Moldova, financial links with Cyprus, and aid allocations from Denmark. The intensity of trade, financial, and migration relations is positively inter-correlated, while the intensity of aid flows is not. But only the latter (among economic links), together with distance, is positively related to readiness of the population to accept Ukraine's accession to the EU. Distance is a barrier to trade and migration links, but not to financial relations and international assistance.

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Received: March 23, 2026.
Reviewed: May 29, 2026.
Accepted: June 8, 2026.